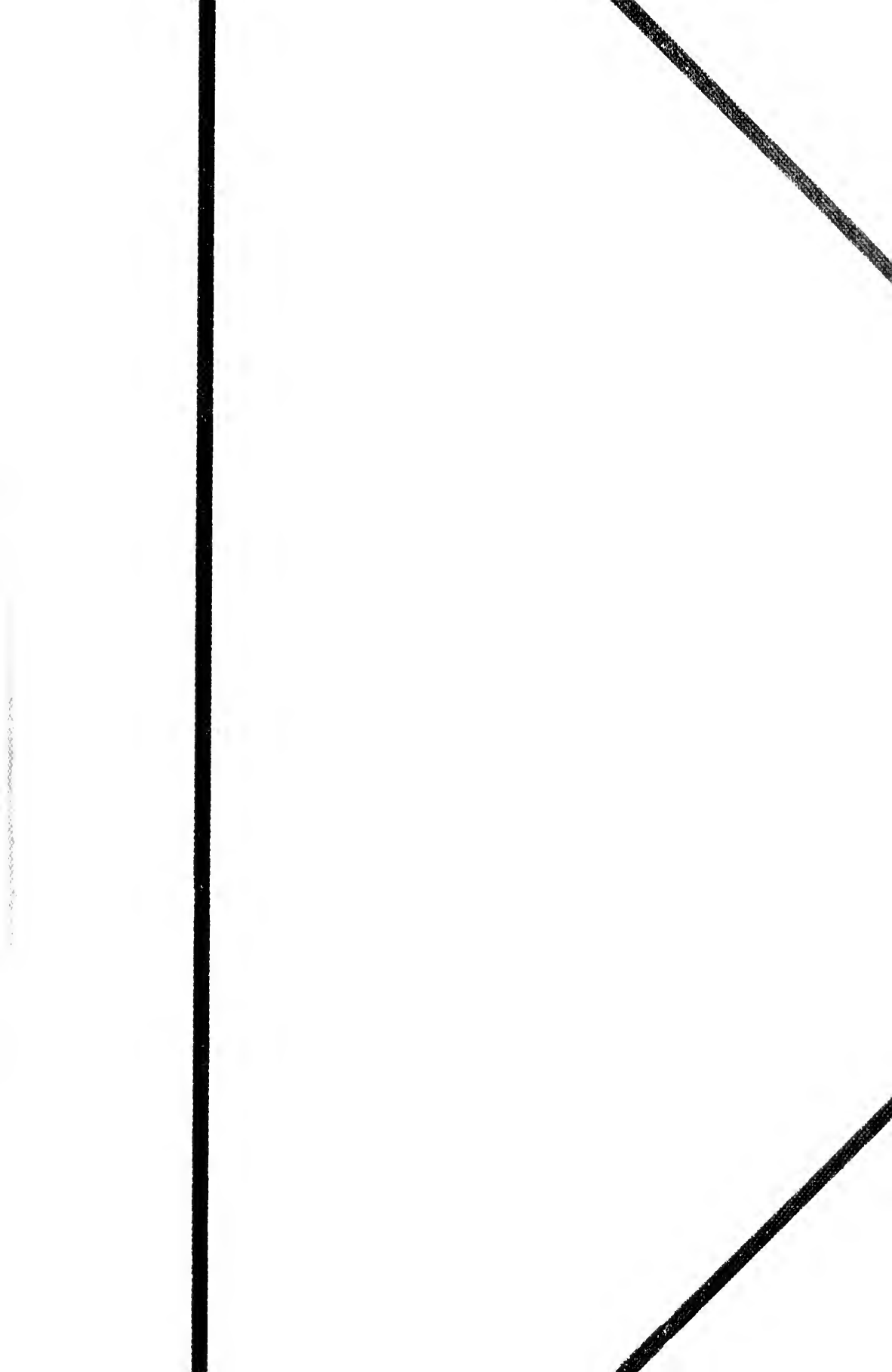

SESSIONAL PAPERS

VOLUME 6

THIRD SESSION OF THE NINTH PARLIAMENT

OF THE

DOMINION OF CANADA

SESSION 1903

VOLUME XXXVII

☞See also Numerical List, page 5

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OF THE

SESSIONAL PAPERS

OF THE

PARLIAMENT OF CANADA

THIRD SESSION, NINTH PARLIAMENT, 1903.

See also Alphabetical Index, page 1.

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14. Report on Adulteration of Food, for the fiscal year ended 30th June, 1902. Presented 13th March, 1903, by Hon. M. E. Bernier. . . . . *Printed for both distribution and sessional papers.*

15. Report of the Minister of Agriculture, for the year ended 31st October, 1902. Presented 13th March, 1903, by Hon. W. S. Fielding. . . . . *Printed for both distribution and sessional papers.*

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17. Criminal Statistics for the year ended 30th September, 1902. Presented 12th October, 1903, by Hon. S. A Fisher. . . . . *Printed for both distribution and sessional papers.*

18. Report on Canadian Archives, 1902. Presented 25th June, 1903, by Hon. S. A. Fisher.
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20. Annual Report of the Department of Railways and Canals, for the fiscal year ended 30th June, 1902, Presented 16th June, 1903, by Hon. A. G. Blair. *Printed for both distribution and sessional papers.*

21. Report of the Department of Marine and Fisheries (Marine), for the fiscal year ended 30th June, 1902. Presented 19th March, 1903, by Hon. J. R. Préfontaine.
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REPORT, RETURNS AND STATISTICS

OF THE

INLAND REVENUES

OF THE

DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED JUNE 30

1902

PART I. EXCISE, &c.

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1902

[No. 12—1903.]

To His Excellency the Right Honourable The Earl of Minto, Governor-General of Canada, &c., &c.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to transmit to Your Excellency the RETURNS AND STATISTICS of Inland Revenues of the Dominion of Canada, for the Fiscal Year ended June 30, 1902, as prepared and laid before me by the Deputy Minister of Inland Revenue.

All of which respectfully submitted.

M. E. BERNIER,
Minister of Inland Revenue.

CONTENTS

FINANCIAL

STATISTICS (APPENDIX A.)

EXCISE.

HYDRAULIC AND OTHER RENTS.

SESSIONAL PAPER No. 12

EXPENDITURES—(APPENDIX B.)

REPORT

OF THE

DEPUTY MINISTER OF INLAND REVENUE

To the Honourable M. E. Bernier,
Minister of Inland Revenue.

Sir,—Herewith I have the honour to submit statements of the Inland Revenues collected by this department during the fiscal year ended June 30, 1902, with the usual information as to the cost of collection and statistics respecting the sources whence these revenues were derived.

The following summary comparison shows the accrued revenue for the years ended June 30, 1898, 1899, 1900, 1901 and 1902, respectively:—

	1898.	1899.	1900.	1901.	1902.
	$	$	$	$	$
*Excise	7,916,483	9,722,967	9,931,950	10,423,865	11,257,485
Public Works	8,915	5,090	5,366	4,805	4,749
Culling Timber	17,107	10,624	8,155	8,271	
Weights and Measures, Gas and Law Stamps	64,570	73,499	78,510	81,987	88,198
Electric Light	9,425	11,520	14,452	15,568	21,062
Other Revenues	720	642	643	587	592
Methylated Spirits				73,675	66,785
Totals	8,017,220	9,824,342	10,039,076	10,608,708	11,438,871

*1898, 1899 and 1900 include Methylated Spirits.

The increase over last fiscal year being $830,163.

Details of Excise Revenue accrued during the undermentioned years.

	1	2	3	4	5
	1898.	1899.	1900.	1901.	1902.
	$	$	$	$	$
Spirits	3,593,980	4,609,619	4,821,218	5,180,775	5,620,613
Malt liquor	6,851	6,807	7,174	6,569	6,970
Malt	589,896	849,468	910,537	977,330	1,077,809
Tobacco	2,894,285	3,320,168	3,281,640	3,337,848	3,563,578
Cigars	688,798	781,319	825,643	837,434	897,360
*Petroleum and Acetic Acid	44,648	46,060	5,505	8,910	8,862
Manufactures in bond	32,598	49,572	30,192	44,242	45,306
Seizures	7,373	10,713	6,071	1,292	1,567
Other receipts	21,163	24,192	34,132	29,465	35,419
†Methylated Spirits	36,891	25,049	9,838	73,675	66,785
Totals	7,916,483	9,722,967	9,931,950	10,497,540	11,324,269

* Petroleum for 1898, 1899 and 1900. Acetic Acid for 1901 and 1902.
† Years 1898, 1899 and 1900 show only the net revenue over expenditure, and 1901 and 1902 represents the gross revenue.

The quantity of spirits produced during the year, was 3,234,147 proof gallons, as compared with 2,652,708 proof gallons produced in the previous fiscal year. The raw material used in its production being as follows :—

	Lbs.
Malt	3,432,066
Indian corn	41,397,871
Rye	9,449,057
Wheat	29,470
Oats	413,965

The transaction of the several distilleries will be found stated in detail in Appendix A (Statement No. 3), pages 64 and 65.

		Proof Galls.
There were on July 1, 1901, in process of manufacture		113,310
Manufactured during the year		3,234,147
Returned to distilleries for re-distillation—Duty paid.	531	
" " " In bond..	469,417	
		469,948
Received into distilleries from other sources—Duty paid		4,742
Total		3,822,147

This was disposed of as follows :

	Proof Gallons.
Placed in warehouse under crown lock	3,668,286
Fusel-oil written off	9,546
Deficiency arising from rectification	2,488
Remaining in process of manufacture, June 30, 1902, by actual stock taking	141,783
Written off	44
Total	3,822,147

The following statement shows the warehousing transactions in spirits during the year ended June 30, 1902, and the four preceding years :—

	1	2	3	4	5	6	7	8	9
Fiscal Years.	In Warehouse at beginning of year.	Warehoused during the year. Ex-distillery.	Otherwise Warehoused.	Taken for consumption.	Exported.	Used in Bonded Factories.	Otherwise accounted for.	For Re-Distillation.	In Warehouse at end of year.
	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.
1897-8	11,886,114	1,766,030	94,798	1,874,479	87,471	321,515	135,318	68,123	11,260,036
1898-9	11,260,036	3,914,094	145,805	2,404,599	120,161	360,876	138,300	475,007	11,820,992
1899-1900	11,820,992	3,113,001	135,196	2,523,576	138,637	345,312	131,222	470,315	11,460,127
1900-1901	11,460,127	3,067,919	155,295	2,707,919	148,154	352,705	212,516	408,477	10,853,570
Totals	46,427,269	11,861,044	531,094	9,510,573	494,423	1,380,408	617,356	1,421,922	45,394,725
Annual average of four years ended June 30, 1901.	11,606,817	2,965,261	132,774	2,377,643	123,606	345,102	154,339	355,481	11,348,681
1901-1902	10,853,570	3,668,287	187,827	2,933,183	151,799	360,235	231,641	469,417	10,563,408

The quantities exported being as follows :—

	Proof Gallons.
1897–8	87,471
1898–9	120,161
1899–1900	138,637
1900–1901	148,154
1901–1902	151,799

The following statement exhibits the entire quantities upon which duties were collected during the several years recited therein. The total column will be found to accord with the figures shown in Financial Statement No. 13, page 23 :—

Fiscal Years.	Canadian Spirits.		Imported Spirits used in Bonded Factories.	Total quantities upon which duty was collected.	Memorandum of Revenue accrued including License Fees.
	Paid duty Ex-distillery.	Paid duty Ex-warehouse.	Paid difference between Customs and Excise Duty.		
	Pf. Gallons.	Pf. Gallons.	Pf. Gallons.	Pf. Gallons.	$
1897–8	3,866	1,874,479	94,681	1,973,026	3,593,980
1898–9	5,571	2,404,599	137,825	2,547,995	4,609,619
1899–1900	493	2,523,576	134,969	2,659,038	4,821,218
1900–1901	914	2,707,919	155,117	2,863,950	5,180,775
Totals	10,844	9,510,573	522,592	10,044,009	18,205,592
Annual average of four years ended June 30, 1901	2,711	2,377,643	130,648	2,511,002	4,551,398
1901–1902	2,488	2,933,183	187,759	3,123,430	5,620,613

MALT :

The following statement shows the transactions in malt during the year 1901-1902, and the four preceding years :—

Fiscal Years.	1	2	3	4	5	6	7	8
	In Warehouse at beginning of year.	Manufactured during the year.	Increase by absorption.	Taken for consumption.	Exported.	Otherwise accounted for.	In Warehouse at end of year.	Memorandum of Revenue accrued, including License Fees.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1897-98..	7,666,642	45,478,529) *2,497,134)	678,738	38,954,715	228,000	561,782	16,576,546	589,896
1898-99..	16,576,546	61,020,839) *2,387,782)	552,363	56,212,822	301,774	2,240,747	21,782,187	849,468
1899-1900.....	21,782,187	61,497,029) *2,786,630)	730,799	60,284,064	327,950	1,663,296	24,521,335	910,538
1900-1901.....	24,521,335	64,095,899) *3,565,270)	807,838	64,723,616	310,000	1,882,070	26,074,656	977,330
Totals....	70,546,710	232,092,296) *11,236,816)	2,769,738	220,175,217	1,167,724	6,347,895	88,954,724	3,327,232
Annual average of four years ended June 30, 1901	17,636,678	58,023,074) *2,809,204)	692,434	55,043,804	291,931	1,586,974	22,238,681	831,808
1901-1902.....	26,074,656	72,870,605) *3,600,214)	835,511	71,440,519	369,230	1,314,308	30,256,929	1,077,809

* Imported.

Tobacco:

The following Statement shows the transactions during the Fiscal Years ended June 30, 1898, 1899, 1900, 1901 and 1902 respectively, in Tobacco, Snuff and Cigarettes.

Fiscal Years.	1	2	3	4	5	6	7	8	9	10
	In Warehouse, July 1.	Manufactured during the year.	Taken for consumption.	Exported.	Otherwise accounted for.	In Warehouse, June 30.	Raw Leaf taken for consumption.	Canadian Twist taken for consumption.	Total Tobacco taken for consumption.	Duty collected thereon, including License fees.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1897 98	283,020	10,519,590	9,001,157	174,595	33,526	1,593,242	8,506,199	55,379	17,562,735	2,894,285
1898 99	1,593,242	10,358,434	10,166,084	136,431	25,967	1,623,194	10,239,863	84,115	20,490,062	3,320,168
1899 1900	1,623,194	11,146,218	11,106,124	170,185	60,105	1,432,998	9,352,535	58,914	20,517,573	3,281,639
1900 1901	1,432,998	11,943 805	11,636,900	392,614	49,285	1,298,004	9,848,804	57,597	21,543,301	3,337,848
Totals	4,932,454	43,967,957	41,910,265	873,825	168,883	5,947,438	37,947,401	256,005	80,113,671	12,833,940
Average for four years ended June 30, 1901	1,233,114	10,991,989	10,477,566	218,456	42,221	1,486,860	9,486,850	64,001	20,028,417	3,208,485
1901 1902	1,298,004	12,054,467	11,900,054	222,355	53,193	1,176,869	10,704,962	72,286	22,677,302	3,563,578

CIGARS:

The following statement shows the transactions in Cigars during the fiscal year ended June 30, 1902, and the four preceding years:—

Fiscal Years.	1	2	3	4	5	6	7	8
	In Warehouse July 1.	Manufactured during the Year.	Assessment to bring production up to Standard.	Taken for consumption.	Exported.	Otherwise accounted for.	In Warehouse June 30.	Memorandum of Revenue accrued including License Fees.
	No.	No.	No.	No.	No.	No.	No.	$
1897–98	8,503,135	116,399,610	38,358	113,132,223	131,300	37,225	11,640,355	688,797
1898–99	11,640,355	133,134,122	9,106	128,919,098	88,250		15,776,235	781,319
1899–1900	15,776,235	139,389,477	8,430	138,041,707	189,975	17,300	16,925,160	825,643
1900–1901	16,925,160	141,430,454	7,660	141,096,889	158,450	59,500	17,048,435	837,434
Totals	52,844,885	530,353,663	63,554	521,189,917	567,975	114,025	61,390,185	3,133,193
Annual average of four years ended June 30, 1901	13,211,221	132,588,416	15,888	130,297,479	141,994	28,506	15,347,546	783,298
1901–1902	17,048,435	156,686,795	4,096	151,780,5 16	128,845	7,450	21,822,815	897,360

The revenue derived from goods manufactured in bond during the past five years has been as follows:—

1897–98	$ 32,623
1898–99	33,494
1899–1900	30,192
1900–1901	44,242
1901–1902	45,306

Acetic Acid:

The revenue derived from acetic acid during the last four years has been as follows:—

1898–99	$ 16,078
1899–1900	9,647
1900–1901	8,910
1901–1902	8,862

Inspection of Petroleum:

The quantity of Canadian Petroleum and Naphtha inspected during the year was as follows:—

	Gallons.
Petroleum	9,412,941
Naphtha	1,081,933
Total	10,494,874

Public Works:

The revenue accrued from this source was as follows:—

	1900–1901.	1901–1902.
Hydraulic and other rents	$3,570	$3,679
Minor public works	1,235	1,070

Weights and Measures, Gas and Electric Light:

The usual special reports in relation to these services have been prepared, containing full statistical information.

The aggregate revenue accrued from these services was $105,180.98.

The cost of the three services being $109,746.80.

Prevention of Adulteration of Food and Agricultural Fertilizers:

The usual supplementary report in relation to this service will be submitted containing details of the work done and the report of the analysts.

METHYLATED SPIRITS :

The quantity of methylated spirits manufactured during the year, was 88,119 proof gallons ; 85,350 gallons were sold. A statement of details appears on pages 58 and 105.

Appendix B contains, as usual, the details concerning illicit stills seized during the year.

Appendix C shows the amount of Excise Revenue collected at each out-office and under various headings, separately.

I have the honour to be, sir,

Your obedient servant,

W. J. GERALD,
Deputy Minister

OTTAWA, August 16, 1902.

APPENDIX A

TABLE showing the Annual Consumption per head of the undermentioned articles paying Excise and Customs Duties, and the Revenue per head derived annually.

YEARS.	DOMINION OF CANADA.									
	Quantity.					Duty.				
	Spirits.	Beer.	Wine.	Tobacco.	Petroleum.	Spirits.	Beer.	Wine.	Tobacco.	Petroleum.
	Galls.	Galls.	Galls.	Lbs.	Galls.	$	$	$	$	$
1865	1·124	2·290	·115	1·755	·575	·761	·092	·037	·193	·041
1870	1·434	2·163	·195	2·190	1·103	·962	·085	·049	·259	·061
1871	1·578	2·490	·259	2·052	1·591	1·059	·095	·056	·336	·077
1872	1·723	2·774	·257	2·481	1·302	1·160	·108	·070	·422	·076
1873	1·682	3·188	·238	1·999	1·387	1·135	·120	·066	·350	·084
1874	1·994	3·012	·288	2·566	1·618	1·363	·119	·086	·442	·103
1875	1·394	3·091	·149	1·995	1·589	1·127	·114	·069	·428	·098
1876	1·204	2·454	·177	2·316	1·360	1·182	·098	·075	·513	·105
1877	·975	2·322	·696	2·051	1·103	·949	·109	·057	·446	·084
1878	·969	2·169	·696	1·976	.... ..	·927	·147	·052	·439	.....
1879	1·137	2·209	·104	1·954	.....	1·005	·125	·057	·449	.....
1880	·715	2·248	·077	1·936	.....	·772	·081	·055	·428	.....
1881	·922	2·203	·099	2·035	.....	·990	·081	·073	·443	.....
1882	1·009	2·747	·120	2·150	.....	1·084	·098	·092	·485	.....
1883	1·090	2·882	·135	2·280	.....	1·186	·103	·097	·473	.....
1884	·998	2·924	·117	2·476	.....	1·074	·104	·082	·365	.....
1885	1·126	2·639	·109	2·623	.....	1·198	·111	·074	·393	.....
1886	·711	2·839	·110	2·652	.....	1·007	·091	·074	·502	.....
1887	·746	3·084	·095	2·062	.....	1·045	·100	·066	·514	.....
1888	·645	3·247	·094	2·093	.....	·944	·119	·066	·509	.....
1889	·776	3·263	·697	1·153	.....	1·107	·114	·068	·529	.....
1890	·883	3·360	·104	2·143	.....	1·257	·121	·072	·539	.....
1891	·745	3·790	·111	2·292	.....	1·094	·137	·080	·590	.....
1892	·701	3·516	·104	2·291	.....	1·156	·211	·075	·680	.....
1893	·740	3·485	·094	2·314	.....	1·235	·218	·070	·691	.....
1894	·712	3·722	·089	2·264	.....	1·235	·205	·060	·683	.....
1895	·666	3·471	·090	2·163	.....	1·124	·161	·056	·645	.....
1896	·623	3·528	·070	2·120	.. ..	1·159	·164	·047	·639	.....
1897	·725	3·469	·684	2·243	.....	1·341	·213	·041	·671	.....
1898	·536	3·808	·082	2·358	.....	1·306	·126	·041	·615	.....
1899	·661	3·995	·086	2·174	.....	1·367	·174	·045	·841	.....
1900	·701	4·364	·085	2·300	.....	1·455	·185	·044	·853	.....
1901	·765	4·737	·100	2·404	.....	1·503	·198	·048	·875	.....
1902	·796	5·102	·090	2·404	.....	1·653	·214	·048	·915	.....
Average	·977	3·187	·124	2·263	.....	1·148	·133	·063	·550	.....

APPENDIX B.

STATEMENT of Seizures of Illicit Manufactures for Fiscal Year ended June 30, 1902.

Divisions.	Number.	Names.	Schedule Value.	Residences.	Dates.	Remarks.
			$ cts.			
Montreal	1,063	H. Vincelette	2 00	Lac Longueuil	Sept. 23, 1901	No action taken.
"	1,064	Unknown	2 00	Montreal	Dec. 18, 1901	Unable to locate owner.
"	1,065	D. David	6 20	"	" 30, 1901	Fine imposed and collected $100.
"	1,067	Z. Gauthier	2 10	St. Jérôme	April 14, 1902	Awaiting further information.
Victoriaville	76	J. O. Legendre	34 50	Victoriaville	" 1, 1902	Seizure unwarranted and property released.
Halifax	183	Frank Penall	48 00	Lunenburg	July 4, 1901	Unable to arrest owner.
"	185	N. Leblanc	100 00	Digby	May 27, 1902	To be prosecuted
Pictou	96	McCuish & McVarish	36 00	River Inhabitants	July 22, 1901	Tried and acquitted.
"	97	D. McDonald	2 00	Antigonish	Sept. 25, 1901	Fined $100 and costs and one month in jail.
"	99	A. McPherson	10 00	"	Dec. 17, 1901	No still found; no evidence to warrant prosecution.
"	100	A. G. McDonald	20 00	"	Jan. 21, 1902	Fined $100 and one month in jail.
"	101	H. McGillivray	20 00	"	" 22, 1902	Fine imposed and collected $100.
"	102	D. McDonnell	14 00	Inverness	" 24, 1902	Unable to secure arrest of offender.
Vancouver	24	B. Shimano		Barnet	Mar. 15, 1902	Fine imposed and collected $100; two months in jail.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

APPENDIX C.

STATEMENT showing the Amount of Excise and other Revenues collected at each of the undermentioned Out-Offices, during the Fiscal Year ended June 30, 1901.

Divisions.	Out-Offices.	Licenses.	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Manufactures in Bond.	Other Receipts.	Electric Light Inspection Fees.	Totals.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Belleville	Deseronto		774 51			1,284 25					2,058 76
	Picton		2,583 16								2,583 16
	Trenton		6,118 45								6,118 45
Brantford	Embro									10 00	10 00
	Ingersoll	150 00				524 50	1,758 30		137 55	25 00	2,595 35
	Norwich	50 00						1,670 91	600 00	10 00	2,330 91
	Paris									10 00	10 00
	Port Dover	50 00						803 76	300 00	10 00	1,163 76
	Port Rowan									10 00	10 00
	Simcoe	75 00				106 50	409 35			10 00	600 85
	Tilsonburg	100 00			2,209 62					10 00	2,319 62
	Woodstock	145 00	3,094 38		2,467 79	537 00	1,596 60		1,675 67	25 00	9,541 44
Guelph	Berlin	570 00	35,317 92		9,337 50	10,130 00	18,636 63		1,437 83	25 00	75,454 88
	Galt	450 00				643 18	2,236 05		146 91	25 00	3,501 14
	New Hamburg	50 00			4,095 00					10 00	4,155 00
	Preston	250 00			3,891 03	749 50	2,433 00		324 38	20 00	7,667 91
	Salem	50 00									50 00
	Waterloo	575 00	450,035 22		25,709 16	1,684 40	6,664 65		5,964 18	25 00	490,657 61
Hamilton	Dundas	200 00			43,415 97						43,615 97
	Greensville	150 00			7,420 50						7,570 50
Kingston	Napanee	40 00	8,876 00			1,960 50				70 00	10,946 50
London	Alvinston									10 00	10 00
	Aylmer									10 00	10 00
	Dutton									10 00	10 00
	Forest									10 00	10 00
	Glencoe									10 00	10 00
	Lucan									10 00	10 00
	Parkhill									10 00	10 00
	Petrolea	21 00	6,494 69						36 00	25 00	6,576 69
	Sarnia	148 50	24,252 49			12,006 90	229 80		9 00	25 00	36,671 69
	St. Thomas	220 00	5,202 77		1,684 83	3,077 40	10,745 00			25 00	20,955 00
	Strathroy	120 00	3,133 63		4,680 00					10 00	7,943 63
	Watford									10 00	10 00
	West Lorne									10 00	10 00

Owen Sound	Collingwood	126 00	2,044 99			20,719 50			128 60	23,019 09
	Kincardine	10 00							356 09	366 09
	Meaford	20 00	1,567 15			2,641 50				4,228 65
	Walkerton	225 00			4,485 81		801 60		376 98	5,889 39
Perth	Arnprior	40 00	8,847 85							25 00 8,912 85
	Eganville	20 00	1,783 41			2,680 75				10 00 4,494 16
	North Bay	20 00	5,769 56							5,789 56
	Pembroke	135 00	11,831 73			11,907 57	976 11		100 00	25 00 24,975 41
	Renfrew	20 00	3,917 36							3,937 36
	Sturgeon Falls	20 00	6,686 96				75 00			10 00 6,791 96
	Sudbury	20 00	12,322 67							25 00 12,367 67
Peterborough	Cobourg	20 00	6,868 23							25 00 6,913 23
	Lindsay	50 00			1,263 60					25 00 1,338 60
	Port Hope	270 00	2,560 67		6,194 69					25 00 9,050 36
Port Arthur	Wabigoon	20 00	2,449 29							2,469 29
Prescott	Brockville	345 00	5,258 79		5,632 86	1,192 14	4,028 10			25 00 16,481 89
	Gananoque	40 00	4,066 50							25 00 4,131 50
St. Catharines	Beamsville									10 00 10 00
	Cayuga									10 00 10 00
	Dunnville	95 00	1,363 22			88 60	292 20			25 00 1,864 02
	Fort Erie								50 00	50 00
	Grimsby									10 00 10 00
	Humberstone	75 00				55 40	222 90			353 30
	Merritton									10 00 10 00
	Niagara									10 00 10 00
	Niagara Falls	87 50				197 20	683 25			25 00 992 95
	Port Colborne	100 00			5,016 00					5,116 00
	Port Dalhousie									10 00 10 00
	Thorold									10 00 10 00
	Welland	95 00	1,153 83			57 20	333 00			10 00 1,649 03
Stratford	Goderich	170 00	1,617 05		2,220 00					4,007 05
	Listowel	125 00			3,556 44	880 70	3,390 00			7,952 14
	Palmerston	200 00			46,344 93					46,544 93
	St. Mary's	20 00	2,990 04			2,033 00				5,043 04
Toronto	Barrie	375 00			5,348 94	154 70	618 00			6,496 64
	Hornby	100 00			3,640 50					3,740 50
	Orillia	50 00			786 11					836 11
	Sault St. Marie	110 00	7,461 72		903 00	7,525 20	1,163 10			17,496 02
Windsor	Chatham	165 00	26,716 40		168 00	1,241 80	4,417 62			25 00 32,433 82
	Kingsville	50 00				10,153 10				10,203 10
	Leamington	200 00				10,790 95	3,148 35			14,139 30
	Ridgetown	75 00				201 91	731 70			10 00 1,021 64
Joliette	Berthierville	250 00	4,572 59						1,715 37	9,537 96
	L'Epiphanie	50 00					5,060 10			5,110 10
Montreal	St. Jérome	115 00	32,171 10			3,340 80	6,260 40			41,887 20
	St. Thérese	50 00			150 00					500 00
	Valleyfield	30 00	24,678 90				114 00			24,822 90
Quebec	Chicoutimi									25 00 25 00
	Gaspé	40 00	1,343 59			502 00				1,885 59
	Paspebiac	20 00								20 00

STATEMENT showing the Amount of Excise and other Revenues collected at each of the undermentioned Out-Offices, during the Fiscal Year ended June 30, 1902—*Concluded.*

Divisions.	Out Offices.	Licenses.	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Manufactures in Bond.	Other Receipts.	Electric Light Inspection Fees.	Totals.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Riviere du Loup	77 50	12,975 03							25 00	13,077 53
Sherbrooke	Granby	265 00				160,827 58	21,049 79				182,142 37
St. Hyacinthe	Sorel	80 00	32,045 41								32,125 41
	St. Johns, Que.	135 00	38,324 46					1,406 87	698 03		43,564 36
	Victoriaville	90 00	23,809 78								23,899 78
St. John	Campobello	20 00	321 04								341 04
	Chatham	20 00				5,304 25					5,324 25
	Bathurst	10 00	416 39			1,611 00					1,437 39
	Fredericton	20 00				17,253 00			1 00		17,274 00
	Moncton	40 00				13,640 37			1 00		13,681 37
	Newcastle	20 00				5,001 50					5,021 50
	Sackville	20 00				2,708 50			1 00		2,729 50
	Sussex	20 00				2,110 50					2,130 50
	St. Stephens	10 00				3,559 00			4 00		3,573 00
	Woodstock	40 00	545 83			718 00					1,303 83
Halifax	Amherst	40 00	2,451 89			1,437 50					3,929 39
	Truro	20 00				8,703 50					8,723 50
	Yarmouth	135 00				7,562 65	377 70			20 00	8,095 35
Pictou	Antigonish					1,961 00				10 00	1,974 00
	New Glasgow	25 00				5,806 00					5,831 00
	North Sydney	25 00				3,377 50					3,402 50
	Sydney	25 00				540 30					565 30
Winnipeg	Brandon	240 00	26,486 12		1,140 60	3,046 80	3,759 30			25 00	34,697 22
	Fort Francis	20 00	1,003 71								1,023 71
	Gretna	20 00	3,082 08			682 50					3,784 58
	Morden	20 00	4,111 08							10 00	4,141 08
	Neepawa									25 00	25 00
	Portage la Prairie	10 00	20,088 28			1,938 88				25 00	22,092 16
	Prince Albert	120 00	672 34		603 87	225 25				10 00	1,631 46
	Rat Portage	130 00	19,957 07		561 93					25 00	20,674 00
	Regina									25 00	25 00
	Selkirk	20 00	2,710 83							10 00	2,740 83
	Virden	20 00	14,344 16								14,364 16
Calgary	Edmonton	295 00	11,728 98		1,386 00	6,001 65	729 90				20,141 53
	Lethbridge	70 00	1,886 13		595 14					10 00	2,561 27
	Pincher Creek	20 00	453 54								473 54

Vancouver	Atlin	50 00			60 00						110 00
	Cranbrook	90 00	11,815 70		32 01	1,415 14					13,352 85
	Fernie	145 00	6,455 99		4,468 30	166 70	336 60				11,572 59
	Golden	20 00	2,950 16								2,970 16
	Grand Forks	120 00	6,056 42		818 98						6,995 40
	Greenwood	215 00	7,009 67		944 15	137 50	403 50				8,709 82
	Kamloops	125 00			504 15	1,216 10	3,499 80				5,405 65
	Kaslo	90 00	937 39			893 00					1,920 39
	Kelowna	65 00				408 98	465 45				939 43
	Ladners	20 00				322 20					342 20
	Moyie City	50 00									50 00
	Nelson	475 00	30,841 06		3,591 82	2,561 70	2,740 00				40,269 58
	New Westminster	145 00	5,433 91		2,385 37	779 10	2,235 00				10,978 38
	Phœnix	50 00	2,342 60		129 90						2,522 50
	Revelstoke	290 00	3,897 88		783 40	1,211 07	1,145 20				7,327 55
	Rossland	285 00	12,431 41		5,801 50	227 25	600 00		32 70		19,377 86
	Sandon	50 00			732 16						782 16
	Trail	50 00			691 44						741 44
	Ymir	50 00			30 00						80 00
Victoria	Nanaimo	320 00	3,926 84		9,970 26	859 00	2,509 50		13 00		17,598 60
		12,350 50	1,037,443 00		226,212 66	372,683 15	116,879 55	6,881 54	17,109 29	1,100 00	1,790,659 69

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

FINANCIAL RETURNS, 1901-1902

No. 1.—GENERAL REVENUES ACCOUNT, 1901-1902.

Dr. | Cr.

Memo. of Refunds deducted below.	Amounts deposited to the credit of the Receiver General.	Abatements.	Balances due June 30, 1902.	Totals.	Services.	Revenues of previous years not collected July 1, 1901.	Revenues accrued 1901-1902.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
150,227 17	11,282,112 82	....	15,452 28	11,297,595 10	Excise and Seizures, per Statement No. 3.	40,110 47	11,257,484 63	11,297,595 10
....	3,617 00	....	27,800 17	31,417 17	Hydraulic and other Rents, per Statement No. 5.	27,738 17	3,679 00	31,417 17
....	1,073 00	45 00	12,390 41	13,508 41	Minor Public Works, per Statement No. 6......	12,438 41	1,070 00	13,508 41
....	62,937 68	....	180 32	63,118 00	Weights and Measures, per Statements Nos. 19 (A) and 19 (B)	2,217 82	60,900 18	63,118 00
....	24,221 80	....	....	24,221 80	Gas Inspection, per Statement No. 21	1,003 75	23,218 05	24,221 80
12 50	21,441 25	....	....	21,441 25	Electric Light Inspection, per Statement No. 23..	379 50	21,061 75	21,441 25
....	4,080 25	....	....	4,080 25	Law Stamps, per Statements Nos. 10 and 18.. ...	....	4,080 25	4,080 25
....	....	....	45 04	45 04	Bill Stamps, per Statement No. 9	45 04	....	45 04
....	591 65	....	....	591 65	Sundry Minor Revenues, per Statement No. 11..	.. ..	591 65	591 65
....	66,784 73	....	....	66,784 73	Methylated Spirits, per Statement No. 25.. ...	....	66,784 73	66,784 73
150,239 67	11,466,890 18	....	....	11,522,803 40		....	11,438,870 24	11,522,803 40
....	150,239 67	....	....	150,239 67	...Less—Refunds as per Statement No. 16.....	....	150,239 67	150,239 67
....	11,316,650 51	45 00	55,868 22	11,372,563 73	...........Totals....	83,933 16	11,288,630 57	11,372,563 73

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

DR. No. 2.—GENERAL EXPENDITURES

Balances due to Collectors, &c., July 1, 1901.	Expenditures Authorized by the Department.			Balances due by Collectors, &c., June 30, 1902.	Totals.	Services.
	Salaries.	Contingencies.	Seizures.			
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
49 08	307,040 36	94,411 84	396 31	443 98	402,341 57	Excise and Seizures, per Statement No. 4
			810 11		810 11	Excise Seizures, distributed per Statement No. 4, Appendix B
	2,749 88	8,103 87			10,853 75	Preventive Service, per Statement No 7
	9,566 90	15,729 68			25,296 58	Adulteration of Food, per Statement No. 8, Appendix B
		132 00			132 00	Sundry Minor Expenditures, per Statement No. 12
	40,300 00	5,059 11		16 66	45,375 77	Departmental Expenditures, per Statement No. 17
	51,073 45	25,318 87	26 00	193 26	76,611 58	Weights and Measures, per Statements Nos. 20 (A) and 20 (B)
	18,186 01	5,880 79		212 88	24,279 68	Gas Inspection, per Statement No. 22
	2,700 00	6,561 68			9,261 68	Electric Light Inspection, per Statement No. 24
	3,449 88	48,567 13			52,017 01	Methylated Spirits, per Statement No. 25
49 08	435,066 48	209,764 97	1,232 42	866 78	646,979 73	Totals

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 12

ACCOUNT, 1901–1902. Cr.

Balances due by Collectors, &c., July 1, 1901.	Amounts disbursed by the Receiver-General, on requisitions of the Department.	Deductions from Salaries for				Balances due to Collectors, &c., June 30, 1902.	Totals.
		Superannuation.	Insurance.	Retirement.	Guarantee.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
343 98	391,201 58	5,053 00	71 76	3,315 62	1,188 10	1,167 53	402,341 57
.....	810 11	.....	.....	.....	.....	.....	810 11
.....	10,847 99	.....	.....	.....	5 76	.....	10,853 75
298 30	24,883 61	114 67	.....	.....	.....	.....	25,296 58
.....	132 00	.....	.....	.....	.....	.....	132 00
16 66	44,576 25	723 76	29 10	30 00	.....	.....	45,375 77
193 26	75,778 26	378 96	80 04	34 96	146 10	.....	76,611 58
212 88	23,786 91	161 04	.....	5 00	113 85	.....	24,279 68
.....	9,260 48	.....	.....	.....	1 20	.....	9,261 68
.....	51,927 01	.....	.....	90 00	.....	.....	52,017 01
1,065 08	633,204 20	6,431 43	180 90	3,475 58	1,455 01	1,167 53	646,979 73

W. J. GERALD,
Deputy Minister.

2-3 EDWARD VII., A. 1903

EXCISE,

No. 3.—Collection Divisions

Dr. (*For Details, see*

Amount Accrued during the Year, including License Fees.

Balances due July 1, 1901.	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Acetic Acid.	Bonded Manufactures.	Seizures.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
17 55	109,706 07	50 00	4,092 17	3,102 80	2,274 00			
425 86	25,677 17	150 00	12,077 91	7,363 70	23,212 17		2,550 19	
	8,392 48			115 50				
210 24	493,406 93	350 00	75,940 12	17,161 65	33,945 78			
1,176 45	211,233 91	150 00	71,802 65	386,802 37	51,980 16		6,444 10	
462 83	62,469 05	100 00	40,916 08	19,624 86	20,100 15		2,573 48	
1,771 39	80,862 48	300 00	72,430 69	78,901 43	190,299 18			
	262,027 73	125 00	8,021 25	39,356 78	1,105 50			
	19,396 95	300 00	16,366 09	39,262 53	2,759 82			
150 74	77,788 02		109 56	14,588 32	1,126 11			
198 59	33,858 34	150 00	13,175 40	232 26	840 90			
	20,154 26	50 00	2,170 60	3,927 50				
386 84	91,982 10	100 00	20,507 40	1,210 14	4,253 10		300 00	
173 41	16,640 82	100 00	17,744 92	4,671 90	7,846 20			
298 40	29,815 15	250 00	53,804 90	7,149 92	9,438 00			1 00
705 73	681,890 88	675 00	203,365 32	212,351 69	66,096 78	7,114 78	11,365 86	365 00
896 36	331,456 85	150 00	47,895 50	23,523 84	11,387 07		700 00	
522 89								
7,397 28	2,556,759 19	3,000 00	660,420 56	859,347 13	426,664 92	7,114 78	23,933 63	366 00
28 25	51,269 73	50 00		13,624 09	8,111 59			
8,285 44	1,340,028 19	550 00	165,795 27	1,807,431 97	289,011 41	1,747 53	10,697 22	242 68
552 09	454,899 25	200 00	61,858 17	115,641 26	26,466 64		3,065 85	4 49
1,724 16	153,443 01	50 00	24,909 33	167,410 69	41,297 49		306 00	
698 34	145,778 36	50 00		1,158 22	11,302 60		5,041 37	
	60,378 77			2,262 46	6,153 02			
3,295 57								
14,583 76	2,205,788 31	900 00	252,562 77	2,107,528 69	382,342 75	1,747 53	19,104 44	247 08
2,402 97	133,911 23	100 00	19,159 98	99,421 42	13,298 37		1,556 87	
1,442 62								
3,845 59	133,911 23	100 00	19,159 98	99,421 42	13,298 37		1,556 87	
1,144 31	64,984 17	200 00	41,328 98	99,372 85	4,140 54			
				22,722 58				364 15
5,860 50								
7,004 81	64,984 17	200 00	41,328 98	122,095 43	4,140 54			364 15
845 30	708 39	50 00	3,945 60	50,259 80				

SESSIONAL PAPER No. 12

1901–1902.

in Account with Revenues.

Appendix A.) CR.

Other Receipts.	Total Duties accrued.	Total Debits.	Divisions.	Deposited to the credit of the Receiver General.	Balances due June 30, 1902.	Total Credits.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
950 00	120,175 04	120,192 59	Belleville	120,192 59		120,192 59
940 75	71,971 89	72,397 75	Brantford	72,285 14	112 61	72,397 75
85 00	8,592 98	8,592 98	Cornwall	8,592 98		8,592 98
5,659 28	626,454 76	626,665 00	Guelph	626,665 00		626,665 00
2,172 26	730,585 15	731,761 90	Hamilton	731,761 90		731,761 90
539 50	146,323 12	146,785 95	Kingston	146,785 95		146,785 95
333 00	423,126 78	424,898 17	London	424,898 17		424,898 17
211 50	310,847 76	310,847 76	Ottawa	310,847 76		310,847 76
160 00	78,245 39	78,245 39	Owen Sound	78,245 39		78,245 39
359 67	93,971 68	94,122 42	Perth	94,122 42		94,122 42
60 00	48,316 84	48,515 43	Peterborough	48,515 43		48,515 43
120 00	26,422 36	26,422 36	Port Arthur	26,422 36		26,422 36
339 79	118,692 58	119,079 37	Prescott	119,079 37		119,079 37
132 50	47,136 34	47,309 75	St. Catharines	47,309 75		47,309 75
80 00	100,538 97	100,837 37	Stratford	100,837 37		100,837 37
3,449 24	1,186,674 55	1,187,380 28	Toronto	1,187,311 28	69 00	1,187,380 28
5,867 68	420,980 94	421,877 30	Windsor	421,877 30		421,877 30
		522 89	Suspense Account		522 89	522 89
21,451 17	4,559,057 38	4,566,454 66	*Ontario*	4,565,750 16	704 50	4,566,454 66
4,748 12	77,794 53	77,822 78	Joliette	77,822 78		77,822 78
3,949 19	3,619,453 46	3,627,738 90	Montreal	3,625,379 34	2,359 56	3,627,738 90
961 40	663,096 97	663,648 97	Quebec	663,333 22	315 75	663,648 97
68 35	387,478 87	389,203 03	Sherbrooke	389,203 03		389,203 03
1,152 70	164,483 25	165,181 59	St. Hyacinthe	165,006 80	174 79	165,181 59
80 00	68,874 25	68,874 25	Three Rivers	68,874 25		68,874 25
		3,295 57	Suspense Account		3,295 57	3,295 57
10,959 76	4,981,181 33	4,995,765 09	*Quebec*	4,989,619 42	6,145 67	4,995,765 09
867 45	268,306 32	270,709 29	St. John	270,709 29		270,709 29
		1,442 62	Suspense Account		1,442 62	1,442 62
867 45	268,306 32	272,151 91	*New Brunswick*	270,709 29	1,442 62	272,151 91
340 00	210,366 54	211,510 85	Halifax	211,510 85		211,510 85
	23,086 73	23,086 73	Pictou	23,086 73		23,086 73
		5,860 50	Suspense Account		5,860 50	5,860 50
340 00	233,453 27	240,458 08	*Nova Scotia*	234,597 58	5,860 50	240,458 08
20 00	54,983 79	55,329 09	Charlottetown, *P.E.I.*	55,329 09		55,329 09

2-3 EDWARD VII., A. 1903

EXCISE.

No. 3.—Collection Divisions

Dr. *(For Details, see*

Balances due July 1, 1901.	Amount Accrued during the Year, including License Fees.							
	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Acetic Acid.	Bonded Manufactures.	Seizures.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
851 62	352,225 36	350 00	30,335 86	218,797 24	34,650 87	.....	711 46	.....
54 70	32,425 21	200 00	11,796 96	6,516 55	2,142 66	.....	.....	.....
906 32	384,650 57	550 00	42,132 82	225,313 79	36,793 53	.....	711 46	.....
5,904 11	153,993 37	1,819 70	32,591 36	65,673 06	22,555 55	.....	.....	589 75
123 30	119,817 75	350 00	25,675 67	33,939 09	11,564 58	.....	.....	.....
6,027 41	273,811 12	2,169 70	58,267 03	99,612 15	34,120 13	.....	.....	589 75
40,110 47	5,620,612 98	6,969 70	1,077,808 74	3,563,578 41	897,360 24	8,862 31	45,306 40	1,566 98
.....	64,349 18	.....	27,090 86	58,363 62	5 25	.....	8 42	.....
.....	5,556,263 80	6,969 70	1,050,717 88	3,505,214 79	897,354 99	8,862 31	45,297 98	1,566 98

Inland Revenue Department,
Ottawa, August 16, 1902

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1901–1902.

in Account with Revenue—*Concluded.*

Appendix A.) Cr.

Other Receipts.	Total Duties accrued.	Total Debits.	Divisions.	Deposited to the credit of the Receiver General.	Balances due June 30, 1902.	Total Credits.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
810 49	637,881 28	638,732 90	..Winnipeg.....	638,732 90	.....	638,732 90
170 00	53,251 38	53,306 08	..Calgary	53,306 08	.....	53,306 08
980 49	691,132 66	692,038 98	...*Manitoba and N. W. T.*..	692,038 98	.....	692,038 98
[illegible]						
640 00	277,862 79	283,766 90	..Vancouver..... ..	282,564 81	1,202 09	283,766 90
160 00	191,507 09	191,630 39	..Victoria	191,533 49	96 90	191,630 39
800 00	469,369 88	475,397 29	...*British Columbia*.....	474,098 30	1,298 99	475,397 29
[illegible]						
35,418 87	11,257,484 63	11,297,595 10	.. Totals	11,282,142 82	15,452 28	11,297,595 10
409 84	150,227 17	... .				
			.. Less—Refunds as per Statement No. 16.			
35,009 03	11,107,257 46	. . . . .	..Net Revenue.			

W. J. GERALD,
Deputy Minister.

2-3 EDWARD VII., A. 1903

EXCISE,

No. 4.—Collection Divisions

Dr. *(For Details, see*

Balances due by Collectors, July 1, 1901.	Amounts received from Department to meet Expenditure.	Deductions from Salaries for				Balances due to Collectors, June 30, 1902.	Totals.	Divisions.
		Superannuation.	Insurance.	Retirement.	Guarantee.			
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
43 98	7,564 35	143 28		28 82	24 48		7,804 91	Belleville
	8,633 33	141 89		94 49	29 52		8,899 23	Brantford
	1,066 15	20 00			3 60		1,089 75	Cornwall
	16,525 81	333 88		28 82	52 56		16,941 07	Guelph
	19,543 61	326 62		208 33	72 24		20,150 20	Hamilton
	7,868 15	148 27			25 92		8,042 34	Kingston
	18,563 13	347 02	71 76	85 67	58 86	49 99	19,176 43	London
	6,425 63	51 60		173 43	23 76		6,674 42	Ottawa
	5,276 19	80 06		37 44	15 12		5,408 81	Owen Sound
	6,808 99	49 96		181 13	35 22	41 65	7,116 95	Perth
	3,478 18	32 32		90 00	13 44	7 50	3,621 44	Peterborough
	1,132 21	19 96		2 48	5 40		1,160 05	Port Arthur
	9,071 59	150 74		25 04	31 32		9,281 69	Prescott
	4,598 04	101 60		28 82	18 72		4,747 18	St. Catharines
	6,282 39	110 88		25 04	20 16		6,438 47	Stratford
	34,871 46	634 00		296 03	128 48		35,929 97	Toronto
	19,555 14	330 42		118 74	72 84	178 29	20,255 43	Windsor
	6,604 23	100 48			22 50		6,727 21	District Inspectors
43 98	183,870 98	3,122 98	71 76	1,424 28	654 14	277 43	189,465 55	*Ontario*
	5,284 05	28 04		118 32	23 03		5,453 44	Joliette
	39,913 51	566 63		534 98	154 80	342 74	41,512 66	Montreal
	15,062 14	215 05		44 18	43 38	438 72	15,803 47	Quebec
	6,491 55	55 96		157 44	24 48	44 90	6,774 33	Sherbrooke
	8,754 68	64 41		221 45	38 10		9,078 67	St. Hyacinthe
	2,113 94	39 00			6 84	63 74	2,223 52	Three Rivers
	2,822 73	3 66		125 00	9 75		2,961 14	District Inspectors
	80,442 60	972 78		1,201 37	300 38	890 10	83,807 23	*Quebec*
	8,000 05	133 43		49 97	26 46		8,209 91	St. John
	2,935 14	50 00			9 00		2,994 14	District Inspector
	10,935 19	183 43		49 97	35 46		11,204 65	*New Brunswick*
	11,012 79	216 62			38 16		11,267 57	Halifax
	2,321 88	19 96		49 38	8 16		2,399 38	Pictou
	13,334 67	236 58		49 38	46 32		13,666 95	*Nova Scotia*
100 00	2,258 26	43 96			6 48		2,408 70	*Charlottetown, P.E.I.*
200 00	15,614 28	213 81		159 92	50 88		16,238 89	Winnipeg
	4,115 98	32 29		54 98	9 72		4,212 97	Calgary, N.W.T
	3,820 56	50 00			9 00		3,879 56	District Inspector
200 00	23,550 82	296 10		214 90	69 60		24,331 42	*Manitoba and N.W.T.*

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in Account with Expenditures.

Appendix B.) CR.

Balances due to Collectors, July 1, 1901.	Expenditures authorized by the Department.						Balances due by Collectors, June 30, 1902.	Totals.
	Salaries.	Seizures Expenditure.	Special Assistance	Rent.	Travelling Expenses.	Sundries.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts	$ cts.
.....	7,184 05	13 50	.....	.....	196 23	367 15	43 98	7,804 91
.....	8,250 33	.....	.....	50 00	348 50	250 40	.....	8,899 23
.....	1,000 00	.....	.....	.....	.....	89 75	.....	1,089 75
.....	16,021 64	.....	.....	136 92	344 05	438 46	.....	16,941 07
.....	19,773 25	.....	.....	.....	118 45	258 50	.....	20,150 20
.....	7,422 49	.....	.....	135 00	115 50	369 35	.....	8,042 34
.....	17,959 53	.....	619 92	80 00	215 15	301 83	.....	19,176 43
.....	6,048 75	.....	521 82	.....	2 80	101 05	.....	6,674 42
.....	4,752 50	7 75	.....	125 00	376 15	147 41	.....	5,408 81
.....	6,527 43	.....	.....	152 50	145 86	291 16	.....	7,116 95
.....	3,416 66	.....	.....	.....	86 75	118 03	.....	3,621 44
.....	1,056 00	.....	.....	.....	58 70	51 35	.....	1,166 05
.....	8,841 58	.....	.....	.....	100 90	339 21	.....	9,281 69
.....	4,361 64	.....	.....	48 00	179 60	157 94	.....	4,747 18
.....	6,050 00	8 55	.....	.....	193 35	186 57	.....	6,438 47
.....	33,835 49	29 65	1,046 90	.....	518 35	499 58	.....	35,929 97
49 08	18,937 24	.....	100 00	72 00	520 20	576 91	.....	20,255 43
.....	5,723 62	.....	.....	75 00	783 29	145 30	.....	6,727 21
49 08	177,156 20	59 45	2,288 64	874 42	4,303 83	4,689 95	43 98	189,465 55
.....	4,536 55	.....	326 18	.....	339 90	250 81	.....	5,453 44
.....	36,986 19	33 15	2,901 76	.....	870 11	721 45	.....	41,512 66
.....	10,995 06	18 54	3,710 13	.....	609 13	470 61	.....	15,803 47
.....	5,950 00	.....	.....	156 00	423 12	245 21	.....	6,774 33
.....	7,132 30	.....	880 29	144 00	481 32	440 76	.....	9,078 67
.....	1,950 00	.....	205 37	.....	.....	68 15	.....	2,223 52
.....	2,683 33	.....	.....	.....	141 06	36 75	100 00	2,961 14
.....	70,233 43	51 69	8,023 73	300 00	2,864 64	2,233 74	100 00	83,807 23
.....	7,792 68	.....	.....	.....	189 43	227 80	.....	8,209 91
.....	2,500 00	.....	.....	.....	481 49	12 65	.....	2,994 14
.....	10,292 68	.....	.....	.....	670 92	240 45	.....	11,204 05
.....	10,842 50	44 65	.....	.....	145 78	234 64	.....	11,267 57
.....	1,988 93	114 52	17 96	.....	129 21	148 76	.....	2,399 38
.....	12,831 43	159 17	17 96	.....	274 99	383 40	.....	13,666 95
.....	2,200 00	.....	.....	30 00	9 95	68 75	100 00	2,408 70
.....	13,659 62	.....	1,278 07	180 00	612 65	308 55	200 00	16,238 89
.....	2,265 58	.....	74 97	90 00	1,547 85	234 57	.....	4,212 97
.....	2,500 00	.....	.....	.....	1,283 60	95 96	.....	3,879 56
.....	18,425 20	.....	1,353 04	270 00	3,444 10	639 08	200 00	24,331 42

2-3 EDWARD VII., A. 1903

EXCISE,

No. 4.—Collection Divisions

Dr. (*For Details, see*

Balances due by Collectors, July 1, 1901.	Amounts received from Department to meet Expenditure.	Deductions from Salaries for				Balances due to Collectors, June 30, 1902.	Totals.	Divisions.
		Superannuation.	Insurance.	Retirement.	Guarantee.			
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
	12,680 55	30 00		360 72	46 56		13,117 83	Vancouver
	5,447 10	117 17		15 00	20 16		5,599 43	Victoria
	3,155 47	50 00			9 00		3,214 47	District Inspector
	21,283 12	197 17		375 72	75 72		21,931 73	*British Columbia*
	297 15						297 15	Inspector of Bonded Factories
	4,632 09						4,632 09	General Expenditure
	423 01						423 01	Legal Expenses
	8,475 82						8,475 82	Printing
	992 95						992 95	Stationery
	2,321 60						2,321 60	Lithographing, Engraving, &c.
	5,485 81						5,485 81	Commission to Customs Officers
	87 40						87 40	Commission on sale of Stamps for Canada Twist
	26,243 01						26,243 01	Tobacco Stamps
	6,567 10						6,567 10	Duty-pay to officers in charge of most important establishments
343 98	391,201 58	5,053 00	71 76	3,315 62	1,188 10	1,167 53	402,341 57	*Grand Totals*

Inland Revenue Department,
Ottawa, August 16, 1902.

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in Account with Expenditures—*Concluded.*

Appendix B.) CR.

Balances due to Collectors, July 1, 1901.	Expenditures authorized by the Department.						Balances due by Collectors, June 30, 1902.	Totals.
	Salaries.	Seizures Expenditure.	Special Assistance	Rent.	Travelling Expenses.	Sundries.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	8,712 88	126 00	1,984 92	913 00	702 52	678 51		13,117 83
	4,688 54		480 00	70 00	57 40	303 49		5,599 43
	2,500 00				714 47			3,214 47
	15,901 42	126 00	2,464 92	983 00	1,474 39	982 00		21,931 73
					286 08	11 07		297 15
						4,632 09		1,632 09
						423 01		423 01
						8,475 82		8,475 82
						992 95		992 95
						2,321 60		2,321 60
						5,485 81		5,485 81
						87 40		87 40
						26,243 01		26,243 01
						6,567 10		6,567 10
49 08	307,040 36	396 31	14,148 29	2,457 42	13,328 90	64,477 23	443 98	402,341 57

W. J. GERALD,
Deputy Minister.

HYDRAULIC AND OTHER RENTS.

No. 5.—Summary Statement of Lessees' Accounts, 1901-1902.

(For Details, see Appendix A.)

Dr. Balances due July 1, 1901.	Accrued during the year ended June 30, 1902.	Totals.		Cr. Deposited to the credit of the Receiver General.	Balances due June 30, 1902.	Totals.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
1,869 84	3,360 00	5,229 84	Chaudière Falls and Ottawa River	3,346 00	1,883 84	5,229 84
75 00	26 00	101 00	St. Lawrence River	1 00	100 00	101 00
20 00	20 00	40 00	St. Maurice River	20 00	20 00	40 00
70 00		70 00	Rivière du Lièvre		70 00	70 00
655 00	273 00	928 00	Sundry properties	250 00	678 00	928 00
			Land Sales.			
15,573 50		15,573 50	Principal Accounts		15,573 50	15,573 50
9,474 83		9,474 83	Interest		9,474 83	9,474 83
27,738 17	3,679 00	31,417 17		3,617 00	27,800 17	31,417 17

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

DR. — No. 6.—MINOR PUBLIC WORKS, 1901-2. — CR.

Balances due July 1, 1901.	Accrued during the year ended June 30, 1902.	Totals.	Works.	Deposited to the credit of the Receiver General.	Abatement.	Balances due June 30, 1901.	Totals.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.
			Bridges				
2,600 62		2,600 62	Dunnville			2,600 62	2,600 62
			Ferries.				
	10 00	10 00	Bristol	10 00			10 00
	15 00	15 00	Buckingham and Cumberland	15 00			15 00
	50 00	50 00	Buffalo and Point Abinot	50 00			50 00
	10 00	10 00	Clair Station and Kent	10 00			10 00
	10 00	10 00	Cross Point and Campbellton	10 00			10 00
20 00		20 00	Edmundston and Maine			20 00	20 00
	50 00	50 00	Fort Erie and Buffalo	50 00			50 00
	15 00	15 00	Hawkesbury and Grenville	15 00			15 00
1,736 79		1,736 79	Hull (old lease)			1,736 79	1,736 79
	30 00	30 00	La Passe and Gower Point	30 00			30 00
	6 00	6 00	Montebello and Alfred	6 00			6 00
	30 00	30 00	Niagara and Youngstown	30 00			30 00
	2 00	2 00	Ottawa and Kettle Island			2 00	2 00
	1 00	1 00	Ouelette Street, Detroit	1 00			1 00
	5 00	5 00	Papineauville and Brown's wharf	5 00			5 00
	100 00	100 00	Pembroke and Allumette Island (new lease)	100 00			100 00
1 00		1 00	Pembroke and Allumette Island (old lease)			1 00	1 00
	200 00	200 00	Prescott and Ogdensburg	200 00			200 00
	10 00	10 00	Queenston and Lewiston (new lease)	10 00			10 00
	60 00	60 00	Queenston and Lewiston (old lease)	60 00			60 00
	159 00	159 00	Quyon	159 00			159 00
50 00	5 00	55 00	Rockliffe and Gatineau	10 00	45 00		55 00
	100 00	100 00	Sault Ste. Marie	100 00			100 00
30 00		30 00	St. Leonard and Van Buren			30 00	30 00
			Sundries.				
8,000 00		8,000 00	Dundas and Waterloo Road			8,000 00	8,000 00
	2 00	2 00	Government Telegraph Lines	2 00			2 00

DR. No. 6.—MINOR PUBLIC WORKS, 1901-1902—*Concluded.* CR.

Balances due July 1, 1901.	Accrued during the year ended June 30, 1902.	Totals.	Works.	Deposited to the credit of the Receiver General.	Abatements.	Balances due June 30, 1901.	Totals.
$ cts.	$ cts.	$ cts.	*Sundries*—Concluded	$ cts.	$ cts.	$ cts.	$ cts.
.....	25 00	25 00	....Wiarton Docks.....	25 00	.....	.....	25 00
.....	175 00	175 00	.....Part of building, Portland, N.B	175 00	.....	.....	175 00
12,438 41	1,070 00	13,508 41	.....Totals	1,073 00	45 00	12,390 41	13,508 41

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1092.

PREVENTIVE SERVICE, 1901–1902.

No. 7.—In Account with Expenditures.

Dr. | Cr.

Amounts received from Department to meet Expenditures.	Guarantee.	Total.		Expenditures Authorized by Department.				Total.
				Salaries.	Special Assistance.	Travelling Expenses.	Sundries.	
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1 95		1 95	London			1 95		1 95
750 00		750 00	Ottawa	750 00				750 00
6 90		6 90	Owen Sound				6 90	6 90
1,110 01		1,110 01	Picton		816 66	286 94	6 41	1,110 01
11 30		11 30	Prescott			11 30		11 30
2,599 36		2,605 12	Toronto	1,199 88	1,199 88	197 55	7 81	2,605 12
612 70		612 70	Montreal		600 00	12 70		612 70
2,992 80	5 76	2,992 80	Quebec		2,936 30	56 50		2,992 80
499 92		499 92	St. Hyacinthe		499 92			499 92
167 40		167 40	Sherbrooke			167 40		167 40
1,185 19		1,185 19	St. John	800 00	277 78	104 27	3 14	1,185 19
231 24		231 24	Halifax		199 92	29 82	1 50	231 24
269 65		269 65	Winnipeg		115 00	151 40	3 25	269 65
109 57		109 57	General				109 57	109 57
10,847 99	5 76	10,853 75		2,749 88	6,645 46	1,019 83	138 58	10,853 75

Inland Revenue Department
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

FOOD INSPECTION, 1901-1902.

No. 8.—In Account with Expenditures.

(For Details see Appendix B.)

Dr. Cr.

Balance due July 1, 1901.	Amounts received from Department to meet Expenditures.	Superannuation.	Total.		Expenditures Authorized by the Department.					Totals.
					Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	
$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	10,541 13	100 04	10,641 17	Chief Analyst	7,349 88	1,032 28	400 00	146 20	1,712 81	10,641 17
	584 59		584 59	Ottawa	200 00			304 32	80 27	584 59
	877 94		877 94	Seafort	500 00		120 00	163 95	93 99	877 94
	707 54	7 00	714 54	Montreal	350 00			240 81	123 73	714 54
298 30	56 04		354 34	St. Hyacinthe	60 72			281 62	12 00	354 34
	350 57	4 00	354 57	St. John, N.B	200 00			109 84	44 73	354 57
	436 08		436 08	Halifax	300 00			101 26	34 82	436 08
	23 04		23 04	Prince Edward Island	23 04					23 04
	200 00		200 00	Calgary	200 00					200 00
	261 83	3 63	265 46	Winnipeg	183 26			42 40	39 80	265 46
	287 20		287 20	Vancouver	200 00			40 85	46 35	287 20
	9,617 92		9,617 92	General					9,617 92	9,617 92
	790 39		790 39	Printing					790 39	790 39
	149 34		149 34	Stationery					149 34	149 34
298 30	24,883 61	114 67	25,296 58	Totals	9,566 90	1,032 28	520 00	1,431 25	12,746 15	25,296 58

Inland Revenue Department,
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

BILL STAMPS, 1901–1902.

No. 9.— Bill Stamp Distributors in account with the Inland Revenue Department.

Dr. Cr.

Balances, July 1, 1901.		Totals.		Balances, June 30, 1902.		Totals.
Stamps on hand.	Cash on hand.			Stamps on hand.	Cash on hand.	
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
1,372 77		1,372 77	Post Office Department	1,372 77		1,372 77
	11 54	11 54	Belleville, ex-Collector E. R. Benjamin		11 54	11 54
	33 50	33 50	Three Rivers, ex-Collector B. Lassalle		33 50	33 50
160 00		160 00	McLeod, Colonel J. F., Fort McLeod	160 00		160 00
1,532 77	45 04	1,577 81	Totals	1,532 77	45 04	1,577 81

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

LAW STAMPS, 1901 1902.

DR. No. 10. LAW STAMP Distributors in account with the Inland Revenue Department CR.

Stamps received from Department.	Totals.		Commission of 5 per cent allowed by Department on stamps sold.	Deposited to the credit of the Receiver General.	Stamps on hand on June 30, 1902.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.
1,500 00	1,500 00	.....Cameron, R., Registrar, Supreme Court	75 00	1,425 00	....	1,500 00
2,795 00	2,795 00	. .. Audette, L. A., Registrar, Exchequer Court.....	139 75	2,655 25	... . . .	2,795 00
18,250 00	18,250 00	.... .Lithgow, J. T., Dawson, Yukon Territory	....	.....	18,250 00	18,250 00
22,545 00	22,545 00	.... Totals	214 75	4,080 25	18,250 00	22,545 00

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

DR. No. 11.—SUNDRY MINOR REVENUES, 1901-1902. CR.

Accrued during the year ended June 30, 1902.	Totals.	——	Deposited to the credit of the Receiver General.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.
374 00	374 00	... Fertilizers Inspection Fees.	374 00	374 00
211 00	211 00	.... Adulteration of Food Fees.	211 00	211 00
6 65	6 65	....Casual Revenue.....	6 65	6 65
591 65	591 65	....Totals....	591 65	591 65

DR. No. 12.—MINOR EXPENDITURES, 1901-1902. CR.

Amounts received from Department to meet Expenditures.	Totals.	——	Contingencies.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.
132 00	132 00	....Minor Public Works.....	132 00	132 00

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

No. 13.—STATEMENT showing the quantities of the several articles subject to Excise and the Duty

1900.

ARTICLES SUBJECT TO EXCISE DUTY.	QUANTITIES.			Duty.
	Ex-Manufactory.	Ex-Warehouse.	Total.	
	Gallons.	Gallons.	Gallons.	$ cts.
Spirits	493	2,523,576	2,524,069	4,778,352 20
	Imported.	*134,969	134,969	40,490 72
Totals	493	2,658,545	2,659,038	4,818,842 92
Malt Liquor, the duty being paid on malt	23,309,172		23,309,172	498 90
	Lbs.	Lbs.	Lbs.	
Malt		60,284,064	60,284,064	904,262 81
Cigars—	No.	No.	No.	
Foreign	70,693,362	61,799,185	132,492,547	794,965 41
Canadian	1,256,590	429,550	1,686,140	5,058 42
Combination	2,534,520	1,328,500	3,863,020	11,589 06
Totals	74,484,472	63,557,235	138,041,707	811,612 89
Cigarettes—				
Foreign	113,256,372	2,184,050	115,440,422	346.321 26
Canadian	349,000	200,000	549,000	823 50
Combination	72,100		72,100	108 15
Totals	113,677,472	2,384,050	116,061,522	347,252 91
	Lbs.	Lbs.	Lbs.	
Tobacco from Foreign Leaf	644,818	6,303,787	6,948,605	1,737,151 40
" Canadian Leaf	1,782,442	680,933	2,463,375	123,168 86
" Combination Leaf	528,327	597,896	1,126,223	56,311 26
Snuff	219,337	400	219,737	40,031 25
Canadian Twist		58,914	58,914	2,945 70
Totals	3,174,924	7,641,930	10,816,854	2,306,861 38
Raw Leaf Tobacco, Foreign		9,352,535	9,352,535	971,977 60
Total Duties on Tobacco and Cigarettes				3,278,838 98
Inspection Fees on Petroleum				5,502 71
Vinegar				28,192 25
Acetic Acid				9,546 96
Licenses, Spirits				2,375 00
" Malt Liquor				6,675 00
" Malt				6,275 00
" Cigars				14,030 00
" Tobacco				2,800 50
" Vinegar				2,000 00
" Acetic Acid				100 00
" Petroleum				2 00
				9,891,555 92

* Spirits imported for use in the manufacture of crude fulminate, on which duty at the rate of 30 cents

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

Duty taken for consumption, during the years ended June 30, 1900, 1901 and 1902, accrued thereon.

1901.				1902.			
Quantities.			Duty.	Quantities.			Duty.
Ex-Manufactory.	Ex-Warehouse.	Total.		Ex-Manufactory.	Ex-Warehouse.	Total.	
Gallons.	Gallons.	Gallons.	$ cts.	Gallons.	Gallons.	Gallons.	$ cts.
914	2,707,919	2,708,833	5,131,739 99	2,488	2,933,183	2,935,671	5,561,785 41
Imported.	*155,117	155,117	46,535 13	Imported.	*187,759	187,759	56,327 57
914	2,863,036	2,863,950	5,178,275 12	2,488	3,120,942	3,123,430	5,618,112 98
25,108,254	.....	25,108,254	68 90	27,623,767	....	27,623,767	369 70
Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.	
1,104	64,722,512	64,723,616	970,855 15	.....	71,440,519	71,440,519	1,071,608 74
No.	No.	No.		No.	No.	No.	
71,874,913	61,272,370	133,147,283	798,889 88	79,815,531	62,268,640	142,084,171	852,508 68
1,942,666	166,300	2,108,966	6,326 89	2,961,230	750,920	3,712,150	11,136 45
3,472,940	2,367,700	5,840,640	17,521 92	2,927,345	3,056,850	5,984,195	17,952 61
77,290,519	63,806,370	141,096,889	822,738 69	85,704,106	66,076,410	151,780,516	881,597 74
119,343,584	1,024,000	120,367,584	361,102 75	130,963,584	1,315,450	132,279,034	397,699 86
....	275,000	275,000	412 50	.....	975,000	975,000	1,462 50
741,000	....	741,000	1,111 50	982,000	.. ..	982,000	1,473 00
120,084,584	1,299,000	121,383,584	362,626 75	131,945,584	2,290,450	134,236,034	400,035 36
Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.	
592,597½	6,171,934½	6,764,532	1,691,133 43	666,696½	6,442,612½	7,109,309	1,777,327 41
2,624,181½	482,480½	3,106,662	155,333 25	2,731,051	200,992	2,932,043	146,640 32
557,346½	644,413	1,201,759½	60,088 10	713,156	569,650	1,282,806	64,102 24
199,795	....	199,795	36,399 20	173,188	.....	173,188	31,635 70
. ...	57,597	57,597	2,879 85	....	72,286½	72,286½	3,614 33
3,973,920½	7,356,425	11,330,345½	2,308,460 56	4,284,091½	7,285,541	11,569,632½	2,423,355 36
.....	9,848,803¾	9,848,803¾	1,026,265 72	....	10,704,961¾	10,704,961¾	1,137,279 05
.....	.....	.....	3,334,726 28	.. ..	.....	.....	3,560,634 41
....	... .	... .	.....	.....	.....	.....	.....
....	... . ..	.....	42,067 16	.....	.....	.....	42,881 40
.. . .	... .	. . ..	8,809 62	.....	.....	.....	8,762 31
....	... .	... .	2,500 00	.....	.....	.....	2,500 00
... .	.....	.....	6,500 00	.....	.....	.....	6,600 00
.....	.....	.....	6,475 00	.....	... ...	....	6,200 00
... .	.....	.....	14,695 00	. . ..	..... .	.. ..	15,762 50
.....	.....	.....	3,122 00	.....	.....	....	2,944 00
....	.....	.....	2,175 00	....	....	.....	2,425 00
.....	.....	....	100 00	.....	... ...	... ...	100 00
....	....	.....	1 00	.....	.....	... .	2 00
.....	....		10,393,108 92	.....	.....	.....	11,220,500 78

per gallon was collected and afterwards refunded, on the exportation of the fulminate.

W. J. GERALD,
Deputy Minister

No. 14.—Amounts deposited monthly to the credit of the Honourable the Receiver General on account of Inland Revenues during the Fiscal Year ended June 30, 1901-2.

	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Manitoba and North-west Territories.	British Columbia.	Totals.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
July:—								
Excise	335,489 56	359,265 36	22,201 05	17,347 78	3,625 90	39,366 03	39,172 07	816,467 75
" Seizures							350 00	350 00
Hydraulic Rents		20 00						20 00
Weights and Measures	1,369 16	1,719 29		50 00	12 51			3,150 96
Gas Inspection	862 25	59 75		78 00			16 00	1,016 00
Electric Light Inspection	159 00	148 75		69 00			37 50	414 25
Methylated Spirits	2,800 08	1,605 91		126 98			63 26	4,596 23
Other Revenues	2,641 25	723 60	175 00	213 00	10 00	240 00	250 00	4,252 25
Totals	343,321 30	363,542 06	22,376 05	17,884 76	3,648 41	39,606 03	39,888 83	830,267 44
August:—								
Excise	378,420 26	402,620 35	21,651 46	19,434 55	4,001 05	59,199 25	39,555 89	924,882 81
Hydraulic Rents	1 00			6 00			25 00	32 00
Minor Public Works			43 75					43 75
Weights and Measures	2,242 64	2,515 95	328 95	296 42	54 35	443 80	62 45	5,944 56
Gas Inspection	1,452 50	481 75	17 00	17 50		11 00	28 50	2,008 25
Electric Light Inspection	496 25	371 50	117 50	36 25		24 50	74 00	1,120 00
Methylated Spirits	3,381 01	1,625 23	171 38			67 70		5,245 32
Other Revenues	393 75	135 00		60 00	30 00		45 00	663 75
Totals	386,387 41	407,749 78	22,330 04	19,850 72	4,085 40	59,746 25	39,790 84	939,940 44
September:—								
Excise	381,356 92	394,045 72	21,488 01	20,007 00	4,576 90	57,423 72	42,063 20	920,961 47
" Seizures	5 00							5 00
Minor Public Works			10 00					10 00
Weights and Measures	2,019 14	2,647 25	239 10	253 99	92 77	626 97	70 20	5,949 42
Gas Inspection	951 25	429 00	16 25	30 00		33 75	82 50	1,542 75
Electric Light Inspection	369 50	301 25	103 75	31 75		63 75	59 00	929 00
Methylated Spirits	3,796 77	2,125 55	47 97	105 57			64 94	6,140 80
Other Revenues	449 10	10 55	10 00	3 00				472 65
Totals	388,947 68	399,559 32	21,915 08	20,431 31	4,669 67	58,148 19	42,339 84	936,011 09

OCTOBER:—								
Excise	421,464 99	462,374 70	22,247 04	23,118 88	4,381 60	68,591 44	40,443 93	1,042,622 58
Hydraulic Rents	300 00	1 00						301 00
Weights and Measures	5,576 03	1,642 46	111 60	273 31	58 84	759 24	198 25	8,619 73
Gas Inspection	1,285 00	111 00	76 50	47 00	9 00	31 75	33 00	1,893 25
Electric Light Inspection	404 75	337 75	20 25	143 25		22 50	96 25	1,024 75
Methylated Spirits	4,510 78	1,437 94				66 23		6,014 95
Other Revenues	407 25			55 00				462 25
Totals	433,948 80	466,204 85	22,455 39	23,637 44	4,449 44	69,471 16	40,771 43	1,066,938 51
NOVEMBER:—								
Excise	406,230 00	439,910 97	25,021 07	22,270 14	5,123 22	75,213 18	40,017 55	1,013,786 13
" Seizures				50 00				50 00
Hydraulic Rents	2 00						18 00	20 00
Minor Public Works	1 00	5 00	43 75				1 00	50 75
Weights and Measures	2,305 72	1,392 91	161 25	150 47	66 24	546 11	9 25	4,631 95
Gas Inspection	954 56	584 50	9 00	37 00		42 00	29 75	1,656 75
Electric Light Inspection	621 25	416 00	13 25	109 00		100 75	129 50	1,389 75
Methylated Spirits	3,315 04	1,489 81	44 79	251 60		232 73	60 17	5,394 14
Other Revenues	262 50	1 80		71 00	25 00			360 30
Totals	413,692 01	443,800 99	25,293 11	22,939 21	5,211 46	76,134 77	40,265 22	1,027,339 77
DECEMBER:—								
Excise	423,236 47	529,407 74	20,042 91	24,042 10	4,611 52	57,286 80	37,332 63	1,095,960 17
" Seizures		25 00						25 00
Hydraulic Rents	303 00						5 00	308 00
Minor Public Works	50 00							50 00
Weights and Measures	3,115 88	792 69	151 00	134 31	14 25	214 82	51 90	4,504 85
Gas Inspection	951 50	421 05	29 25	23 00	1 50		34 00	1,460 30
Electric Light Inspection	639 75	309 75	28 75	76 00	2 50	32 25	155 50	1,244 50
Methylated Spirits	3,544 66	1,538 92	46 38	150 75				5,286 71
Other Revenues	179 75	11 50				10 00	4 00	565 25
Totals	432,351 01	532,506 65	20,298 29	24,426 16	4,629 77	57,543 87	37,583 03	1,109,338 78
JANUARY:—								
Excise	367,272 91	374,799 83	22,129 88	21,818 46	4,842 95	52,708 14	36,581 11	880,153 28
" Seizures	186 00	105 20						291 20
Hydraulic Rents	500 00	1 00		22 00			1 00	524 00
Minor Public Works	26 00							26 00
Weights and Measures	3,533 37	596 95	62 90	138 41	11 95	605 80	97 15	5,046 53
" " Seizures	5 00							5 00
Gas Inspection	1,543 25	449 25	71 50	67 00	14 25	96 00	42 50	2,286 75
" Seizures	5 00							5 00
Electric Light Inspection	729 75	341 75	32 75	14 25		50 75	171 50	1,310 75
Methylated Spirits	3,901 22	1,368 30	47 83				59 24	5,376 59
Other Revenues	654 70	21 00					1 80	677 50
Totals	378,357 20	377,683 28	22,347 86	22,060 12	4,869 15	53,160 69	36,954 30	895,732 60

No. 14.—Amounts deposited monthly to the credit of the Honourable the Receiver General, &c. *Concluded.*

	Ontario.	Quebec.	New Brunswick.	Nova Scotia	Prince Edward Island.	Manitoba and North-west Territories.	British Columbia.	Totals.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
February:								
Excise	331,451 20	361,727 33	18,579 53	16,981 31	3,252 30	50,110 11	31,230 66	813,338 74
" Seizures	50 00			113 25				163 25
Minor Public Works			43 75					43 75
Weights and Measures	1,567 72	672 28	70 10	150 30	18 55	233 65	4 30	2,716 90
Gas Inspection	1,066 75	556 75	17 25	22 00		36 75	48 50	1,748 00
Electric Light Inspection	738 50	610 75	49 25	27 75	4 25	18 75	229 50	1,708 75
Methylated Spirits	3,078 43	2,457 10		168 49				5,704 02
Other Revenues	157 90		23 00	24 00			28 00	532 90
Totals	338,113 50	366,024 21	18,782 88	17,490 10	3,275 10	50,429 56	31,540 96	825,956 31
March:								
Excise	330,967 76	372,146 65	22,746 53	14,660 99	4,274 51	52,468 50	38,646 92	835,911 86
" Seizures	50 00	10 00		100 00				160 00
Hydraulic Rents	1,250 00	1 00						1,251 00
Weights and Measures	3,642 81	710 15	51 35	35 52	16 55	200 68	2 60	4,659 66
Gas Inspection	995 25	529 50	18 75	27 75	9 00	76 75	19 25	1,706 25
Electric Light Inspection	715 75	611 50	97 75	60 25	5 50	51 75	62 75	1,608 25
Methylated Spirits	3,600 84	1,068 77	43 47	232 15				4,945 23
Other Revenues	248 25		1 00	4 00	6 00			259 25
Totals	341,470 66	375,077 57	22,958 85	15,120 66	4,311 56	52,800 68	38,761 52	850,501 50
April:								
Excise	398,443 75	428,900 56	19,117 86	21,147 50	5,179 31	60,206 90	35,485 02	968,480 93
" Seizures	50 00	2 48		100 00			139 75	292 23
Hydraulic Rents	11 00	1 00						12 00
Minor Public Works	290 00	11 00	10 00					311 00
Weights and Measures	2,976 28	1,013 27	36 95	97 14	22 60	208 40	104 55	4,459 19
" " Seizures	20 00							20 00
Gas Inspection	1,433 00	523 75	93 50	50 75	9 00	62 25	94 75	2,267 00
Electric Light Inspection	542 75	310 50	43 00	79 25		3 00	87 50	1,066 00
Methylated Spirits	1,095 35	987 08	43 33					5,125 76
Other Revenues	534 25	50 00	1 00	3 00				588 25
Totals	408,396 38	431,799 64	19,345 64	21,477 64	5,210 94	60,480 55	35,911 57	982,622 36

MAY:—								
Excise	391,078 08	423,929 58	25,199 07	17,614 93	5,241 15	52,136 40	41,055 08	956,254 29
" Seizures		4 40						4 40
Hydraulic Rents	1 00						1 00	2 00
Minor Public Works	255 00	65 00	43 75					363 75
Weights and Measures	1,164 54	1,574 24	70 20	109 25	18 47	346 06	146 85	3,429 61
Gas Inspection	1,332 00	726 25	27 00	36 75	2 50	76 50	20 50	2,221 50
Electric Light Inspection	614 00	1,095 50	35 75	20 00	3 75	43 50	131 50	1,944 00
Methylated Spirits	4,286 73	1,823 01					66 77	6,176 51
Other Revenues	419 25	14 00	17 00					450 25
Totals	399,150 60	429,231 98	25,392 77	17,780 93	5,265 87	52,602 46	41,421 70	970,846 31
JUNE:—								
Excise	399,969 26	440,243 55	30,284 88	15,786 79	6,218 65	67,328 21	51,924 49	1,011,755 83
" Seizures	25 00	100 00		0 90			100 00	225 90
Hydraulic Rents	996 00	101 00					50 00	1,147 00
Minor Public Works	15 00	159 00						174 00
Weights and Measures	5,264 69	3,430 38	211 35	361 79	52 35	394 31	84 45	9,799 32
Gas Inspection	2,892 75	1,232 00	100 25	64 75	9 00	45 75	65 50	4,410 00
Electric Light Inspection	1,203 75	1,041 25	105 00	157 25		15 00	61 50	2,583 75
Methylated Spirits	4,259 52	2,169 80	94 47	171 64		45 31	43 73	6,784 47
Other Revenues	494 80	16 00	1 00				3 00	514 80
Totals	415,120 77	448,492 98	30,796 95	16,543 12	6,280 00	67,828 58	52,332 67	1,037,395 07
Grand total	4,679,557 32	5,041,673 31	274,292 91	239,642 17	55,909 77	698,252 79	477,561 91	11,466,890 18

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

EXCISE

No. 15.—Comparative Monthly

	July.	August.	September.	October.	November.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Spirits { 1900-1901	361,460 24	402,425 25	435,297 96	481,928 82	510,226 61
Spirits { 1901-1902	418,004 41	444,122 73	475,449 43	553,024 81	520,641 18
Increase, 1901-1902	56,544 17	41,697 48	40,151 47	71,095 99	10,414 57
Decrease, 1901-1902					
Malt Liquor { 1900-1901	5,850 00	150 00	200 00	100 00	50 00
Malt Liquor { 1901-1902	5,763 00	400 00	200 00	119 70	
Increase, 1901-1902		250 00		19 70	
Decrease, 1901-1902	87 00				50 00
Malt { 1900-1901	64,501 88	70,212 25	75,743 28	89,622 72	82,803 61
Malt { 1901-1902	89,750 77	83,599 86	86,040 79	90,659 67	93,796 80
Increase, 1901-1902	25,248 89	13,387 61	10,297 51	1,036 95	10,993 19
Decrease, 1901-1902					
Tobacco { 1900-1901	268,257 78	290,948 65	274,512 96	321,780 16	309,395 80
Tobacco { 1901-1902	280,531 88	309,629 47	283,569 82	334,919 47	313,297 04
Increase, 1901-1902	12,274 10	12,680 82	9,056 86	13,139 31	3,901 24
Decrease, 1901-1902					
Cigars { 1900-1901	83,391 89	76,159 91	69,003 54	75,674 58	68,921 15
Cigars { 1901-1902	88,065 86	74,304 77	72,305 99	76,643 89	73,254 03
Increase, 1901-1902	4,673 97		3,302 45	969 31	4,332 88
Decrease, 1901-1902		1,854 24			
Acetic Acid { 1900-1901	107 69	419 94	576 18	2,340 81	3,068 57
Acetic Acid { 1901-1902	929 87	84 73	497 94	50 00	1,937 52
Increase, 1901-1902	822 18				
Decrease, 1901-1902		335 21	78 24	2,290 81	1,131 05
Manufactures in bond { 1900-1901	3,427 34	5,633 38	6,383 94	5,213 65	3,251 94
Manufactures in bond { 1901-1902	4,187 74	4,889 99	6,019 83	5,997 74	3,755 91
Increase, 1901-1902	760 40			784 09	503 97
Decrease, 1901-1902		743 39	364 11		
Seizures { 1900-1901	607 40	111 58	91 70		64 00
Seizures { 1901-1902	350 00		5 00		50 00
Increase, 1901-1902					
Decrease, 1901-1902	257 40	111 58	86 70		14 00
Other receipts { 1900-1901	11,407 84	1,477 79	720 35	2,030 32	1,701 97
Other receipts { 1901-1902	11,921 63	2,492 20	1,840 08	2,111 59	1,942 46
Increase, 1901-1902	513 79	1,014 41	1,119 73	81 27	240 49
Decrease, 1901-1902					
Total Increase, 1901-1902	100,493 10	65,985 90	63,398 97	84,835 81	29,191 29
" Decrease, 1901-1902					
Total Revenue, 1900-1901	799,012 06	853,537 85	862,529 91	978,691 06	979,483 65
" 1901-1902	899,505 16	919,523 75	925,928 88	1,063,526 87	1,008,674 94

Inland Revenue Department,
Ottawa, August 16, 1902.

SESSIONAL PAPER No. 12

REVENUE.

Statement, 1900–1901 and 1901–1902.

December.	January.	February.	March.	April.	May.	June.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
606,778 19	388,089 75	402,410 09	367,272 93	411,473 53	417,080 79	396,330 96	5,180,775 12
676,881 73	408,858 85	393,059 83	376,589 33	474,053 88	437,414 92	442,511 88	5,620,612 98
70,103 54	20,769 10	.....	9,316 40	62,580 35	20,334 13	46,180 92	439,837 86
.....	.....	9,350 26	.....	.....	.....	.....	.....
50 09	68 56	50 00	.....	13 70	.....	36 70	6,568 90
59 00	75 00	25 00	207 00	.....	130 00	.....	6,969 70
.....	6 50	.....	207 00	.....	130 00	.....	400 80
.....	.....	25 00	.....	13 70	.....	36 70	.....
88,133 59	82,493 39	71,052 68	97,349 63	84,397 93	89,148 94	81,870 25	977,330 15
85,668 44	85,450 98	81,900 03	92,750 17	112,233 63	97,513 21	78,444 39	1,077,808 74
.....	2,957 59	10,847 35	.....	27,835 70	8,364 27	.....	100,478 59
2,465 15	.....	.....	4,599 46	.....	.....	3,425 86	.....
228,776 74	251,383 61	249,619 99	283 015 24	298,461 82	298,090 22	257,605 31	3,337,848 28
268,333 92	280,629 91	274,692 36	289,368 13	327,860 41	308,902 69	291,843 31	3,563,578 41
39,557 18	29,246 30	25,072 37	6,352 89	29,398 59	10,812 47	34,238 00	225,730 13
.....	.....	.....	.....	.....	.....	.....	.....
66,833 68	57,127 84	56,851 05	62,746 82	71,975 37	76,396 05	72,352 71	837,433 69
77,771 43	60,945 77	61,263 81	64,417 61	82,743 16	82,682 66	82,961 23	897,369 24
10,937 75	3,817 93	4,412 79	1,670 79	10,767 79	6,286 61	10,608 52	59,926 55
.....	.....	.....	.....	.....	.....	.....	.....
801 15	39 97	281 63	.....	105 87	192 76	975 05	8,909 62
1,631 21	1,089 76	.....	.....	477 11	147 17	2,917 00	8,862 31
839 06	1,049 79	.....	.....	371 24	.....	1,041 95	.....
.....	.....	281 63	.....	.....	45 59	.....	47 31
2,164 06	1,599 30	1,393 64	3,529 09	3,441 89	4,295 21	3,908 72	44,242 16
2,224 50	1,135 50	1,738 44	2,313 26	3,944 35	4,833 14	4,266 00	45,306 40
60 44	.....	344 80	.....	502 46	537 93	357 28	1,064 24
.....	463 80	.....	1,215 83	.....	.....	.....	.....
.....	100 00	38 56	14 80	10 00	115 70	137 95	1,291 69
31 20	285 00	163 25	262 48	194 15	.....	225 90	1,566 98
31 20	185 00	124 69	247 68	184 15	.....	87 95	275 29
.....	.....	.....	.....	.....	115 70	.....	.....
1,717 50	1,796 19	1,785 41	1,323 62	1,514 16	1,875 50	2,114 35	29,465 00
2,474 06	2,125 83	1,839 84	2,326 62	1,963 13	2,708 23	1,673 20	35,418 87
756 56	329 64	54 43	1,003 00	448 97	832 73	.....	5,953 87
.....	.....	.....	.....	.....	.....	441 15	.....
119,811 58	57,898 05	31,199 54	12,982 47	132.075 55	47,136 85	88,610 91	833,629 02
.....	.....	.....	.....	.....	.....	.....	.....
995,254 91	782,698 55	783,483 05	815,252 13	871,394 27	887,195 17	815,332 00	10,428,864 61
1,115,066 49	840,596 60	814,682 59	828,234 60	1,003,469 82	934,382 02	903,942 91	11,257,484 63

W. J. GERALD,
Deputy Minister.

No. 16. REFUNDS of Revenue during the Fiscal Year ended June 30, 1902.

EXCISE.

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
		1901.			$ cts.	$ cts.
Spirits	Swift, E. G	July 19..	Windsor	Refunded under Revised Statutes, cap. 34, sec. 238	104 25	
	"	" 23..	"	" " 34 " 238	51 61	
	"	Aug. 2..	"	" " 34 " 238	196 63	
	Austin, A. S	" 9..	"	" " 34 " 238	611 24	
	Swift, E. G	" 20..	"	" " 34 " 238	273 05	
	"	Sept. 6..	"	" " 34 " 238	85 42	
	"	" 12..	"	" " 34 " 238	95 47	
	"	" 17..	"	" " 34 " 238	121 60	
	"	" 24..	"	" " 34 " 238	109 02	
	"	Oct. 4..	"	" " 34 " 238	102 43	
	Heney, J. J	" 14..	Prescott	" " 34 " 238	11,543 03	
	Swift, E. G	" 26..	Windsor	" " 34 " 238	523 99	
	Eastern Township Bank	Nov. 5..	Sherbrooke	" " 34 " 238	7,570 83	
	Swift, E. G	" 7..	Windsor	" " 34 " 238	29 62	
	Hamilton, J. S., & Co	" 8..	Brantford	" " 34 " 238	54 87	
	Swift, E. G	" 12..	Windsor	" " 34 " 238	148 41	
	"	" 21..	"	" " 34 " 238	419 85	
	"	" 23..	"	" " 31 " 238	34 86	
	Bolmer, J. E	" 30..	"	" " 34 " 238	961 26	
	Swift, E. G	" 30..	"	" " 34 " 238	181 39	
	"	Dec. 4..	"	" " 34 " 238	38 76	
	Hamilton, J. S., & Co	" 7..	Brantford	" " 34 " 238	71 17	
	Swift, E. G	" 10..	Windsor	" " 34 " 238	113 20	
	"	" 10..	"	" " 34 " 238	15 92	
	"	" 24..	"	" " 31 " 238	206 23	
		1902.				
	"	Jan. 9..	"	" " 31 " 238	310 38	
	"	" 20..	"	" " 34 " 238	7 00	
	"	" 20..	"	" " 34 " 238	59 52	
	"	" 24..	"	" " 34 " 238	107 39	
	"	" 28..	"	" " 34 " 238	116 85	
	"	Feb. 10..	"	" " 31 " 238	249 83	
	"	" 21..	"	" " 34 " 238	278 03	
	"	Mar. 10..	"	" " 34 " 238	388 13	

"	"	"	"	15	"	"	34	238		99	31
"	"	"	"	24	"	"	34	238		1	84
"	"	"	"	25	"	"	34	238		111	15
"	"	"	April	2	"	"	34	238		55	99
"	"	"	"	5	"	"	34	238		281	75
"	"	"	"	8	"	"	34	238		212	08
"	"	"	"	16	"	"	34	238		256	86
"	"	"	"	21	"	"	34	238		135	77
Heney, J. J	"	"	"	25	Prescott	"	34	238		13,465	16
Swift, E. G	"	"	"	26	Windsor	"	34	238		90	61
Eastern Township Bank	"	"	May	5	Sherbrooke	"	34	238		7,632	52
Swift, E. G	"	"	"	5	Windsor	"	34	238		384	01
Heney, J. J	"	"	"	10	Prescott	"	34	238		13,392	66
Swift, E. G	"	"	"	20	Windsor	"	34	238		220	84
"	"	"	"	27	"	"	34	238		64	87
Grand Trunk Railway Co	"	"	June	2	Montreal	"	34	238		90	40
Canadian Pacific Co	"	"	"	3	Winnipeg	"	34	238		63	19
Hamilton, J. S., & Co	"	"	"	3	Brantford	"	34	238		45	52
Bolmer, J. E	"	"	"	6	Windsor	"	34	238		1,488	23
Swift, E. G	"	"	"	18	"	"	34	238		864	74
"	"	"	"	21	"	"	34	238		35	55
Whitney, A	"	"	"	24	Prescott	"	34	238		194	99
Swift, E. G	"	"	"	26	Windsor	"	34	238		85	86
Hamilton, J. S., & Co	"	"	July	4	Brantford	"	34	238		39	90
Swift, E. G	"	"	"	9	Windsor	"	34	238		211	13
										64,349	18
				1901.							
Mah											
Bernhardt, Peter	"	"	July	25	Guelph	"	30	238		200	67
Grant's Spring Brewing Co	"	"	"	25	Hamilton	"	30	238		964	69
Steele, J. J	"	"	"	25	"	"	30	238		244	50
Wilson, M. S	"	"	"	25	"	"	30	238		2,054	60
Taylor, H. J	"	"	"	25	St. Catharines	"	30	238		503	42
Hiram Walker & Sons, Ltd	"	"	"	25	Windsor	"	30	238		1,245	75
Irion, A. L	"	"	"	25	"	"	30	238		356	30
Winfindale, A. H	"	"	"	25	Montreal	"	30	238		39	40
Reinhardt, L., jr	"	"	"	25	"	"	30	238		357	40
Clouthier, D	"	"	"	25	"	"	30	238		18	39
Clarke, E. L	"	"	"	25	"	"	30	238		1,093	35
Reinhardt, C. S	"	"	"	25	"	"	30	238		429	75
Dow & Co, Wm	"	"	"	25	"	"	30	238		2,816	91
Dawes, A. J	"	"	"	25	"	"	30	238		21,369	61
Mace, T. F	"	"	"	25	"	"	30	238		193	12
Drewry, E. L	"	"	"	25	Winnipeg	"	30	238		791	58
Shea, Patrick	"	"	"	25	"	"	30	238		314	92
Downes, J. R	"	"	"	25	"	"	30	238		9	75
Wittenam, K	"	"	"	25	"	"	30	238		12	25
Robinson, L. A	"	"	"	25	"	"	30	238		46	35
Celsier, Robt	"	"	"	25	Calgary	"	30	238		66	75

No. 16. REFUNDS of Revenue during the Fiscal Year ended June 30, 1902 —*Continued.*

EXCISE—*Continued.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
					$ cts.	$ cts.
Malt—*Con.*	Union Brewing Co	July 25	Victoria	Refunded under Revised Statutes, cap. 29, sec. 78	90 00	
	Ambrose, T. H	" 25	Peterborough	" " " " 78	326 75	
	Cronmiller & White	" 25	St. Catharines	" " " " 78	278 33	
	Schwartz Wm	" 25	Winnipeg	" " " " 78	71 50	
	Clark, L. H	Aug. 1	Kingston	" " " " 78	1,024 45	
	Ready, James	" 1	St. John, N.B	" " " " 78	676 45	
	Nutter, S. C	" 3	Sherbrooke	" " " " 78	851 84	
	Blackwood, W	" 3	Winnipeg	" " " " 78	110 98	
	Beauport Brewing Co., The	" 9	Quebec	" " " " 78	429 00	
	McCarthy, D. J	" 26	Prescott	" " " " 78	570 08	
	Labatt, J	Sept. 24	London	" " " 31 " 178	15 72	
	Bowie R	" 24	Prescott	" " " " 78	288 13	
	Proteau & Carignan	" 24	Quebec	" " " " 78	249 00	
	McCarthy, D. J	" 27	Prescott	" " " 31 " 238	11 16	
	Grant's Spring B. Co., Ltd.	Oct. 4	Hamilton	" " " 34 " 238	432 27	
	May, J. P	" 8	Halifax	" " " 34 " 238	43 74	
	Curren, A. E	" 8	"	" " " 34 " 238	46 11	
	Wickwire, W. N	" 8	"	" " " 34 " 238	1,082 91	
	Victoria Phœnix B. Co	" 8	Victoria	" " " 34 " 238	361 49	
	Wilson, D. H	" 10	Toronto	" " " 34 " 178	225 45	
	McCarthy, D. J	Dec. 7	Prescott	" " " " 78	25 68	
	Capital B. and M. Co., The	" 7	Ottawa	" " " " 78	56 76	
	Boswell Bros	" 18	Quebec	" " " " 78	58 44	
		1902.				
	Heuser, Peter	Jan. 9	London	" " " 29 " 178	33 36	
	Wilson, D. H	" 9	Toronto	" " " " 78	76 87	
	Ambrose, T. H	" 9	Peterborough	" " " 34 " 238	9 39	
	Wickwire, W. N	" 9	Halifax	" " " 34 " 238	1,056 83	
	Curren, A. E	" 9	"	" " " 34 " 238	85 31	
	May, J. P	" 9	"	" " " 34 " 238	29 35	
	Victoria Phœnix B. Co	" 9	Victoria	" " " 31 " 238	537 81	
	Fort Steele Mercantile Co	" 13	Vancouver	" " " 29 " 178	26 38	
	Carling, T. H	" 17	London	" " " 34 " 178	12 33	
	Mace, T. F	Feb. 3	Montreal	" " " 29 " 78	230 69	

	Labatt, John	"	22	London	"	"	"	34	"	178	27 65	
	Dawes, A. J	Mar.	18	Montreal	"	"	"	34	"	178	59 05	
	Walkerville B. Co., Ltd	"	19	Windsor	"	"	"	34	"	238	133 95	
	Carling, T. H	April	2	London	"	"	"	34	"	238	11 10	
	Curren, A. E	"	2	Halifax	"	"	"	34	"	238	27 45	
	Wickwire, W. N	"	2	"	"	"	"	31	"	238	1,072 80	
	Victoria Phœnix B. Co	"	2	Victoria	"	"	"	31	"	238	270 68	
	Gowen, C. N	"	2	"	"	"	"	34	"	238	4 73	
	Dowing & Marstrand B.Co.	May	21	Vancouver	"	"	"	34	"	153	98 25	
	" "	June	18	"	"	"	"	34	"	153	60 00	
	Carling, T. H	"	24	London	"	"	"	34	"	238	105 65	
	McCarthy, D. J	July	4	Prescott	"	"	"	29	"	78	47 90	
	Victoria Phœnix B.Co., The	"	9	Victoria	"	"	"	34	"	238	509 18	
	Wickwire, W. N	"	9	Halifax	"	"	"	34	"	238	859 80	
	Curren, A. E	"	9	"	"	"	"	34	"	238	42 72	
	Carling, T. H	"	16	London	"	"	"	34	"	238	5 48	
												27,090 86
Tobacco	Fraser, James	"	19	Halifax	"	"	"	34	"	238	143 72	
	Henry, James	"	19	Montreal	"	"	"	34	"	259	4 83	
	Ein, S	"	19	"	"	"	"	34	"	259	1 35	
	Fortier, J. M	"	19	"	"	"	"	34	"	259	3 33	
	American Tobacco Co., Ltd., The	"	19	"	"	"	"	34	"	259	707 82	
	Isaacs, A	"	23	St. John, N.B	"	"	"	31	"	238	52 18	
	Macdonald, Sir W. C	"	23	Montreal	"	"	"	34	"	238	111 10	
	McKenna, Bros	"	23	Picton	"	"	"	34	"	238	115 68	
	American Tobacco Co., Ltd., The	"	25	Montreal	"	"	"	31	"	238	3 04	
	Isaacs, A	Aug.	1	St. John, N.B	"	"	"	34	"	238	4 31	
	McKenna, A	"	2	Picton	"	"	"	34	"	238	435 18	
	Gold, T. F	"	2	Victoria	"	"	"	34	"	238	24 75	
	McKenna, Bros	"	12	Picton	"	"	"	34	"	238	48 48	
	Isaacs, A	"	12	St. John, N.B	"	"	"	34	"	259	14 23	
	G. E. Tuckett & Son Co. Ltd., The	"	12	Hamilton	"	"	"	34	"	259	72 50	
	Williams, J. S	"	12	Toronto	"	"	"	34	"	238	192 86	
	Spilling, M. E	"	12	"	"	"	"	34	"	238	11 50	
	Fortier, J. M	"	13	Montreal	"	"	"	34	"	238	1,980 75	
	"	"	13	"	"	"	"	34	"	259	81 71	
	Henry, Jas	"	14	"	"	"	"	34	"	259	6 05	
	Ein, S	"	14	"	"	"	"	34	"	259	1 66	
	Fortier, J. M	"	14	"	"	"	"	34	"	259	8 37	
	American Tobacco Co., Ltd., The	"	14	"	"	"	"	34	"	259	691 50	
	McKenna, A	"	14	Picton	"	"	"	34	"	238	52 16	
	American Tobacco Co., Ltd., The	Sept.	10	Montreal	"	"	"	34	"	238	229 05	
	McKenna, Bros	"	10	Picton	"	"	"	34	"	238	59 28	
	Tobin & Co., John	"	10	Halifax	"	"	"	34	"	238	33 10	
	McKenna, A	"	17	Picton	"	"	"	34	"	238	31 08	

No. 16. REFUNDS of Revenue during the Fiscal Year ended June 30, 1902—*Continued.*

EXCISE *Continued.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Total.
		1901.			$ cts.	$ cts.
Tobacco *Con.*	McKenna, A	Sept. 17	Pictou	Refunded under Revised Statutes, cap. 34, sec. 238	117 52	
	G. E. Tuckett & Son Co., Ltd., The	" 17	Hamilton	" " 34 " 259	88 74	
	Henry, James	" 17	Montreal	" " 34 " 259	6 00	
	American Tobacco Co., Ltd., The	" 17	"	" " 34 " 259	832 82	
	Fortier, J. M	" 17	"	" " 34 " 259	1 23	
	Ein, S	" 17	"	" " 34 " 259	1 18	
	Houde & Co., B	" 17	Quebec	" " 34 " 259	91 12	
	Isaacs, A	" 17	St. John, N.B.	" " 34 " 259	10 22	
	Fortier, J. M	" 17	Montreal	" " 34 " 238	57 12	
	Honsinger, B. F	" 27	London	" " 34 " 238	10 60	
	Fortier, J. M	" 27	Montreal	" " 34 " 238	8 60	
	Flynn, F. L	" 27	Hamilton	" " 34 " 238	12 40	
	Fortier, J. M	Oct. 1	Montreal	" " 34 " 238	7 00	
	Martin, M	" 4	"	" " 34 " 238	15 50	
	American Tobacco Co., Ltd., The	" 4	"	" " 34 " 238	840 00	
	Tobin & Co., John	" 4	Halifax	" " 34 " 238	37 62	
	McKenna, A	" 4	Pictou	" " 34 " 238	442 80	
	G. E. Tuckett & Son Co., Ltd., The	" 12	Hamilton	" " 29 " 78	106 21	
	Isaacs, A	" 12	St. John, N.B	" " 34 " 259	18 12	
	McKenna, A	" 12	Pictou	" " 34 " 238	108 08	
	McKenna, Bros.	" 12	"	" " 34 " 238	107 36	
	Fortier, J. M	" 12	Montreal	" " 34 " 238	118 56	
	G. E. Tuckett & Son Co., Ltd., The	" 14	Hamilton	" " 34 " 238	1,081 23	
	Houde & Co	" 16	Quebec	" " 34 " 259	79 71	
	Henry, Jas	" 16	Montreal	" " 34 " 259	4 36	
	American Tobacco Co., Ltd., The	" 16	"	" " 34 " 259	661 13	
	Fortier, J. M	" 16	"	" " 34 " 259	0 12	
	Ein, S	" 16	"	" " 34 " 259	1 07	
	McKenna, A	" 16	Pictou	" " 34 " 238	78 64	
	McKenna, Bros.	" 16	"	" " 31 " 238	114 56	

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Gold, T. F.	"	18	Victoria	"	"	34	238	"	"	12	30
Tobin, John & Co.	"	30	Halifax	"	"	34	238	"	"	15	68
McKenna, A.	"	30	Pictou	"	"	34	238	"	"	51	72
Henry, James.	Nov.	8	Montreal	"	"	34	238	"	"	57	60
Lemesurier, John	"	19	Quebec	"	"	34	259	"	"	17	59
Henry, James	"	19	Montreal	"	"	34	259	"	"	9	51
American Tobacco Co., Ltd., The	"	19	"	"	"	84	259	"	"	765	91
Fortier, J. M.	"	19	"	"	"	34	259	"	"	2	99
Ein, S.	"	19	"	"	"	34	259	"	"	1	57
Isaacs, A.	"	19	St. John, N.B.	"	"	34	259	"	"	1	59
C. E. Tuckett & Son Co., Ltd., The	"	19	Hamilton	"	"	34	259	"	"	94	33
Fortier, J. M.	"	19	Montreal	"	"	34	238	"	"	175	25
McKenna, Bros.	"	19	Pictou	"	"	34	238	"	"	122	16
McKenna, A.	"	19	"	"	"	34	238	"	"	75	52
Nelson, C. H.	"	19	Montreal	"	"	34	238	"	"	89	10
Nolan, J. P.	"	19	London	"	"	34	238	"	"	100	30
Olmsted, Geo.	"	19	"	"	"	34	238	"	"	47	90
Kelly, G.	"	19	"	"	"	34	238	"	"	160	80
Smith, James.	"	19	"	"	"	34	238	"	"	130	90
Manness, S. R.	"	19	"	"	"	34	238	"	"	41	60
Honde, B. & Co.	"	19	Quebec	"	"	34	259	"	"	81	70
C. E. Tuckett & Son Co., Ltd., The	"	19	Hamilton	"	"	34	238	"	"	881	75
Youngheart, Ed	"	19	Montreal	"	"	34	238	"	"	263	60
C. E. Tuckett & Son Co., Ltd., The	"	19	Hamilton	"	"	34	238	"	"	17	85
C. E. Tuckett & Son Co., Ltd., The	"	21	"	"	"	34	238	"	"	572	90
Macdonald, Sir W. C	"	22	Montreal	"	"	34	238	"	"	26	12
" "	"	22	"	"	"	34	238	"	"	15	84
Seaton, R. B. & Co	"	26	Halifax	"	"	34	238	"	"	12	04
McKenna, A.	"	26	Pictou	"	"	34	238	"	"	63	60
Breper, A. H.	"	26	London	"	"	34	238	"	"	103	30
McNee, John	"	30	"	"	"	34	238	"	"	302	40
American Tobacco Co., Ltd., The	Dec.	4	Montreal	"	"	34	238	"	"	450	60
" "	"	4	"	"	"	34	270	"	"	582	42
Fair, T. J.	"	4	Brantford	"	"	34	238	"	"	142	70
Gendré, L. O.	"	4	Montreal	"	"	34	238	"	"	403	56
Henry, Jas.	"	6	"	"	"	34	238	"	"	276	60
Tobin, John & Co.	"	6	Halifax	"	"	34	238	"	"	39	64
Keenan, S.	"	7	Montreal	"	"	34	238	"	"	10	20
American Tobacco Co., Ltd., The	"	9	"	"	"	34	270	"	"	11	31
C. E. Tuckett & Son Co., Ltd., The	"	10	Hamilton	"	"	34	238	"	"	99	15
McKenna, A.	"	10	Pictou	"	"	34	238	"	"	215	16
Isaacs, A.	"	10	St. John	"	"	34	259	"	"	13	16

No. 16.—Refunds of Revenue—*Continued.*

EXCISE *Continued.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
		1901.			$ cts.	$ cts.
Tobacco *Con.*	Isaacs, A.	Dec. 13.	St. John	Refunded under Revised Statutes, cap. 34, sec. 238	52 50	
	Fortier, J. M.	" 16.	Montreal	" " 34 " 238	173 53	
	Henry, Jas.	" 16.	"	" " 34 " 238	5 79	
	Tansey, C. E.	" 16.	St. Catharines	" " 34 " 238	30 50	
	Henry, Jas.	" 18.	Montreal	" " 34 " 238	5 70	
	"	" 19.	"	" " 34 " 259	7 08	
	American Tobacco Co., Ltd., The	" 19.	"	" " 34 " 259	530 23	
	Fortier, J. M.	" 19.	"	" " 34 " 259	4 61	
	Ein, S.	" 19.	"	" " 34 " 259	1 51	
	Houde, B. & Co.	" 19.	Quebec	" " 34 " 259	84 06	
	McHugh, J.	" 19.	St. Catharines	" " 34 " 238	58 40	
	Fortier, J. M.	" 21.	Montreal	" " 34 " 238	28 90	
	McKenna, A.	" 23.	Pictou	" " 34 " 238	237 68	
	Daly, John M.	" 26.	London	" " 34 " 238	93 20	
	Ward, W.	" 31.	"	" " 34 " 238	140 40	
		1902.				
	Dyer, J. J.	Jan. 2.	"	" " 34 " 238	138 20	
	G. E. Tuckett & Son Co., Ltd., The	" 11.	Hamilton	" " 29 " 78	112 12	
	Kelly, G.	" 11.	London	" " 34 " 259	89 10	
	Brener, A. H.	" 11.	"	" " 34 " 238	131 30	
	McDonald, R. D.	" 11.	"	" " 34 " 238	363 10	
	Tobin, John, Co.	" 16.	Halifax	" " 34 " 238	10 62	
	Fortier, J. M.	" 16.	Montreal	" " 34 " 238	2,566 05	
	Ein, S.	" 16.	"	" " 34 " 259	0 66	
	Henry, James.	" 16.	"	" " 34 " 259	2 96	
	American Tobacco Co., Ltd., The	" 16.	"	" " 34 " 259	714 93	
	Isaacs, A.	" 16.	St. John, N.B.	" " 34 " 259	11 77	
	Kimberley, G. F.	" 16.	St. Catharines	" " 34 " 238	45 10	
	Fortier, J. M.	" 16.	Montreal	" " 34 " 238	120 80	
	"	" 16.	"	" " 34 " 238	2,630 20	
	Houde, B. & Co.	" 17.	Quebec	" " 34 " 259	67 48	
	Blumenstiel, I.	" 18.	Hamilton	" " 34 " 238	127 90	
	McKenna, A.	" 20.	Pictou	" " 34 " 238	1,216 00	

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Baird Bros. & Co.	"	20	Halifax	34	238				11	22
Isaacs, A	"	20	St. John, N.B.	"	238				15	72
Hebrecker, A	"	25	Halifax	34	238				48	99
Tuckett Cigar Co., Ltd	"	25	Hamilton	34	238				241	80
Hirsch, Jacob	"	25	Montreal	34	238				386	50
G. E. Tuckett & Son Co., Ltd., The	"	27	Hamilton	34	238				767	85
McKenna, A	Feb.	3	Picton	34	238				350	51
G. E. Tuckett & Son Co., Ltd., The	"	3	Hamilton	34	238				107	75
Hebrecker, A	"	3	Halifax	34	238				91	08
American Tobacco Co., Ltd., The	"	3	Montreal	34	238				46	40
" "	"	3	"	34	238				23	66
Macdonald, Sir W. C.	"	3	"	34	238				32	60
Jacobs, H. & Co.	"	3	"	34	238				14	60
Tobin, John & Co.	"	13	Halifax	34	238				25	56
Henry, Jas.	"	17	Montreal	34	259				4	75
Fin, S.	"	17	"	34	259				1	00
Fortier, J. M.	"	17	"	34	259				5	05
American Tobacco Co., Ltd., The	"	17	Quebec	34	259				620	32
Houde, E. & Co.	"	17	Quebec	34	259				51	35
Isaacs, A	"	17	St. John, N.B.	34	259				16	48
G. E. Tuckett & Son Co., Ltd., The	"	17	Hamilton	34	259				88	97
McDonald, R. D	"	17	London	34	238				140	20
Simon, H	"	17	"	34	238				212	70
McNee, John	"	17	"	34	238				265	60
Payne, J. B	"	17	Sherbrooke	34	238				253	60
G. E. Tuckett & Son Co., Ltd., The	"	24	Hamilton	34	238				785	86
American Tobacco Co., Ltd., The	"	27	Montreal	34	238				794	90
Webster, W. R	"	27	Sherbrooke	34	238				220	80
McKenna, A	"	28	Picton	34	238				323	96
" "	"	28	"	34	238				5	61
Hebrecker, A	Mar.	1	Halifax	34	238				22	44
"	"	8	Toronto	34	238				16	62
Ballard, A	"	8	"	34	270				105	24
Macdonald, Sir W. C.	"	8	Montreal	34	238				108	62
Billman, Chisholm & Co.	"	8	Halifax	34	238				94	02
McKenna, A	"	10	Picton	34	238				33	57
G. E. Tuckett & Son Co., Ltd., The	"	10	Hamilton	34	238				644	48
McKenna, A	"	15	Picton	34	238				786	90
Henry, Jas.	"	18	Montreal	34	259				579	52
Fin, S.	"	18	"	34	259				5	03
										66

No. 16. Refunds of Revenue—*Continued.*

EXCISE—*Continued.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
		1902.			$ cts.	$ cts.
Tobacco *Con.*	American Tobacco Co., Ltd., The	Mar. 18.	Montreal	Refunded under Revised Statutes, cap. 34, sec. 259	661 06	
	Fortier, J. M	" 18.	"	" " 34 " 259	4 57	
	Houde, B. & Co.	" 18.	Quebec	" " 34 " 259	53 51	
	G. E. Tuckett & Son Co., Ltd., The	" 18.	Hamilton	" " 34 " 259	109 56	
	Isaacs, A.	" 18.	St. John, N.B.	" " 34 " 259	17 55	
	Winterhalt, J.	" 18.	Guelph	" " 34 " 238	30 40	
	Tuckett Cigar Co., The	" 18.	Hamilton	" " 34 " 238	281 70	
	McGowan, G. A.	" 18.	Kingston	" " 34 " 238	271 10	
	Nolan, J. F.	" 18.	London	" " 34 " 238	163 20	
	Smith, James	" 18.	"	" " 34 " 238	174 30	
	Douglass, A.	" 18.	"	" " 34 " 238	60 90	
	O'Brien, W.	" 18.	Windsor	" " 34 " 238	128 70	
	Fortier, J. M.	" 18.	Montreal	" " 34 " 238	1,123 70	
	Lee, Thomas	" 18.	Winnipeg	" " 34 " 238	72 20	
	Masuret & Co.	" 19.	London	" " 34 " 238	153 76	
	American Tobacco Co., Ltd., The	" 19.	Montreal	" " 34 " 238	109 40	
	Blumenstiel, I.	" 21.	Hamilton	" " 34 " 238	169 40	
	Milligan, Geo.	" 22.	Toronto	" " 34 " 238	595 00	
	Isaacs, A.	" 24.	St. John	" " 34 " 238	118 80	
	Fortier, J. M.	" 25.	Montreal	" " 34 " 238	156 99	
	Grothé, L. O.	" 27.	"	" " 34 " 238	882 50	
	Ward, W.	Apr. 10.	London	" " 34 " 238	4 10	
	"	" 10.	"	" " 34 " 238	22 90	
	Brener, A. H.	" 10.	"	" " 34 " 238	5 80	
	Kelly, G.	" 10.	"	" " 34 " 238	5 30	
	American Tobacco Co., Ltd., The	" 10.	Montreal	" " 34 " 238	14 30	
	McAlpin, E. A.	" 10.	Toronto	" " 34 " 238	323 50	
	Isaacs, A.	" 14.	St. John	" " 34 " 238	18 56	
	Hobrecker, A.	" 14.	Halifax	" " 34 " 238	107 76	
	McKenna, A.	" 14.	Pictou	" " 34 " 259	3 00	
	G. E. Tuckett & Son Co., Ltd., The	" 14.	Hamilton	" " 34 " 259	122 10	
	Hobrecker, A.	" 15.	Halifax	" " 34 " 238	16 25	

Henry, James	"	"	15	Montreal	"	"	34	259			2 59
Ein, S.	"	"	15	"	"	"	34	259			1 38
Fortier, J. M.	"	"	15	"	"	"	34	259			4 80
American Tobacco Co., Ltd., The	"	"	15	"	"	"	34	259			605 40
Hondle, B.	"	"	15	Quebec	"	"	34	259			75 68
Isaacs, A.	"	"	15	St. John	"	"	34	259			22 47
Nelson, C. A.	"	"	15	Montreal	"	"	34	238			191 80
Donahue & Bradley	"	"	15	Hamilton	"	"	34	238			107 30
O'Dowd, Thos.	"	"	15	"	"	"	34	238			28 30
Weis, Frank	"	"	15	St. Catharines	"	"	34	238			45 00
Fortier, J. M.	"	"	15	Montreal	"	"	34	238			1,465 40
American Tobacco Co., Ltd., The	"	"	19	"	"	"	34	238			195 00
Tuckett Cigar Co., Ltd., The	"	"	19	Hamilton	"	"	34	238			192 30
Kelly, G.	"	"	19	London	"	"	34	238			58 70
Nolan, J. F.	"	"	19	"	"	"	34	238			142 00
Dyer, J. J.	"	"	19	"	"	"	34	238			189 20
McDonald, R. D.	"	"	19	"	"	"	34	238			250 70
Brener, A. H.	"	"	21	"	"	"	34	238			157 40
Fair, T. J.	"	"	21	Brantford	"	"	34	238			152 70
McKenna, A.	"	"	21	Picton	"	"	34	238			188 56
American Tobacco Co., Ltd., The	"	"	22	Montreal	"	"	31	238			90 99
Donnelly, Jas	"	"	23	London	"	"	34	238			46 80
McKenna, A.	"	"	28	Picton	"	"	34	238			108 56
Schrader, J. H.	"	"	28	Hamilton	"	"	33	238			47 40
G. E. Tuckett & Son Co., Ltd., The	"	"	28	"	"	"	34	238			76 90
Dawson, E. J.	"	"	28	London	"	"	34	238			46 10
Daly, J. M.	"	"	28	"	"	"	34	238			127 40
Webster, W. R.	"	"	28	Sherbrooke	"	"	34	238			295 30
McHugh, John	"	"	29	St. Catharines	"	"	34	238			38 90
Bollard, A	"	May	17	Toronto	"	"	34	270			142 35
Isaacs, A.	"	"	17	St. John	"	"	34	238			276 25
McKenna, A.	"	"	17	Picton	"	"	34	238			26 81
Tobin, John & Co.	"	"	17	Halifax	"	"	34	238			26 70
American Tobacco Co., Ltd., The	"	"	17	Montreal	"	"	34	270			1,608 43
"	"	"	17	"	"	"	31	259			678 46
Fortier, J. M.	"	"	17	"	"	"	34	259			9 03
Ein, S.	"	"	17	"	"	"	34	259			1 01
Hondle, B. & Co.	"	"	17	Quebec	"	"	34	259			74 21
G. E. Tuckett & Son Co., The	"	"	17	Hamilton	"	"	34	259			165 46
Isaacs, A.	"	"	17	St. John, N.B.	"	"	34	259			16 99
Henry, Jas.	"	"	17	Montreal	"	"	34	259			1 63
Lemeunier, John	"	"	17	Quebec	"	"	31	259			13 62
Taylor, John	"	"	17	Toronto	"	"	34	238			75 20

EXCISE – *Concluded.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
		1902.			$ cts.	$ cts
Tobacco *Con.*	O'Brien, W.	May 17	Windsor	Refunded under Revised Statutes, cap. 34, sec. 238	46 70	
	Hamilton, J. D.	" 20	Stratford	" " 34 " 238	87 60	
	Jacobs, H. & Co.	" 20	Montreal	" " 34 " 238	1,073 10	
	Rithet, R. P. & Co., Ltd.	" 21	Victoria	" " 34 " 238	369 91	
	Oberndorffer, S.	" 23	Kingston	" " 34 " 238	228 30	
	Hirch, J.	" 27	Montreal	" " 34 " 238	207 10	
	Youngheart, E.	" 27	"	" " 34 " 238	364 30	
	Fortier, J. M.	" 30	"	" " 34 " 238	891 60	
	Isaacs, A.	" 30	St. John, N.B.	" " 34 " 238	454 50	
	McKenna, A.	" 30	Pictou	" " 34 " 238	273 92	
	American Tobacco Co., Ltd., The	June 2	Montreal	" " 34 " 238	71 50	
	Hobrecker, A.	" 3	Halifax	" " 34 " 238	112 76	
	American Tobacco Co., Ltd., The	" 4	Montreal	" " 34 " 238	41 63	
	Tucket Cigar Co., Ltd.	" 6	Hamilton	" " 34 " 238	277 50	
	Hobrecker, A.	" 9	Halifax	" " 34 " 238	66 25	
	G. E. Tuckett & Son Co., Ltd., The	" 10	Hamilton	" " 34 " 238	344 01	
	Flynn, F. L.	" 11	"	" " 34 " 238	73 40	
	American Tobacco Co., Ltd., The	" 13	Montreal	" " 34 " 238	3 92	
	Courtney, T. F. & Co.	" 13	Halifax	" " 34 " 238	17 13	
	G. E. Tuckett & Son Co., Ltd., The	" 13	Hamilton	" " 34 " 238	696 85	
	Ein, S.	" 17	Montreal	" " 34 " 259	0 42	
	Henry, Jas.	" 17	"	" " 34 " 259	3 16	
	Fortier, J. M.	" 17	"	" " 34 " 259	16 03	
	American Tobacco Co., Ltd., The	" 17	"	" " 34 " 259	696 30	
	Hondc, B. & Co.	" 17	Quebec	" " 34 " 259	61 29	
	Isaacs, A.	" 17	St. John, N.B.	" " 34 " 259	29 61	
	G. E. Tuckett & Son Co., Ltd., The	" 17	Hamilton	" " 34 " 259	116 00	
	Fortier, J. M.	" 19	Montreal	" " 34 " 238	139 10	
	Payzant & King	" 19	Halifax	" " 34 " 238	62 08	

	McKenna, A	"	20	Pictou	"	"	34	"	238	300 32		
	Fortier, J. M	"	20	Montreal	"	"	34	"	238	218 30		
	Tietjen, W	"	23	Vancouver	"	"	34	"	238	170 50		
	Henry, Jas	"	21	Montreal	"	"	34	"	238	13 50		
	Friedman, K	"	24	Toronto	"	"	34	"	238	132 20		
	Jacobs, H. & Co	"	24	Montreal	"	"	34	"	238	201 30		
	Hynes & Co	"	28	Hamilton	"	"	34	"	238	34 10		
	Daly, John M	"	30	London	"	"	34	"	238	56 60		
	Manners, S. R	July	4	"	"	"	34	"	238	8 00		
	Nicholson, D	"	9	Charlottetown	"	"	34	"	238	200 80		
	McKenna, A	"	9	Pictou	"	"	34	"	238	60 00		
	Dyer, J. J	"	9	London	"	"	34	"	238	172 80		
	Spilling, M. E	"	14	Toronto	"	"	34	"	238	214 40		
	Davis, S. & Son	"	14	Montreal	"	"	34	"	238	850 70		
	Henry, James	"	16	"	"	"	34	"	259	5 51		
	Ein, S	"	16	"	"	"	34	"	259	0 88		
	American Tobacco Co., Ltd., The	"	16	"	"	"	34	"	259	797 62		
	Fortier, J. M	"	16	"	"	"	34	"	259	21 09		
	Honde, B. & Co	"	16	Quebec	"	"	34	"	259	66 15		
	Isaacs, A	"	16	St. John, N.B.	"	"	34	"	259	23 71		
	Tuckett, G. E. & Son Co., The	"	16	Hamilton	"	"	34	"	259	137 45		
	" "	"	16	"	"	"	29	"	78	1 80		
	McDonald, Sir W. C	"	18	Montreal	"	"	34	"	238	91 96		
										59,338 62		
									Less refunded	975 00		
											58,363 62	
Cigars	Fortier, J. M	Mar.	5	"	Refunded under Revised Statutes, cap. 34, sec. 270						5 25	
		1901.										
Manufactures in bond	Haaz, A	Aug.	12	Kingston	"	"	34	"	238		8 42	
Officer's salary	Allen, S	Sept.	27	Brantford	"	"	34	"	238	300 00		
		1902.										
	Stevenson, A. W	April	10	Montreal	"	"	34	"	238	75 00		
											375 00	
Other receipts	Lyman Bros. & Co	July	16	"							34 84	
Electric light, registration fees	The Corporation of the Town of St. Mary's	Aug.	12								12 50	
									Grand Total		150,239 67	

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

DR. No. 17. DEPARTMENTAL EXPENDITURES. CR.

(For Details see Appendix B.)

Due by sundry persons July 1, 1901.	Disbursed by the Receiver General.	Deductions for Superannuation.	Deductions for Insurance.	Deductions for Retirement.	Totals.		Salaries.	Contingencies.	Due by sundry persons June 30, 1902.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.
	7,000 00				7,000 00	Minister of Inland Revenue	7,000 00			7,000 00
	32,517 14	723 76	29 10	30 00	33,300 00	Departmental Officers	33,300 00			33,300 00
	201 58				201 58	Subscription to Newspapers		201 58		201 58
	1,637 50				1,637 50	Extra Clerks		1,637 50		1,637 50
	216 52				216 52	Telegraph Companies and Telephone		216 52		216 52
	1,356 01				1,356 04	Stationery		1,356 01		1,356 01
	99 98				99 98	Books and Maps		99 98		99 98
	1,229 49				1,229 49	Printing and Lithographing		1,229 49		1,229 49
	23 12				23 12	Postage		23 12		23 12
16 66	294 88				311 54	Sundry persons		294 88	16 66	311 54
16 66	14,576 25	723 76	29 10	30 00	45,375 77	Totals	40,300 00	5,659 11	16 66	45,375 77

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 12

WEIGHTS AND MEASURES, GAS, ELECTRIC LIGHT AND LAW STAMPS.

No. 18.—STATEMENT showing amount of Revenue accrued during year ended June 30, 1902.

DR.

—	Weights and Measures Stamps.	Gas Stamps.	Electric Light Stamps.	Law Stamps.			Totals.
				Supreme Court.	Exchequer Court.	Yukon Territory.	
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
To amount of stamps destroyed or returned by distributors	152 25	37 50					189 75
To commission allowed				75 00	139 75		214 75
To amount of stamps remaining in hands of distributors, June 30, 1902	44,736 60	29,833 30	36,440 25			18,250 00	129,260 15
To balance, being the revenue during 1901-1902	60,820 18	23,207 75	15,994 25	1,425 00	2,655 25		104,102 43
Totals	105,709 03	53,078 55	52,434 50	1,500 00	2,795 00	18,250 00	233,767 08

CR.

—	Weights and Measures Stamps.	Gas Stamps.	Electric Light Stamps.	Law Stamps.			Totals.
				Supreme Court.	Exchequer Court.	Yukon Territory.	
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
By amount of stamps in the hands of distributors on July 1, 1901	39,853 03	30,766 05	36,534 50				107,153 58
By stamps issued by Inland Revenue Department during the year	65,856 00	22,312 50	15,900 00	1,500 00	2,795 00	18,250 00	126,613 50
Totals	105,709 03	53,078 55	52,434 50	1,500 00	2,795 00	18,250 00	233,767 08

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

No. 19 (A). Inspection Divisions in Account with Revenue.

Dr. Balances due by Inspectors, July 1, 1901. Stamps on hand.	Cash on hand.	Stamps issued to Inspectors.	Seizures and Penalties.	Other Receipts.	Totals.	Divisions.	Stamps returned or destroyed.	Deposited to the credit of the Receiver General.	Cr. Balances due by Inspectors, June 30, 1902. Stamps on hand.	Cash on hand.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
2,942 05	230 10	2,275 00	20 00	.. ..	5,467 45	....Belleville.	13 60	4,206 55	1,247 30	.. ..	5,467 45
3,246 19	.. ..	10,745 00	5 00	.. ..	13,996 19	....Hamilton	25 00	9,653 46	1,317 73	.. ..	13,996 19
2,520 70	.. ..	6,395 00	.. ..	55 00	8,970 70	....Ottawa	1 30	6,809 26	2,160 14	.. ..	8,970 70
1,573 12	312 14	6,906 00	.. ..	.. ..	11,792 56	.. Toronto	.. ..	6,881 29	1,911 27	.. ..	11,792 56
3,182 95	.. ..	7,320 00	.. ..	.. ..	10,502 95	....Windsor	.. ..	7,282 42	3,220 53	.. ..	10,502 95
16,165 31	543 54	33,641 00	25 00	55 00	50,729 85	.. *Ontario*	39 90	34,832 98	15,856 97	.. ..	50,729 85
9,112 07	645 95	12,940 00	.. ..	.. ..	22,698 02	....Montreal	.. ..	11,827 69	10,870 33	.. ..	22,698 02
2,617 71	823 34	2,600 00	.. ..	.. ..	6,041 05	....Quebec	.. ..	4,339 46	1,664 44	37 15	6,041 05
.. ..	.. ..	4,553 00	.. ..	.. ..	4,553 00	.. St. Hyacinthe	.. ..	666 27	3,886 73	.. ..	4,553 00
2,366 00	.. ..	2,928 00	.. ..	.. ..	5,294 00	...Three Rivers	104 00	1,874 40	3,315 60	.. ..	5,294 00
14,095 78	1,469 29	23,021 00	.. ..	.. ..	38,586 07	.. *Quebec*	104 00	18,707 82	19,737 10	37 15	38,586 07
1,771 00	.. ..	1,280 00	.. ..	.. ..	3,051 00	.. *St. John, N. B*	.. ..	1,494 75	1,556 25	.. ..	3,051 00
299 73	.. ..	490 00	.. ..	.. ..	789 73	....Cape Breton	8 35	371 66	409 72	.. ..	789 73
802 57	80 50	811 50	.. ..	.. ..	1,694 57	....Halifax	.. ..	1,030 13	613 99	50 45	1,694 57
884 23	31 77	1,070 00	.. ..	.. ..	1,986 00	....Pictou	.. ..	649 12	1,336 88	.. ..	1,986 00
1,986 53	112 27	2,371 50	.. ..	.. ..	4,470 30	.. *Nova Scotia*	8 35	2,050 91	2,360 59	50 45	4,470 30
751 21	.. ..	267 50	.. ..	.. ..	1,018 71	.. *Charlottetown, P.E.I.*	.. ..	439 43	579 28	.. ..	1,018 71

3,727 06	.....	4,262 50	.....	.....	7,989 56	..... *Winnipeg, Man.*	.....	4,065 59	3,923 97	.....	7,989 56
492 49	.....	280 00	.....	.....	772 49	..... *Calgary, N.W.T.*	.....	514 25	258 24	.....	772 49
563 65	.....	732 50	.....	.....	1,296 15	..... *Victoria, B.C.*	.....	831 95	464 20	.....	1,296 15
39,853 03	2,125 10	65,856 00	25 00	55 00	107,914 13	..... Grand Totals.....	152 25	62,937 68	44,736 60	87 60	107,914 13

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902

W. J. GERALD,
Deputy Minister.

WEIGHTS AND MEASURES, 1901–1902.

No. 19 (B).—Deputy Inspectors of the Old Divisions in Account with Revenue.

DR.			CR.	
Balances due July 1, 1901. — Cash on hand.	Totals.	Divisions.	Balances due June 30, 1902. — Cash on hand.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.
87 10	87 10	Essex	87 10	87 10
87 10	87 10	*Ontario*	87 10	87 10
5 62	5 62	Hull	5 62	5 62
5 62	5 62	*Quebec*	5 62	5 62
92 72	92 72	Totals	92 72	92 72

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

WEIGHTS AND MEASURES, 1901–1902.

No. 20 (A). —Inspection Divisions in Account with Expenditures.

(For Details, see Appendix B.)

Dr.										Cr.						
Amounts received from Department to meet Expenditures.	Deductions from Salaries for				Totals.	Divisions.	Expenditures Authorized by the Department.						Totals.
	Superannuation.	Insurance.	Retirement.	Guarantee.			Salaries.	Seizures.	Special Assistance	Rent.	Travelling Expenses	Sundries.	
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
5,830 17	51 92			10 80	5,892 89	Belleville	3,399 92	16 35	499 92	290 00	1,213 04	473 66	5,892 89
7,269 69	32 08			14 85	7,307 62	Hamilton	6,141 02				1,058 17	108 43	7,307 62
5,520 89	12 00	41 76		10 80	5,585 45	Ottawa	3,899 88			250 00	1,247 50	188 07	5,585 45
5,820 67	16 04			10 80	5,847 51	Toronto	4,099 88				1,637 49	110 14	5,847 51
5,179 00	28 04			9 00	5,216 04	Windsor	3,724 82	9 65			1,331 76	149 81	5,216 04
29,611 42	140 08	41 76		56 25	29,849 51	*Ontario*	21,265 52	26 00	499 92	540 00	6,187 96	1,030 11	29,849 51
9,756 97	64 04			18 90	9,839 91	Montreal	7,874 69				1,640 10	325 12	9,839 91
8,019 33	86 88	38 28		15 30	8,159 79	Quebec	6,016 55		166 59	200 00	1,525 14	251 51	8,159 79
2,828 26			34 96	6 30	2,869 52	Three Rivers	1,949 92		249 97		650 20	19 43	2,869 52
563 01				0 90	563 91	St. Hyacinthe	324 99				206 41	32 51	563 91
21,167 57	150 92	38 28	34 96	41 10	21,433 13	*Quebec*	16,166 15		416 56	200 00	4,021 85	628 57	21,433 13
3,462 42	49 96			9 00	3,521 38	*St. John, N.B.*	3,100 00				403 20	18 18	3,521 38
1,179 30				3 60	1,182 90	Cape Breton	800 00			50 00	275 00	57 90	1,182 90
2,813 32				5 40	2,818 72	Halifax	1,599 96		419 97	225 00	420 21	153 58	2,818 72
1,855 84	19 96			5 40	1,881 20	Pictou	1,600 00				249 00	32 20	1,881 20
5,848 46	19 96			14 40	5,882 82	*Nova Scotia*	3,999 96		419 97	275 00	944 21	243 68	5,882 82
1,711 11				5 40	1,716 51	*Charlottetown, P.E.I.*	1,549 92				157 66	38 93	1,716 51

WEIGHTS AND MEASURES, 1901-1902.

No. 20 (A). Inspection Divisions in Account with Expenditures *Concluded.*

(For Details, see Appendix B.)

Dr. Cr.

Amounts received from Department to meet Expenditures.	Deductions from Salaries for Superannuation.	Insurance.	Retirement.	Guarantee	Totals.	Divisions.	Expenditures Authorized by the Department. Salaries.	Seizures.	Special Assistance	Rent.	Travelling Expenses	Sundries.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
6,035 76	1 01	..	.. ..	10 20	6,050 00	Winnipeg	2,799 84	.....	1,300 08	108 00	1,740 43	101 65	6,050 00
990 03	14 00	.....	.....	3 30	1,007 33	Calgary	783 30	.....	.....	.....	201 80	22 23	1,007 33
7,025 79	18 04	....	.....	13 50	7,057 33	*Manitoba and N. W. Territories.*	3,583 14	.. ..	1,300 08	108 00	1,942 23	123 88	7,057 33
2,691 10	...	...	.. .	6 15	2,697 25	*Victoria, B.C.*	1,408 76	.....	.. . .	45 00	1,153 28	90 21	2,697 25
3,476 70	.....	....	....	. ..	3,476 70	General Contingencies	....	.....	... .	... ...	.....	3,476 70	3,476 70
282 36	.....	....	.....	... ..	282 36	Printing	....	. ..	.....	.....	....	282 36	282 36
146 34	....	...	.....	... ..	146 34	Stationery	....	....	.....	.. ...	... .	146 34	146 34
324 99	..	.....	.. ...	...	324 99	Lithographing	....	.....	.....	.....	.. ..	324 99	324 99
75,778 26	378 96	80 01	34 96	146 10	76,418 32	Grand Totals	51,073 45	26 00	2,636 53	1,168 00	15,110 39	6,403 95	76,418 32

Inland Revenue Department,
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

WEIGHTS AND MEASURES, 1901-1902.

DR. No. 20 (B).—Inspection Divisions in Account with Expenditures. CR.

Balances due by sundry persons, July 1, 1901.	Totals.	Divisions.	Balances due by sundry persons, June 30, 1902.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.
39 56	39 56	Essex	39 56	39 56
33 53	33 53	Waterloo	33 53	33 53
73 09	73 09	*Ontario*	73 09	73 09
0 33	0 33	Drummond	0 33	0 33
41 45	41 45	Laval	41 45	41 45
26 88	26 88	Montmorency	26 88	26 88
27 51	27 51	Richelieu	27 51	27 51
96 17	96 17	*Quebec*	96 17	96 17
24 00	24 00	Lunenburg, Nova Scotia	24 00	24 00
193 26	193 26	Totals	193 26	193 26

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902

GAS INSPECTION AND LAW STAMPS, 1901-1902.

Dr. No. 21. Inspection Districts and Stamp Distributors in Account with Revenue. Cr.

Balances Due by Inspectors, July 1, 1901.		Stamps issued to Inspectors and others.	Penalties	Other Receipts.	Totals.	Divisions.	Commission allowed to Distributors of Stamps.	Returned damaged Stamps.	Deposited to the credit of the Receiver General.	Balances Due by Inspectors, June 30, 1902.		Totals.
Stamps on hand.	Cash on hand.									Stamps on hand.	Cash on hand.	
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
677 25					677 25	Barrie			75 75	601 50		677 25
486 25	34 50	450 00			970 75	Belleville		37 50	105 75	827 50		970 75
258 50		725 00			983 50	Berlin			233 00	750 50		983 50
344 25		200 00			544 25	Brockville			192 25	352 00		544 25
173 00		475 00			648 00	Cobourg			162 50	485 50		648 00
303 75					303 75	Cornwall			49 75	254 00		303 75
525 75		75 00			600 75	Guelph			174 50	426 25		600 75
1,885 25	181 75	1,550 00			3,617 00	Hamilton			2,002 50	1,614 50		3,617 00
783 50	38 50	250 00			1,072 00	Kingston			342 50	729 50		1,072 00
295 50					295 50	Listowel			48 75	246 75		295 50
1,865 50		1,875 00	5 60		3,745 50	London			2,187 75	1,557 75		3,745 50
119 25	25 00	87 50			231 75	Napanee			96 00	135 75		231 75
2,915 50		475 00			3,390 50	Ottawa			742 50	2,648 00		3,390 50
241 00		400 00			641 00	Owen Sound			102 00	539 00		641 00
987 25	17 00				1,004 25	Peterborough			140 25	864 00		1,004 25
743 75		175 00			918 75	Sarnia			248 25	670 50		918 75
790 50		525 00			1,315 50	Stratford			138 50	1,177 00		1,315 50
6,043 80	553 25	6,950 00			13,547 05	Toronto			8,682 50	4,864 55		13,547 05
19,439 55	850 00	14,212 50	5 00		34,507 05	*Ontario*		37 50	15,725 00	18,744 55		34,507 05
1,968 25		5,075 00		5 30	7,048 55	Montreal			5,937 55	1,111 00		7,048 55
798 25	59 75	300 00			1,158 00	Quebec			431 00	727 00		1,158 00
444 50					444 50	Sherbrooke			36 00	408 50		444 50
3,211 00	59 75	5,375 00		5 30	8,651 05	*Quebec*			6,404 55	2,246 50		8,651 05
847 25		37 50			884 75	Fredericton			58 00	826 75		884 75
980 75		250 00			1,230 75	St. John			421 25	809 50		1,230 75
1,828 00		287 50			2,115 50	*New Brunswick*			479 25	1,636 25		2,115 50

959 00	78 00				1,037 00	*Halifax, N.S.*			501 50	535 50	1,037 00
728 00		300 00			1,028 00	*Charlottetown, P.E.I.*			54 25	973 75	1,028 00
1,222 50		525 00			1,747 50	*Winnipeg, Man*			512 50	1,235 00	1,747 50
917 00					917 00	Nanaimo			61 75	855 25	917 00
		1,312 50			1,312 50	New Westminster				1,312 50	1,312 50
1,463 75	16 00				1,479 75	Vancouver			242 25	1,237 50	1,479 75
997 25		300 00			1,297 25	Victoria			240 75	1,056 50	1,297 25
3,378 00	16 00	1,612 50			5,006 50	*British Columbia*			544 75	4,461 75	5,006 50
30,766 05	1,003 75	22,312 50	5 00	5 30	54,092 60	Grand Totals		37 50	24,221 80	29,833 30	54,092 60
		4,295 00			4,295 00	Law Stamps	214 75		4,080 25		4,295 00

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

GAS

No. 22.—Inspection Districts in

Dr. (*For Details, see*

Balances due by Inspectors, July 1, 1901.	Amounts received from Department to meet Expenditures.	Deductions from Salaries for			Totals.	Divisions.
		Superannuation.	Retirement.	Guarantee.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
	97 00	2 00		3 60	102 60	Barrie
	663 00	7 04		6 00	676 04	Belleville
	150 62			3 60	154 22	Berlin
	111 66				111 66	Brockville
	161 95	2 00		3 60	167 55	Cobourg
	124 40	2 00		3 60	130 00	Cornwall
	205 47	4 00		3 60	213 07	Guelph
	2,764 20	36 00		7 20	2,807 40	Hamilton
	515 03			3 60	518 63	Kingston
	171 15			3 60	174 75	Listowel
	1,569 90			3 60	1,573 50	London
	39 23				39 23	Napanee
	2,004 42			3 60	2,008 02	Ottawa
	322 10	4 00		3 60	329 70	Owen Sound
	148 40			3 60	152 00	Peterborough
	21 75				21 75	Sarnia
	206 90	4 06		3 60	214 50	Stratford
	3,285 31	34 04		7 05	3,326 40	Toronto
	12,562 49	95 08		63 45	12,721 02	*Ontario*
	3,048 70			5 40	3,054 10	Montreal
	1,422 22	25 96		3 60	1,451 78	Quebec
	143 40	3 00		3 60	150 00	Sherbrooke
	73 20			1 80	75 00	St. Hyacinthe
	4,687 52	28 96		14 40	4,730 88	*Quebec*
	196 40			3 60	200 00	Fredericton
	1,144 08			3 60	1,147 68	St. John
	1,340 48			7 20	1,347 68	*New Brunswick*
	2,597 56	27 00		7 20	2,631 76	Halifax
12 88					12 88	Pictou
12 88	2,597 56	27 00		7 20	2,644 64	*Nova Scotia*
	322 79			3 60	326 39	*Charlottetown, P.E.I.*
	379 25			3 60	382 85	*Winnipeg, Man*
	99 40			3 60	103 00	Nanaimo
	368 97		5 00	3 60	377 57	New Westminster
	437 10	6 00		3 60	446 70	Vancouver
	192 40	4 00		3 60	200 00	Victoria
	1,097 87	10 00	5 00	14 40	1,127 27	*British Columbia*

SESSIONAL PAPER No. 12

INSPECTION.

Account with Expenditures, 1901–1902.

Appendix B.) CR.

Expenditures authorized by the Department.						
Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	Balances due by Inspectors, June 30, 1902.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
100 00				2 60		102 60
438 67		136 25	16 43	84 69		676 04
100 00			40 00	14 22		154 22
	99 96			11 70		111 66
100 00			33 35	34 20		167 55
100 00				30 00		130 00
200 00				13 07		213 07
2,499 96		36 00	171 70	99 74		2,807 40
400 00		67 50		51 13		518 63
100 00		60 00		14 75		174 75
1,050 00	48 00	25 00	391 50	59 00		1,573 50
			34 38	4 85		39 23
1,050 00	540 00	300 00	35 45	82 57		2,008 02
200 00		125 00	2 85	1 85		329 70
150 00				2 00		152 00
		20 00		1 75		21 75
200 00				14 50		214 50
3,272 54				53 86		3,326 40
9,961 17	687 96	769 75	725 66	576 48		12,721 02
2,299 92	334 00	240 00	18 00	162 18		3,054 10
1,300 00		150 00		1 78		1,451 78
150 00						150 00
75 00						75 00
3,824 92	334 00	390 00	18 00	163 96		4,730 88
200 00						200 00
1,050 00			88 11	9 57		1,147 68
1,250 00			88 11	9 57		1,347 68
1,849 92		307 35	378 57	95 92		2,631 76
					12 88	12 88
1,849 92		307 35	378 57	95 92	12 88	2,644 64
300 00				26 39		326 39
300 00		27 00	47 85	8 00		382 85
100 00				3 00		103 00
100 00				277 57		377 57
300 00			89 95	56 75		446 70
200 00						200 00
700 00			89 95	337 32		1,127 27

GAS

No. 22.—INSPECTION DISTRICTS in

DR. (*For details see*

Balances due by Inspectors, July 1, 1901.	Amounts received from Department to meet Expenditures.	Deductions from Salaries for			Totals.	Divisions.
		Superannuation.	Retirement.	Guarantee.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
200 00	121 89	....	....	.. . .	321 89	..General..... ....
.....	427 84	.. . .	.. ..	....	427 84	..General expenses.. ....
....	95 76	.....	....	.....	95 76	..Printing .. ..
. . ....	133 46	.....	.....	.....	133 46	..Stationery.....
....	20 00	....	....	.....	20 00	..Lithographing..... . .....
212 88	23,786 91	161 04	5 00	113 85	24,279 68	.... .Grand Totals. .....

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 12

INSPECTION.

Account with Expenditures, 1901–1902.

Appendix B.) CR.

Expenditures Authorized by the Department.					Balances due by Inspectors, June 30, 1902.	Totals.
Salaries.	Special Assistance.	Rent.	Travelling Expenses	Sundries.		
$ cts.	$ cts.	$ cts.	$ cts	$ cts.	$ cts.	$ cts.
.....	.....	.....	30 80	91 09	200 00	321 89
.....	.....	.....	.....	427 84	.....	427 84
.....	.....	.....	.....	95 76	.....	95 76
.....	.....	.....	.....	133 46	.....	133 46
.....	.....	.....	.....	29 00	.....	29 00
18,186 01	1,021 96	1,494 10	1,378 94	1,985 79	212 88	24,279 68

W. J. GERALD,
Deputy Minister.

ELECTRIC LIGHT INSPECTION, 1901 1902.

No. 23.—Inspection Districts in Account with Revenue.

Dr. Cr.

Balances, July 1, 1901.		Stamps issued to Inspectors	Registration Fees Accrued.	Totals.	Districts.	Deposited to the credit of the Receiver General.		Balances, June 30, 1902.		Totals.
Stamps on hand.	Cash on hand.					Registration Fees.	Inspection Fees.	Stamps on hand.	Cash on hand.	
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	
1,881 25		225 00	590 00	2,696 25	Belleville	590 00	588 50	1,517 75		2,696 25
1,904 75	31 25	1,037 50	380 00	3,356 50	Hamilton	380 00	1,014 75	1,961 75		3,356 50
2,157 50		675 00	682 50	3,515 00	London	682 50	803 50	2,029 00		3,515 00
6,627 25		2,325 00	380 00	9,332 25	Ottawa	380 00	1,772 00	7,180 25		9,332 25
8,503 25	90 00	2,500 00	980 00	12,073 25	Toronto	980 00	3,056 25	8,037 00		12,073 25
21,074 00	124 25	6,762 50	3,012 50	30,973 25	*Ontario*	3,012 50	7,235 00	20,725 75		30,973 25
4,555 50		3,900 00	275 00	8,730 50	Montreal	275 00	4,575 75	3,879 75		8,730 50
2,153 75	148 75	850 00	160 00	3,312 50	Quebec	160 00	1,005 50	2,147 00		3,312 50
266 25		50 00	210 00	556 25	Sherbrooke	240 00	195 00	121 25		556 25
		1,450 00	175 00	1,625 00	St. Hyacinthe	175 00	120 00	1,330 00		1,625 00
6,975 50	148 75	6,250 00	850 00	14,224 25	*Quebec*	850 00	5,896 25	7,478 00		14,224 25
1,644 50		825 00	185 00	2,654 50	*St. John, N.B.*	185 00	647 00	1,822 50		2,654 50
2,151 75	69 00	500 00	375 00	3,095 75	*Halifax, N.S.*	375 00	824 00	1,896 75		3,095 75
		350 00	60 00	410 00	*Charlottetown, P.E.I.*	60 00	16 00	334 00		410 00
1,546 50		137 50	290 00	1,974 00	*Winnipeg, Man.*	290 00	459 50	1,224 50		1,974 00
2,056 00	37 50	750 00	235 00	3,078 50	Vancouver	235 00	926 75	1,916 75		3,078 50
1,086 25		325 00	60 00	1,471 25	Victoria	60 00	369 25	1,042 00		1,471 25
3,142 25	37 50	1,075 00	295 00	4,549 75	*British Columbia*	295 00	1,296 00	2,958 75		4,549 75
36,534 50	379 50	15,900 00	5,067 50	57,881 50	Grand Totals	5,067 50	16,373 75	36,440 25		57,881 50
			12 50	12 50	Less Refunds, as per Statement No. 16	12 50				12 50
36,534 50	379 50	15,900 00	5,055 00	57,869 00		5,055 00	16,373 75	36,440 25		57,869 00

Inland Revenue Department,
Ottawa, August 16, 1902

W. J. GERALD,
Deputy Minister.

ELECTRIC LIGHT INSPECTION.

No. 24.—Inspection Districts in Account with Expenditures, 1901–1902.

Dr. *(For Details, see Appendix B.)* Cr.

Amounts received from Department to meet Expenditures.	Guarantee.	Totals.		Expenditures Authorized by the Department.					Totals.
				Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
301 46	.....	301 46	Belleville	.....	.....	.....	294 06	7 40	301 46
111 45	.....	111 45	Hamilton	.....	.....	.....	110 75	0 70	111 45
193 35	.....	193 35	London	.....	.....	.....	188 35	5 00	193 35
238 41	.....	238 41	Toronto	.....	.....	.....	190 35	48 06	238 41
454 10	.....	454 10	Montreal	.....	396 00	.....	46 10	12 00	454 10
72 91	.....	72 91	Quebec	.....	.....	.....	3 36	69 55	72 91
79 85	.....	79 85	Sherbrooke	.....	.....	.....	71 40	8 45	79 85
320 60	1 20	321 80	St. Hyacinthe	300 00	.....	.....	20 40	1 40	321 80
94 12	.....	94 12	St. John	.....	.....	.....	72 46	21 66	94 12
212 96	.....	212 96	Halifax	.....	.....	.....	209 76	3 20	212 96
52 59	.....	52 59	Charlottetown	.....	.....	.....	18 45	34 14	52 59
104 00	.....	104 00	Winnipeg	.....	.....	81 00	.....	23 00	104 00
12 85	.....	12 85	Victoria	.....	.....	.....	11 60	1 25	12 85
2,826 87	.....	2,826 87	Chief electrical engineer	2,400 00	.....	.....	273 85	153 02	2,826 87
4,088 74	.....	4,088 74	General	.....	.....	.....	.....	4,088 74	4,088 74
81 99	.....	81 99	Printing	.....	.....	.....	.....	81 99	81 99
14 23	.....	14 23	Stationery	.....	.....	.....	.....	14 23	14 23
9,260 18	1 20	9,261 68	Totals	2,700 00	396 00	81 00	1,510 89	4,573 79	9,261 68

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

DR. No. 25. STATEMENT showing the transactions in connection with the manufacture of Methylated Spirits, 1901-1902. CR

	Amounts.	Totals.		Amounts.	Totals.
	$ cts.	$ cts.		$ cts.	$ cts.
To Stock on hand, July 1, 1901, viz.		8,717 98	By Goods sold as follows		66,784 73
Wood Naphtha, 6,356·47 Proof Galls.=3,801·56 Std. Galls. at $1.40	5,322 18		Methylated Spirits, 85,350·89 Proof Galls.=		
Methylated Spirits, 3,111·99 Proof Galls.=			11,952·88 Std. Galls. at $1.08	12,909 11	
1,180·66 Std. Galls. No. 1 at $1.10	1,298 73		32,447·55 " $1.10	35,692 30	
505·54 " No. 2 at $1.50	758 31		7,321·16 " $1.50	10,981 73	
194·79 " Special at $1.10.	214 27		Alcohol, 4·95 Proof Galls. at 25c.	1 24	
Alcohol, 8,879·68 Proof Galls. at 25c.	221 99		Drums, 12 at $8 and 242 at $10	2,516 00	
Drums, 4 at $10	40 00		Barrels, 1,869 at $2.50	4,672 50	
Barrels, 345 at $2.50	862 50		Freight, $10.90; cans, 95c	11 85	
To Stock sold in 1900-01 and not paid until after July 1, 1901		1,581 44	By Stock sold and not paid for, up to June 30, 1901		1,360 55
Methylated Spirits, 2,081·11 Proof Galls.=			Methylated Spirits, 1,843.59 Proof Galls.=		
121·50 Std. Galls. at $1.08	131 22		453·05 Std. Galls. at $1.08	489 29	
886·49 " $1.10	975 14		535·40 " $1.10	588 94	
248·39 " $1.50	372 58		124·88 " $1.50	187 32	
Drums, 5 at $10	50 00		Drums, 6 at $10	60 00	
Barrels, 21 at $2 50	52 50		Barrels, 14 at $2.50	35 00	
To Disbursements for purchases, &c.		44,993 63	By Goods used in manufacture—		
Alcohol, 63,712·38 Proof Galls. at 25c.	15,928 10		Wood Naphtha, 23,831.45 Proof Galls.=14,270·34 Std. Galls.		
Wood Naphtha, 25,768·29 Proof Galls.=15,411·09 Std. Galls. at $1.40	21,575 53		Alcohol, 66,039.58 Proof Galls		
Drums, 20 at $8 and 248 at $10	2,640 00		Barrels destroyed, 85		
Barrels, 1,939 at $2.50	4,847 50				
Fusel Oil	2 50				
To other expenses as follows		7,023 38	By Alcohol sold, the proceeds of which having been treated as refund of expenditure and deducted from it, 72·10 Proof Galls. at 25c., $18.02; barrel, $2.50	20 52	20 52
Rent of warehouse	800 00				
Salaries	3,449 88				

Stationery, $8.53; printing, $5.19	13 72		By Stock on hand June 30, 1902		17,906 10
Sundries, including rent of motor power, heating, lighting, freight, &c	2,759 78		Wood Naphtha, 8,293·01 Proof Galls.=4,960·07 Std. Galls. at $1.40	6,944 10	
			Methylated Spirits, 6,213.26 Proof Galls.=		
			3,205·03 Std. Galls. No. 1 at $1.10	3,525 53	
Manufactured during the year—			547·41 " No. 2 at $1.50	821 11	
Methylated Spirits, 88,449.16 Proof Galls			Alcohol, 6,475.43 Proof Galls. at 25c	1,618 86	
			Drums, 8 at $8 and 9 at $10	154 00	
Net profit		23,755 47	Barrels, 337 at $2.50	842 50	
Total		86,071 90	Total		86,071 90

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

No 26.—STATEMENT showing the amounts voted and the Expenditures authorized for each service for the year ended June 30, 1902.

Services.	Grants.	Expenditures.	Over Expenditures.	Under Expenditures.
	$ cts	$ cts.	$ cts.	$ cts.
Minister's salary	7,000 00	7,000 00		
Departmental salaries	38,600 00	33,300 00		5,300 00
" contingencies	7,000 00	5,059 11		1,940 89
Excise salaries	321,899 37	307,040 36		14,859 01
" contingencies	55,000 00	55,010 07	10 07	
" " on account of stamps	29,000 00	26,243 01		2,756 99
Commission to Customs officers	5,500 00	5,485 81		14 19
Duty pay	6,000 00	5,967 10		32 90
" other than special surveys	1,000 00	600 00		400 00
Preventive service	13,000 00	10,853 75		2,146 25
Minor revenues	200 00	132 00		68 00
Tobacco stamp commission	100 00	87 40		12 60
Weights and measures salaries	50,900 00	51,073 45	173 45	
" " contingencies	25,000 00	24,845 00		155 00
Gas and electric light inspection salaries	21,050 00	20,886 01		163 99
" " contingenc's	12,600 00	12,384 01		215 99
Adulteration of food	25,000 00	24,956 74		43 26
Methylated spirits	65,000 00	52,017 01		12,982 99
Metric system supplies	500 00	499 87		0 13
L. A. Fréchette, translation	100 00	100 00		
	684,449 37	643,540 70	183 52	41,092 19

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX A

STATISTICS

APPENDIX A. SPIRITS.

No. 1. RETURN of Manufactures for the year ended June 30, 1902.

DIVISIONS.	LICENSES.		GRAIN USED FOR DISTILLATION.					Total Grain used for Distillation.	Proof Spirits Manufactured.	Duty Collected ex-Manufactory, on Deficiencies and Assessments.		Total Duty Collected ex-Manufactory, including License Fees.
	No.	Fees.	Malt.	Indian Corn.	Rye.	Oats.	Wheat.			Galls.	$ cts.	$ cts.
		$	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Galls.	Galls.	$ cts.	$ cts.
Belleville, Ont.	1	250	129,353	2,451,000	826,112	24,830	.....	3,431,295	201,367·81	28·33	53 83	303 83
Guelph "	1	250	210,160	1,234,400	790,370	43,870	.....	5,308,800	304,934·88	44·95	85 11	335 11
Hamilton "	1	250	111,746	2,262,975	554,732	20,722	.....	2,950,175	171,337·92	.....	.....	250 00
Perth "	3	750	230,120	.....	.....	.....	.....	230,120	12,260·88	.....	.....	750 00
Prescott "	1	250	208,120	4,152,736	779,118	51,686	.....	5,151,660	308,943·39	.....	.....	250 00
Toronto "	1	250	597,460	10,626,910	2,319,820	128,407	29,470	13,702,067	838,297·65	1,531·83	2,910 48	3,160 48
Windsor "	1	250	1,054,002	16,956,000	3,320,670	144,450	.....	21,475,122	1,274,463·29	882·46	1,767 77	2,017 77
Joliette, Que.	1	250	861,105	713,850	858,235	.....	.....	2,433,190	122,541·48	.....	.....	250 00
Totals	10	2,500	3,432,066	41,397,871	9,449,057	413,965	29,470	54,722,429	3,234,147·30	2,487·57	4,817 49	7,317 49

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—SPIRITS.

No. 2.—Comparative Statement of Manufactures for the years ended June 30, 1901 and 1902.

Provinces.	Licenses.		Grain used for Distillation.						Total Grain used for Distillation.	Proof Spirits Manufactured.	Duty Collected ex-Manufactory, on Deficiencies and Assessments.		Total Duty Collected ex-Manufactory, including License Fees.
	No.	Fees.	Malt.	Indian Corn.	Rye.	Oats.	Wheat.	Barley.					
1901.		$	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Galls.	Galls.	$ cts.	$ cts.
Ontario	9	2,250	2,805,741	32,702,158	6,805,139	399,130	12,775	37,380	42,762,323	2,543,502·46	913·67	2,668 54	4,918 54
Quebec	1	250	778,560	563,130	767,610	.....	.....	.....	2,109,300	109,206·39	.....	.....	250 00
Totals	10	2,500	3,584,301	33,265,288	7,572,749	399,130	12,775	37,380	44,871,623	2,652,708·85	913 67	2,668 54	5,168 54
1902.													
Ontario	9	2,250	2,570,961	40,684,021	8,590,822	413,965	29,470	.....	52,289,239	3,111,605·82	2,487·57	4,817 49	7,067 49
Quebec	1	250	861,105	713,850	858,235	.....	.....	.....	2,433,190	122,541·48	.....	.....	250 00
Totals	10	2,500	3,432,066	41,397,871	9,449,057	413,965	29,470	.....	54,722,429	3,234,147·30	2,487·57	4,817 49	7,317 49

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

APPENDIX A—*Continued*—SPIRITS.

No. 3—STATEMENT showing the transactions in the Distilleries in the

DIVISIONS.	In process, including deficiencies brought forward.	Manufactured during the year, including surpluses.	RETURNED TO DISTILLERY FOR REDISTILLATION.		Received from other sources, duty paid.
			Duty paid.	In bond.	
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Belleville, Ont	1,561·97	201,367·81			445·82
Guelph "	16,394·54	304,934·88		4,150·17	1,698·07
Hamilton "	677·25	171,337·92	198·89	30,618·14	443·27
Perth "	3,153·96	12,260·88			
Prescott "	23,128·72	308,943·39		388·00	916·69
Toronto "	7,416·10	838,297·65	331·66	239,045·10	365·93
Windsor "	49,030·67	1,274,463·29		195,195·86	872·10
Joliette, Que	11,946·69	122,541·48		25·11	
Totals	113,309·90	3,234,147·30	530·55	469,417·38	4,741·88

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

Dominion of Canada during the year ended 30th June, 1902.

Totals.	Warehoused during the year.	Fused oil written off.	Written off.	Deficiencies on which duty was collected.	In process including deficiencies carried forward.	Totals.
Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
203,375·60	200,466·60	1,472·70	.....	28·33	1,407·97	203,375·60
327,177·66	292,498·41	1,826·75	.....	44·95	32,807·55	327,177·66
203,270·47	201,982·85	318·67	.....	.....	968·95	203,270·47
15,414·84	15,305·74	.....	.....	.....	109·10	15,414·84
333,376·80	321,580·84	791·18	.....	.....	11,004·78	333,376·80
1,085,456·44	1,075,238·17	2,159·92	44·03	1,531·83	6,482·49	1,085,456·44
1,519,561·92	1,430,398·20	2,224·77	.....	882·46	86,056·49	1,519,561·92
134,513·28	130,815·69	751·54	.....	.....	2,946·05	134,513·28
3,822,147·01	3,668,286·50	9,545·53	44·03	2,487·57	141,783·38	3,822,147·01

W. J. GERALD,
Deputy Minister.

APPENDIX A *Continued*—SPIRITS.

DR. No. 4.—WAREHOUSE RETURN

Remaining in Warehouse from last year.	Placed in Warehouse.	Imported.	Received from other Divisions.	Totals.	DIVISIONS.	Entered for Consumption.	
Galls.	Galls.	Galls.	Galls.	Galls.		Galls.	$ cts.
651,833·11	200,466·60	1·47	11,636·89	863,938·07	Belleville, Ont.	57,580·20	169,402 24
4,090·74	.....	.....	24,556·59	28,647·33	Brantford "	13,514·26	25,677 17
396·87	.....	.....	4,675·18	5,072·05	Cornwall "	4,417·09	8,392 48
869,294·00	292,498·41	.....	117,477·47	1,279,269·88	Guelph "	259,511·25	493,071 52
497,214·29	201,982·85	.....	90,898·79	790,095·93	Hamilton "	111,039·64	210,983 91
3,817·15	.....	.....	40,311·80	44,128·95	Kingston "	32,877·87	62,469 05
7,498·13	.....	22·15	42,245·49	49,865·77	London "	42,557·31	80,862 48
23,043·90	.....	.....	138,737·15	161,781·35	Ottawa "	137,876·31	262,027 73
8,879·68	.....	.....	63,712·38	72,592·06	" Gvt Wse "	.....	.....
.....	.....	.....	77·50	77·50	" Dep. Lab."	.....	.....
1,417·45	.....	.....	10,052·73	11,470·18	Owen Sound "	10,208·77	19,396 95
62,793·25	15,305·74	.....	33,122·62	111,221·61	Perth "	40,449·16	77,038 02
2,266·39	.....	.....	20,483·98	22,750·37	Peterboro' "	17,817·42	33,858 34
2,243·65	.....	.....	10,873·60	13,116·65	Port Arthur "	10,606·36	20,154 26
719,973·52	321,580·84	127,802·80	38,221·87	1,207,579·03	Prescott "	28,100·87	91,732 10
1,145·17	.....	.....	8,455·25	9,600·42	St. Cath'ines"	8,758·66	16,640 82
1,665·33	.....	.....	16,116·66	17,781·39	Stratford "	15,688 70	29,815 15
3,729,491·44	1,075,238·17	.....	128,301·73	4,933,031 34	Toronto "	360,388·28	678,730 40
3,804,853 68	1,430,398·20	9,277·94	9,659 26	5,254,189·08	Windsor "	172,972·87	329,439 08
10,392,017·15	3,537,470·81	137,104·36	809,616·64	14,876,208·96	..Totals.....	1,324,365·02	2,549,691 70
214,913·24	130,815·69	.....	23,997·53	369,726 46	Joliette, Que.	26,811·37	51,010 73
75,123·81	.....	.....	827,228·52	902,352·33	Montreal "	709,787·63	1,330,028 19
28,655·73	.....	.....	250,905·97	279,561·70	Quebec "	239,332·31	454,899 25
13,776·42	.....	.....	95,763·04	109,539·46	St. Hya'nthe"	76,681·50	145,778 36
3,095·34	.....	50,677·82	74,347·85	128,121·01	Sherbrooke "	72,745·28	153,443 01
7,016 18	.....	.....	31,868·39	38,884·57	Three Rivers"	31,763·26	70 378 77
342,580·72	130,815·69	50,677·82	1,304,111·30	1,828,185·53	. Totals.....	1,157,121·25	2,205,538 31
13,966·71	.....	.....	76,650·02	90,616 73	St. John. N.B..	70,478·74	133,911 23
7,346 43	.....	.....	33,535·60	40,882·03	Halifax, N.S..	34,202·21	64,984 17
309 98	.....	.....	472·51	782 49	Charlot'n, P.E.I	372·82	708 39
31,908·13	.....	.....	190,837·11	221,845·22	Winnipeg, Mn.	185,482·32	352,225 36
6,137 96	.....	.....	18,965·92	25,103 88	Calgary, NWT.	17,063·27	32,425 21
31,157·65	.....	.....	87,144·72	118,302·37	Vancouver, B.C	81,045·96	153,993 37
20,133·12	.....	44·48	70,710 67	91,188·27	Victoria "	63,051·36	119,817 75
51,590 77	.....	44·48	157,855·39	209,490·64	..Totals.....	144,097·32	273,811 12
8,612 54	.....	.....	.....	8 612 54	Sundries.....	.....	.....
10,853,570·37	3,668,286·50	187,826·66	2,592,044·49	17,301.728·02	Grand Totals..	2,933,182 95	†5,613,295 49

† This amount includes $56,327.57 collected on imported spirits used in Bonded Factories, at 30c. per gallon.

INLAND REVENUE DEPARTMENT,
OTTAWA, AUGUST 16, 1902.

for the year ended June 30, 1902. Cr.

Removed in Bond.		Free.					
To other Divisions.	To Distillery for Re-distillation.	Legal Allowance.	Other.	Exported.	Used in Bonded Factories.	Remaining in Warehouse.	Totals.
Galls.	Galls.	Galls.	Galls.	Galls.	Galls.	Galls.	Galls.
179,217·46		4,269·07	470·67	453·80		621,946·87	863,938·07
					12,837·25	2,295·82	28,647·33
						654·96	5,072·05
112,888·51	4,150·17	21,546·94	1,630·51	9,900·99		869,641·51	1,279,269·88
119,865·17	30,613·14	7,547·79	447·26	420·76	25,405·08	494,757·09	790,095·93
			14·31	36·52	7,319·33	3,880·92	44,128·95
385·66				80·39		6,842·41	49,865·77
			250·65			23,654·39	161,781·35
			77·05		66,039·58	6,475·43	72,592·06
			77·50				77·50
				3·00		1,258·41	11,470·18
1,916·22		883·51		126·38		67,846·34	111,221·61
						4,932·95	22,750·37
						2,510·29	13,116·65
307,641·14	388·00	4,600·59	830·71	2,193·81	127,802·80	736,021·20	1,207,579·03
				210·63		631·13	9,600·42
						2,092·69	17,781·39
965,533·48	239,045·10	21,138·50	2,934·17	5,508·82	32,115·73	3,306,367·26	4,933,031·34
761,692·78	195,195·86	97,172·70	890·33	129,991·75	9,277·94	3,886,994·85	5,254,189·08
2,449,140·42	469,392·27	157,159·01	7,623·16	148,926·85	214,758·13 *66,039·58	10,038,804·52	14,876,208·96
84,441·14	25·11	639·00				257,809·84	369,726·46
16,464·04				162·51	50,911·28	95,026·87	962,352·33
			122·10		14,260·56	25,846·73	279,561·70
22·05			58·74		24,603·41	8,773·86	109,539·46
				18·00	50,677·82	4,679·91	128,121·01
						7,121·31	38,884·57
130,927·23	25·11	639·00	180·84	180·51	139,853·07	399,258·52	1,828,185·53
1,243·55				50·93	5,623·57	13,219·94	90,616·73
471·09				131·76		6,076·97	40,882·03
						409·67	782·49
1,543·54				102·39		34,716·97	221,845·22
						8,040·61	25,103·88
75·00				288·83		36,892·58	118,302·37
8,643·66				2,117·71		17,375·54	91,188·27
8,718·66				2,406·54		54,268·12	209,490·64
						8,612·54	8,612·54
2,592,044·49	469,417·38	157,798·01	7,804·00	151,798·98	360,234·77 *66,039·58	10,563,407·86	17,301,728·02

* Used in the manufacture of methylated spirits at the Government Warehouse, Ottawa.

W. J. GERALD,
Deputy Minister.

APPENDIX A.—*Continued*—SPIRITS.

DR. No 5.—COMPARATIVE STATEMENT of Warehouse

Remaining in Warehouse from last year.	Placed in Warehouse	Imported.	Received from other Divisions.	Totals.	PROVINCES.	Entered for Consumption.	
Galls.	Galls.	Galls.	Galls.	Galls.	1901.	Galls.	$ cts.
11,112,348·04	*8·89 2,956,619·77	‡74·27 120,098·19	794,155·23	14,983,304·39	Ontario	1,281,773·48	2,464,142·51
228,489·99	111,299·53	†4·50 35,018·87	1,177,619·56	1,552,432·45	Quebec.	999,112·06	1,900,091·47
7,323·50	.....	.....	79,776·36	87,109·86	N. Brunswick..	67,841·08	128,898·30
6,489·32	.....	.....	36,549·03	43,038·35	Nova Scotia. ..	35,576·95	67,596·32
329·10	.....	.....	1,016·78	1,345·88	P. E. Island....	1,035·90	1,968·21
30,366·18	.....	.....	157,588·12	187,954·30	Manitoba	153,273·03	291,223·66
6,543·90	.....	.....	15,132·27	21,676·17	N. W. Territ...	15,538·21	29,522·89
59,614·82	.....	‡90·16	154,873·31	214,578·59	B. Columbia....	153,768·69	292,163·22
8,612·54	.....	.....	.....	8,612·54	Sundries	.....	.....
11,460,127·39	*8·89 3,067,919·30	169·23 155,117·06	2,416,710·66	17,100,052·53	.. Totals....	2,707,919·40	5,175,606·58
					1902.		
10,392,017·15	3,537,470·81	137,104·36	809,616·64	14,876,208·96	Ontario	1,324,365·02	2,549,691·70
342,580·72	130,815·69	50,677·82	1,304,111·30	1,828,185·53	Quebec.	1,157,121·25	2,205,538·31
13,966·71	.....	.....	76,650·02	90,616·73	N. Brunswick..	70,478·74	133,911·23
7,346·43	.....	.....	33,535·60	40,882·03	Nova Scotia....	34,202·21	64,984·17
309·98	.....	.....	472·51	782·49	P. E. Island....	372·82	708·39
31,008·11	.....	.....	190,837·11	221,845·22	Manitoba	185,482·32	352,225·36
6,137·96	.....	.....	18,965·92	25,103·88	N. W. Territ...	17,063·27	32,425·21
51,590·77	.....	44·48	157,855·39	209,490·64	B. Columbia....	144,097·32	273,811·12
8,612·54	.....	.....	.....	8,612·54	Sundries.	.....	.....
10,853,570·37	3,668,286·50	187,826·66	2,592,044·49	17,301,728·02	...Totals.....	2,933,182·95	5,613,295·49

*Surplus. †Seizure. ‡Rewarehoused.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

Returns for the Years ended June 30, 1901 and 1902. CE.

Removed in Bond.		Free.		Exported.	Used in Bonded Factories.	Remaining in Warehouse.	Totals.
To other Divisions.	To Distillery for Re-distillation.	Legal Allowance.	Other				
Galls.	Galls.	Galls.	Galls.	Galls.	Galls.	Galls.	Galls.
2,321,653·52	408,476·75	137,498·51	4,902·60	145,066·86	‡69,138·13 222,777·39	10,392,017·15	14,983,304·39
84,293·15		370·34	606·16	274·10	125,285·92	342,580·72	1,552,432·45
660·03					4,642·04	13,966·71	87,109·86
				114·97		7,346·43	43,038·35
						302·98	1,345·88
3,559·30				113·86		31,008·11	187,954·30
						6,137·96	21,676·17
6,634·66				2,584·47		51,590·77	214,578·59
						8,612·54	8,612·54
2,416,710·66	408,476·75	137,868·85	5,508·76	148,154·26	‡69,138·13 352,705·35	10,853,570·37	17,100,052·53
2,449,140·42	469,392·27	157,159·01	7,623·16	148,926·85	66,039·58 214,758·13	10,038,804·52	14,876,208·96
130,927·23	25·11	639·00	180·84	180·51	139,853·07	399,258·52	1,828,185·53
1,243·55				50·93	5,623·57	13,219·94	90,616·73
471·09				131·76		6,076·97	40,882·03
						469·67	782·49
1,543·54				102·39		34,716·97	221,845·22
						8,040·61	25,103·88
8,718·66				2,406·54		54,268·12	209,490·64
						8,612·54	8,612·54
2,592,044·49	469,417·38	157,798·01	7,804·00	151,798·98	66,039·58 360,234·77	10,563,407·86	17,301,728·02

‡Used in the manufacture of Methylated Spirits at the Government Warehouse, Ottawa.

	1901.	1902.
Total duty collected ex-manufactory and ex-warehouse	$ 5,178,275 12	$ 5,618,112 98
" " on licenses	2,500 00	2,500 00
Totals	$ 5,180,775 12	$ 5,620,612 98

W. J. GERALD,
Deputy Minister.

APPENDIX A.—*Continued*—MALT.

No. 6.—RETURN of Manufactures for the Year ended June 30, 1902.

DIVISIONS.	LICENSES. No.	LICENSES. Fees.	Grain placed in Steep.	Malt Manufactured.	Warehoused.	Total Duty collected ex-Manufactory, including License Fees.
		$	Lbs.	Lbs.	Lbs.	$ cts.
Belleville, Ont	1	50	193,683	151,556	151,556	50 00
Brantford "	2	100	746,611	593,734	593,734	100 00
Guelph "	7	850	9,228,924	7,393,104	7,393,104	850 00
Hamilton "	3	500	7,041,316	5,608,316	5,608,316	500 00
Kingston "	2	250	8,090,542	6,351,228	6,351,228	250 00
London "	3	450	5,519,122	4,320,823	4,320,823	450 00
Owen Sound, Ont	1	200	5,499,427	4,258,571	4,258,571	200 00
Perth "	2	100	288,614	237,419	237,419	100 00
Peterborough "	2	250	2,961,080	2,276,962	2,276,962	250 00
Prescott "	3	200	1,586,971	1,216,563	1,216,563	200 00
St. Catharines "	2	100	1,001,318	801,228	801,228	100 00
Stratford "	1	200	7,643,550	6,150,440	6,150,440	200 00
Toronto "	10	1,400	19,061,242	14,915,096	14,915,096	1,400 00
Windsor "	1	200	3,802,480	3,107,960	3,107,960	200 00
Totals	40	4,850	72,664,880	57,383,000	57,383,000	4,850 00
Montreal, Que.	3	600	14,418,795	11,498,916	11,498,916	600 00
Quebec "	1	150	1,308,020	1,058,887	1,058,887	150 00
Totals	4	750	15,726,815	12,557,803	12,557,803	750 00
Halifax, N. S.	1	150	483,399	383,217	383,217	150 00
Winnipeg, Man.	2	200	1,818,646	1,426,674	1,426,674	200 00
Calgary, N.W.T.	2	250	1,430,963	1,119,911	1,119,911	250 00
Grand Totals	49	6,200	92,124,703	72,870,605	72,870,605	6,200 00

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT
OTTAWA, August 16, 1902.

APPENDIX A—*Continued*—MALT.

No. 7.—Comparative Statement of Manufactures for the Years ended June 30, 1901 and 1902.

Provinces.	Licenses. No.	Licenses. Fees.	Grain placed in Steep.	Malt manufactured	Paid Duty.	Warehoused.	Total Duty collected ex-Manufactory, including License Fees.
1901.		$	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
Ontario	43	5,125	65,083,977	52,076,406		52,076,406	5,125 00
Quebec	4	750	12,645,334	10,216,570		10,216,570	750 00
Nova Scotia	1	150	564,758	454,254		454,254	150 00
Manitoba	2	200	1,053,344	816,531	1,104	815,427	216 56
N. W. Territories	2	250	687,577	532,138		532,138	250 00
Totals	52	6,475	80,034,990	64,095,899	1,104	64,094,795	6,491 56
1902.							
Ontario	40	4,850	72,664,880	57,383,000		57,383,000	4,850 00
Quebec	4	750	15,726,815	12, 57,803		12,557,803	750 00
Nova Scotia	1	150	483,399	383,217		383,217	150 00
Manitoba	2	200	1,818,646	1,426,674		1,426,674	200 00
N. W. Territories	2	250	1,430,963	1,119,911		1,119,911	250 00
Totals	49	6,200	92,124,703	72,870,605		72,870,605	6,200 00

Inland Revenue Department,
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—MALT.

DR. No. 8.—WAREHOUSE RETURN

Remaining in Warehouse from last year.	Placed in Warehouse.	Increases.	Received from other Divisions.	Imported.	Totals.	Divisions.	
Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.		
120,844	151,556	1,304			273,704	Belleville,	Ont.
229,415	593,734	11,509	168,000		1,002,658	Brantford	"
2,493,985	7,393,104	109,578	339,000		10,335,467	Guelph	"
1,921,700	5,608,316	58,286			7,588,302	Hamilton	"
2,123,568	6,351,228	115,626			8,590,422	Kingston	"
2,737,829	4,320,823	52,802	70,000		7,181,454	London	"
127,428		4,720	456,000		588,148	Ottawa	"
1,320,734	4,258,571	3,131	710,600		6,293,036	Owen Sound	"
8,103	237,419	1,187			246,709	Perth	"
594,777	2,276,962	54,557	168,880		3,095,176	Peterborough	"
			160,976		160,976	Port Arthur	"
844,247	1,216,563	41,338			2,102,148	Prescott	"
150,126	801,228	6,280	338,800		1,296,434	St. Catharines	"
2,034,414	6,150,440	21,660	476,122		8,682,636	Stratford	"
5,221,527	14,915,096	122,864	1,707,806	79,200	22,046,493	Toronto	"
896,153	3,107,960	12,822	820,800		4,837,735	Windsor	"
20,824,850	57,383,000	617,464	5,416,984	79,200	84,321,498	Totals	
11,755		7,895	861,455		881,105	Joliette,	Que.
4,328,576	11,498,916	157,962	2,916,556	8,234	18,910,244	Montreal	"
131,000	1,058,887		2,964,000		4,153,887	Quebec	"
62,400		1,106	1,643,316		1,706,822	Sherbrooke	"
4,533,731	12,557,803	166,963	8,385,327	8,234	25,652,058	Totals	
71,390			1,290,000		1,361,390	St. John, N.B.	
36,000	383,217	6,201	2,449,064		2,874,482	Halifax, N.S	
20,000			256,000		276,000	Charlottetown, P.E.I.	
195,381	1,426,674	37,684	842,000	1,120	2,502,859	Winnipeg, Man.	
150,583	1,119,911	7,199	150,000	75,860	1,503,553	Calgary, N.W.T.	
202,721			315,000	1,907,810	2,425,531	Vancouver, B.C.	
40,000			146,900	1,527,990	1,714,890	Victoria "	
242,721			461,900	3,435,800	4,140,421	Totals	
26,074,656	72,870,605	835,511	19,251,275	3,600,214	122,632,261	Grand totals	

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1901.

for the Year ended June 30, 1902. G.

Entered for Consumption at 1½ cents per lb.		Removed to other Divisions.	Exported.	Free, and Written off.	Remaining in Warehouse.	Totals.
Lbs.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
269,478	4,042 17				4,226	273,704
798,528	11,977 91				204,130	1,002,658
5,006,008	75,090 12	2,826,428	72,000		2,431,031	10,335,467
4,753,510	71,302 65	867,000			1,967,792	7,588,302
2,711,072	40,666 08	1,626,800		18,700	1,233,850	5,590,422
4,798,642	71,980 69	5,200	5,230		2,372,382	7,181,454
534,748	8,021 25				53,400	588,148
1,077,739	16,166 09	3,089,476	112,000	76,524	1,937,297	6,293,036
637	9 56			238,223	7,849	246,709
861,693	12,925 40	1,838,064		1,000	394,419	3,095,176
144,706	2,170 60				16,270	160,976
1,353,826	20,307 40	344,556			403,766	2,102,148
1,176,328	17,644 92				120,106	1,296,434
3,573,666	53,604 90	3,443,816			1,665,160	8,682,636
13,464,355	201,965 32	1,346,080	108,000	22,364	7,105,694	22,046,493
3,179,700	47,695 50	72,000		92,000	1,494,635	4,837,735
43,704,630	655,570 56	15,459,420	297,230	448,811	24,411,407	84,321,498
				861,105	20,000	881,105
11,013,018	165,195 27	3,591,455	72,000		4,233,771	18,910,244
4,113,887	61,708 17				40,600	4,153,887
1,660,622	24,909 33				46,200	1,706,822
16,787,527	251,812 77	3,591,455	72,000	861,105	4,339,971	25,652,058
1,276,732	19,150 98			4,392	80,266	1,361,390
2,745,265	41,178 98	36,000			93,217	2,874,482
263,040	3,945 60				12,960	276,000
2,009,058	30,125 86				493,801	2,502,859
769,795	11,546 96	157,500			576,258	1,503,553
2,172,747	32,591 36	6,900			245,884	2,425,531
1,711,725	25,675 67				3,165	1,714,890
3,884,472	58,267 03	6,900			249,049	4,140,421
71,440,519	1,071,608 74	19,251,275	369,230	1,314,308	30,256,929	122,632,261

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—MALT.

No. 9.—Comparative Statement of Warehouse Returns

Remaining in Warehouse from last year.	Placed in Warehouse.	Increases.	Received from other Divisions.	Imported.	Totals.	Provinces.
Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	1901.
18,620,364	52,076,406	614,305	3,419,930	5,067	74,736,072	Ontario
4,852,370	10,216,570	171,124	7,084,466	14,704	22,339,234	Quebec
60,326			913,000		973,326	New Brunswick
199,001	454,254		1,843,000		2,496,255	Nova Scotia
12,280		790	136,000		149,070	Prince Edward Island
391,860	815,427	16,138	862,000	400	2,085,825	Manitoba
223,381	532,138	5,481			761,000	N. W. Territories
161,753			242,082	3,545,099	3,948,934	British Columbia
24,521,335	64,094,795	807,838	14,500,478	3,565,270	107,489,716	Totals
						1902.
20,824,850	57,383,000	617,464	5,416,984	79,200	84,321,498	Ontario
4,533,731	12,557,803	166,963	8,385 327	8,234	25,652,058	Quebec
71,390			1,290,000		1,361,390	New Brunswick
36,000	383,217	6,201	2,449,064		2,874,482	Nova Scotia
20,000			256,000		276,000	Prince Edward Island
195,381	1,426,674	37,684	842,000	1,120	2,502,859	Manitoba
150,583	1,119,911	7,199	150,000	75,869	1,503,553	N. W. Territories
242,721			461,900	3,435,860	4,140,421	British Columbia
26,074,656	72,870,605	835,511	19,251,275	3,600,214	122,632,261	Totals

Department of Inland Revenue,
Ottawa, August 16, 1902.

for the Years ended June 30, 1901 and 1902.

Entered for Consumption at 1½ cents per lb.		Removed to other Divisions.	Exported.	Free, and Written off.	Remaining in Warehouse.	Totals.
Lbs.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
40,440,316	606,605 74	12,093,396	274,000	1,103,510	20,824,850	74,736,072
14,645,943	219,689 07	2,345,000	36,000	778,560	4,533,731	22,339,234
901,936	13,529 04				71,390	973,326
2,440,255	36,603 84	20,000			36,000	2,496,255
129,070	1,936 05				20,000	149,070
1,890,444	28,356 65				195,381	2,085,825
568,335	8,525 05	42,082			150,583	761,000
3,706,213	55,593 15				242,721	3,948,934
64,722,512	970,838 59	14,500,478	310,000	1,882,070	26,074,656	107,489,716
43,704,630	655,570 56	15,459,420	297,230	448,811	24,411,407	84,321,498
16,787,527	251,812 77	3,591,455	72,000	861,105	4,339,971	25,652,058
1,276,732	19,150 98			4,392	80,266	1,361,390
2,745,265	41,178 98	36,000			93,217	2,874,482
263,040	3,945 60				12,960	276,000
2,009,058	30,135 86				493,801	2,502,859
769,795	11,546 96	157,500			576,258	1,503,553
3,884,472	58,267 03	6,900			249,049	4,140,421
71,440,519	1,071,608 74	19,251,275	369,230	1,314,308	30,256,929	122,632,261

	1901.	1902.
Total duty collected, ex-manufactory and ex-warehouse	$ 970,855 15	$ 1,071,608 74
" " on licenses	6,475 00	6,200 00
Totals	$ 977,330 15	$ 1,077,808 74

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—MALT LIQUOR.

No. 10.—RETURN of Manufactures for the Year ended June 30, 1902.

DIVISIONS.	LICENSES. No.	LICENSES. Fees.	Malt used.	Other commodities used.	Malt Liquor manufactured.	Malt Liquor exported and used by H. M. Army and Navy.	Total Duty collected, including License Fees.
		$	Lbs.	Lbs.	Galls.	Galls.	$ cts.
Belleville, Ont	1	50	130,946		57,490		50 00
Brantford, "	3	150	793,280		316,955		150 00
Guelph, "	7	350	4,789,760		1,992,144		350 00
Hamilton, "	3	150	3,878,278		1,568,653		150 00
Kingston, "	2	100	547,927		174,025		100 00
London, "	6	300	5,024,332		1,924,289	1,674⅔	300 00
Ottawa, "	3	125	983,238		385,670		125 00
Owen Sound, "	6	300	1,146,689		455,990		300 00
Peterborough, "	3	150	857,087		296,296	159	150 00
Port Arthur, "	1	50	137,770		66,560		50 00
Prescott, "	2	100	1,117,947		359,190		100 00
St. Catharines, "	2	100	1,188,140		446,850		100 00
Stratford, "	5	250	572,962		275,100		250 00
Toronto, "	14	675	13,226,416		5,615,525		675 00
Windsor, "	3	150	2,161,093		1,026,409		150 00
Totals	61	3,000	36,055,856		14,961 140	1,833⅔	3,000 00
Joliette, Que	1	50	4,480		1,460		50 60
Montreal, "	11	550	15,962,729		6,276,430		550 00
Quebec, "	4	200	4,050,858		1,534,025		200 00
St. Hyacinthe, "	1	50	19,090		8,940		50 00
Sherbrooke, "	1	50	1,660,522		708,300		50 00
Totals	18	900	21,697,679		8,529,155		900 00
St. John, N.B	2	100	1,486,932		555,475		100 00
Halifax, N.S	4	200	2,808,194		941,500	130,895½	200 00
Charlottetown, P.E.I	1	50	263,004		91,450		50 00
Winnipeg, Man	7	350	2,048,448		780,667		350 00
Calgary, N.W.T	4	200	739,725		276,840		200 00
Vancouver, B.C	29	1,450	2,232,335	5,356	901,996		1,819 70
Victoria, "	7	350	1,701,444		585,544	49,981	350 00
Totals	36	1,800	3,933,779	5,356	1,487,540	49,981	2,169 70
Grand Totals	133	6,600	69,033,617	5,356	27,623,767	182,710 1/16	6,969 70

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

SESSIONAL PAPER No. 12

APPENDIX A—*Continued*—MALT LIQUOR.

No. 11.—Comparative Statement of Manufactures for the Years ended June 30, 1901 and 1902.

Provinces.	Licenses. No.	Licenses. Fees.	Malt used.	Other commodities used.	Malt Liquor manufactured.	Malt Liquor exported and used by H. M. Army and Navy.	Total Duty collected, including License Fees.
1901.		$	Lbs.	Lbs.	Galls.	Galls.	$ cts.
Ontario	61	3,050	33,994,789	.....	14,051,570	2,317½	3,050 00
Quebec	18	875	19,002,825	.....	7,362,535	.....	875 00
New Brunswick	2	100	1,302,836	.....	480,700	.....	100 00
Nova Scotia	4	200	2,407,615	.....	843,066	117,767	200 00
Prince Edward Island	1	50	129,080	.....	44,900	.....	50 00
Manitoba	7	325	1,895,774	.....	678,946	.....	325 00
N. W. Territories	4	200	551,606	.....	207,045	.....	200 00
British Columbia	34	1,700	3,709,011	991	1,439,492	53,036	1,768 90
Totals	131	6,500	62,993,536	991	25,108,254	173,120½	6,568 90
1902.							
Ontario	61	3,000	36,055,856	.....	14,961,140	1,833⅓	3,060 00
Quebec	18	900	21,697,679	.....	8,529,155	.....	900 00
New Brunswick	2	100	1,486,932	.....	555,475	.....	100 00
Nova Scotia	4	200	2,808,194	.....	941,500	130,895½	200 00
Prince Edward Island	1	50	263 004	.....	91,450	.....	50 00
Manitoba	7	350	2,048,448	.....	780,667	.....	350 00
N. W. Territories	4	200	739,725	.....	276,840	.....	200 00
British Columbia	36	1,800	3,933,779	5,356	1,487,540	49,981	2,169 70
Totals	133	6,600	69,033,617	5,356	27,623,767	182,710 1/10	6,969 70

	1901.	1902.
	Galls.	Galls.
Exported	2,641½	2,148⅔
Used by H. M. Army and Navy	170,479	180,561½
Totals	173,120½	182,710 1/10

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

TEMENT of Manufactures for the Years ended June 30, 1901 and 1902.

	Canadian Tobacco.			Combination Tobacco.			Tobacco.
Ware-housed.	At 5c. per lb.	Paid Duty.	Ware-housed.	At 5c. per lb.	Paid Duty.	Ware-housed.	
No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
.....	337,546½	233,895½	103,651	133,470½	50,154½	83,316	
1,526,950	2,674,964½	2,377,274	297,690½	1,065,208	497,287	567,921	
3,461,500	.....	.....	.....	.....	.....	.....	
.....	48,677	6,808	11,869	6,639	2,741	3,898	87,9
.....	10,499	6,204	4,295	19,094	7,164	11,930	88,5
4,988,450	3,041,687	2,624,181½	417,505½	1,224,411½	557,346½	667,065	18,7
							43,2
							5,87
							62,9
							5,2
50,000	419,719	375,749	43,970	198,091	60,393	137,698	54,6
3,534,850	2,475,180	2,339,883	135,297	1,094,479	648,341	446,138	19,7
2,736,500	.....	.....	.....	.....	.....	.....	86,92
.....	19,549	15,419	4,130	.....	.....	.....	
.....	.....	.....	.....	8,788	4,422	4,366	
6,321,350	2,914,448	2,731,051	183,397	1,301,358	713,156	588,202	
							6,64
							1,44
							7,49
							3,88
							0,03
							1,94
							1,53
							9,29
							9,71
							4,98

APPENDIX A—*Continued*—TOBACCO.

No. 12.—Returns of Manufactures for the Year ended June 30, 1902.

Districts.	Licenses No.	Licenses Fees	Total weight of Raw Leaf Tobacco and other materials actually used	Tobacco At 25 cents per lb.	Tobacco Paid Duty	Tobacco Warehoused	Cigarettes At $3 per M.	Cigarettes Paid Duty	Cigarettes Warehoused
		$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	No.	No.	No.
Hamilton, Ont	1	75 00	908,138	962,164	[illegible]	807,976½	9,620,684	9,570,684	50,000
London	1	50 00	19,573						
Toronto	2	102 50	198,906	1,476	476				
Windsor	3	150 00	385,969						
Totals	7	377 50	1,502,586	963,640	[illegible]	807,976½	9,620,684	9,570,684	50,000
Joliette, Que	[illegible]	165 00	182,820						
Montreal	18	1,145 00	6,817,450½	6,353,273	[illegible]	5,607,377	112,683,700 *52,550	110,163,250 52,550	2,520,450
Quebec	8	477 50	469,920½	101,772½	[illegible]	6,315	9,070,000	8,055,000	1,014,100
St. Hyacinthe, Que	2	75 00	1,659						
Sherbrooke	2	115 00	2,071,793						
Three Rivers	1	50 00	6,534						
Totals	31	2,027 50	9,546,075½	6,458,045½	[illegible]	5,613,692	121,753,700 *52,550	118,218,850 52,550	3,531,850
St. John, N.B.	1	75 00	18,053	3,062	788	274	5,858,000	3,121,500	2,736,500
Picton, N.S.	[illegible]	125 00	96,350½	59,626	806	73,020			
Charlottetown, P.E.I.	3	215 00	156,552	146,298		88,315			
Grand Totals	47	2,820 00	11,314,484½	7,230,672	[illegible]	6,588,257½	137,232,384 *52,550	130,911,034 52,550	6,321,350

Districts.	Canadian Tobacco At 5 cents per lb.	Canadian Tobacco Paid Duty	Canadian Tobacco Warehoused	Combination Tobacco At 5 cents per lb.	Combination Tobacco Paid Duty	Combination Tobacco Warehoused	Combination Cigarettes At $1.50 per M.	Combination Cigarettes Paid Duty	Snuff At 25 cents per lb.	Snuff Paid Duty	Snuff At 18 cts. per lb.	Snuff Paid Duty	Total Duty collected from Manufactories, including License Fees.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	No.	No.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
Hamilton, Ont													67,341 07
London	19,573	19,573											1,098 6[illegible]
Toronto				198,091	60,393	137,698							3,191 [illegible]
Windsor	400,146	356,176	43,970										47,168 80
Totals	419,719	375,749	43,970	198,091	60,393	137,698							89,812 07
Joliette, Que	133,836½	55,384	78,452½	51,296	16,700½	34,295½							3,769 1[illegible]
Montreal	640,378½	616,997½	23,381	239,467	175,917½	63,549½	982,000	982,000	5,065	5,065	9 [illegible]	[illegible]	177,663 85
Quebec	311,114½	281,384	29,730	107,337½	84,640½	22,697			1,533	1,553	7 [illegible]	[illegible]	81,181 16
St. Hyacinthe, Que	1,755	1,755											167 75
Sherbrooke	1,380,716½	1,376,983½	733	696,578½	371,052½	325,526							87,316 81
Three Rivers	7,479	7,479											418 95
Totals	2,475,180	2,339,883	135,297	1,094,479	648,341	446,138	982,000	982,000	6,598	6,598	16 [illegible]	166,[illegible]	650,712 67
St. John, N.B.													10,136 50
Picton, N.S.	19,549	15,419	4,130										5,397 15
Charlottetown, P.E.I.				8,788	4,422	4,366							11,997 [illegible]
Grand Totals	2,914,448	2,731,051	183,397	1,301,358	713,156	588,202	982,000	982,000	6,598	6,598	16 [illegible]	166,[illegible]	76[illegible],766 6[illegible]

* Cigarettes at $8.00 per M.

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

No. 13.—Comparative Statement of Manufactures for the Years ended June 30, 1901 and 1902.

Province	Licenses: Fees	Total weight of Raw Leaf Tobacco and other material actually used	Tobacco: At [illegible] per lb.	Tobacco: Paid Duty	Tobacco: Warehoused	Cigarettes: At $3 per M.	Cigarettes: Paid Duty	Cigarettes: Warehoused	Canadian Tobacco: At 5c. per lb.	Canadian Tobacco: Paid Duty	Canadian Tobacco: Warehoused	Combination Tobacco: At 5c. per lb.	Combination Tobacco: Paid Duty	Combination Tobacco: Warehoused	Combination Cigarettes: At $[illegible] per M.	Combination Cigarettes: Paid Duty	Snuff: At 2[illegible]c. per lb.	Snuff: Paid Duty	At 18c. per lb.	Paid Duty	Total Duty collected ex-Manufactory, including License Fees
1901	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	No.	No.	No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	No.	No.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
Ontario	300 00	1,547,855	885,910½	131,118½	754,87[illegible]	1,301,084	1,301,0[illegible]		337,516½	233,895½	103,671	153,470½	50,154½	83,316							71,284 [illegible]
Quebec	[illegible] 00	9,779,845	5,995,190½	409,894	5,585,296½	117,313,750	115,786,800	1,526,950	2,674,961½	2,377,271	297,690½	1,065,208	497,287	567,921	741,100	741,100	6,230	6,230	193,565	193,565	633,062 92
New Brunswick	75 00	17,25[illegible]	2,285	2,285		5,711,200	2,252,700	3,461,500													7,401 35
Nova Scotia	2[illegible] 00	109,905	87,693	9,190	78,503				18,677	6,808	11,869	6,139	2,741	3,898							3,03[illegible]
P. E. Island	265 00	161,597	131,532	40,110	91,422				10,499	6,204	4,295	19,094	7,164	11,930							10,960 90
Totals	2,[illegible]85 00	11,416,460	7,102,692	592,507½	6,510,094½	124,332,034	119,343,584	4,988,450	3,041,687	2,624,181½	417,505½	1,224,411½	557,346½	667,065	741,100	741,100	6,230	6,230	193,565	193,565	725,752 [illegible]
1902																					
Ontario	377 50	1,602,586	963,640½	155,664	807,976½	9,620,681	9,570,68[illegible]	50,000	419,719	375,749	43,970	198,091	60,393	137,698							90,812 [illegible]
Quebec	2,027 50	9,616,975½	6,058,045½	444,530	5,613,692	121,753,700 *52,550	118,218,850 52,550	3,534,850	2,475,180	2,339,883	135,297	1,094,479	678,341	416,138	982,000	982,000	6,598	6,598	166,590	166,590	650,712 [illegible]
New Brunswick	75 00	18,051	3,062	2,788	274	5,858,000	3,121,500	2,736,500													10,1[illegible]
Nova Scotia	125 00	95,350½	79,626	6,006	73,620				19,549	15,419	4,130										2,[illegible]
P. E. Island	215 00	151,522	146,298	57,885	88,413							8,788	4,422	4,366							14,[illegible]
Totals	2,820 00	11,514,485½	7,250,672	666,[illegible]	6,583,975½	137,232,384 *52,550	130,911,034 52,550	6,321,350	2,914,448	2,731,051	183,397	1,301,358	713,156	588,202	982,000	982,000	6,598	6,598	166,590	166,590	767,06[illegible]

* Cigarettes at $8.00 per M.

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

Combination Cigarettes.		Snuff.				Total Duty collected ex-Manufactory, including License Fees.
At $1.50 per M.	Paid Duty.	At 25c. per lb.	Paid Duty.	At 18c. per lb.	Paid Duty.	
No.	No.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
.....	.....	.....	.....	.....	.....	51,284 39
741,100	741,100	6,230	6,230	193,565	193,565	633,062 92
.....	.....	.....	.....	.....	.....	7,404 35
.....	.....	.....	.....	.....	.....	3,039 95
.....	.....	.....	.....	.....	.....	10,960 90
741,100	741,100	6,230	6,230	193,565	193,565	705,752 51
.....	.....	.....	.....	.....	.....	89,812 67
982,000	982,000	6,598	6,598	166,590	166,590	650,712 67
.....	.....	.....	.....	.....	.....	10,136 50
.....	.....	.....	.....	.....	.....	2,397 45
.....	.....	.....	.....	.....	.....	14,907 35
982,000	982,000	6,598	6,598	166,590	166,590	767,966 64

W. J. GERALD,
Deputy Minister.

ED.			Army and Navy and Ships' Stores.		Written off.	Taken for Re working.				
Canadian Tobacco.	Canadian Cigarettes.	Combination Tobacco.	Tobacco.	Cigarettes.	Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Combination Tobacco.	Tobacco.
lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.	Lbs.
....	.....	.....	296	.....	8,603	7,210	..	3,532	736	287,9
,873½	25,000	... ...	300	.....	....	3,401	24,150	12,064	4,678½	588,5
.....	.....	.....	230	.....	.....	.....	.....	.....	.....	18,7
....	... ..	... ...	2,101	100,000	.....	453	....	20	... ...	43,2
.....	.....	.....	.....	.....	.....	924	.. ..	.....	.....	5,87
....	.....	.....	.....	.....	.....	.....	..	... ..	....	62,9
.....	... .	.. ..	.....	.....	....	.....	.....	.....	.....	5,2
....	.....	.....	4,364	... ...	.....	.....	....	....	.....	54,6
.....	... .	.....	.....	.....	.....	.....	.....	.....	.. ...	19,71
,873½	25,000	.....	7,291	100,000	8,603	11,988	24,150	15,616	5,414½	1,086,92
....	... ...	.....	496	... .	988½	2,047½	.....	2,454	504	266,64
640	.....	8	1,983½	.....	109½	495½	.....	13,376½	8,055	531,44
...	.....	.. ....	232	.....	.....	.....	... ..	... ...	...	17,49
202	.....	.....	9,119	545,000	54	2,900	....	2,081½	.....	33,88
....	....	.....	.....	.....	....	153	.. ..	.....	1,300	10,03
...	.....	... ...	.....	....	.....	.... .	.....	.....	.....	61,94
....	.....	.....	.....	... ..	.....	.....	.....	.....	.....	4,53
....	.....	.....	5,209	... .	.....	....	....	.....	.....	59,29
.	.. ....	..... .	.....	.....	.....	.....	.	... ...	.....	19,71
842	.....	8	17,039½	545,000	1,152	5,596	.....	17,912	9,859	1,004,98

No. 14.—Warehouse Return for the Year ended June 30, 1902.

Divisions	Entered for Consumption: Tobacco	Cigarettes	Canadian Tobacco	Canadian Cigarettes	Combination Tobacco	Duty	Removed in Bond to other Divisions: Tobacco	Cigarettes	Canadian Tobacco	Combination Tobacco	Exported: Tobacco	Cigarettes	Canadian Tobacco	Combination Tobacco	Army and Navy and Ships' Stores: Tobacco	Cigarettes	Written off: Tobacco	Taken for Reworking: Tobacco	Canadian Tobacco	Combination Tobacco	Remaining in: Lbs.	Cigarettes
	Lbs.	No.	Lbs.	No.	Lbs.	$ cts.	Lbs.	No.	Lbs.	Lbs.	Lbs.	No.	Lbs.	Lbs.	Lbs.	No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	No.
Belleville, Ont.	7,974					1,993 50															643	
Guelph	30,825½					7,706 37															158	
Hamilton	735,299½					183,817 99	530,453½	50,000			54,890				496		988½	2,047½			200,234½	
Kingston	51,024½					12,756 12															2,18[illegible]	
London	73,461½		2,326			18,481 65															5,097	
Ottawa	154,979½					38,744 88															13,92[illegible]	
Owen Sound	153,372½					38,343 13															7,330	
Perth	57,448½					14,359 62															4,448	
Port Arthur	15,710					3,927 50															682	
St. Catharines	9,868					2,467 00															753	
Stratford	15,900½					3,975 12																
Toronto	652,106½				140,966½	174,787 14	1,079													601	2,664	
Windsor			45,110			2,255 50													2,154			
Totals	1,978,780		47,436		140,966½	503,615 22	531,532½	50,000			54,890				496		988½	2,047½	2,154	601	506,646	
Joliette, Que.			86,296		49,317½	6,280 91			28,620	300									100			
Montreal	2,373,558	189,650	21,890½	975,000	2,987	599,215 47	3,221,859	610,000			65,473	1,585,500	30		1,961½		100½	154½	8,230	600	524,788	145,000
Quebec	29,412	501,800	17,770		1,682½	11,156 16						8,000			22			44	2,838½		[illegible]	168,000
Sherbrooke			22,975		50,200½	17,659 00							00	8					2,208	7,3[illegible]		
Totals	2,401,970½	1,691,450	151,047½	975,000	142,187½	634,711 42	3,224,859	640,000	28,620	2,300	65,473	1,593,500	30	8	1,983½		100½	195½	13,376½	8,0[illegible]	541,131	313,000
St. John, N.B.	329,471	221,000				83,064 76					174	2,736,500			232						17,193½	295,100
Halifax, N.S.	392,519				1,150	98,187 48					2,288½				8,967	545,000	54				26,911	145,000
Pictou	53,075		1,983½			13,442 [illegible]	555				76,990		202		152			2,000	2,081		6,97[illegible]	
Totals	445,594		1,983½		1,150	111,630 31	555				79,278½		202		9,119	545,000	54	2,000	2,081		33,886	145,000
Charlottetown, P.E.I.	84,104		525		5,346	21,319 55												151		1,300	10,030	
Winnipeg, Man.	827,210					206,812 24															61,943	
Calgary, N.W.T.	23,105					5,776 25															4,39[illegible]	
Vancouver, B.C.	230,258½					57,564 63	1,290								540½						9,088	
Victoria	120,250					30,070 01									1,068½						19,606	
Totals	350,508½					87,634 64	1,290								6,209						28,294	
Sundries																					19,719	
Grand Totals	6,442,642½	1,315,450	200,992	975,000	300,650	1,654,594 30	3,758,236½	690,000	28,620½	5,300	199,615½	4,329,800	812	8	17,039½	545,000	1,152	6,796	17,012	9,850	1,004,989	753,100

Inland Revenue Department,
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

No. 15.—Comparative Statement of Warehouse Returns for the Years ended June 30, 1901 and 1902.

Totals to be Accounted for

Provinces	Tobacco	Cigarettes	Canadian Tobacco	Canadian Cigarettes	Combination Tobacco
	Lbs.	No.	Lbs.	No.	Lbs.
1901					
Ontario	2,801,503½		103,651		104,539
Quebec	6,140,398	1,827,000	482,429½	1,27[illegible],000	647,843
New Brunswick	356,752½	4,054,400			
Nova Scotia	622,298½	100,000	11,869		3,898
P. E. Island	80,074		4,922		11,930
Manitoba	789,080				
N. W. Territories	15,125				
British Columbia	443,026				
Sundries	19,719½				
Totals	11,286,067	5,981,400	602,871½	1,27[illegible],000	768,210
1902					
Ontario	2,835,381	50,000	62,490		147,478
Quebec	6,227,435	3,637,750	228,825	97[illegible],000	556,073½
New Brunswick	347,472½	3,255,900			
Nova Scotia	571,686½	690,000	7,053		1,150
P. E. Island	94,287		1,551		7,192
Manitoba	899,193				
N. W. Territories	27,635				
British Columbia	416,431½				
Sundries	19,719½				
Totals	11,429,141	7,633,650	299,919	97[illegible],000	711,893½

Entered for Consumption — Removed in Bond to other Divisions — Export

Provinces	Tobacco at 25c. per lb.	Cigarettes at $3 per M.	Canadian Tobacco at 5c. per lb.	Canadian Cigarettes at $1.50 per M.	Combination Tobacco	Duty	Removed: Tobacco	Removed: Cigarettes	Removed: Canadian Tobacco	Removed: Combination Tobacco	Export: Tobacco	Export: Cigarettes
	Lbs.	No.	Lbs.	No.	Lbs.	$ cts.	Lbs.	No.	Lbs.	Lbs.	Lbs.	No.
1901												
Ontario	1,949,256½		81,599		[illegible]	496,095 18	406,488½				51,601½	
Quebec	2,190,386	1,014,000	388,584½	275,000	[illegible]	597,107 22	3,129,801½	100,000			227,905	585,950
New Brunswick	337,733	10,000				84,463 28						525,000
Nova Scotia	492,175½		8,926		2,718	123,632 85	645				83,743	
P. E. Island	92,036		3,371		9,104	23,632 75	240					
Manitoba	726,091					181,522 73						
N. W. Territories	9,890					2,472 49						
British Columbia	374,386½					93,596 70	9,611					
Sundries												
Totals	6,171,934½	1,024,000	482,480½	275,000	644,113	1,602,813 20	3,636,889	100,000			363,332½	1,110,950
1902												
Ontario	1,978,780½		47,136		130,663½	503,615 22	531,582½	50,000			54,890	
Quebec	2,409,470½	1,091,150	151,047½	975,000	432,575	634,741 42	3,224,859	640,000	28,620½	5,300	65,173	1,594,400
New Brunswick	329,571	224,000				83,064 76					174	2,736,500
Nova Scotia	445,891		1,983½		1,150	111,030 31	555				79,278½	
P. E. Island	84,101		725		5,746	21,419 55						
Manitoba	827,249					206,812 24						
N. W. Territories	23,105					5,776 25						
British Columbia	350,538½					87,634 64	1,290					
Sundries												
Totals	6,412,612½	1,315,150	200,992	975,000	568,750	1,654,594 01	3,758,236½	690,000	28,620½	5,300	199,515½	4,329,800

	1901.	1902.
Total duty collected ex manufactory and ex warehouse, including Canada Twist and Raw Leaf	$3,334,726 28	$3,600,634 41
Total duty collected on licenses	3,122 00	2,944 00
Totals	$3,337,848 28	$3,603,578 41

Inland Revenue Department,
Ottawa, August 16, 1902.

Remaining in Warehouse.					Total Accounted for.				
	Cigarettes.	Canadian Tobacco.	Canadian Cigarettes.	Combination Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Canadian Cigarettes.	Combination Tobacco.
	No.	Lbs.	No.	Lbs	Lbs.	No.	Lbs.	No.	Lbs.
5	. . .	18,520	. . . . .	9,780	2,801,503½	. . . . .	103,651	. . . . .	104,539
4½	102,000	64,907½	975,000	194,626½	6,140,398	1,827,000	482,429½	1,275,000	647,843
9½	519,400	. . . .	. . . . .	. . . . .	356,752½	4,054,400	. . . . .	. . . . .	. . . .
1	. . . . .	2,923	. . . .	1,150	622,288½	109,000	11,869	. . . . .	3,898
4	. . . . .	1,551	. . . . .	2,826	99,074	. . . .	4,922	. . . . .	11,930
9	. . . . .	. . . . .	. . .	. . .	789,080	. . . . .	. . . .	. . . . .	. . . .
5	. . . . .	. . . . .	. . . .	. . . . .	15,125	. . . . .	. . . .	. . . . .	. . . .
1½	. . . . .	. . . . .	. . . .	. . . . .	443,026	. . . . .	. . . .	. . . . .	. . . .
9½	. . . . .	. . . .	. . . . .	. . . . .	19,719½	. . . . .	. . . .	. . . . .	. . . .
9	622,300	87,901½	975,000	118,382½	11,286,967	5,981,400	602,871½	1,275,000	768,210
5		12,600	. . . . .	16,007½	2,835,381	59,000	62,490	. . . . .	147,478
4	313,000	28,140½	. . . . .	110,514	6,227,435	3,637,750	228,825	975,000	556,073½
5½	295,400	. . . .	. . . . .	. . . . .	347,472½	3,255,900	. . . . .	. . . . .	. . . .
5	145,000	786	. . . .	. . . . .	571,686½	690,600	7,053	. . . .	1,150
1	. . . . .	1,026	. . . .	. . . .	546	94,287	. . . .	1,551	. . . .	7,192
4	. . . .	. . . . .	. . . .	. . . . .	. . . . .	889,193	. . . .	. . . . .	. . . . .	. . . .
9	. . . .	. . . . .	. . . .	. . . . .	. . . . .	27,635	. . . .	. . . . .	. . . .	. . .
1	. . . .	. . . . .	. . . .	. . . .	. . . . .	416,331½	. . . .	. . . .	. . . .	. . . .
0½	. . . .	. . . . .	. . . .	. . . .	. . . . .	19,719½	. . . .	. . . . .	. . . . .	. . . . .
0	753,400	42,552½	. . . . .	127,067½	11,429,141	7,633,650	299,919	975,000	711,893½

W. J. GERALD,
Deputy Minister.

APPENDIX A *Continued* RAW LEAF TOBACCO, INCLUDING STEMS, SCRAPS AND CUTTINGS.

DR. No. 16. WAREHOUSE RETURN for the Year ended June 30, 1902. CR.

Remaining in Warehouse from last Year.	Imported.	Placed in Warehouse ex-Factory.	Received from other Divisions.	Totals.	Divisions.	Entered for Consumption. Quantity.	Entered for Consumption. Duty.	Removed in Bond to other Divisions.	Exported.	Written off.	Taken for Horticultural purposes and destroyed.	Re-entered for Manufacture.	Remaining in Warehouse.	Totals.
Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.		Std. lbs.	$ cts	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.
1,366	6,021	1,413	5,868	14,668	Belleville, Ont.	11,093	1,109 30	1,413	.....	.....	243	.....	1,919	14,668
8,635	74,669	7,401	2,476	93,184	Brantford " ..	73,637	7,363 70	257	6,483	....	48	301	12,758	93,184
19,718	102,167	3,433	591¾	125,609¾	Guelph " ..	94,552¾	9,455 28	1,809	3,051	....	.....	.....	26,191	125,609¾
650,725	1,266,639	218,916	10,942	2,147,222	Hamilton " ..	1,355,583½	135,690 91	20,999	201,133	.....	1,722	2,153½	565,031	2,147,222
65,284	70,946	5,631	1,756	143,617	Kingston " ..	68,371	6,868 74	6,985	5,303	.....	231	1,115	61,311	143,617
160,628	616,637½	53,242	13,823¾	844,331	London " ..	590,362½	59,391 13	7,951	50,998	.....	.....	10,135½	184,881	844,331
.....	7,505	419	4,187	12,111	Ottawa " ..	5,024	502 40	119	.....	..	1,858	419	4,391	12,111
1,101	8,638	.....	1,233	10,972	Owen Sound " ..	9,191	919 40	.....	.....	.....	.....	.....	1,778	10,972
376	1,444	60	1,172¾	3,052½	Perth " ..	2,287	228 70	155	.....	.....	.....	.....	610½	3,052½
633	1,929	.....	2,361	4,923	Peterborough " ..	2,322	232 20	.....	.....	.....	1,557	.....	1,011	4,923
3,025	12,990	.....	128	16,143	Prescott " ..	11,865	1,192 14	623	.....	21	.....	.....	3,634	16,143
13,726	24,736	2,300	759	41,521	St. Catharines " ..	22,049	2,204 90	719	2,179	.....	.....	880	15,694	41,521
22,789	21,872	2,378	.....	47,039	Stratford " ..	31,748	3,174 80	.....	876	.....	.....	1,502	12,913	47,039
112,695	271,786	29,395	10,705½	424,581½	Toronto " ..	267,451	34,073 10	11,937	16,711	..	5,918	9,037	113,494½	424,581½
10,043	36,321	3,741	1,148	51,253	Windsor " ..	32,951	3,309 54	2,775	1,754	.....	.....	373	13,400	51,253
1,070,744	2,524,300½	328,032	57,151¼	3,980,227¾	.... Totals.....	2,578,490¾	265,676 21	56,042	288,491	21	11,580	26,544	1,019,086	3,980,227¾
21,252	3,728	713	.....	25,693	Joliette, Que..	4,499	1,349 70	21,494	.....	.....	.....	.....	.....	25,693
4,160,749½	7,262,063¾	269,925¼	62,696½	11,755,434¾	Montreal " ..	7,080,871	729,152 07	121,434½	173,691¾	125	2,999	116,956½	1,259,354¼	11,755,434¾
71,882½	218,186	8,241	26,761	325,070½	Quebec " ..	263,198	23,003 61	434	.....	..	1,241	28,949½	91,545	325,070½
20,883	8,922	1,052	3,110½	33,967½	St. Hyacinthe " ..	9,759½	995 47	1,658	.....	.....	.....	6,098	16,452	35,967½
134,656½	277,929	21,916	76,444	510,945½	Sherbrooke " ..	295,609½	62,234 88	19,552	19,747	.....	110	28,797½	147,129½	510,945½
2,223	15,144	.....	2,552	19,919	Three Rivers " ..	16,413	1,843 51	107½	.....	...	.....	.....	3,368½	19,919
4,411,646¼	7,785,972¾	301,847¼	171,564	12,671,030¼	.....Totals ...	7,610,380	818,579 27	164,079¾	193,441¼	125	4,353	180,801½	1,517,849¼	12,671,030¼
20,091½	64,848	3,778	2,582	91,299½	St. John, N.B....	53,160	6,220 16	1,132	4,228	.....	.....	913	31,866½	91,299½

8,016	10,330	.....	1,143	19,489	Halifax, N.S.....	11,795½	1,185 47	.....	.....	...	.....	230	.....	7,693½	19,489
29,400	57,570	....	.....	86,970	Pictou "	68,822	6,882 20	....	.....					17,918	86,970
37,416	67,900	....	1,143	106,459	..... Totals	80,617½	8,067 67	....	.....		....	230	.....	25,611½	106,459
64,755	133,662	. . ....	... .	198,417	Charlottetown, P.E.I.	138,385	14,032 90	.....	....		.....	.....	....	60,032	198,417
54,996	104,038	12,369	138½	171,541½	Winnipeg, Man...	119,850	11,985 00	3,601	7,976		.....	.....	... ..	40,114½	171,541½
1,224	7,482	742	162	9,610	Calgary, N.W.T..	7,403	740 30	742	.....		....	... ..	....	1,465	9,610
33,726	80,978½	7,920	277	122,901½	Vancouver, B.C...	78,501½	8,108 43	5,179	2,725		....	.....	696	35,798	122,901½
8,926	35,846	2,996	754	48,522	Victoria " ...	38,174	3,869 08	2,996	... . ..		....	...	81	7,271	48,522
42,652	116,824½	10,916	1,031	171,423½	.....Totals . .	116,675½	11,977 51	8,175	2,725		. .	. ...	779	43,069	171,423½
5,703,524¾	10,805,027¾	657,684¼	233,771¾	17,400,008½	...Grand Totals...	10,704,961¼	1,137,279 65	233,771¾	496,864¼		146	16,163	209,067½	5,739,093¾	17,400,008½

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX A —*Continued*—RAW LEAF TOBACCO, INCLUDING STEMS, SCRAPS AND CUTTINGS.

DR. No. 17. COMPARATIVE STATEMENT of Warehouse Returns for the Years ended June 30, 1901 and 1902. CR.

Remaining in Warehouse from last year.	Imported.	Placed in Warehouse ex-Factory.	Received from other Divisions.	Totals.	PROVINCES.	ENTERED FOR CONSUMPTION. Quantity.	Duty.	Removed in bond to other Divisions.	Exported.	Written off.	Taken for Horticultural purposes and destroyed.	Re-entered for Manufacture.	Remaining in Warehouse.	Totals.
Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	1901.	Std. lbs.	$ cts.	Std. lbs.	Std. lbs.	S. lbs.	S. lbs.	Std. lbs.	Std. lbs.	Std. lbs.
1,431,174 3/4	1,908,660 3/4	226,976 1/2	45,561 1/2	3,612,373 1/2	Ontario	2,249,948	239,182 39	77,875 1/2	189,142	373	5,601	48,687	1,070,744	3,612,373 1/2
4,122,016 1/2	7,510,008 3/4	291,230 1/2	195,472	12,118,727 1/4	Quebec	7,176,407 3/4	748,684 53	148,331	134,190	425	915	246,812 1/4	4,411,646 1/4	12,118,727 1/4
19,672	37,397	279	5,922 1/2	63,270 1/2	New Brunswick	40,677	5,115 06	320	712			1,470	20,091 1/2	63,270 1/2
19,761 1/2	111,642		320	131,723 1/2	Nova Scotia	94,182 1/2	9,482 01				24	101	37,416	131,723 1/2
55,944	141,422			197,366	P. E. Island	132,611	13,822 90						64,755	197,366
47,989	87,726	9,044	1,779	146,538	Manitoba	79,979	8,004 26	9,212	1,937			414	54,996	146,538
	2,144			2,144	N. W. Territories	920	92 00						1,224	2,144
30,484 1/2	115,398 1/2	16,525 1/2	4,514	166,922 1/2	British Columbia	104,078 1/2	10,882 57	17,830 1/2	1,986			375 1/2	42,652	166,922 1/2
5,727,042 1/4	9,914,398 1/2	544,055 1/2	253,569	16,439,065 1/4	Totals	9,848,803 3/4	1,026,265 72	253,569	327,967	798	6,543	297,859 3/4	5,703,524 3/4	16,439,065 1/4
					1902.									
1,070,744	2,524,300 1/2	328,032	57,151 1/4	3,980,227 3/4	Ontario	2,578,490 3/4	265,676 24	56,042	288,494	21	11,580	26,514	1,019,086	3,980,227 3/4
4,111,646 1/4	7,785,972 3/4	301,847 1/4	171,564	12,671,030 1/4	Quebec	7,610,380	818,579 27	164,079 3/4	193,441 1/4	125	4,353	180,801 1/2	4,517,849 1/4	12,671,030 1/4
20,091 1/2	64,848	3,778	2,582	91,299 1/2	New Brunswick	53,160	6,220 16	1,132	4,228			913	31,866 1/2	91,299 1/2
37,446	67,900		1,143	106,459	Nova Scotia	80,617 1/2	8,067 67				230		25,611 1/2	106,459
64,755	133,662			198,417	P. E. Island	138,385	14,032 90						60,032	198,417
54,996	104,038	12,369	138 1/2	171,541 1/2	Manitoba	119,850	11,985 00	3,601	7,976				40,111 1/2	171,541 1/2
1,224	7,482	742	162	9,610	N. W. Territories	7,403	740 30	742					1,465	9,610
42,652	116,824 1/2	10,916	1,031	171,423 1/2	British Columbia	116,675 1/2	11,977 51	8,175	2,725			779	43,069	171,423 1/2
5,703,524 3/4	10,805,027 3/4	657,684 1/4	233,771 3/4	17,400,008 1/2	Totals	10,704,961 3/4	1,137,279 05	233,771 3/4	496,864 1/4	146	16,163	209,007 1/2	5,739,093 3/4	17,400,008 1/2

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—CANADA TWIST TOBACCO.

No. 18.—STATEMENT of Revenue collected from Canada Twist Tobacco for the Year ended June 30, 1902.

DIVISIONS.	LICENSES.		Canada Twist, at 5 cts. per pound.	Duty collected, including License Fees.
	No.	Fees.		
		$	Lbs.	$ cts.
Cornwall, Ont.	4	8	2,150	115 50
Ottawa "	10	19	1,810	109 50
Prescott "	1	2	320	18 00
Totals	15	29	4,280	243 00
Joliette, Que.	20	29	43,915	2,224 75
Montreal "	33	66	24,091½	1,270 58
Totals	53	95	68,006½	3,495 33
Grand Totals	68	124	72,286½	3,738 33

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

CANADA TWIST TOBACCO.

No. 19.—COMPARATIVE STATEMENT for Years ended June 30, 1901 and 1902.

YEARS.	PROVINCES.	LICENSES.		Canada Twist, at 5 cts. per pound.	Duty collected, including License Fees.
		No.	Fees.		
			$	Lbs.	$ cts.
1901	Ontario	20	39	6,453	361 65
	Quebec	55	98	51,144	2,655 20
	Totals	75	137	57,597	3,016 85
1902	Ontario	15	29	4,280	243 00
	Quebec	53	95	68,006½	3,495 33
	Totals	68	124	72,286½	3,738 33

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX A—*Continued*—CIGARS.

No. 20.—RETURN of Manufactures

DIVISIONS.	LICENSES.		Total weight of Raw Leaf Tobacco and all other materials actually used.	Deficiencies paying duty.	CIGARS AT $7 PER THOUSAND.		CIGARS
	No.	Fees.			Produced.	Paid Duty.	Produced.
		$ cts.	Lbs.	No.	No.	No.	No.
Belleville, Ont.	1	75 00	8,852				510,500
Brantford "	9	675 00	67,512				3,671,870
Guelph "	12	900 00	90,196$\frac{3}{4}$				5,554,570
Hamilton "	15	1,125 00	179,372				9,403,920
Kingston "	3	187 50	61,625				3,189,025
London "	22	1,612 50	542,447				32,073,235
Ottawa "	1	37 50	4,028				207,350
Owen Sound "	3	187 50	8,840				448,520
Perth "	1	75 00	2,319				100,035
Peterborough, Ont	1	75 00	2,236				143,550
Prescott "	3	225 00	11,237				678,650
St. Catharines "	10	750 00	19,539				1,162,075
Stratford "	3	225 00	20,251				1,535,500
Toronto "	27	1,875 00	206,237				11,738,325
Windsor "	6	450 00	30,117		1,710	1,710	1,709,075
Totals	117	8,475 00	1,263,808$\frac{3}{4}$		1,710	1,710	72,106,200
Joliette, Que.	2	100 00	55,050				
Montreal "	36	2,577 50	976,855$\frac{1}{2}$	3,510	1,950	1,950	47,559,460
Quebec "	8	512 50	84,688$\frac{1}{2}$				4,412,905
St. Hyacinthe, Que	6	332 50	26,685$\frac{1}{2}$				573,365
Sherbrooke "	4	300 00	150,329				7,973,815
Three Rivers "	3	215 00	26,426				848,770
Totals	59	4,037 50	1,320,034$\frac{1}{2}$	3,510	1,950	1,950	61,368,315
St. John, N.B.	7	495 00	63,404				1,116,305
Halifax, N.S.	3	225 00	11,597$\frac{1}{2}$				679,800
Winnipeg, Man	7	525 00	106,255				5,948,910
Calgary, N.W.T	2	150 00	6,707				352,960
Vancouver, B.C.	14	1,040 00	67,664$\frac{1}{2}$				3,530,750
Victoria "	11	815 00	34,365	586			1,763,800
Totals	25	1,855 00	102,029$\frac{1}{2}$	586			5,294,550
Grand totals	220	15,762 50	2,873,836$\frac{1}{4}$	4,096	3,660	3,660	146,867,040

Destroyed by fire.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

for the Year ended June 30, 1902.

At $6 per Thousand.		Canadian Cigars at $3 per Thousand.			Combination Cigars at $3 per Thousand.			Duty Collected ex-manufactory, including License Fees.
Paid Duty.	Warehoused	Produced.	Paid Duty.	Warehoused.	Produced.	Paid Duty.	Warehoused.	
No.	No.	No.	No.	No.	No.	No.	No.	$ cts.
70,000	440,500							495 00
2,384,835	1,287,035							14,984 01
2,514,325	3,040,245							15,985 95
3,430,220	5,973,700							21,706 32
937,375	2,251,650							5,811 75
*3,400 / 21,426,555	10,643,280							130,171 83
77,700	129,650							503 70
173,720	274,800							1,229 82
12,600	87,435							150 60
113,650	29,900							756 90
414,250	244,400							2,710 50
1,121,150	40,925							7,476 90
1,517,150	18,350							9,327 90
6,207,455	5,530,870							39,119 73
999,760	709,315							6,460 53
*3,400 / 41,400,745	30,702,055							256,891 44
		2,708,730	2,028,630	680,100				6,185 89
24,360,660	23,198,800				2,153,130	1,604,930	548,200	153,590 99
2,154,360	2,258,545	125,100	103,550	21,550	769,750	459,100	310,650	15,126 61
145,500	427,865	932,770	829,050	103,720	82,600	34,000	48,600	3,794 65
3,935,605	4,038,210							23,913 63
400,810	447,960				539,950	275,450	264,500	3,446 21
30,996,935	30,371,380	3,766,600	2,961,230	805,370	3,545,430	2,373,480	1,171,950	206,057 98
392,025	724,280				2,253,090	362,940	1,890,150	3,935 97
352,180	327,620							2,338 08
2,208,005	3,740,905							13,773 03
120,635	232,325							873 81
3,045,800	484,950				175,200	115,150	60,050	19,660 25
1,291,450	472,350				75,775	75,775		8,794 53
4,337,250	957,300				250,975	190,925	60,050	28,454 78
*3,400 / 79,807,775	67,055,865	3,766,600	2,961,230	805,370	6,049,495	2,927,345	3,122,150	512,325 09

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—CIGARS.

No. 21.—Comparative Statement of Manufactures

Provinces.	Licenses.		Total weight of Raw Leaf Tobacco and all other materials actually used.	Deficiencies paying Duty.	Cigars at $7 per thousand.		Cigars
	No.	Fees.			Produced.	Paid Duty.	Produced.
1901.		$ cts.	Lbs.	No.	No.	No.	No.
Ontario	106	7,837 50	1,085,985	990	1,200	1,200	64,741,980
Quebec	54	3,795 00	1,184,228¾	*3,234	4,974	4,974	58,068,775
New Brunswick	6	382 50	67,843				603,790
Nova Scotia	3	225 00	11,149½				672,800
Manitoba	8	562 50	71,480				4,056,190
North-West Territories	2	75 00	601				33,350
British Columbia	27	1,817 50	95,413½	†3,436			4,552,425
Totals	206	14,695 00	2,516,700¼	7,660	6,174	6,174	132,729,310
1902.							
Ontario	117	8,475 00	1,263,808¾		1,710	1,710	72,106,200
Quebec	59	4,037 50	1,326,034½	3,510	1,950	1,950	61,368,315
New Brunswick	7	495 00	63,404				1,116,305
Nova Scotia	3	225 00	11,597½				679,800
Manitoba	7	525 00	106,255				5,948,910
North-West Territories	2	150 00	6,707				352,960
British Columbia	25	1,855 00	102,029½	586			5,294,550
Totals	220	15,762 50	2,873,836¼	4,096	3,660	3,660	146,867,040

*1,300 of these cigars were manufactured from Canadian leaf at $3 per M.
†Combination cigars at $3 per M.
‡Destroyed by fire.

Inland Revenue Department,
Ottawa, August 16, 1902.

for the Years ended June 30, 1901 and 1902.

At $6 per Thousand.		Canadian cigars at $3 per Thousand.			Combination Cigars at $3 per Thousand.			Total Duty collected ex-Manufactory including License Fees
Paid duty.	Warehoused	Produced.	Paid Duty	Warehoused.	Produced.	Paid Duty	Warehoused.	
No.	No.	No.	No.	No.	No.	No.	$ cts.	$ cts.
38,578,035	26,163,945							239,320 05
27,251,550	30,817,225	2,160,230	1,937,930	222,300	3,321,800	2,313,300	1,008,500	180,108 32
236,040	367,750				2,793,140	815,340	1,997,800	4,244 76
291,240	381,560							1,972 44
1,593,125	2,553,065							9,581 25
24,550	8,800							222 30
3,981,275	571,150				419,800	344,300	75,500	26,748 35
71,865,815	60,863,495	2,160,230	1,937,930	222,300	6,534,740	3,472,940	3,061,800	462,197 47
‡3,400								
41,400,745	30,702,055							256,891 44
30,996,935	30,371,380	3,766,600	2,961,230	805,370	3,545,430	2,373,480	1,171,950	206,057 98
392,025	724,280				2,253,090	362,940	1,890,150	3,935 97
352,180	327,620							2,338 08
2,208,005	3,740,905							13,773 03
120,635	232,325							873 81
4,337,250	957,300				250,975	190,925	60,050	28,454 78
‡3,400								
79,807,775	67,055,865	3,766,600	2,961,230	805,370	6,049,495	2,927,345	3,122,150	512,325 09

W. J. GERALD,
Deputy Minister.

IVE STATEMENT of Warehouse Returns for the Years ended June 30, 1901 and 190

ıber to be ted for.			Entered for Consumption.				Removed in Bond t other Divisions.	
lian.	Combination.	Provinces.	Foreign, at $6 per M.	Canadian, at $3 per M.	Combination, at $3 per M.	Duty.	Foreign.	Canadia
o.	No.	1901.	No.	No.	No.	$ cts.	No.	No.
3,600	....	Ontario.	25,081,265	34,000	....	150,789 59	238,000	....
2,300	1,213,500	Quebec.	31,883,905	132,300	840,650	194,240 28	612,285	....
....	2,247,850	New Brunswick.	477,690	....	1,521,650	7,428 75	....	....
....	....	Nova Scotia	295,350	....	....	1,772 10	....	....
....	....	Manitoba.	2,998,525	....	....	17,991 15	....	....
....	....	N. W. Territories	....	....	....	....	....	....
....	75,500	British Columbia.	535,725	....	....	3,214 35	....	....
5,900	3,536,850	Totals	61,272,370	166,300	2,367,700	375,236 22	850,285	....
		1902.						
4,600	....	Ontario.	28,276,180	50,800	....	169,773 48	833,835	....
0,370	1,514,600	Quebec.	28,450,160	700,120	1,161,150	176,284 77	921,500	70,0
..	2,616,950	New Brunswick.	640,300	....	1,840,200	9,362 40	....	....
....	....	Nova Scotia	300,410	....	....	1,802 46	....	....
.	....	Manitoba.	3,479,640	....	....	20,877 84	....	....
....	....	N. W. Territories	211,475	....	....	1,268 85	....	....
....	135,550	British Columbia.	916,475	....	55,500	5,665 35	....	....
4,970	4,267,100	Totals	62,268,640	750,920	3,056,850	385,055 15	1,755,335	70,0

	1901.	1902.
y collected, ex-manufactory and ex-warehouse	$ 822,738 69	$ 881,597 74
" on licenses	14,695 00	15,762 50
Totals	$ 837,433 69	$ 897,360 24

APPENDIX A—*Continued.*—CIGARS.

No. 22.—WAREHOUSE RETURN for the Year ended June [illegible]

District	Total Number Accounted for
[illegible]	91,850
Brantford	1,560,545
[illegible]	1,41[illegible],190
Hamilton	[illegible]
Kingston	[illegible]
[illegible]	[illegible]
[illegible]	13,[illegible],180
Owen Sound	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
St. Catharines	[illegible]
Stratford	18,750
Toronto	[illegible]
Windsor	1,009,[illegible]
Totals	[illegible]
[illegible]	[illegible]
Montreal	[illegible]
[illegible]	[illegible]
St. Hyacinthe	[illegible]
Sherbrooke	[illegible]
Three Rivers	[illegible]
Totals	[illegible]
St. John, N.B.	1,0[illegible]
Halifax, N.S.	[illegible]
Winnipeg, Man.	1,[illegible]
Calgary, N.W.T.	911,125
Vancouver, B.C.	[illegible]
Victoria	677,[illegible]
Totals	1,25[illegible],125
Grand Totals	[illegible]

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. G. GERAL[illegible],
Deputy Minister.

APPENDIX A—*Continued.* CIGARS.

No. 23.—Comparative Statement of Warehouse Returns for the Years ended June 30, 1901 and 1902.

Dr.

Provinces	Remaining in Warehouse from last year — Foreign	Remaining — Canadian	Remaining — Combination	Placed in Warehouse — Foreign	Placed — Canadian	Placed — Combination	Received from other Divisions — Foreign	Received — Canadian	Re-imported — Foreign	Total Number to be Accounted for — Foreign	Total — Canadian	Total — Combination
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1901.												
Ontario	7,039,395	63,600		26,163,945			238,000			33,441,340	63,600	
Quebec	7,657,440		205,000	30,714,225	222,300	1,008,500	592,285			38,963,950	222,300	1,213,500
New Brunswick	414,875		270,050	367,750		1,977,800				782,625		2,247,850
Nova Scotia	108,500			381,560			20,000			510,060		
Manitoba	891,650			2,656,065						3,547,715		
N. W. Territories				8,800						8,800		
British Columbia	274,650			571,150		75,500				845,800		75,500
Totals	16,386,510	63,600	475,050	60,863,495	222,300	3,061,800	850,285			78,100,290	285,900	3,536,850
1902.												
Ontario	8,061,575	29,000		30,702,055			72,000	25,000	450	38,836,080	54,600	
Quebec	6,371,460	90,000	342,650	30,371,380	805,370	1,171,950	1,673,335	45,000		38,416,175	940,370	1,514,600
New Brunswick	302,025		726,800	724,280		1,890,150				1,026,305		2,616,950
Nova Scotia	194,710			327,620			10,000			532,330		
Manitoba	549,190			3,740,905						4,290,095		
N. W. Territories	8,800			232,325						241,125		
British Columbia	296,125		75,500	957,300		60,050				1,253,425		135,550
Totals	15,783,885	119,000	1,144,950	67,055,865	805,370	3,122,150	1,755,335	70,000	450	84,595,535	994,970	4,267,100

Cr.

Provinces	Entered for Consumption — Foreign, at $6 per M.	Entered — Canadian, at $3 per M.	Entered — Combination, at $3 per M.	Duty	Removed in Bond to other Divisions — Foreign	Removed — Canadian	Exported — Foreign	Exported — Combination	Taken for re-working — Foreign	Remaining in Warehouse — Foreign	Remaining — Canadian	Remaining — Combination	Total Number Accounted for — Foreign	Total — Canadian	Total — Combination
	No.	No.	No.	$ cts.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1901.															
Ontario	25,081,265	34,600		150,789 59	238,000		1,000		59,500	8,061,575	29,000		33,441,340	63,600	
Quebec	31,883,905	132,300	846,650	191,210 28	612,285		96,300	24,200		6,371,460	90,000	342,650	38,963,950	222,300	1,213,500
New Brunswick	477,600		1,521,050	7,428 75			3,000			302,025		726,800	782,625		2,247,850
Nova Scotia	295,350			1,772 10			20,000			194,710			510,060		
Manitoba	2,998,525			17,991 15						549,190			3,547,715		
N. W. Territories										8,800			8,800		
British Columbia	535,725			3,214 35			13,950			296,125		75,500	845,800		75,500
Totals	61,272,370	166,900	2,367,700	375,236 22	850,285		134,250	24,200	59,500	15,783,885	119,000	1,144,950	78,100,290	285,900	3,536,850
1902.															
Ontario	28,270,180	50,800		169,773 48	833,835		725			9,731,340	3,800		38,836,080	54,600	
Quebec	28,450,160	700,120	1,161,150	176,284 77	921,500	70,000	49,970	700		8,994,545	170,250	352,750	38,416,175	940,370	1,514,600
New Brunswick	640,300		1,840,200	9,362 40			17,750	51,400		368,255		725,350	1,026,305		2,616,950
Nova Scotia	300,410			1,802 46			8,100			223,820			532,330		
Manitoba	3,479,640			20,877 84						810,455			4,290,095		
N. W. Territories	211,475			1,268 85						29,650			241,125		
British Columbia	916,475		55,500	5,665 35			650		3,750	332,550		80,050	1,253,425		135,550
Totals	62,268,640	750,920	3,056,850	385,035 15	1,755,335	70,000	77,195	52,100	3,750	20,490,615	174,050	1,158,150	84,595,535	994,970	4,267,100

	1901.	1902.
Total Duty collected, ex manufactory and ex-warehouse	$ 822,738 69	$ 881,597 74
" " on licenses	14,395 00	15,762 50
Totals	$ 837,133 69	$ 897,360 24

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

2.

Cr.

	Exported.		Taken for re-working	Remaining in Warehouse.			Total Number Accounted for.		
	Foreign.	Combination.	Foreign.	Foreign.	Canadian.	Combination.	Foreign.	Canadian.	Combination.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
	1,606		59,560	8,061,575	29,600		33,441,340	63,660	
	96,370	24,200		6,871,460	90,000	342,650	38,963,950	222,560	1,213,500
	3,000			302,025		726,800	782,625		2,247,850
	20,000			194,710			510,060		
				549,190			3,547,715		
				8,860			8,860		
	13,950			296,125		75,500	845,800		75,500
	134,250	24,200	59,560	15,783,885	119,600	1,144,950	78,100,290	285,900	3,536,850
	725			9,731,340	3,800		38,836,080	54,600	
00	49,970	760		8,994,545	170,250	352,750	38,416,175	940,370	1,514,600
	17,750	51,400		368,255		725,350	1,026,905		2,616,950
	8,100			223,820			532,330		
				810,455			4,290,695		
				29,650			241,125		
	650		3,750	332,550		80,050	1,253,425		135,550
00	77,195	52,100	3,750	20,490,615	174,050	1,158,150	84,595,585	994,970	4,267,100

W. J. GERALD,
Deputy Minister.

APPENDIX A.—*Continued.*—INSPECTION OF PETROLEUM.

No. 24.—RETURN of Canadian Petroleum and Naphtha inspected during the Year ended June 30, 1902.

DIVISIONS.	LICENSES.		Petroleum.	Naphtha.	Total.
	No.	Fees.			
		$	Galls.	Galls.	Galls.
London.....	2	2	9,412,940 64	1,081,933 58	10,494,874 22

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

No. 25.—Comparative Statement of Petroleum and Naphtha inspected during the Years ended June 30, 1901 and 1902.

Provinces.	Licenses.		Petroleum.	Naphtha.	Totals.
	No.	Fees.			
1901.		$	Galls.	Galls.	Galls.
Ontario	1	1	11,197,314 80	1,477,662 77	12,674,977 57
1902.					
Ontario	2	2	9,412,940 64	1,081,933 58	10,494,874 22

W. J GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

No 26.—RETURN of Manufactures

DIVISIONS.	LICENSES.		MATERIALS USED.			
	No.	Fees.	Spirits.	Beer, Wine, &c.	Nitric Acid.	Mercury.
		$ cts.	Galls.	Galls.	Lbs.	Lbs.
Brantford, Ont	2	100 00	12,837·25	721·80		
Hamilton "	2	100 00	25,405·08	417·80		
Kingston "	1	50 00	7,319·33	157·10		
Prescott "	1	300 00	127,802·80		637,750	68,591·00
Toronto "	4	200 00	32,115·73	607·60		
Windsor "	4	700 00	9,202·31		41,924	5,150·50
Totals	14	1,450 00	214,682·50	1,901·30	679,674	73,741·50
Montreal, Que	8	375 00	50,911·28	1,301·10		
Quebec "	1	50 00	14,260·56	735·00		
St. Hyacinthe, Que	2	100 00	24,003·41	782·70		
Sherbrooke "	1	300 00	50,677·82		226,217	28,307·00
Totals	12	825 00	139,853·07	2,818·80	226,217	28,307·00
St. John, N.B.	2	100 00	5,623·57	259·75		
Winnipeg, Man	1	50 00				
Grand Totals	29	2,425 00	360,159·14	4,982·85	905,891	102,048·50

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

for the Year ended June 30, 1902.

Manufactured,		Paid Duty Ex-Manufactory.		Warehoused.		Total Duty Collected Ex-Manufactory, including License Fees.
Vinegar.	Crude Fulminate.	Vinegar.	Duty.	Vinegar.	Crude Fulminate.	
Galls.	Lbs.	Galls.	$ cts.	Galls.	Lbs.	$ cts.
60,761·08	.....	58,413·04	2,336 55	2,348·04	.. ..	2,436 55
157,430·77	....	30,535·01	1,221 41	126,895·76	... .	1,321 41
54,532·44	....	. .....	.....	54,532·44	.. . .	50 00
....	84,347·00	....	. . ..	....	84,347 00	300 00
219,275·49	..... .	83,262·88	3,330 51	136,012·61	... .	3,530 51
.....	6,075·30	... .	....	....	6,075·30	700 00
491,999·78	90,422·30	172,210·93	6,888 47	319,788·85	90,422·30	8,338 47
270,770·90	....	204,885·54	8,195 39	65,885·36	.....	8,570 39
77,513·98	....	55,078·21	2,203 12	22,435·77	....	2,253 12
148,029·65	....	75,158·95	3,006 39	72,870·70	.....	3,106 39
.....	31,185·00	. .....	.....	... .	31,185·00	300 00
496,314·53	31,185·00	335,122·70	13,404 90	161,191·83	31,185·00	14,229 90
32,181·78	.....	27,984·41	1,119 35	4,197·37	....	1,219 35
....	....	....	....	....	....	50 00
1,020,496·09	121,607·30	535,318·04	21,412 72	485,178·05	121,607·30	23,837 72

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

No. 27.—Comparative Statement of Manufactures

Provinces.	Licenses.		Materials Used.			
	No.	Fees.	Spirits.	Beer, Wine, &c.	Nitric Acid.	Mercury.
1901.		$	Galls.	Galls.	Lbs.	Lbs.
Ontario	13	1,125	222,777·39	2,222·98	583,078	63,839
Quebec	10	950	125,285·92	3,036·30	150,377	19,039
New Brunswick	2	100	4,642·04	69·90		
Totals	25	2,175	352,705·35	5,329·18	733,455	82,878
1902.						
Ontario	14	1,450	214,682·50	1,904·30	679,674	73,741·50
Quebec	12	825	139,853·07	2,818·80	226,217	28,307·00
New Brunswick	2	100	5,623·57	259·75		
Manitoba	1	50				
Totals	29	2,425	360,159·14	4,982·85	905,891	102,048·50

Inland Revenue Department,
Ottawa, August 16, 1902

for the Years ended June 30, 1901 and 1902.

Manufactured.		Paid Duty ex-Manufactory.		Warehoused.		Total Duty Collected ex-Manufactory, including License Fees.
Vinegar.	Crude Fulminate.	Vinegar.	Duty.	Vinegar.	Crude Fulminate.	
Galls.	Lbs.	Galls.	$ cts.	Galls.	Lbs.	$ cts.
656,268·05	78,654·15	362,806·45	14,512 27	293,461·60	78,654·15	15,637 27
515,028·45	22,496·00	398,805·40	16,126 80	116,223·05	22,496·00	17,076 80
28,436·13	.....	22,115·58	884 63	6,320·55	.....	984 63
1,199,732·63	101,150·15	783,727·43	31,523 70	416,005·20	101,150·15	33,698 70
491,999·78	90,422·30	172,210·93	6,888 47	319,788·85	90,422·30	8,338 47
496,314·53	31,185·00	335,122·70	13,404 90	161,191·83	31,185·00	14,229 90
32,181·78	.....	27,984·41	1,119 35	4,197·37	.....	1,219 35
.....	.....	.....	.....	.....	.....	50 00
1,020,496·09	121,607·30	535,318·04	21,412 72	485,178·05	121,607·30	23,837 72

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

DR. No. 28.—WAREHOUSE RETURN for

Remaining in Warehouse from Last Year.	Placed in Warehouse.		Received from other Divisions.	Totals.		DIVISIONS.
Vinegar.	Vinegar.	Crude Fulminate.	Vinegar.	Vinegar.	Crude Fulminate.	
Galls.	Galls.	Lbs.	Galls.	Galls.	Lbs.	
1,104·92	2,348·04			3,452·96		Brantford, Ont
47,420·94	126,895·76			174,316·70		Hamilton "
16,983·20	54,532·44			71,515·64		Kingston "
		84,347·00			84,347·00	Prescott "
142,299·74	136,012·61			278,312·35		Toronto "
		6,075·30			6,075·30	Windsor "
267,808·80	319,788·85	90,422·30		527,597·65	90,422·30	Totals.
27,308·38	65,885·36			93,193·74		Montreal, Que
22,065·79	22,435·77			44,501·56		Quebec "
42,068·81	72,870·70			114,939·51		St. Hyacinthe, Que.
		31,185·00			31,185·00	Sherbrooke "
91,442·98	161,191·83	31,185·00		252,634·81	31,185·00	Totals.
6,320·55	4,197·37			10,517·92		St. John, N.B
			16,536·50	16,536·50		Winnipeg, Man
305,572·33	485,178·05	121,607·30	16,536·50	807,286·88	121,607·30	Grand totals.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

the Year ended June 30, 1902. CR.

Entered for Consumption.		Removed to other Divisions.	Exported.		Written off.	Remaining in Warehouse.	Totals.	
Vinegar.	Duty.	Vinegar.	Vinegar.	Crude Fulminate	Vinegar.	Vinegar.	Vinegar.	Crude Fulminate.
Galls.	$ cts.	Galls.	Galls.	Lbs.	Galls.	Galls.	Galls.	Lbs.
2,840·96	113 64					612·00	3,452·96	
128,067·35	5,122 69				2,739·21	43,510·14	174,316·70	
63,086·81	2,523 48					8,428·83	71,515·64	
				84,347 00				84,347·00
195,883·68	7,835 35	16,536·50	1,498·44			64,393·73	278,312·35	
				6,075·30				6,075·30
389,878·80	15,595 16	16,536·50	1,498·44	90,422·30	2,739·21	116,944·70	527,597·65	90,422·30
53,170·92	2,126 83					40,022·82	93,193·74	
20,318·29	812 73					24,183·27	44,501 56	
48,374·24	1,934 98					66,565·27	114,939 51	
				31,185·00				31,185·00
121,863·45	4,874 54			31,185·00		130,771·36	252,634·81	31,185·00
8,438·21	337 52					2,079·71	10,517 92	
16,536·50	661 46						16,536 50	
536,716·96	21,468 68	16,536·50	1,498·44	121,607·30	2,739·21	249,795.77	807,286·88	121,607·30

W. J. GERALD,
Deputy Minister.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

DR. No. 29.—COMPARATIVE STATEMENT of Warehouse Returns

Remaining in Warehouse from Last Year.	Placed in Warehouse.		Received from other Divisions.	Totals.		PROVINCES.
Vinegar.	Vinegar.	Crude Fulminate.	Vinegar.	Vinegar.	Crude Fulminate.	
Galls.	Galls.	Lbs.	Galls.	Galls.	Lbs.	1901.
115,081·41	293,461·60	78,654·15	.. ..	408,543·01	78,654·15	..Ontario.....
32,610·02	116,223·05	22,496·00	20,011·75	168,844·82	22,496·00	..Quebec. ... .
6,189·54	6,320·55	....	....	12,510·09	.....	..New Brunswick .....
153,880·97	416,005·20	101,150·15	20,011·75	589,897·92	101,150·15	.....Totals.... .. ....
						1902.
207,808·80	319,788·85	90,422·30	....	527,597·65	90,422·30	..Ontario .....
91,442·98	161,191·83	31,185·00	. . ....	252,634·81	31,185·00	..Quebec.....
6,320·55	4,197·37	.....	.....	10,517·92	... .	..New Brunswick .....
... ...	.....	. . . ..	16,536·50	16,536·50	....	..Manitoba ....
305,572·33	485,178·05	121,607·30	16,536·50	807,286·88	121,607·30	.....Totals..... ....

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

for the Years ended June 30, 1901 and 1902. CR.

Entered for Consumption.		Removed to other Divisions.	Exported.		Written off.	Remaining in Warehouse.	Totals.	
Vinegar.	Duty.	Vinegar.	Vinegar.	Crude Fulminate	Vinegar.	Vinegar.	Vinegar.	Crude Fulminate.
Galls.	$ cts.	Galls.	Galls.	Lbs.	Galls.	Galls.	Galls.	Lbs.
195,931·61	7,837·31	4,074·42	728·18	78,654·15		207,808·80	408,543·01	78,654·15
61,464·51	2,458·57	15,937·33		22,496·00		91,442·98	168,844·82	22,496·00
6,189·54	247·58					6,320·55	12,510·09	
263,585·66	10,543·46	20,011·75	728·18	101,150·15		305,572·33	589,897·92	101,150·15
389,878·80	15,595·16	16,536·50	1,498·44	90,422·30	2,739·21	116,944·70	527,597·65	90,422·30
121,863·45	4,874·54			31,185·00		130,771·36	252,634·81	31,185·00
8,438·21	337·52					2,079·71	10,517·92	
16,536·50	661·46						16,536·50	
536,716·96	21,468·68	16,536·50	1,498·44	121,607·30	2,739·21	249,795·77	807,286·88	121,607·30

	1901.	1902.
Total duty collected, ex-manufactory and ex-warehouse	$42,067 16	$42,881 40
" on licenses	2,175 00	2,425 00
Totals	$44,242 16	$45,306 40

W. J. GERALD,
Deputy Minister.

APPENDIX A *Continued* MANUFACTURES IN BOND.

No. 30. STATEMENT showing the transactions in Vinegar in the Bonded Manufactories in the Dominion of Canada, during the Year ended June 30, 1902.

DR. On hand July 1, 1901.	Manufactured during the Year.	Brought in.	Totals.	DIVISIONS.	CR. Removed.	Written off.	On hand June 30, 1902.	Totals.
Galls.	Galls.	Galls.	Galls.		Galls.	Galls.	Galls.	Galls.
1,104 92	60,761 08		61,866 00	....Brantford, Ont..	61,254 00		612 00	61,866 00
55,427 01	157,430 77	24,033 00	236,890 78	....Hamilton "	177,023 89	2,739 21	57,127 68	236,890 78
16,983 20	54,532 44		71,515 64	....Kingston "	63,086 81		8,428 83	71,515 64
142,299 71	219,275 49		361,575 23	....Toronto "	297,181 50		64,393 73	361,575 23
215,814 87	491,999 78	24,033 00	731,847 65	..... Totals ...	598,546 20	2,739 21	130,562 24	731,847 65
36,288 05	270,770 90	41,280 87	348,339 82	....Montreal, Que	297,373 08		50,966 74	348,339 82
22,065 79	77,513 98		99,579 77	... Quebec "	75,396 50		24,183 27	99,579 77
44,320 12	148,029 65	556 33	192,906 10	...St. Hyacinthe, Que.	121,971 15		70,934 95	192,906 10
102,673 96	496,314 53	41,837 20	640,825 69	Totals	494,740 73		146,084 96	640,825 69
6,320 55	32,181 78		38,502 33	.. St. John, N.B	36,422 62		2,079 71	38,502 33
324,809 38	1,020,496 09	65,870 20	1,411,175 67	....Grand Totals	1,129,709 55	2,739 21	278,726 91	1,411,175 67

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX A—*Continued*—ACETIC ACID.

No. 31.—Return of Manufactures for the Year ended June 30, 1902.

Divisions.	Licenses.		Manufactured.	Paid Duty ex-Manufactory.		Warehoused.	Total Duty collected ex-Manufactory, including License Fees.
	No.	Fees.	—	—	Duty.	—	
			Galls.	Galls.	$ cts.	Galls.	$ cts.
Toronto, Ont.	1	50	145,820·65	111,473·10	4,458 91	34,347·55	4,508 91
Montreal, Que.	1	50	40,649·72	21,403·23	856 13	19,246·49	906 13
Totals	2	100	186,470·37	132,876·33	5,315 04	53,594·04	5,415 04

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

No. 32.—Comparative Statement of Manufactures for the Years ended June 30, 1901 and 1902.

Provinces.	Licenses.		Manufactured.	Paid Duty ex-Manufactory.		Taken for reworking, Duty paid.	Warehoused.	Total Duty collected ex-Manufactory, including License Fees.
	No.	Fees.	—	—	Duty.	—	—	
1901.			Galls.	Galls.	$ cts.	Galls.	Galls.	$ cts.
Ontario	1	50	223,555·84	152,969 74	6,118 79	4,827·77	65,758.33	6,168 79
Quebec	1	50	7,754·67	1,043·46	41 74	.....	6,711·21	91 74
Totals	2	100	231,310·51	154,013·20	6,160 53	4,827·77	72,469·54	6,260 53
1902.								
Ontario	1	50	145,820.65	111,473·10	4,458 91	.....	34,347·55	4,508 91
Quebec	1	50	40,649·72	21,403·23	856 13	.....	19,246·49	906 13
Totals	2	100	186,470·37	132,876·33	5,315 04	.....	53,594·04	5,415 04

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa August 16, 1902.

APPENDIX A—*Continued*—ACETIC ACID.

No. 33.—Warehouse Return for the Year ended June 30, 1902.

Dr. Cr.

Remaining in Warehouse from last year.	Placed in Warehouse.	Totals.	Divisions.	Entered for Consumption.	Duty.	Totals.
Galls.	Galls.	Galls.		Galls.	$ cts.	Galls.
30,799 16	34,347 55	65,146 71	....Toronto.....	65,146 71	2,605 87	65,146 71
1,788 40	19,246 49	21,034 89	....Montreal.....	21,034 89	841 40	21,034 89
32,587 56	53,594 04	86,181 60	Total.....	86,181 60	3,447 27	86,181 60

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

No. 34.—Comparative Statement of Warehouse Returns for the Years ended June 30, 1901 and 1902.

Dr. Cr.

Remaining in Warehouse from last year.	Placed in Warehouse.	Totals.	Provinces.	Entered for Consumption.	Duty.	Remaining in Warehouse.	Totals.
Galls.	Galls.	Galls.	1901.	Galls.	$ cts.	Galls.	Galls.
26,345 08	65,758 33	92,103 41	...Ontario.....	61,304 25	2,452 18	30,799 16	92,103 41
.....	6,711 21	6,711 21	....Quebec.....	4,922 81	196 91	1,788 40	6,711 21
26,345 08	72,469 54	98,814 62	Totals.....	66,227 06	2,649 09	32,587 56	98,814 62
			1902.				
30,799 16	34,347 55	65,146 71	...Ontario.....	65,146 71	2,605 87	.....	65,146 71
1,788 40	19,246 49	21,034 89	....Quebec.....	21,034 89	841 40	.....	21,034 89
32,587 56	53,594 04	86,181 60	Totals.....	86,181 60	3,447 27	.....	86,181 60

	1901.	1902.
Total duty collected, ex-manufactory and ex-warehouse.....	$ 8,809 62	$ 8,762 31
" on licenses.....	100 00	100 00
	$ 8,909 62	$ 8,862 31

Inland Revenue Department,
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

SESSIONAL PAPER No. 12

APPENDIX A—*Continued*—METHYLATED SPIRITS.

No. 35.—STATEMENT showing quantity of Raw Materials on hand at beginning and end of year, and brought in and used during the year 1901 1902.

DR. CR.

(A)

Names of Articles.	Stock on hand July, 1901.	Brought in during the year.	Total to be Accounted for.	Used in manufacture of Methylated Spirits.	Sold.	Stock on hand June 30, 1902.	Total Accounted for.
	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.
Alcohol.....	8,879·68	63,712·38	72,592·06	66,039·58	77·05	6,475·43	72,592·06
Wood Naphtha.	6,356·17	25,768·29	32,124 46	23,831·45	.....	8,293·01	32,124 46

(B)

STATEMENT showing quantity of Raw Material used and Methylated Spirits produced therefrom.

Alcohol used. Statement (A) above.	Wood Naphtha used. Statement (A) above.	Methylated Spirits used. Statement (C) below.	Total to be Accounted for.	Methylated Spirits produced.	Loss in Manufacture.		Total Accounted for.
Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	p. c.	Pr'f galls.
66,039·58	23,831 45	.....	89,871 03	88,449·16	1,421·87	1·06	89,871·03

(C)

STATEMENT showing quantity of Methylated Spirits on hand at beginning and end of year, and brought in, sold and otherwise accounted for during the year.

Stock on hand July 1, 1901.	Manufactured as above. Statement (B)	Brought in during the year.	Total to be Accounted for.	Sold.	Used in Methylated Spirits Warehouse.	Re-used in Manufacture of Methylated Spirits.	Stock on hand June 30, 1902.	Total Accounted for.
Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.	Pr'f galls.
3,114·99	88,449·16	.....	91,564·15	85,350·89	.....	.....	6,213·26	91,564·15

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

DR. No. 36.—HYDRAULIC and other Rents, &c.,

Balances due on July 1, 1901.	Rents accrued up to June 30, 1902.	Totals.	Number.	Location.	Original Lessees.	Present Occupants.
$ cts.	$ cts.	$ cts.				
100 00	200 00	300 00	1	Ottawa River	Perley & Pattee	J. R. Booth
50 00	100 00	150 00	2	"	Thompson & Perkins	"
150 00	300 00	450 00	3	"	Lyman Perkins	"
150 00	300 00	450 00	4	"	R. Blackburn *et al*	McKay Milling Co., Ltd
	100 00	100 00	5	"	J. & J. Petrie	Ottawa Electric Co
	100 00	100 00	6	"	A. H. Baldwin	"
	300 00	300 00	7	"	Ottawa Electric Ry. Co	
	400 00	400 00	8	"	Perley & Pattee	Ottawa Electric Co
	100 00	100 00	9	"	J. M. Currier	N. S. Blaisdell
	600 00	600 00	10	"	Harris, Bronson & Co.	The Bronson & Weston Lumber Co.
	200 00	200 00	11	"	Levi Young	Ottawa Electric Ry. Co
	104 00	104 00	12	"	J. R. Booth	
	10 00	10 00	13	"	Bronson & Weston	
	100 00	100 00	14	"	"	
	96 00	96 00	15	"	Perley & Pattee	J. R. Booth
48 00	8 00	56 00	16	"	L. M. Coutlee	Mary Conroy
570 84		570 84	17	"	John Rochester	
	25 00	25 00	18	"	Nérée Têtreau	Thomas Ahearn
200 00		200 00	19	"	Hon. J. Skead	
96 00		96 00	20	"	"	
	1 00	1 00	21	"	G. A. Grier & Co.	Ottawa Investment Co.
380 00		380 00	22	"	John Rankin	
75 00	150 00	225 00	23	"	J. R. Booth	
50 00	5 00	55 00	24	"	Colin Dewar	
	50 00	50 00	25	"	Bronson & Weston	
	1 00	1 00	26	"	Alfred Desjardins	
	100 00	100 00	27	"	The Bronson Co.	
	10 00	10 00	28	"	Ottawa Electric Co.	
	1 00	1 00	1	St. Lawrence R.	Que. Har. Commissioners	
75 00	25 00	100 00	2	"	Rich. and Ont. Nav. Co.	
	1 00	1 00	3	Kingston, Ont.	The Frontenac Milling Co., Ltd.	
	1 00	1 00	4	Quebec	Corporation of Quebec	
	1 00	1 00	5	"	Narcisse Blais	
	5 00	5 00	6	Richibucto Har.	Wm. Hudson	
	1 00	1 00	7	Rondeau Har.	School Trustees	
1 00	1 00	2 00	8	Collingwood Har.	Great North'n Transit Co	
2 00	1 00	3 00	9	Ottawa	E. G. Laverdure	
	1 00	1 00	10	Walkerton, Ont.	D. Robertson & J. Rowland	
	1 00	1 00	11	Three Rivers	Corporation of Three Riv	
100 00	100 00	200 00	12	"	W. Ritchie	
165 00		165 00	13	British Columbia	A. Peel	
90 00		90 00	14	"	Jonathan Maury	
25 00	25 00	50 00	15	"	Roderick Finlayson	
25 00	25 00	50 00	16	"	Joseph Spratt	
	1 00	1 00	17	"	Bank of British Columbia	
	1 00	1 00	18	"	W. Dodd	
	12 00	12 00	19	"	D. W. Gordon	
	5 00	5 00	20	"	S. Williams	
	5 00	5 00	21	"	Geo. H. Huff	
	1 00	1 00	22	"	Canadian Pac. Ry. Co.	
	50 00	50 00	23	"	John Reid	

Lessees Accounts, 1901-1902. CR.

Description of Property.	Number.	Date to which Account is made up.	Paid during Fiscal Year.	Balances due on June 30, 1902.	Totals.
			$ cts	$ cts.	$ cts.
Lots B and C, Chaudière St., service ground	1	June 30, 1902	200 00	100 00	300 00
Lot D	2	" 30, 1902	100 00	50 00	150 00
Lots E, F and G, South Head St	3	" 30, 1902	300 00	150 00	450 00
Lots H, I and J, grist mill, South Head St	4	" 30, 1902	300 00	150 00	450 00
Lot K, fanning mill, South Head St.	5	Dec. 31, 1901	100 00		100 00
Lot L, service ground	6	" 31, 1901	100 00		100 00
Lots Q, R and T, service ground, North Middle St	7	" 31, 1901	300 00		300 00
Lots M, N, O and P, service ground (no water used)	8	" 31, 1901	400 00		400 00
Lot S, service ground	9	June 30, 1902	100 00		100 00
Lots U, V, W, X, Y and Z, service ground	10	" 30, 1902	600 00		600 00
Two strips of land	11	Jan. 1, 1903	200 00		200 00
Lumber yard at head of slides	12	Sept. 20, 1902	104 00		104 00
Bridge over slides	13	June 30, 1903	10 00		10 00
Strip of land, Amelia Island	14	Jan. 1, 1903	100 00		100 00
Reserve, head of Chaudière Island	15	" 1, 1903	96 00		96 00
Small Island, Deschênes Rapids	16	" 1, 1902		56 00	56 00
Portion of lot 39, Concession 'A,' Nepean	17	Feb. 1, 1885		570 84	570 84
Excavated channel slide and two dams, Little Chaudière	18	Mar. 1, 1903	25 00		25 00
Water lots opposite lot 30, Concession 'A,' Nepean	19	Dec. 1, 1891		200 00	200 00
Three small islands, Ottawa River	20	May 1, 1891		96 00	96 00
Covering over portion of Ottawa slides	21	Nov. 10, 1902	1 00		1 00
East portion of Hawley's Island	22	June 30, 1891		380 00	380 00
Piece of land, south-west end of Union Bridge	23	Nov. 12, 1902	150 00	75 00	225 00
Piece of land on Victoria Island	24	June 15, 1903		55 00	55 00
Piece of land, south side of Middle St., Victoria Island	25	Aug. 31, 1902	50 00		50 00
Piece of land, Longue Pointe Rouge Templeton, Ottawa County	26	Oct. 24, 1902		1 00	1 00
South-west of lot No. 1, Amelia Island	27	Oct. 9, 1901	100 00		100 00
Lot Pa, South Head St	28	Jan. 10, 1903	10 00		10 00
Small lot near Custom House, Quebec	1	Sept. 1, 1902	1 00		1 00
Roadway from pier at Côteau Landing	2	July 1, 1902		100 00	100 00
Portion of the Graving Dock, Gore St., Ont	3	May 31, 1903	1 00		1 00
Old Provincial Government Building grounds, on Mountain Hill	4	June 25, 1903	1 00		1 00
Privilege to erect bridge on St. Charles River	5	Feb. 6, 1903	1 00		1 00
Piece of land at North Beach	6	June 30, 1902		5 00	5 00
Use of old log house formerly used as Custom House, Shrewsbury, Ont.	7	Sept. 11, 1901	1 00		1 00
Use of breakwater for storing coal	8	Feb. 5, 1903	2 00		2 00
South-east half of lot 8, Ottawa	9	Dec. 18, 1902	3 00		3 00
Right of way over strip of land	10	Apl. 27, 1903	1 00		1 00
Lot of land on St. Christopher Island, St. Maurice River	11	Dec. 1, 1902	1 00		1 00
Outlet of River St. Maurice	12	June 30, 1902	100 00	100 00	200 00
Portion of Assay Office, New Westminster	13	June 11, 1891		165 00	165 00
" "	14	" 11, 1891		90 00	90 00
Privilege to erect two bulkheads, Rock Bay, Victoria Harbour	15	" 1, 1903		50 00	50 00
Privilege to build a wharf opposite his own property, Victoria Harbour	16	" 1, 1903	25 00	25 00	50 00
Right of drainage through Government property, Nanaimo	17	Dec. 1, 1902	1 00		1 00
Old Government House, Yale	18	July 24, 1901	1 00		1 00
Beach lots A, C, E and F, front of 7, 8 and 9, Nanaimo Harbour	19	Aug. 27, 1902	12 00		12 00
Frontage on lot 7, block M, Victoria	20	July 16, 1902	5 00		5 00
Permission to build a wharf on lot A, block 2, Somas River, Alberni, B.C.	21	Aug. 12, 1902	5 00		5 00
Portion of Custom House lot, New Westminster	22	Apl. 14, 1903	1 00		1 00
Lot 1, block 13, corner Begbie and Columbia Sts., New Westminster	23	May 12, 1903	50 00		50 00

DR. No. 36.—HYDRAULIC and other Rents, &c.,

Balances due on July 1, 1901.	Rents accrued up to June 30, 1902.	Totals.	Number.	Location.	Original Lessees.	Present Occupants.
$ cts	$ cts.	$ cts.				
70 00	.....	70 00	24	Rivière du Lièvre	Dominion Phosphate Co., Ltd	
1 00	.....	1 00	25	Charlottetown....	Rt. Rev. Bishop McIntyre	Rt. Rev. Bishop McDonald
20 00	20 00	40 00	26	Rivière St. Maurice.....	Laurentides Pulp Co., Ltd	
...	16 00	16 00	27	Antigonish, N.S.	L. C. Archibald	
...	1 00	1 00	28	Owen Sound.....	Grand Trunk Railway..	
...	5 00	5 00	29	.....	Jacob Duke Speers.....	
240 00	....	240 00	30	Windsor	Archie McNee	
...	1 00	1 00	31	Lévis, Quebec....	Cyrille Robitaille	
...	1 00	1 00	32	Port Morien, N.S.	The Gourie & Blackhouse Collieries, Ltd...	
5 00	5 00	10 00	33	Bayfield, N.S ...	Charles S. Gass	
1 00	1 00	2 00	34	" ...	"	
...	5 00	5 00	35	Village of Brooke, Ont. ...	Pedwell, William..	
2,689 84	3,679 00	6,368 84				

Lessees' Accounts, 1901-1902—*Concluded.* CR.

Description of Property.	Number.	Date to which Account is made up.	Paid during Fiscal Year.	Balances due on June 30, 1902.	Totals.
			$ cts.	$ cts.	$ cts.
Permission to erect a landing at Little Rapids, Rivière du Lièvre	24	Apl. 30, 1898		70 00	70 00
Leave to connect drain to main service of public building	25	May 16, 1902		1 00	1 00
Tract of land, Chûte de la Grande Mère, St. Maurice River	26	June 17, 1903	20 00	20 00	40 00
Tract of land and water lot, McNair's Cove	27	Dec. 30, 1902	16 00		16 00
Lot of land west of Sydenham River	28	Dec. 31, 1902		1 00	1 00
Water lot	29	Apl. 8, 1903	5 00		5 00
Lot on Ouellette St., Windsor, Ont	30	" 30, 1900		240 00	240 00
Ground rent	31	" 4, 1903	1 00		1 00
Water lot for the purpose of constructing a pier	32	Dec. 20, 1902	1 00		1 00
Water lot	33	" 7, 1902	10 00		10 00
"	34	June 8, 1903	1 00	1 00	2 00
"	35	Mar. 31, 1903	5 00		5 00
Grand Totals			3,617 00	2,751 84	6,368 84

APPENDIX

No. 36 (A).—Hydraulic and other Rents, &c.—

Balances due on July 1, 1901.	Totals.	Number.	Location.	Name of Proprietors.
$ cts.	$ cts.			Land Sales—Principal Account.
12,092 83	12,092 83	1	Hamilton and Port Dover Road	Choat & Kern
433 34	433 34	2	Bonner's property, Quebec	Timothy Sullivan, now M. Murphy
333 34	333 34	3		John Bailey, now Alex. Powell
300 00	300 00	4		Abraham Thompson
147 80	147 80	5		John Boomer
248 40	248 40	6		John Garbatz, now J. C. Nolan
154 80	154 80	7		N. H. Bowen
600 00	600 00	8		Estate Robert Reid
333 33	333 33	9		John Chevalier
533 33	533 33	10		Daniel Holden
333 33	333 33	11		George Creeley
63 00	63 00	12		Thomas McAdam
15,573 50	15,573 50			
				Land Sales—Interest Account.
6,298 25	6,298 25	1	Hamilton and Port Dover Road	Choat & Kern (matured)
558 00	558 00	2	Bonner's property, Quebec	Timothy Sullivan, now M. Murphy
120 00	120 00	3		John Bailey, now Alex. Powell
306 00	306 00	4		Abraham Thompson
155 22	155 22	5		John Boomer
275 82	275 82	6		John Garbatz, now J. C. Nolan
208 95	208 95	7		N. H. Bowen
828 00	828 00	8		Estate Robert Reid
190 00	190 00	9		John Chevalier
298 68	298 68	10		Daniel Holden
35 91	35 91	11		George Greeley
100 00	100 00	12		Thomas McAdam
100 00	100 00	13		Joseph Brook, tenant
9,474 83	9,474 83			

Inland Revenue Department,
Ottawa, August 16, 1902.

SESSIONAL PAPER No. 12

A—*Concluded.*

Lessees' Accounts, 1901–1902—*Concluded.*

Description of Property.	Number.	Date to which the account is made up.	Balances due on June 30, 1902.	Totals.
			$ cts.	$ cts.
Hamilton and Port Dover & Caledonia Bridge	1		12,092 83	12,092 83
Lot No. 1, Wolfe Street	2		433 34	433 34
" 9 "	3		333 34	333 34
" 49 "	4		300 00	300 00
" 73 and 74, Tower Street	5		147 80	147 80
" 64 Wolfe Street and 211 and 252 Ware Street	6		248 40	248 40
" 67 and 68, Monument Street	7		154 80	154 80
" 22 and 23, Wolfe Street	8		600 00	600 00
" 32, Wolfe Street	9		333 33	333 33
" 65 and 66, Wolfe Street	10		533 33	533 33
" 31, Wolfe Street	11		333 33	333 33
" 135, Church Street	12		63 00	63 00
			15,573 50	15,573 50
	1	June 30, 1874	6,298 25	6,298 25
Lot No. 1, Wolfe Street	2	May 1, 1889	558 00	558 00
" 9 "	3	"	120 00	120 00
" 49 "	4	"	306 00	306 00
" 73 and 74, Tower Street	5	"	155 22	155 22
" 64, Wolfe Street, and 211 and 252 Ware Street	6	"	275 82	275 82
" 67 and 68, Monument Street	7	"	208 95	208 95
" 22 and 23, Wolfe Street	8	"	828 00	828 00
" 32, Wolfe Street	9	Nov. 1, 1863	190 00	190 00
" 65 and 66, Wolfe Street	10	"	298 68	298 68
" 31, Wolfe Street	11	"	35 91	35 91
" 135, Church Street	12	"	100 00	100 00
Monument Hotel	13	"	100 00	100 00
			9,474 83	9,474 83

W. J. GERALD,
Deputy Minister.

APPENDIX B.

No. 1.—Details of Excise Expenditures for the Year ended June 30, 1902.

To whom paid.	Service.	Deductions for Retirement.	Deductions for Superannuation.	Deductions for Guarantee.	Amounts paid.	Total amounts paid.
	Belleville.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
McAllister, A.	Salary as Collector from July 1, 1901, to July 31, 1901	...	3 30	.....	161 70	
Standish, J. G.	" Special Class Exciseman for year	.....	30 00	4 32	1,465 68	
Pole, C. W.	" Deputy Collector for year	...	27 24	3 60	1,334 16	
McCoy, W.	" 1st Class Exciseman "	.....	24 00	4 32	1,171 68	
McCuaig, A. F.	" Deputy Collector "	.....	16 04	2 88	781 08	
McFee, A. C.	" 2nd Class Exciseman "	....	26 16	2 88	720 96	
Brown, W. J.	" Probationary Exciseman from July 1, 1901 to Sept. 24, 1901, and 3rd Class from Sept. 25, 1901, to June 30, 1902	28 82	.....	2 88	544 94	
Iler, B.	" Collector from Jan. 16, 1902, to June 30, 1902	.....	16 54	3 60	807 27	
	Salaries	28 82	143 28	24 48	6,987 47	
	Contingencies				576 88	
						7,564 35
	Brantford.					
Simon, E. H.	Salary as Collector for year	.....	29 06	7 20	1,416 24	
Sloan, W.	" Deputy Collector for year	57 05	.....	3 60	1,080 60	
Walsh, D. J.	" Special Class Exiseman "	.....	24 00	4 32	1,171 68	
Weyms, C.	" 1st Class Exiseman "	.....	19 96	2 88	977 16	
Bell, J. E.	" 1st " "	.....	19 96	2 88	977 16	
Orr, H. N.	" 1st " "	.....	31 99	2 88	878 88	
Hart, P. D.	" 2nd " "	.....	16 92	2 88	773 03	
Berry, H. L.	" 2nd " "	37 44	.....	2 88	709 68	
	Salaries	94 49	141 89	29 52	7,984 43	
	Contingencies	...	.....	...	648 90	
						8,633 33
	Cornwall.					
Mulhern, M. M.	Salary as Collector for year	...	20 00	3 60	976 40	
	Salary	.....	.....	.....	976 40	
	Contingencies	..	.....	.....	89 75	
						1,066 15
	Guelph.					
Powell, J. B.	Salary as Collector for year					
Till, T. M.	" Deputy Collector for year	.....	39 60	7 20	1,933 20	
Dawson, W.	" Special Exciseman "	....	28 64	3 60	1,397 76	
Woodward, G. W.	" " "	.....	30 00	4 32	1,465 68	
Broadfoot, S.	" Accountant for year	.....	24 00	4 32	1,171 68	
Bish, P.	" 1st Class Exciseman for year	.....	21 00	4 32	1,024 68	
Spence, F. H.	" 1st " "	...	19 96	2 88	977 16	
Bowman, A.	" 1st " "	....	19 96	2 88	977 16	
O'Donoghue, M. J.	" 1st " "	.....	19 96	2 88	977 16	
Kilroy, E. T.	" 1st " "	....	19 96	2 88	977 16	
Brain, A. F.	" 1st " "	.....	19 96	2 88	977 16	
O'Brien, E. C.	" 2nd " "	..	32 72	2 88	899 40	
Alteman, P. J.	" 2nd " "	....	16 96	2 88	830 16	
Howie, A.	" 2nd " "	.....	26 16	2 88	720 96	
Coutts, J. J.	" Probationary 3rd Class from July 1, 1901, to Sept. 24, and 3rd Class from Sept. 25, 1901, to June 30, 1902	...	15 00	2 88	732 12	
		28 82	.....	2 88	544 94	
	Salaries	28 82	333 88	52 56	15,606 38	
	Contingencies	.....	.....	.....	919 43	
						16,525 81

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts Paid.	Total amounts paid.
		Retirement.	Superannuation.	Guarantee.		
	Hamilton.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Miller, W. F.	Salary as Collector for year		43 96	14 40	2,141 64	
Cameron, D. M.	" Special Class Exciseman for year		30 00	4 32	1,465 68	
Ross, S. F.	" Deputy Collector, superannuated Aug. 1, 1901		2 50	0 60	121 90	
Baby, W. A. D.	" Special Class Exciseman for year		30 00	4 32	1,465 68	
Donaghy, W.	" " "		28 04	4 32	1,367 64	
Crawford, W. P.	" Accountant for year		24 52	4 32	1,196 16	
O'Brien, J. F.	" 1st Class Exciseman for year		19 96	2 88	977 16	
Irwin, R.	" 1st " "		19 96	2 88	977 16	
Dumbrille, R. W.	" 1st " "		19 96	2 88	977 16	
Weir, J.	" 1st " "		19 96	2 88	977 16	
Hobbs, G. N.	" 1st " "		19 54	2 88	955 08	
Wardell, R. S. R.	" 1st " "		34 30	2 88	940 32	
Logan, J.	" 2nd " "		16 96	2 88	830 16	
Amor, W.	" 2nd " "		16 96	2 88	830 16	
Hayhurst, T. H.	" 1st " "	42 52		2 88	804 60	
Bishop, J. B.	" 3rd " "	33 00		2 88	624 12	
Cheseldine, J. H.	" Probationary Exciseman from July 1 to Sept. 24, 1901, and 3rd Class from Sept. 25, 1901, to June 30, 1902	28 82		2 88	544 94	
Lawlor, J. J.	" " "	28 82		2 88	544 94	
O'Brien, Jas.	" Deputy Collector from Oct. 1, 1901, to June 30, 1902	48 69		5 40	920 88	
Blackman, C.	" 3rd Class Exciseman for year	26 48			503 52	
	Salaries	208 33	326 62	72 24	19,166 06	
	Contingencies				376 95	
						19,543 01
	Kingston.					
Dickson, C. T.	Salary as Collector for year		31 96	7 20	1,560 84	
Grinnason, T.	" Deputy Collector for year		24 00	3 60	1,172 40	
Hanley, A.	" Asst. Accountant "		19 96	2 88	977 16	
McFarland, C. D.	" 1st Class Exciseman "		19 96	2 88	977 16	
Lyons, E.	" 1st " "		19 96	2 88	977 16	
Browne, G. W.	" 2nd " July 1, 1901, to Sept. 30, 1901		4 23	0 72	207 54	
O'Donnell, J.	" 3rd Class Exciseman for year		15 00	2 88	732 12	
Fahey, E.	" 3rd " "		13 20	2 88	643 92	
	Salaries		148 27	25 92	7,248 30	
	Contingencies				619 85	
						7,868 15
	London.					
Alexander, T.	Salary as Collector for year		39 60	7 20	1,933 20	
Spereman, J. J.	" Special Class Exciseman for year		31 96	4 32	1,563 72	
Davis, T. G.	" Deputy Collector for year		30 00	3 60	1,466 40	
McSween, Jas.	" 1st Class Exciseman to March 11, and Collector at Windsor from March 12 to June 30, 1902		13 87	2 16	680 17	
Hicks, W. H.	" Deputy Collector for year		19 96	4 68	975 36	
Coles, F. H.	" Accountant for year		21 00	4 32	1,024 68	
Stewart, J.	" 1st Class Exciseman "		19 96	2 88	977 16	
Lee, E.	" 1st " "		19 96	2 88	977 16	
Wilson, D.	" Asst. Accountant "		19 96	2 88	977 16	
Girard, I.	" 1st Class Exciseman "		19 96	2 88	977 16	

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for Retirement.	Deductions for Superannuation.	Deductions for Guarantee.	Amounts Paid.	Total amounts paid.
	London—Con.	$ cts. Insurance.	$ cts.	$ cts.	$ cts.	$ cts.
Boyle, P.	Salary as 1st Class Exciseman for year.	71 76	29 92	2 88	895 44	
Webb, C. E. A.	" 2nd " " "	.....	16 96	2 88	830 16	
Tracey, J. P.	" 2nd " " "	.....	16 96	2 88	830 16	
Davis, Jas.	" 2nd " " "	.....	17 27	2 88	848 18	
Foster, J. H.	" 2nd " " "	.....	29 68	2 88	817 44	
Whitehead, J. P.	" Deputy Collector "	32 48	.....	2 88	614 64	
Talbot, J.	" 3rd Class Exciseman "	34 44	.....	2 88	652 68	
Trasher, W. A.	" Deputy Class "A," April 1 to June 30, 1902.	18 75	.....	0 90	355 35	
	Salaries	157 43	347 02	58 86	17,396 22	
	Contingencies	.....	.....	.....	1,216 90	
						18,613 21
	Ottawa.					
Freeland, A.	Salary as Collector for year.	70 04	.....	7 20	1,322 76	
McGuire, T.	" Deputy Collector for year.	58 39	.....	3 60	1,106 76	
Slattery, R.	" 1st Class Exciseman for year.	.....	19 96	2 88	977 16	
Bennett, Jas.	" Deputy Collector for year.	45 00	.....	2 88	852 12	
Hinchey, E. H.	" Accountant for year	.....	16 64	4 32	809 04	
Laporte, G.	" 3rd Class Exciseman for year	.....	15 00	2 88	732 12	
	Salaries	173 43	51 60	23 76	5,799 96	
	Contingencies	.....	.....	.....	625 67	
						6,425 63
	Owen Sound.					
Graham, W. J.	Salary as Collector for year	.....	25 20	3 60	1,231 20	
Nichols, J. T.	" Deputy Collector for year.	.....	19 96	2 88	977 16	
Johnson, J. J.	" 1st Class Exciseman for year.	.....	17 94	2 88	871 68	
Chisholm, W. N.	" Deputy Collector for year.	.....	16 96	2 88	830 16	
Blyth, A.	" 2nd Class Exciseman for year	37 44	.....	2 88	709 68	
	Salaries	37 44	80 06	15 12	4,619 88	
	Contingencies	.....	.....	.....	656 31	
						5,276 19
	Perth.					
McLenaghan, N.	Salary as Collector for year.	70 04	.....	7 20	1,322 76	
Mason, T.	" Special Class Exciseman for year.	.....	30 00	4 32	1,465 68	
Goodman, A. W.	" 1st Class Exciseman for year	.....	19 96	2 88	977 16	
Noonan, H. T.	" Deputy Collector for year.	32 04	.....	3 60	609 36	
Clarke, T.	" " " "	30 00	.....	2 88	567 12	
Rowan, W. E.	" " " "	19 96	.....	2 88	377 16	
Egan, W.	" " " "	.....	.....	2 88	397 08	
George, J.	" " " "	10 04	.....	2 88	187 08	
Girard, A. B.	" Class "B" from July 18, 1901, to February 11, 1902	2 81	.....	1 20	53 00	
Baikie, D.	" Class "B" from July 17, 1901, to June 30, 1902	14 35	.....	3 30	269 44	
Maurice, E.	" Deputy Collector from February 12 to June 30, 1902.	1 89	.....	1 20	35 28	
	Salaries	181 13	49 96	35 22	6,261 12	
	Contingencies	.....	.....	.....	589 52	
						6,850 64
	Peterborough.					
Ruikins, W.	Salary as Collector for year.	49 96	.....	3 60	946 44	
Howden, R.	" Deputy Collector for year.	.....	16 04	2 88	781 08	
Bickle, J. W.	" " "	.....	13 96	2 88	683 16	

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total Amounts paid.
		Retirement.	Superannuation.	Guarantee.		
	Peterborough—Con.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Knowlson, J. B.	Salary as Deputy Collector, to September 1, 1901		2 32	48	113 86	
Rork, T	" Deputy Collector	40 04		3 60	756 36	
	Salaries	90 00	32 32	13 44	3,280 90	
	Contingencies				204 78	
						3,485 68
	Port Arthur.					
Ironside, G. A.	Salary as Collector for year		19 96	3 60	976 44	
Robinson, R. S.	" Deputy Collector for year	2 48		1 80	45 72	
	Salaries	2 48	19 96	5 40	1,022 16	
	Contingencies				110 05	
						1,132 21
	Prescott.					
Dumbrille, J.	Salary as Collector to February 1, 1902		21 00	4 20	1,024 80	
Gerald, W. H.	" Special Class Exciseman for year		30 09	4 32	1,465 68	
Keilty, T.	" Deputy Collector for year		25 96	5 60	1,270 44	
Macdonald, A. B.	" Special Class Exciseman for year		24 00	4 32	1,171 68	
Marshall, F.	" 2nd Class Exciseman to September 1, 1901		2 82	0 48	138 36	
Keeler, G. S.	" 2nd Class Exciseman for year		16 96	2 88	830 16	
Wood, J. A.	" Deputy Collector for year			2 88	797 04	
Ferguson, J.	" 3rd Class Exciseman for year		15 00	2 88	732 12	
Johnston, G. E.	" " " "		15 00	2 88	732 12	
White, J. B.	" Deputy Collector for year	25 04		2 88	472 08	
	Salaries	25 04	150 74	31 32	8,634 48	
	Contingencies				440 11	
						9,074 59
	Stratford.					
Caven, A.	Salary as Collector for year		31 96	3 60	1,564 44	
Kennie, G.	" Deputy Collector for year		24 00	3 60	1,172 40	
Clark, A. F.	" Accountant for year		19 96	4 32	975 72	
Egener, A.	" 1st Class Exciseman for year		19 96	2 88	977 16	
Waller, J.	" 3rd " "		15 00	2 88	732 12	
Young, R. E.	" Deputy Collector for year	25 04		2 88	472 08	
	Salaries	25 04	110 88	20 16	5,893 92	
	Contingencies				388 47	
						6,282 39
	St. Catharines.					
Hesson, C. A.	Salary as Collector for year		24 00	7 20	1,168 80	
Harris, J. G.	" Deputy Collector for year		34 96	2 88	962 16	
Milliken, E.	" 2nd Class Exciseman for year		16 96	2 88	830 16	
Schram, R. L. H.	" 3rd " "		25 68	2 88	706 44	
Simpson, W. A.	" Probationery Exciseman for year	28 82		2 88	544 94	
	Salaries	28 82	101 60	18 72	4,212 50	
	Contingencies				385 54	
						4,598 04

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for Retirement.	Deductions for Superannuation.	Deductions for Guarantee.	Amounts paid.	Total Amounts paid.
	Toronto	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Frankland, H. R.	Salary as Collector for year	96 72		14 40	1,823 88	
Iler, B.	" Deputy Collector to January 16, 1902 and Collector at Belleville to June 30, 1902		17 25	3 60	843 64	
Gerald, C.	" Special Class Exciseman for year		31 96	4 32	1,563 72	
Henderson, W.	" Deputy Collector for year		25 00	3 00	1,222 00	
Boomer, J. B.	" Assistant Accountant for year		28 04	4 32	1,367 64	
Metcalf, W. F.	" Special Class Exciseman for year		24 00	4 32	1,171 68	
Boyd, S. I.	" Deputy Collector for year		24 00	2 88	1,173 12	
Dick, J. W.	" Special Class Exciseman for year		24 00	4 32	1,171 68	
Evans, G. T.	" Special Class Exciseman for year		24 00	4 32	1,171 68	
Jamieson, R. C.	" 1st Class Exciseman for year		24 00	4 32	1,171 68	
Shanacy, M.	" Deputy Collector for year		22 04	2 88	1,075 08	
Coleman, C.	" " "		19 96	2 88	977 16	
Helliwell, H. N.	" 1st Class Exciseman for year		19 96	2 88	977 16	
O'Leary, T. J.	" " "		19 96	2 88	977 16	
Flynn, D. J.	" " "		19 96	2 88	977 16	
Graham, W. T.	" " "		19 96	2 88	977 16	
Doyle, B. J.	" " "		19 96	2 88	977 16	
Brennan, D. J.	" " "		19 96	2 88	977 16	
Cook, W. R.	" " "		19 96	2 88	977 16	
Howard, W. W. S.	" " "		19 96	2 88	977 16	
Hurst, L. B.	" " "		20 63	2 88	975 84	
Barber, J. S.	" 2nd " "		16 96	2 88	830 16	
Murray, A. E.	" " " "		16 96	2 88	830 16	
Dager, H. J.	" Deputy Collector for year	42 52		2 88	804 60	
Jones, A.	" 3rd Class Exciseman for year		15 00	2 88	732 12	
Adams, J. S.	" " " "		15 00	2 88	732 12	
Boyd, J. F. S.	" " " "		26 16	2 88	720 96	
Coulter, A.	" " " "		26 16	2 88	720 96	
Falconer, R. H.	" " " "	31 14		2 88	595 68	
Graham, A. L.	" " " "	31 14		2 88	595 68	
Burns, R. J.	" Exciseman for year	50 26		2 88	566 86	
Elliott, T. H.	" Deputy Collector for year	17 48		2 88	329 64	
Brentnall, F. F.	" Class "B" from January 13, to June 30, 1902	18 69		1 34	354 12	
Blair, J. B.	" Accountant from January 30, to June 30, 1902		26 94	5 04	384 67	
Dudley, W. H.	" Special Class Exciseman, from January 30, to June 30, 1902		40 22	6 12	370 31	
Mahoney, H.	" Exciseman from February 13 to June 30, 1902	9 51		0 96	179 97	
Mackenzie, J. H.	" Deputy Collector from March 22 to June 30, 1902	17 97		0 99	341 06	
Hawkins, A. C.	" 1st Class Exciseman from April 30, 1902, to June 30, 1902		6 64	0 96	161 83	
	Salaries	296 03	634 00	128 48	32,776 98	
	Contingencies				2,094 48	
						34,871 46
	Windsor.					
Kenning, J. H.	Salary as Collector to Mch. 12, 1902		25 62	10 80	1,495 27	
Bouteiller, G. A.	" Special Class Exciseman for year		31 96	4 32	1,563 72	
Conway, B. J.	" " to Aug. 1, 1902		2 50	0 36	122 14	
Crowe, W.	" Accountant for year		28 04	4 32	1,367 64	

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901–1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total amounts paid.
		Retirement.	Superannuation.	Guarantee.		
	Windsor—Con.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Dunlop, C	Salary as Deputy Collector for year		25 96	3 60	1,270 44	
Gow, J. E	" Special Class Exciseman for year		21 00	4 32	1,171 68	
Brennan, J	" Accountant for year		21 00	4 32	1,171 68	
Allen, G. A	" 1st Class Exciseman for year		19 96	2 88	977 16	
Marcon, F. A	" " " "		19 96	2 88	977 16	
Jubenville, J. P	" 2nd " " "		16 92	2 88	603 95	
Thomas, P	" 1st " " "		19 51	2 88	955 08	
Bayard, G. A	" 1st " " "		19 54	2 88	955 08	
Falconer, J	" 3rd " " "		15 00	2 88	732 12	
Keogh, P. M	" Deputy Class 'B,' March 12 to June 30, 1902		16 49	3 06	806 37	
Crotty, J	" 3rd Class Exciseman for year		15 00	2 88	732 12	
Cahill, J. W	" 3rd " " "		15 00	2 88	732 12	
Belleperche, A. J. E	" 2nd " " "	37 44		2 88	709 68	
Neil, Jas	" 3rd " " from July 23, 1901, to June 30, 1902	32 85		3 30	622 41	
Chilver, F. W	" Exciseman from Aug. 12, 1901, to June 30, 1902	24 06		2 40	455 42	
McSween, J	" Collector from March 12 to June 30, 1902		10 93	3 60	532 24	
Marion, H. R	" Deputy Collector from March 24 to June 30, 1902	17 62		1 80	333 52	
McArthur, G. H	" Probationary Exciseman from March 24 to June 30, 1902	6 77		0 72	128 24	
	Salaries	118 74	330 42	72 84	18,415 24	
	Contingencies				1,269 11	
						19,684 35
	Joliette.					
Basinet, L	Salary as Acting Collector for year			2 77	766 64	
Taylor, G. W	" Special Class Exciseman for year		28 04	4 32	1,367 64	
Marion, J. E. E	" 3rd Class Exciseman for year	28 08		2 16	532 26	
Moreau, A	" Deputy Collector for year	33 28		3 60	629 76	
Ralston, T	" " "	25 04		3 60	471 36	
Forest, M	" " "	10 04		3 60	186 36	
Labelle, L. V	" Collector from April 8 to June 30, 1902	16 13		2 57	304 05	
Basinet, L	" Exciseman from April 8 to June 30, 1902	5 75		0 41	109 09	
	Salaries	118 32	28 04	23 03	4,367 16	
	Contingencies				916 89	
						5,284 05
	Montreal.					
Lawlor, H	Salary as Collector for year		43 96	14 40	2,141 64	
Toupin, F. X. J. A.	" Deputy Collector for year		30 60	7 20	1,462 80	
Caven, Wm	" " " "		30 00	7 20	1,462 80	
Lecours, H. T	" Accountant, from July 1, to Nov. 30, 1901		11 65	1 80	569 85	
Forest, E. R	" Cashier for year		25 96	7 20	1,266 84	
Fox, J. D	" Asst. Accountant for year		25 20	3 24	1,231 56	
Lane, T. M	" Accountant for year		24 00	2 88	1,173 12	
Fox, T	" 1st Class Exciseman for year		19 92	2 88	807 80	
Villeneuve, J	" " " "		18 26	2 64	895 73	
Scullion, W. J	" " " "		19 96	2 88	977 16	
Macintyre, D	" " " "		19 96	2 88	977 16	
Hawkins, A. C	" " " "		13 28	1 92	442 89	
Malo, T	" 2nd " "		16 96	2 88	830 16	

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total Amounts paid.
		Retirement.	Superannuation.	Guarantee.		
	Montreal—Con.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Dumouchel, L.	Salary as 2nd Class Exciseman for year		16 96	2 88	830 16	
Courtney, J. J.	" " " "		16 96	2 88	830 16	
Verner, F.	" " " "		16 96	2 88	830 16	
Dixon, H. G. S.	" " " "		16 96	2 88	830 16	
Codd, H. J. S.	" " " "		15 78	2 88	768 84	
Millier, E.	" 3rd " "		15 00	2 88	732 12	
Panneton, G. E.	" " " "		15 00	2 88	732 12	
Costigan, J. J.	" " " "		15 00	2 88	732 12	
O'Flaherty, E. J.	" " " "		15 00	2 88	732 12	
Brabant, J. B. G. N.	" " " "		15 00	2 88	732 12	
Belair, A. P.	" " " "		15 00	2 88	732 12	
Ryan, W.	" " " "	37 44		2 88	709 68	
Mainville, C. P.	" " " "		15 00	2 88	732 12	
Daveluy, J. P.	" " " "	37 44		2 88	709 68	
Andrews, A. A.	" 2nd " "		28 80	2 88	793 32	
Renaud, A. H.	" " " "		26 16	2 88	720 96	
Desaulniers, J. E. A.	" " " "	37 44		2 88	709 68	
Fortier, V.	" Deputy Collector "	30 00		3 60	566 40	
Comte, L. A. A. J.	" 3rd Class Exciseman "		23 94	2 88	655 68	
Laurier, J. L.	" 2nd " " "	37 44		2 88	709 68	
Snowden, J. W.	" " " " "	37 44		2 88	709 68	
Kearney, D. J.	" 3rd " " "	31 44		2 88	595 68	
Bruyère, H. P.	" Deputy Collector "	30 00		3 60	566 40	
Lambert, J. A.	" Exciseman "	30 42		2 88	574 20	
Maranda, N. A.	" 3rd Class Exciseman "	29 80		2 88	563 54	
David, T.	" " " "	29 33		2 88	554 59	
Harwood, J. O. A.	" " " "	27 99		2 88	529 37	
St. Michel, F. X.	" Deputy Collector "	25 04		3 60	471 36	
Patterson, C. E. A.	" " " "	25 04		3 60	471 36	
Bernard, N. J. D.	" " " "	25 04		3 36	471 60	
O'Donnell, M. J.	" Messenger "	25 04			474 96	
Normandin, Geo.	" Deputy Collector from Feby. 13 to June 30, 1902	19 02		1 20	360 71	
Marin, L. H.	" Probationary Exciseman from Feby. 13 to June 30, 1902	9 81		2 88	177 75	
Gauvin, E.	" Probationary Exciseman from Feby. 13 to 28, 1902	1 49			22 31	
Bernier, J. A.	" 3rd Class from March 1 to June 30, 1902	8 32		0 96	157 36	
	Salaries	534 98	566 63	154 80	35,729 78	
	Contingencies				4,526 47	
						40,256 25
	Quebec.					
LaRue, G.	Salary as Collector for year		39 60	7 20	1,933 20	
Cahill, J. H.	" Deputy Collector for year			3 60	1,426 32	
Coleman, J. J.	" 1st Class Exciseman "		19 96	2 88	977 16	
Rouleau, J.	" 3rd Class Exciseman from July 1 to Sept. 30, 1901		3 75	0 72	183 03	
Lemoine, J.	" 3rd Class Exciseman for year		15 00	2 88	732 12	
Bourget, O.	" " " "		16 26	2 88	796 66	
Lepine, L.	" " " "		15 00	2 88	732 12	
Bourassa, J.	" " " "		26 16	2 88	720 96	
LaRue, A.	" Deputy Collector "		31 44	3 60	864 96	
Beaulieu, J. B.	" 3rd Class Exciseman "		23 94	2 88	655 68	
Timmons, P.	" " " "		23 94	2 88	655 68	
Pelletier, N. G.	" Deputy Collector "	25 04		3 60	471 36	
Blair, A.	" " " "			3 30	179 96	
Patry, J. H.	" Deputy Collector from March 20 to June 30, 1902	18 32		0 90	347 70	

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for Retirement.	Deductions for Superannuation.	Deductions for Guarantee.	Amounts paid.	Total Amounts paid.
	Quebec—Con.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Michon, A. E. ...	" Deputy Collector from May 1 to June 30, 1902	0 82	.....	0 30	15 54	
	Salaries	44 18	215 05	43 38	10,692 45	
	Contingencies	.....	.....	.....	4,808 41	
						15,500 86
	Sherbrooke.					
Simpson, A. F. ..	Salary as Collector for year	.....	31 96	7 20	1,560 84	
Quinn, J. D	" Special Class Exciseman for year	.....	24 00	4 32	1,171 68	
Chartier, E.....	" Deputy Collector for year	60 00	.....	3 60	1,136 40	
Bowen, T. C.....	" 3rd Class Exciseman for year.	36 72	....	2 88	695 40	
de Grosbois, C. B.	" " " "	30 72	.....	2 88	581 40	
Rousseau, E. H...	" Deputy Collector "	30 00	.....	3 60	566 40	
	Salaries	157 44	55 96	24 48	5,712 12	
	Contingencies	.....	.....	.....	824 33	
						6,536 45
	Three Rivers.					
Hébert, Chs. D...	Salary as Collector for year	....	24 00	3 60	1,172 40	
Duplessis, Chs. Z..	" " "	....	15 00	3 24	731 76	
	Salaries	.....	39 00	6 84	1,904 16	
	Contingencies	.....	.....	.....	273 52	
						2,177 68
	St. Hyacinthe.					
Benoit, L. V.....	Salary as Collector for year	60 00	.....	7 20	1,132 80	
Morin, J. P ...	" Deputy Collector for year	40 04	.....	4 80	755 16	
Murray, D.....	" 1st Class Exciseman "	.....	19 96	2 88	977 16	
Fortier, J. J. O...	" Deputy Collector "	.....	19 96	2 88	977 16	
Poirier, J. N. ...	" " " "	.....	24 52	2 88	672 60	
Deland, A. N.....	" " " "	32 48	.....	3 60	613 92	
Bousquet, J. O ...	" 3rd Class Exciseman "	31 44	.....	2 88	595 68	
Dumaine, J. D. E.	" " " "	29 33	.....	2 88	554 59	
Tétreault, Jos	" Deputy Collector "	4 96	.....	3 60	91 44	
Desmarais, F.	" Deputy Collector from July 1, 1901, to Jany. 31, 1902	2 87	.....	2 10	53 34	
Rouleau, J. C.....	" Probationary Exciseman from Jan. 8 to June 30, 1902	12 01	.....	1 44	227 10	
Gauvin, E.....	" Probationary Exciseman from March 1 to June 30, 1902	8 32	.....	0 96	157 36	
	Salaries	221 45	64 44	38 10	6,808 31	
	Contingencies	.....	.....	.....	1,946 37	
						8,754 68
	St. John, N.B.					
Belyea, T. H.....	Salary as Collector for year	.....	28 04	4 32	1,367 64	
Clarke, J. A.....	" Deputy Collector for year	.....	24 00	3 60	1,172 40	
McCloskey, J. R..	" 1st Class Exciseman "	.....	19 96	2 88	977 16	
Fitzpatrick, W. J.	" " "	.....	19 96	2 88	977 16	
Geldart, O. A.....	" " "	.....	19 96	2 88	977 16	
Harrison, W. F...	" Deputy Collector "	48 31	.....	3 30	916 09	
Ferguson, J. C....	" 2nd Class Exciseman "	.....	16 96	2 88	830 16	
Hill, A. M	" Deputy Collector for July 1901	.....	0 83	0 24	40 59	
Dibblee, W.....	" Deputy Collector for year	...	3 72	2 88	293 40	
Dwyer, D. T.....	" " from April 22 to June 30, 1902	1 66	.....	0 60	31 06	
	Salaries	49 97	133 43	26 46	7,582 82	
	Contingencies	.....	.....	.....	417 23	
						8,000 05

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for Retirement.	Deductions for Superannuation.	Deductions for Guarantee.	Amounts paid.	Total Amounts paid.
	Halifax.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Grant, H. H.	Salary as Collector for year	.....	36 00	7 20	1,756 80	
King, R. M.	" Deputy Collector for year	.....	25 96	3 60	1,270 44	
James, T. C.	" Accountant "	.....	19 96	4 32	975 72	
Carroll, D.	" 1st Class Exciseman "	.....	19 96	2 88	977 16	
Blethen, C. W.	" " "	.....	19 96	2 88	977 16	
Wainwright, F. G.	" 2nd " "	.....	16 96	2 88	830 16	
Hubley, H. H.	" 1st " "	.....	17 82	2 88	871 80	
Tompkins, P.	" 3rd " "	.....	15 00	2 88	732 12	
Hagarty, P.	" " "	.....	15 00	2 88	732 12	
Munro, H. D.	" " "	.....	15 00	2 88	732 12	
Gorman, A. M.	" 2nd " "	.....	15 00	2 88	732 12	
	Salaries	.....	216 62	38 16	10,587 72	
	Contingencies	.....	.....	.....	425 07	
						11,012 79
	Pictou.					
Fraser, P.	Salary as Collector for year	.....	19 96	3 60	976 44	
McDonald, A. J.	" Deputy Collector for year	34 96	.....	2 88	662 16	
Carroll, F. P.	" 3rd Class from Dec. 3, 1901, to June 30, 1902	14 42	.....	1 68	272 83	
	Salaries	49 38	19 96	8 16	1,911 43	
	Contingencies	.....	.....	.....	410 45	
						2,321 88
	Charlottetown.					
Nash, S. C.	Salary as Collector for year	.....	24 00	3 60	1,172 40	
Moore, T.	" Deputy Collector for year	.....	19 96	2 88	977 16	
	Salaries	.....	43 96	6 48	2,149 56	
	Contingencies	.....	.....	.....	108 70	
						2,258 26
	Winnipeg.					
Gosnell, T. S.	Salary as Collector for year	.....	41 40	7 20	2,021 40	
Watson, W. W.	" Deputy Collector for year	.....	.....	3 60	1,426 32	
Code, A.	" Accountant "	.....	28 04	4 32	1,367 64	
Hawkins, W. L.	" " "	.....	21 00	4 32	1,171 68	
Girdlestone, R. J. M.	" Deputy Collector "	.....	19 96	2 88	977 16	
Saucier, X.	" 1st Class Exciseman "	.....	17 82	2 64	875 49	
Sparling, J. W.	" Deputy Collector "	42 52	.....	2 88	804 60	
Verner, T. H.	" 1st Class Exciseman "	.....	31 99	2 88	878 88	
LaRiviere, A. C.	" " "	.....	29 68	2 88	817 44	
Conklin, W. M.	" 2nd " "	37 44	.....	2 88	709 68	
Barnes, G.	" Deputy Collector "	30 00	.....	2 88	567 12	
Long, W. H.	" 2nd Class Exciseman "	37 44	.....	2 88	709 68	
Ross, H. E.	" Deputy Collector "	.....	11 92	2 88	385 20	
McNiven, J. D.	" " "	12 52	.....	2 88	234 60	
Jamieson, S. B.	" from Sept. 1, 1901, to June 30, 1902	.....	9 00	2 88	288 12	
	Salaries	159 92	213 81	50 88	13,235 01	
	Contingencies	.....	.....	.....	2,379 27	
						15,614 28
	Calgary.					
Thomas, P.	Salary as Acting Collector from July 1 to Dec. 11, 1901	.....	9 15	1 50	447 65	
Fletcher, R. W.	" Deputy Collector for year	40 04	.....	2 88	757 08	
Osborne, F. A.	" " "	.....	21 00	2 88	576 12	
Ives, G. C.	" " "	14 94	.....	2 16	282 87	

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total Amounts paid.
		Retirement.	Superannuation.	Guarantee.		
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Calgary—Con.					
Saucier, X.	" Collector from May 20 to June 30, 1902		2 14	0 30	104 87	
	Salaries	54 98	32 29	9 72	2,168 59	
	Contingencies				1,947 39	
						4,115 98
	Vancouver.					
Miller, J. E	Salary as Collector for year		30 00	7 20	1,462 80	
Parkinson, E. B.	" Deputy Collector for year	55 04		3 60	1,041 36	
McCraney, H. P.	" " "	45 00		3 60	851 40	
Wolfenden, W.	" " "	34 96		3 60	661 44	
Cargill, W	" " "	36 52		3 60	689 88	
Swannell, F. W.	" " "	40 04		3 60	756 36	
McCutcheon, H. M.	" " "	30 00		3 60	566 40	
Hodder, W. E	" " "	30 00		3 60	566 40	
Thorburn, Jas.	" 3rd Class Exciseman "	29 34		2 88	554 85	
Howell, T.	" Deputy Collector "	25 04		3 60	471 36	
Stevens, D. B.	" " "	19 96		3 60	376 44	
Parsons, C. H.	" " "	10 04		3 60	186 36	
Power, J. F.	" 3rd Class Exciseman from April 22 to June 30, 1902	4 78		0 48	90 55	
	Salaries	360 72	30 00	46 56	8,275 60	
	Contingencies				4,404 95	
						12,680 55
	Victoria.					
Jones, R	Salary as Collector for year		31 38	7 20	1,531 42	
O'Sullivan, D.	" Deputy Collector for year		38 45	3 60	1,057 95	
Ridgman, A. H.	" 2nd Class Exciseman "		27 54	2 88	757 08	
McAloney, J. A.	" Deputy Collector "	15 00		3 60	281 40	
Henwood, Geo.	" Exciseman "		19 80	2 88	908 36	
	Salaries	15 00	117 17	20 16	4,536 21	
	Contingencies				910 89	
						5,447 10

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total amounts paid.
		Retirement.	Superannuation.	Guarantee.		
	DISTRICT INSPECTORS.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Ontario.					
Dingman, N. J.	Salary for year		40 00	9 00	1,951 00	
	Contingencies				602 96	2,553 96
Stratton, W. C.	Salary for year		48 00	9 00	2,343 00	
	Contingencies				247 04	2,590 04
Gow, J.	Salary from July 1 to October 1, 1901.		12 48	2 25	610 26	
Kenning, J. H.	Salary from March 12 to June 30, 1902.			2 25	696 38	
	Contingencies				153 59	1,460 23
	Quebec.					
Beauchamp, J. P.	Salary from July 1 to August 1, 1901.		3 66	0 75	178 92	178 92
Rinfret, C. I.	Salary for year	125 00		9 00	2,366 00	
	Contingencies				177 81	2,543 81
	New Brunswick.					
Burke, T.	Salary for year		50 00	9 00	2,441 00	
	Contingencies				494 14	2,935 14
	Manitoba.					
Barrett, J. K.	Salary for year		50 00	9 00	2,441 00	
	Contingencies				1,379 56	3,820 56
	British Columbia.					
Gill, W.	Salary for year		50 00	9 00	2,441 00	
	Contingencies				714 47	3,155 47
	Inspector of Bonded Factories.					
Stratton, W. C.	Contingencies					297 15

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
	General Excise Contingencies.	$ cts.	$ cts.
Potvin, Napoléon	Express and freight charges	49 50	
British American Bank Note Co	To pay for bottling labels supplied	3,006 85	
St. Jean, L. G.	Clocks, cabinets and skins	53 50	
The Pritchard-Andrews Co.	Rubber stamps, rollers, pads and repairs	205 45	
Bailey, G.	Keys and repairs to locks, &c.	84 85	
Whitehead, Mrs. J.	Cleaning storerooms	143 00	
Edwards, W. C. & Co., Limited	Lumber and cartage	85 00	
American Bank Note Co.	To pay for stamps and labels supplied	26,243 01	
Miller Lock Co.	Label locks	735 79	
Graves Bros.	Screws, nails, oil, &c.	30 85	
Laliberté, J. B.	Rug skins	18 50	
Eaves, Alfred	1 clock	3 50	
Carsley, S., Co.	Skins	18 00	
Lymans Sons & Co.	Chemical apparatus	4 00	
Leger, C. J.	Glass jars	3 60	
Gosnell, T. S.	To pay for analysis of kerosene oil	90 00	
Registrar Exchequer Court	Writs of assistance for R. Jones, T. Belyea and A. Freeland	8 70	
Gerald, Charles	Travelling expenses	72 60	
Bart, M. L.	Stock taking and cleaning storeroom	19 06	
	Total General Excise Contingencies		30,875 10
	Law Costs.		
McL. Forin, P.	Law costs in *re* Rex *vs.* W. S. Jones		14 56
Black, A. S.	" " Hamilton & Oneil		25 00
Gouin, L.	" " E. Saumerre dit Masse	150 00	
	" " D. David	10 00	
	" " Charette & Gagnon	28 20	
			188 20
Broderick, J. S.	" " T. Brooks		20 00
Chisholm, D. C.	" " Wm. Chisholm	20 00	
	" " D. McDonald	20 00	
	" " J. Kennedy	41 90	
	" " A. G. McDonald	39 75	
	" " H. McGillivray	15 00	
	" " D. McGillivray	15 00	
			151 65
Plamondon, J. O.	" " J. H. Pinsonnault		23 60
	Total Law Costs		423 01

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901–1902—*Continued.*

To whom paid.	Place of Residence.	Service.	Amounts paid.	Totals.
		Commission to Customs Officers.	$ cts.	$ cts.
Ross, W. T.	Pictou, N.S.	From July 1, 1900, to June 30, 1902	271 15	
McGuire, F. J.	Trenton	" "	400 00	
Valleau, A. S.	Deseronto, Ont	" "	239 04	
Dawson, D.	Petrolea, Ont.	From Oct. 1, 1900, to June 30, 1901	150 00	
McPherson, M. J.	Kincardine, Ont.	From July 1, 1900, to June 30, 1902	45 90	
Watson, G.	Collingwood	" "	500 00	
Cameron, A. McK.	Meaford, Ont.	" "	300 00	
Anderson, J. J.	Sackville, N.B.	" "	127 50	
Veniot, P. J.	Bathurst, N.B.	" "	208 88	
Kavanagh, A. J.	Gaspé, Que.	" "	166 88	
Park, W. A.	Newcastle, N.B.	" " 1901	200 00	
Binney, J. M.	Moncton, N.B.	" "	250 00	
Street, A. F.	Fredericton, N.B.	" "	250 00	
Boyd, A.	Antigonish, N.S.	" "	135 85	
Champness, F.	Lethbridge, N.W.T.	" "	150 00	
Pound, J. T.	Morden, Man.	" "	28 38	
Marsh, R. J. F.	Fort Francis, Man.	" "	41 99	
Gillmly, R. H.	Selkirk, Man.	" "	116 04	
Tennant, J. F.	Gretna, N.W.T.	" "	150 00	
Clark, C.	Fort Steel, B.C.	" "	43 72	
Gilpin, R. R.	Grand Forks, B.C.	" "	150 00	
Keay, W. S.	Cranbrook, B.C.	" "	250 00	
Anderson, T. E.	Napanee, Ont.	" "	250 00	
Stanley, D. T.	St. Mary's, Ont.	" "	200 00	
Britton, W. H.	Gananoque, Ont.	" "	146 40	
Ratchford, C. E.	Amherst, N.S.	" "	153 60	
Kirk, J. T.	Sussex, N.B.	From May 20, 1901, to June 30, 1901	23 15	
Smith, A. H.	Sudbury, Ont.	From July 1, 1901, to July 16, 1901	37 66	
Hay, M. G.	Ridgetown, N.W.T.	From July 1, 1900, to Dec. 11, 1901	147 47	
Blair, H. C.	Truro, N.S.	From July 1, 1900, to June 30, 1902	200 00	
Graham, H.	St. Stephens, N.B.	From Nov. 1, 1901, to May 1, 1902	103 20	
Clark, A. J.	Campobello, N.B.	From July 1, 1900, to June 30, 1902	20 65	
Beauchesne, E. C.	Paspebiac, Que.	Guarantee 12 mos. paid up to June 1, 1901	3 60	
Joncas, P. C.	Magdalen Islands, Q.	" 12 " " 1901	3 60	
McKenzie, W.	North Bay, Ont.	" 9 " " 1901	2 70	
Girard, A. B.	Sturgeon Falls, Ont	" 1 " " 1901	0 30	
Furguson, O. D.	Chatham, N.B.	" 2 " " 1901	0 60	
Wallace, G. H.	Sussex, N.B.	" 3 " Sept., 1901	0 45	
Campbell, G.	Moyie City, B.C.	" 12 " June 30, 1901	3 60	
Meyer, F. A.	Vernon, B.C.	" 12 " " 1901	3 60	
Atkins, B. R.	Revelstoke, B.C.	" 12 " " 1901	3 60	
Stevenson, J. K.	Moose Jaw, N.W.T.	" 11 " " 1901	3 30	
Douglass, H.	Banff, N.W.T.	" 12 " " 1901	3 00	
		Total Commission to Customs Officers.		5,485 81
		Commission on Tobacco Stamps.		
Forest, Z.	L'Epiphanie	Allowance, 5 p. c. on sale of stamps.	50 32	
Grignon, A.	St. Eustache.	" " "	15 58	
Roy, J.	St. Alexis	" " "	14 00	
Labelle, L.	Joliette	" " "	6 00	
Lapierre, T.	St. Alexis	" " "	1 50	
		Total		87 40

APPENDIX B.—No. 1. Details of Excise Expenditures, 1901–1902 *Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
	Duty-pay.	$ cts.	$ cts.
Gerald, Charles	From July 1, 1901, to June 30, 1902	200 00	
Jamieson, R. E.	" "	150 00	
Howard, W. W. S.	" "	100 00	
O'Leary, T. J	" "	100 00	
Brennan, D. J.	" "	100 00	
Doyle, B. J.	" "	100 00	
Hurst, L. B	" "	100 00	
Bish, Phil.	" "	100 00	
Waller, Dick	" "	200 00	
Baby, W. A. D.	" "	100 00	
Weir, J	" "	150 00	
Irwin, R	" "	100 00	
Cameron, D. M	" "	200 00	
Desaulniers, J. E. A.	" "	200 00	
Millier, E	" "	150 00	
Scullion, W. J	" "	100 00	
Mason, F.	" "	100 00	
Goodman, A. W	" "	100 00	
Standish, J. G	" "	100 00	
McCoy, W	" "	100 00	
McFee, A. C	" "	150 00	
Quinn, J. D	" "	100 00	
Bernard, N. J. D	" "	150 00	
Johnston, G. E	" "	100 00	
Keeler, G. S.	" "	100 00	
McDonald, A. B.	" "	150 00	
Gerald, W. H	" "	150 00	
Bouteiller, G. A	" "	200 00	
Gow, J. E.	" "	150 00	
Allen, G. A	" "	150 00	
Brennan, John	" "	100 00	
Thomas, Robt.	" "	100 00	
Bayard, G. A	" "	100 00	
Cahill, J. W	" "	100 00	
Crothy, John	" "	100 00	
Keogh, P. M	" "	100 00	
Howie, Alex	" "	150 00	
Kilroy, E. T	" "	100 00	
Woodward, G. W	" "	100 00	
Dawson, W.	" "	100 00	
Taylor, G. W	" "	150 00	
Moreau, Aug.	" "	100 00	
Ralston, Tim	" "	100 00	
Coleman, J. J	" "	150 00	
Traversy, F. X	" "	100 00	
Murray, D	" "	100 00	
Malo, T.	" "	100 00	
Weyms, C.	" "	100 00	
Waller, John	" "	200 00	
Marcon, F. E.	" to Oct. 11, 1901, and from Nov. 27, 1901, to June 30, 1902	83 60	
Falconer, G. E.	From July 1, 1901, to Nov. 10, 1901, and from Nov. 28, 1901, to June 30, 1902	95 62	
Flynn, D. J	From July 1, 1901, to May 2, 1902	83 87	
Chilver, F. W.	From Aug. 13, 1901, to June 30, 1902	88 16	
Lepine, L	From July 1, 1901, to Sept. 30, 1901	18 75	
Mulrooney, G	From Oct. 1, 1901, to June 30, 1902	56 25	
Jones, Andrew	From May 2, 1902, to June 30, 1902	16 13	
Bousquet, J. O.	From April 2, 1902 to June 30, 1902	24 72	
	Total duty-pay		6,567 10
	Grand total		380,429 66

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
		$ cts.	$ cts.
	ADD—Printing	8,475 82	
	Stationery	992 95	
	Lithographing	2,321 60	11,790 37
	Authorized disbursements (less superannuation, insurance, retirement and guarantee)		392,220 03
	ADD—Balances due to Collectors, July 1, 1901	49 08	
	" by " June 30, 1902.	443 98	493 06
			392,713 09
	LESS—Balances due by Collectors, July 1, 1901	343 98	
	" to " June 30, 1902	1,167 53	1,511 51
	Actual disbursements agreeing with Statement No. 4, page 12		391,201 58

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX B—*Continued.*

No. 2.—Distribution of Seizures for the Year ended June 30, 1902.

Divisions.	To whom paid.	Service.	Amounts paid.	Totals.
		Ontario.	$ cts.	$ cts.
Owen Sound....	Vandrick, A	For his portion of seizure, Genl. No. 4,676..		5 00
Toronto	Floody, E..........	" " No. 375....	50 00	
		" " " 383..	25 00	
		" " " 384.	12 50	
		" " " 387.......	2 50	
				90 00
	Frankland, H. R....	To pay informer penalty in seizure, No. 383.	25 00	
		" " " 384.	12 50	
		" " " 387.	2 50	
		" " " 388.	10 00	
				50 00
		Quebec.		
Montreal. .. .	Lawlor, H........ .	For his portion of seizure, No. 1,065	24 50	
		To pay informer penalty in seizure, No. 1,054	5 00	
		" " " 1,065	50 00	
		" " " 1,066	5 00	
				84 50
	Brabant, J. B. G. N.	For his portion of seizure, No. 975........	0 27	
		" " " 1,060.. ...	2 85	
				3 12
	Cinq-Mars, A... .	" " " 975......		0 28
	David, T.....	" " " 1,057...		6 20
	Claude, J......	" " " 1,058.... ...	25 67	
		" " " 1,059	24 53	
				50 20
	Kearney, D. J......	" " " 1,058........	25 68	
		" " " 1,059	24 52	
		" " " 1,065.......	24 50	
				74 70
Sherbrooke.. ...	Putney, C. A.	" " " 202		10 00
	Murray, D.	" " G. No. 4,602...		50 00
		Nova Scotia.		
Pictou....	Murray, D.........	For his portion of seizure, No. 88		11 11
	Fraser, P.....	To pay informer penalty in seizure, No. 88.	25 00	
		" " " 90.	50 00	
		" " " 100.	50 00	
		" " " 101.	50 00	
				175 00
		British Columbia.		
Vancouver......	Miller, J. E.... ..	To pay informer penalty in seizure, No. 23 .	50 00	
		" " " 24..	50 00	
				100 00
	McCutcheon, H.....	For his portion of seizure, No. 23....		50 00
		Grand total......		760 11

RECAPITULATION.

Ontario...$	145 00
Quebec..	279 00
Nova Scotia...	186 11
British Columbia..	150 00
Total....................................$	760 11

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

APPENDIX B—*Continued.*

No. 3.—Details of Sundry Minor Expenditures for the Fiscal Year ended June 30, 1902.

To whom paid.	Service.	Amounts paid.	Totals.
	SUNDRIES.	$ cts.	$ cts.
La Cie de Publication de La Patrie	Advertising tenders— Ferry between Cros Point and Campbellton	14 40	
Le Soleil	" "	27 60	
Williams, L. B.	" "	6 00	
La Tribune	" "	9 00	
The Pontiac Advance	" Gower Point and La Passe	7 80	
The Journal Printing and Publishing Co.	" Queenston and Lewiston	13 50	
" "	" Niagara and Youngstown	13 75	
Clarke, J. S.	" Queenston ferry	4 36	
"	" Youngstown ferry	4 44	
Dominion Express Co.	Charges on law stamps to the Yukon	16 75	
The Pritchard & Andrews Co.	Repairing daters, rollers, etc.	15 00	
	Total agreeing with Statement No. 12, page 21		132 00
	ADULTERATION OF FOOD.	Deductions for Superannuation. $ cts.	
Macfarlane, Thomas	Salary as Chief Analyst for the year	69 00	2,940 00
McGill, A.	" 1st Assistant Analyst for the year	40 04	1,959 96
Watson, James	" Clerk in laboratory "		999 96
Tyrrell, M. J.	" " 5 mos. from July 1 to Nov. 30, 1902		250 00
Wright, S. E.	" Clerk in laboratory for the year		600 00
Leveque, H.	" Messenger in laboratory for the year		499 92
Watson, James	" Food Inspector for the year		200 00
Kidd, Thomas	" " "		500 00
Costigan, J. J.	" " "	7 00	343 00
Ferguson, J. C.	" " "	4 00	196 00
Waugh, R. J.	" " "		300 00
Saucier, X.	" " "	3 63	179 63
Fletcher, R. W.	" " "		200 00
Parkinson, E. B	" " "		200 00
Roulean, J. C.	" " from Mar. 12 to June 30, 1902		60 72
Moore, F.	" Food Inspector from April 8 to June 30, 1902		23 04
		114 67	9,452 23

SESSIONAL PAPER No. 12

APPENDIX B—*Continued.*

No. 3.—DETAILS of Sundry Minor Expenditures, 1901-1902—*Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
	ADULTERATION OF FOOD—*Continued.*	$ cts.	$ cts.
	Contingencies.		
Macfarlane, T	Travelling and other expenses	1,859 01	
"	Rent	400 00	
Watson, James	Travelling and other expenses	384 59	
Kidd, Thomas	" "	377 94	
Costigan, J. J	" "	364 54	
Ferguson, J. C	" "	154 57	
Waugh, R. J.	" "	136 68	
Saucier, X	" "	82 20	
Parkinson, E. B	" "	87 20	
Rouleau, J. C	" "	79 84	
			3,925 97
Bowman, M	Allowance under Act for retaining fees	200 00	
	" " rent	100 00	
	" " material used in analysis	100 00	
	Fees for analysis	634 00	
		1,034 00	
	Less material supplied by laboratory	6 27	
			1,027 73
Valade, F. X.	Allowance under Act for retaining fees	200 00	
	" " rent	100 00	
	" " material used in analysis	100 00	
	Fees for analysis	494 00	
			894 00
Ellis, W. H.	Allowance under Act for retaining fees	200 00	
	" " rent	100 00	
	" " material used in analysis	100 00	
	Fees for analysis	558 67	
			958 67
Fiset, M.	Allowance under Act for retaining fees	200 00	
	" " material used in analysis	100 00	
	Fees for analysis	569 00	
		869 00	
	Less material supplied by laboratory	5 67	
			854 33
Kenrick, E. B.	Allowance under Act for retaining fees	200 00	
	" " rent	100 00	
	" " material used in analysis	100 00	
	Fees for analysis	428 00	
			828 00
Harrison, F. T.	Allowance under Act for retaining fees	200 00	
	" " material used in analysis	100 00	
	Fees for analysis	564 00	
			864 00
Fagan, C. J.	Allowance under Act for retaining fees	200 00	
	" " rent	100 00	
	" " material used in analysis	100 00	
	Fees for analysis	492 00	
		892 00	
	Less material supplied by laboratory	9 81	
			882 19
Tourchot, A. L. J.	Allowance under Act for retaining fees	150 00	
	" " material used in analysis	75 00	
	Fees for analysis	942 00	
		1,167 00	
	Less material supplied by laboratory 3 25		
	" refund 84 52		
		87 77	
			1,079 23

APPENDIX B—*Continued.*

No. 3.—Details of Sundry Minor Expenditures, 1901–1902—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
	Adulteration of Food—*Continued.*	$ cts.	$ cts.
	Contingencies—Continued.		
Donald, J. T.	Allowance under Act for retaining fees	72 47	
	" " rent	36 24	
	" " material used in analysis	25 00	
	Fees for analysis	80 00	
	Allowance for fitting up laboratory and purchase of material	300 00	
			513 71
Potvin, Napoléon	Sundry petty expenses	49 48	
Baily, George	Material and labour fixing up laboratory	230 97	
Franz Schmidt & Haeusch	Chemical apparatus	450 00	
The Electric Storage Co.	1 portable storage battery	40 15	
Marchand, P. E. & Co.	Material and for fixing up laboratory	19 55	
Batterworth & Co.	Material and work for laboratory	31 64	
Hamilton, I. C.	Law costs Rex *vs.* Sam Richer	47 86	
Bausch & Lamb	Repairs to foreign objective	2 58	
The Pritchard & Andrews Co.	Numerals and 1 seal	12 50	
Chandler & Massey	1 adapter and postage	2 31	
Eimer & Amend	Chemical apparatus	484 74	
Lyman & Sons	Chemicals supplied to laboratory	55 29	
Gooderham & Wor'ts	Spirits for laboratory	63 21	
Dominion Express Co.	Express charges	30 08	
Valin, J. A.	Services in laboratory, Ottawa, for year	400 00	
Lemoine, Alp.	" " from July 18, 1901, to June 30, 1902	572 60	
Davidson, Miss	" " from May 26, 1901, to June 30, 1902	59 68	
Shedrick, C. E.	Post ammeter	16 10	
Canadian Pacific Ry. Co.	Freight charges	11 10	
Dunn, Mrs. S.	Charwoman in laboratory	9 25	
Mead, Mrs. M	Services in laboratory	23 33	
Frechette, A.	Technical translation	41 54	
			2,663 82
	Total adulteration of food expenditure		23,943 88
	Add—Printing	790 39	
	Stationery	149 34	
			939 73
	Grand total, agreeing with statement No. 8, page 18		24,883 61

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

APPENDIX B—*Continued.*

No. 4.—DETAILS of Departmental Expenditures for the Year ended June 30, 1902.

Names.	Rank.	Period.	Deductions for			Amounts paid.	Totals.
			Superannuation.	Retirement.	Insurance.		
			$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Bernier, Hon. M. E.	Minister	For the year.				7,000 00	
Gerald, W. J.	Deputy Minister	"	53 30			3,146 70	
Himsworth, Wm	Chief Clerk and Secretary	"	48 00			2,352 00	
Campeau, F. R. E.	Chief Clerk and Chief Acc't.	"	48 00			2,352 00	
Valin, J. E.	Accountant's Branch Clerk.	"	36 00			1,764 00	
Carter, Wm.	Assistant Secretary	"	36 00			1,764 00	
Shaw, J. F.	Chief Statistical Clerk, Accountant's Branch	"	33 00			1,617 00	
Doyon, J. A.	Weights and Measures Clerk, Accountant's Branch	"	31 00			1,519 00	
Westman, T.	Statistical Clerk, Acc'tant's Branch	"	30 00			1,470 00	
Quain, R.	Accountant's Branch Clerk.	"	30 96		15 48	1,353 56	
Fowler, Geo.	Clerk of Supplies, Secretary's Branch	"	28 00			1,372 00	
Newby, F.	Secretary's Branch Clerk.	"	28 00			1,372 00	
Byrnes, J.	Accountant's Branch Clerk.	"	28 00			1,372 00	
Dunne, J. P.	" " "	"	28 00			1,372 00	
Burns, J.	Weights and Measures Clerk, Accountant's Branch	"	28 00			1,372 00	
Hudon, L. E.	Statistical Clerk Acc'tant's Branch	"	40 25			1,109 75	
Hughes, W. A	Accountant's Branch Clerk.	"	38 50			1,061 50	
Bouchette, R. E.	Weights and Measures Clerk, Accountant's Branch	"	38 50			1,061 50	
McCullough, A.	Secretary's Branch Clerk.	"	22 00			1,078 00	
Halliday, W. A.	Accountant's Branch Clerk.	"	38 50			1,061 50	
Roy, L. G.	" " "	"	29 75			820 25	
Bourgault, Alp.	Private Secretary	"				600 00	
Chevrier, B.	Junior Second Class Clerk.	"		30 00		570 00	
Potvin, N.	Messenger	"	16 50			533 50	
Yetts, R. P.	Messenger	"	13 50		13 62	422 88	
	Total salaries		723 76	30 00	29 10		39,517 14

APPENDIX B—*Continued.*

No. 4.—Details of Departmental Expenditures, 1901-1902—*Continued.*

Names.	Service.	Amounts paid.	Totals.
		$ cts.	$ cts.
Hagerty, Miss B	Extra clerk for the year	505 00	
Lawless, Miss E. M.	" "	505 00	
Chateauvert, G. E.	" "	477 50	
Postmaster	Postage	23 12	
Controller of Stationery	Stationery	1,356 04	
" "	Parliamentry publications	70 99	
" "	Books	28 99	
Kings's Printer	Printing	1,214 49	
"	Lithographing	15 00	
C. P. Railway Co.'s Telegraph	Telegraph account	126 57	
G. N. W. Telegraph Co.	"	89 95	
The Bell Telephone Co	Telephone messages	2 90	
Gerald, W. J.	Travelling expenses	7 25	
Storr, A. M.	Cartage	85 40	
Batterton, T.	Packing	32 04	
Bryson & Graham	Towels, cloth, &c.	11 84	
Maveity, Mrs. S.	Washing towels	60 00	
Canadian Express Co.	Freight	8 55	
Dominion Express Co	"	1 75	
Payment, T.	Soap, &c	18 65	
Dupont, J. C.	Sundries for department	6 00	
C. P. Railway Co.'s Telegraph	Messengers	4 30	
G. N. W. Telegraph Co.	"	3 70	
McMorran, R. M	Sundries	11 75	
Pritchard & Andrews Co.	Repairing locks, &c	4 35	
Bart, Mrs. M. L.	Cleaning office	4 00	
Potvin, N.	Sundry petty expenses	22 79	
The Shareholder	Subscription	2 00	
The Daily Telegraph, Quebec	"	5 00	
La Nation, St. Jérôme, Quebec	"	1 00	
Daily World, Vancouver	"	5 00	
Brampton Times, Brampton	"	1 50	
Intelligencer, Belleville.	"	3 00	
The Sunday Budget, Quebec	"	1 00	
Daily Witness, Montreal	"	6 00	
The Catholic Record, London	"	2 00	
Scientific American, New York	"	7 00	
The Herald Publishing Co	"	6 00	
Bulletin des Recherches Historiques	"	2 00	
The Toronto World, Toronto	"	3 00	
Le Soleil, Quebec	"	6 00	
Le Temps, Ottawa	"	3 00	
Canadian Mining Review, Ottawa	"	6 00	
The Mail and Empire, Toronto	"	4 00	
Chatham Banner News	"	4 00	
La Patrie, Montreal	"	6 00	
Le Cultivateur, Montreal	"	1 00	
Saturday Night, Toronto	"	4 00	
The Gazette, Montreal.	"	12 00	
Evening Journal, Ottawa	"	6 60	
The Star, Montreal	"	3 00	
Acadian Recorder, Halifax	"	5 00	
The Citizen, Ottawa	"	6 00	
La Presse, Montreal	"	9 00	
The Toronto Daily Star, Toronto.	"	3 00	
Free Press, Ottawa	"	14 40	
Manitoba Free Press, Winnipeg.	"	8 00	
Times Printing Co., Hamilton	"	3 00	
Jones, Yarrell & Poulter, London, Eng.	"	15 58	
Globe Printing Co., Toronto	"	8 00	
L'Union, St. Hyacinthe	"	2 00	
Canadian Manufacturer, Toronto	"	1 00	

APPENDIX B—*Continued.*

No. 4.—DETAILS of Departmental Expenditures, 1901 1902—*Concluded.*

Names.	Service.	Amounts paid.	Totals.
		$ cts.	$ cts.
The Daily World, Vancouver	Subcription	5 00	
Chronicle Printing Co., Quebec	"	3 00	
The Farmer's Advocate, London	"	3 00	
The Sherbrooke Examiner	"	1 00	
Le Canada Français, St. Jean, P. Q.	"	2 00	
Le Progrès du Saguenay, Chicoutimi	"	7 00	
Catholic Register, Toronto	"	1 50	
The Tribune Publishing Co., Winnipeg	"	4 00	
McNeill, E. R., Ottawa	Repairing typewriter	0 50	
Graves Bros., Ottawa	Hardware	9 11	
Robert, A., Ottawa	Messenger from Jan'y 1 to June 30, 1902	150 00	
	Total Department Contingencies		5,059 11
	Authorized disbursements (less superannuation, retirement and insurance)		44,576 25
	ADD—Balance due June 30, 1902		16 66
			44,592 91
	LESS—Balance due July 1, 1901		16 66
	Actual disbursements, agreeing with Statement No. 17, page 42		44,576 25

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX B—*Continued.*

No. 5.—DETAILS of Weights and Measures Expenditures for the Year ended June 30, 1902.

To whom paid.	Service.	Deductions for Retirement.	Deductions for Superannuation.	Deductions for Guarantee.	Amounts paid.	Total amounts paid.
	Belleville.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Johnson, W.	Salary as Inspector for year		24 00	3 60	1,172 40	
Slattery, T.	" Mechanical Inspector for year		13 96	1 80	684 24	
Irwin, S.	" Asst. Inspector for year		13 96	1 80	684 24	
Behan, J. J.	" " "			1 80	598 20	
Errett, R. W.	" " "			1 80	198 12	
	Salaries		51 92	10 80	3,337 20	
	Contingencies				2,492 97	
						5,830 17
	Hamilton.					
Freed, A. T.	Salary as Inspector for year			3 60	1,596 36	
McDonald, J.	" Asst. Inspector for year		16 04	1 80	782 16	
Marentette, A.	" " "		16 04	1 80	782 16	
Fitzgerald, E. W.	" " "			1 80	748 20	
Wheatley, A. E.	" " "			1 80	748 20	
Laidman, R. H.	" " "			1 80	698 16	
Jarvis, H.	" " "			1 80	598 20	
Robins, S. W.	" " from Mar. 20 to June 30, 1902			0 45	140 65	
	Salaries		32 08	14 85	6,094 09	
	Contingencies				1,166 60	
						7,260 69
	Ottawa.					
Macdonald, J. A.	Salary as Inspector for year			3 60	1,396 32	
Breen, J.	" Asst. Inspector for year			1 80	598 20	
McFarlane, J.	" " "		12 00	1 80	586 20	
Winsor, J. A.	" " "			1 80	698 16	
Elliott, T. H.	" " "	Insurance. 41 76		1 80	556 44	
	Insurance	41 76				
	Salaries		12 00	10 80	3,835 32	
	Contingencies				1,685 57	
						5,520 89
	Toronto.					
Kelly, D.	Salary as Inspector for year			3 60	1,296 36	
Milligan, R. J.	" Asst. Inspector for year			1 80	798 12	
Wright, R. J.	" " "		16 04	1 80	782 16	
Smith, J. C.	" " "			1 80	598 20	
Murdoch, J.	" " "			1 80	598 20	
	Salaries		16 04	10 80	4,073 04	
	Contingencies				1,747 63	
						5,820 67
	Windsor.					
Hayward, W. J.	Salary as Inspector for year		28 04	3 60	1,368 36	
Coughlin, D.	" Mechanical Inspector for year			1 80	798 12	
Thomas, J. S.	" Asst. Inspector for year			1 80	798 12	
Hughes, R. A.	" " "			1 80	723 18	
	Salaries		28 04	9 00	3,687 78	
	Contingencies				1,491 22	
						5,179 00

APPENDIX B—*Continued.*

No. 5.—DETAILS of Weights and Measures Expenditures, 1901 1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total amounts paid.
		Retirement.	Superannuation.	Guarantee.		
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Montreal.					
Chalus, J. O	Salary as Inspector for year		31 96	3 60	1,554 44	
Daoust, J. A.	" Asst. Inspector for year		16 04	1 80	782 16	
Gervais, S.	" " "		16 04	1 80	782 16	
Hébert, J. A. P.	" " "			1 80	798 12	
Boudet, E	" " "			1 80	798 12	
Collins, D.	" Mechanical Inspector for year			1 80	798 12	
Baker, J. S	" Asst. Inspector for year			1 80	698 16	
Tomlinson, W. M.	" " from July 1, 1901, to March 31, 1902			1 35	523 62	
Dessert, V.	" Asst. Inspector for year			1 80	598 20	
Fournier, L. A.	" " from July 1, 1901, to March 31, 1902			1 35	448 65	
	Salaries		64 04	18 90	7,791 75	
	Contingencies				1,965 22	
						9,756 97
	Quebec.					
Guay, G. N.	Salary as Inspector for year			3 60	1,196 40	
LeBel, J. A. W.	" Asst. Inspector for year		38 60	1 80	1,059 60	
Kelly, M. J	" " "	38 28	23 96	1 80	735 96	
Guay, A.	" " "			1 80	698 16	
Chabot, F. X.	" " "		12 00	1 80	586 20	
Petit, J. B.	" " "		6 32	1 80	491 88	
Préfontaine, F. X.	" " "			1 80	564 83	
Moreau, A.	" Caretaker "		6 00		234 60	
Knowles, Chas.	" Asst. Inspector from Dec. 30, 1901, to June 30, 1902			0 90	249 06	
	Insurance	38 28				
	Salaries		86 88	15 30	5,876 09	
	Contingencies				2,133 24	
						8,019 33
	St. Hyacinthe.					
Tomlinson, W. M.	Salary as Inspector from Apr. 1 to June 30, 1902			0 45	174 54	
Fournier, L. A.	" Asst. Inspector "			0 45	149 55	
	Salaries			0 90	324 09	
	Contingencies				238 92	
						563 01
	Three Rivers.					
Gravel, A. I.	Salary as Inspector for year			3 60	996 36	
Provost, J. J.	" Asst. Inspector for year	34 96		1 80	663 24	
Beaulac, J. H	" " from Jan. 1 to June 30, 1902			0 90	249 06	
	Salaries	34 96		6 30	1,908 66	
	Contingencies				919 60	
						2,828 26
	St. John, N.B.					
Wilmot, J. B.	Salary as Inspector for year		24 00	3 60	1,172 40	
Cowan, E.	" Asst. Inspector for year		13 96	1 80	684 24	
Richard, D.	" " "		12 00	1 80	586 20	
Bernier, J. A.	" " "			1 80	598 20	
	Salaries		49 96	9 00	3,041 04	
	Contingencies				421 38	
						3,462 42

APPENDIX B—*Continued.*

No. 5.—Details of Weights and Measures Expenditures, 1901–1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total Amounts paid.
		Retirement.	Superannuation.	Guarantee.		
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Cape Breton.					
Laurence, G. C....	Salary as Inspector for year.			3 60	796 40	
	Contingencies				382 90	
						1,179 30
	Halifax.					
Frame, A.	Salary as Inspector for year			3 60	996 36	
Waugh, R. J.	" Asst. Inspector for year			1 80	598 20	
	Salaries			5 40	1,594 56	
	Contingencies				1,218 76	
						2,813 32
	Pictou.					
Dustan, W. M.	Salary as Inspector for year		19 96	3 60	976 44	
Chisholm, J. J.	" Asst. Inspector for year			1 80	598 20	
	Salaries		19 96	5 40	1,574 64	
	Contingencies				281 20	
						1,855 84
	Charlottetown.					
Davy, E.	Salary as Inspector for year			3 60	946 32	
Hughes, H.	" Asst. Inspector for year			1 80	598 20	
	Salaries			5 40	1,544 52	
	Contingencies				196 59	
						1,741 11
	Winnipeg.					
Magness, R.	Salary as Inspector for year			3 60	1,396 32	
McDonald, A. W.	" Asst. Inspector for year			1 80	698 16	
Francis, G. M	" " from July 1, 1901, to Mar. 1, 1902			1 20	398 80	
Girdlestone, R. J. M	" Asst. Inspector for year		4 04	1 80	194 16	
Ross, H. E.	" " "			1 80	98 16	
	Salaries		4 04	10 20	2,785 60	
	Contingencies				3,250 16	
						6,035 76
	Calgary.					
Thomas, P.	Salary as Inspector from July 1 to Dec 1, 1901			1 50	81 80	
Costello, J. W.	" Asst. Inspector for year		14 00	1 80	684 20	
	Salaries		14 00	3 30	766 00	
	Contingencies				224 03	
						990 03
	Victoria.					
Findley, H.	Salary as Inspector for year			3 60	796 32	
McAloney, J. A.	" Asst. Inspector for year			1 80	348 12	
Parker, Thos.	" " from Feb. 27 to June 30, 1902			0 75	258 17	
	Salaries			6 15	1,402 61	
	Contingencies				1,288 49	
						2,691 10

APPENDIX B—*Continued.*

No. 5.—DETAILS of Weights and Measures Contingencies, Expenditures for the Year ended June 30, 1902—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
		$ cts.	$ cts
Burgess, Thos.	Salary as mechanical assistant for the year	800 00	
American Bank Note Co.	Printing weights and measures stamps	468 50	
Veuve, Louis Havez	Metrical compendiums, calculating tables, &c.	796 97	
Lawson, T.	400 50-lb. weights	620 00	
McMoran, R. M.	7¼ yards green cloth	21 75	
Bailey, G.	Brass weights, corners and clasps	4 40	
The Pritchard & Andrews Co.	Copper brands, numerals, daters, &c.	241 70	
McFarlane, John	Plating 2 sets of scales	5 00	
Picard, L.	Services as carpenter, 29 days at $2 per diem	58 00	
Carson, H.	25 leather bags	75 00	
Aubé, J.	Services in store room, 70½ days at $1 per diem	70 50	
Vincent, Arthur	Books on metric system	39 00	
Dominion Plating Works.	Plating 1 set of scales	2 50	
Wilson & Co.	" "	2 50	
Ladouceur, J.	Services as mechanic, 77 days at $2 per diem	154 00	
Edwards, W. C. & Co., Ltd.	Lumber and cartage	4 75	
Gouin, Lomer	Law cost, King *vs.* Cheselborough Co.	20 00	
Canadian Pacific Ry. Co.	Freight	12 14	
Canadian Express Co.	Express charges	6 10	
Dominion Express Co.	"	17 55	
Yetts, R.	Petty expenses	15 14	
Potvin, Napoléon	"	53 24	
		3,488 74	
	LESS—Refund	12 04	
	Total general contingencies		3,476 70
	Grand total		75,024 57
	ADD—Printing	282 36	
	Stationery	146 34	
	Lithographing	324 99	
			753 69
	Actual disbursements (less superannuation, insurance, retirement and guarantee)		75,778 26
	ADD—Old balances due by Inspectors June 30, 1902		193 26
			75,971 52
	LESS—Old balances due by Inspectors July 1, 1901		193 26
	Actual disbursements, agreeing with Statement No. 20A, page 48		75,778 26

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902

APPENDIX B—*Continued.*

No. 6.—DETAILS of Gas Inspection Expenditures for the Year ended June 30, 1902.

To whom paid.	Service.	Deductions for			Amounts paid.	Total amounts paid.
		Retirement.	Superannuation.	Guarantee.		
	Barrie.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Shanacy, M	Salary as Inspector for year		2 00	3 60	94 40	
	Contingencies				2 60	
						97 00
	Belleville.					
Johnson, W	Salary as Inspector for year		7 04	3 60	339 36	
Stuart, W. E	" Asst. Inspector from Aug. 12, 1901, to June 30, 1902			2 40	86 27	
	Salaries		7 04	6 00	425 63	
	Contingencies				237 37	
						663 00
	Berlin.					
Broadfoot, S	Salary as Inspector for year			3 60	96 40	
	Contingencies				54 22	
						150 62
	Brockville.					
Johnston, C. W.	Contingencies					111 66
	Cobourg.					
Bickle, J. W	Salary as Inspector for year		2 00	3 60	94 40	
	Contingencies				67 55	
						161 95
	Cornwall.					
Mulhern, M. M	Salary as Inspector for year		2 00	3 60	94 40	
	Contingencies				30 00	
						124 40
	Guelph.					
Broadfoot, S	Salary as Inspector for year		4 40	3 60	192 40	
	Contingencies				13 07	
						205 47
	Hamilton.					
McPhie, D	Salary as Inspector for year		36 00	3 60	1,760 40	
McPhie, W. H	" Asst. Inspector for year			1 80	598 20	
Dennis, W. A	" " "			1 80	98 16	
	Salaries		36 00	7 20	2,456 76	
	Contingencies				307 44	
						2,764 20
	Kingston.					
Behan, J. J	Salary as Inspector for year			3 60	396 40	
	Contingencies				118 63	
						515 03
	Listowel.					
Male, Thos	Salary as Inspector for year			3 60	96 40	
	Contingencies				74 75	
						171 15
	London.					
Nash, A. F	Salary as Inspector for year			3 60	1,046 40	
	Contingencies				523 50	
						1,569 90

SESSIONAL PAPER No. 12

APPENDIX B—*Continued.*

No. 6—Details of Gas Inspection Expenditures, 1901–1902—*Continued.*

To whom paid.	Service.	Deductions for Retirement.	Superannuation.	Guarantee.	Amounts paid.	Total amounts paid.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Napanee.					
Johnson, W.	Contingencies					39 23
	Ottawa.					
Roche, H. G.	Salary as Inspector for year			3 60	1,046 40	
	Contingencies				958 02	
						2,004 42
	Owen Sound.					
Graham, W. J.	Salary as Inspector for year		4 00	3 60	193 40	
	Contingencies				128 70	
						322 10
	Peterborough.					
Rork, Thos.	Salary as Inspector for year			3 60	146 40	
	Contingencies				2 00	
						148 40
	Sarnia.					
Hicks, W. H.	Contingencies					21 75
	Stratford.					
Rennie, Geo.	Salary as Inspector for year		4 00	3 60	192 40	
	Contingencies				14 50	
						206 90
	Toronto.					
Johnstone, J. K.	Salary as Inspector for year		34 04	3 60	1,662 36	
Pape, J.	" Asst. Inspector for year			1 80	998 16	
Whyte, J. A.	" " from July 18, 1901, to June 30, 1902			1 65	570 93	
	Salaries		34 04	7 05	3,231 45	
	Contingencies				53 86	
						3,285 31
	Montreal.					
Aubin, A.	Salary as Inspector for year			3 60	1,496 40	
O'Flaherty, M. J.	" Asst. Inspector for year			1 80	798 12	
	Salaries			5 40	2,294 52	
	Contingencies				754 18	
						3,048 70
	Quebec.					
LeVasseur, N.	Salary as Inspector for year		19 96	3 60	976 44	
Moreau, A.	" Asst. Inspector for year		6 00		294 00	
	Salaries		25 96	3 60	1,270 44	
	Contingencies				151 78	
						1,422 22
	Sherbrooke.					
Simpson, A. F.	Salary as Inspector for year		3 00	3 60		143 40
	St. Hyacinthe.					
Benoit, L. V.	Salary as Inspector for year			1 80		73 20

APPENDIX B—*Continued.*

No. 6.—DETAILS of Gas Inspection, Expenditures for the Year ended June 30, 1902—*Continued.*

To whom paid.	Service.	Deductions for			Amounts paid.	Total amounts paid.
		Retirement.	Superannuation.	Guarantee.		
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
	Fredericton.					
Fowler, J. D.	Salary as Inspector for year			3 60		196 40
	St. John, N.B.					
Wilson, J. E.	Salary as Inspector for year			3 60	1,046 40	
	Contingencies				97 68	1,144 08
	Halifax.					
Miller, A.	Salary as Inspector for year		25 04	3 60	1,221 36	
Ritchie, A. J.	" Asst. Inspector for year			1 80	498 12	
Munro, H. D.	" " "		1 96	1 80	96 24	
	Salaries		27 00	7 20	1,815 72	
	Contingencies				681 84	2,597 56
	Charlottetown.					
Bell, J. H.	Salary as Inspector for year			3 60	296 40	
	Contingencies				26 39	322 79
	Winnipeg.					
Magness, R.	Salary as Inspector for year			3 60	296 40	
	Contingencies				82 85	379 25
	Nanaimo.					
McAloney, J. A.	Salary as Inspector for year			3 60	96 40	
	Contingencies				3 00	99 40
	New Westminster.					
Wolfenden, W.	Salary as Inspector for year	5 00		3 60	91 40	
	Contingencies				277 97	368 97
	Vancouver.					
Miller, J. E.	Salary as Inspector for year		6 00	3 60	290 40	
	Contingencies				146 70	437 10
	Victoria.					
Jones, R.	Salary as Inspector for year		4 00	3 60		192 40
	General.					
McPhie, D.	Contingencies					121 80

APPENDIX B—*Continued.*

No. 6.—DETAILS of Gas Inspection Expenditures for the Year ended June 30, 1902—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
	General Contingencies.	$ cts.	$ cts.
American Bank Note Co.	Printing stamps	50 00	
The Pritchard & Andrews Co	10 meter seals, pads, ink, &c.	132 10	
American Rubber Co.	Rubber tubing	64 63	
American Meter Co.	4 Burners, test meters	120 00	
Fréchette, A.	Technical translation	58 46	
Potvin, Napoléon	Petty expenses	2 65	
	Total general contingencies		427 84
	Grand total		23,537 69
	ADD—Printing	95 76	
	Stationery	133 46	
	Lithographing	20 00	
			249 22
	Authorized disbursements (less superannuation, retirement and guarantee.)		23,786 91
	ADD—Balances due by Inspectors, June 30, 1902		212 88
			23,999 79
	LESS—Balances due by Inspectors, July 1, 1901		212 88
	Actual disbursements agreeing with Statement No. 22, page 54		23,786 91

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX B—*Continued.*

No. 7.—Details of Electric Light Inspection, Expenditures for the Year ended June 30, 1902.

To whom paid.	Service.	Deduction for Guarantee	Amounts paid.	Total Amounts paid.
	Belleville.	$ cts.	$ cts.	$ cts.
Johnson, W.	Contingencies			301 46
	Hamilton.			
McPhie, D.	Contingencies			111 45
	London.			
Nash, A. F.	Contingencies			193 35
	Toronto.			
Johnstone, J. K.	Contingencies			238 41
	Montreal.			
Aubin, A.	Contingencies			454 10
	Quebec.			
Le Vasseur, N.	Contingencies			72 91
	Sherbrooke.			
Simpson, A. F.	Contingencies			79 85
	St. Hyacinthe.			
Fontaine, A.	Salary as Inspector for year	1 20	298 80	
	Contingencies		21 80	
				320 60
	St. John.			
Wilson, J. E.	Contingencies			94 12
	Halifax.			
Miller, A.	Contingencies			212 96
	Charlottetown.			
Bell, J. H.	Contingencies			52 59
	Winnipeg.			
Magness, R.	Contingencies			104 00
	Victoria.			
Jones, R.	Contingencies			12 85
Higman, O.	Chief Electrical Engineer for year		2,400 00	
	Contingencies		426 87	
				2,826 87

APPENDIX B—*Continued.*

No. 7.—DETAILS of General Electric Light Inspection, Expenditures for the Year ended June 30, 1902—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
		$ cts.	$ cts.
Ahearn & Soper	Electrical supplies, materials, repairs, &c	3,636 24	
Western Electrical Investment Co	Electrical supplies	105 76	
Blyth & Watt	1 lead-lined tank	60 00	
Mills & Sons, A. K	3 slate table tops and setting of the same	42 56	
Sproule, W. H	4 stop watches	40 00	
Gouin, Lomer	Law costs, Rex *vs.* Norman McBeth	30 25	
The Baldwin Iron and Steel Works Co	Motor stand, pulley and belting	22 60	
Shedrick, C. E	Electrical repairs	31 10	
Electric Storage Battery	Glass jars and Bott's connectors	19 54	
Lyman Sons & Co	2 carboys sulphuric acid	12 76	
American Meter Co	12 pressure gauges and Element's rubber	21 10	
Jarvis, S. J	1 box veloc. developer	1 60	
Garrioch & Godard Co	Electrical supplies	5 50	
Fuller & Co	Wire	2 50	
Turner, C. E	Fees of power of attorney from Weston Electric Co	2 00	
Hearn & Harrison	Eye pieces for microscope	4 60	
Canada Atlantic Ry. Co	Freight	7 05	
Canadian Pacific Ry. Co	"	6 30	
Potvin, Napoléon	Petty expenses	28 54	
	Total general contingencies		4,088 74
	Grand total		9,164 26
	ADD—Printing	81 99	
	Stationery	14 23	
			96 22
	Actual disbursements, agreeing with Statement No. 24, page 57		9,260 48

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX B—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department on Salary, during the Year ended June 30, 1902.

Names.	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Adams, J. S.		1					
Alexander, Thos.		1					
Allen, G. A.		1					
Alteman, Peter J.		1					
Amor, Wm.		1					
Andrews, A. A.		1					
Armstrong, Walter		1					
Aubin, A.				1	1		
Baby, W. A. D.		1					
Baker, J. S.			1				
Barber, J. S.		1					
Barnes, G.		1					
Barrett, J. K.		1					
Basinet, Louis		1					
Bayard, Gilbert A.		1					
Beaulieu, J. B.		1					
Behan, J. J.			1	1			
Belair, A. (Plessis dit)		1					
Bell, James E.		1					
Bell, J. H.				1	1		
Bellepeiche, A. J. E.		1					
Belyea, T. H.		1					
Bennett, James		1					
Benoit, L. V.		1		1			
Bernard, N. J. D.		1					
Bernier, J. A.			1				
Berry, H. L.		1					
Bickle, J. W.		1		1			
Bish, Philip		1					
Bishop, J. B.		1					
Blackman, C.		1					
Blair, A.		1					
Blethen, C. W.		1					
Blyth, Alex.		1					
Boomer, J. B.		1					
Bouchette, R. E.	1						
Boudet, E.			1				
Bourassa, Joseph		1					
Bourget, O.		1					
Bousquet, J. O.		1					
Bouteiller, G. A.		1					
Bowman, Allan		1					
Boyd, J. F. S.		1					
Boyd, S. I.		1					
Boyle, P.		1					
Bowen, F. C.		1					
Brabant, J. B. G. N.		1					
Brain, A. F.		1					
Breen, John			1				
Brennan, D. J.		1					
Brennan, John		1					
Broadfoot, S.		1		1			
Brown, W. J.		1					
Browne, G. W.		1					
Bruyere, H. P.		1					
Burgess, Thomas H.			1				
Burke, T.		1					
Burns, John	1						
Burns, R. J.		1					

APPENDIX B—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department, 1901-1902—*Continued.*

Names.	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Byrnes, John	1						
Cahill, J. H.		1					
Cahill, J. W.		1					
Cameron, D. M.		1					
Campeau, F. R. E.	1						
Cargill, W.		1					
Carroll, D.		1					
Carter, William	1						
Casey, John						1	
Caven, A.		1					
Caven, W.		1					
Chabot, F. X.			1				
Chalus, J. O.			1				
Chartier, Etienne		1					
Cheseldine, J. H.		1					
Chevrier, B.	1						
Chisholm, J. J.			1				
Chisholm, W. N.		1					
Clark, A. F.		1					
Clark, James Alfred		1					
Clarke, Thomas		1					
Codd, Herbert J. S.		1					
Code, Abraham		1					
Coleman, Charles		1					
Coleman, J. J.		1					
Coles, F. H.			1				
Collins, D.		1					
Comte, L. A. A. J.		1					
Conklin, W. M.		1					
Cook, W. R.			1				
Costello, J. W.		1					1
Costigan, J. J.			1				
Coughlin, D.		1					
Coulter, Alex.		1					
Courtney, J. J.		1					
Coutts, J. J.			1				
Cowan, Edgar		1					
Crawford, W. P.		1					
Crotty, John		1					
Crowe, W.		1					
Dager, H. J.			1				
Daoust, J. A.		1					
Daveluy, J. P.		1					
David, T.		1					
Davis, J.		1					
Davis, T. G.			1				
Davy, Edward		1					
Dawson, W.		1					
Deland, A. N.				1			
Dennis, W. A.		1					
Desaulniers, J. E. A.			1				
Dessert, Victor		1					
Dibblee, William		1					
Dick, J. W.		1					
Dickson, C. T.		1					
Dingman, N. J.		1					
Dixon, H. G. S.		1					
Donaghy, William		1					
Doyle, B. J.							

APPENDIX B.—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department, 1901–1902—*Continued.*

Names.	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Doyon J. A.	1						
Dumaine, J. D. E		1					
Dumbrille, R. W		1					
Dumouchel, Léandre		1					
Dunlop, C.		1					
Dunne, J. P.	1						
Duplessis, C. Z.		1					
Dustan, W. M.			1				
Egan, Wm		1					
Egener, A		1					
Elliott, T. H		1	1				
Errett, R. W			1				
Evans, G. T.		1					
Fahey, Ed		1					
Falconer, James		1					
Falconer, R. H.		1					
Ferguson, J		1					
Ferguson, John C.		1					1
Findley, Hugh			1				
Fitzgerald, E. W.			1				
Fitzpatrick, W. J		1					
Fletcher, R. W.		1					1
Floody, E.						1	
Flynn, D. J		1					
Fontaine, A.					1		
Forest, E. R.		1					
Forest, M		1					
Fortier, J. J. O.		1					
Fortier, V.		1					
Foster, J. Henry		1					
Fournier, L. A.			1				
Fowler, George	1						
Fowler, J. D.				1			
Fox, J. D.		1					
Fox, Thomas		1					
Frame, Archibald			1				
Frankland, H. R.		1					
Fraser, P		1					
Freed, A. T.			1				
Freeland, Anthony		1					
Geldart, O. A.		1					
George, John		1					
Gerald, C.		1					
Gerald, W. H.		1					
Gerald, W. J.	1						
Gervais, Samuel			1				
Gill, Wm		1					
Girard, Irené		1					
Girdlestone, R. J. M.		1	1				
Goodman, A. W.		1					
Gorman, Arthur M.		1					
Gosnell, T. S		1					
Gow, J. E.		1					
Graham, A. L.		1					
Graham, W. J.		1		1			
Graham, W. T.		1					
Grant, H. H.		1					
Gravel, A. I.			1				
Grimason, Thomas		1					

APPENDIX B—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department, 1901-1902—*Continued.*

Names.	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Grosbois (de), Chas. B.		1					
Guay, Alphonse			1				
Guay, G. N.			1				
Hagan, James		1					
Hagarty, P.		1					
Halliday, W. A.	1						
Hanley, A.		1					
Harwood, J. O. A.		1					
Harris, J. G.		1					
Harrison, W. F.		1					
Hart, P. D.		1					
Hawkin, A. C.		1					
Hawkins, W. L.		1					
Hayhurst, T. H.		1					
Hayward, W. J.			1				
Hébert, C. D.		1					
Hébert, J. A. P.			1				
Helliwell, H. N.		1					
Henderson, W.		1					
Henwood, Geo.		1					
Hesson, C. A.		1					
Hicks, W. H.		1		1			
Higman, O.					1		
Himsworth, Wm.	1						
Hinchey, E. H.		1					
Hobbs, G. N.		1					
Hodder W. E.		1					
Howard, W. W. S.		1					
Howden, R.		1					
Howell, Thomas		1					
Howie, A.		1					
Hubley, H. H.		1					
Hudon, L. E.	1						
Hughes, Henry			1				
Hughes, P. A.	1						
Hughes, R. A.			1				
Hurst, Levi, B.		1					
Iler, B.		1					
Ironside, G. A.		1					
Irwin, Robert.		1					
Irwin, Samuel			1				
James, T. C.		1					
Jameson, S. B.		1					
Jamieson, R. C.		1					
Jarvis, Henry			1				
Johnson, C. W.				1			
Johnson, J. J.		1					
Johnson, Wm.			1	1	1		
Johnston, G. E.		1					
Johnstone, J. K.				1	1		
Jones, Andrew		1					
Jones, Richard		1		1	1		
Jubenville, J. P.		1					
Kearny, D. J.		1					
Keeler, G. S.		1					
Keilty, T.		1					
Kelly, Daniel			1				
Kelly, J. F.						1	
Kelly, M. J.			1				

APPENDIX B—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department, 1901-1902—*Continued.*

Names.	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Kenning, J. H		1					
Keogh, P. M		1					
Kidd, Thomas							1
Kilroy, E. T		1					
King, R. M		1					
Laidman, Richard H			1				
Lambert, J. A		1					
Lane, T. M		1					
Laporte, Geo		1					
LaRiviere, A. C		1					
LaRue, George		1					
LaRue, J. B. Alexandre		1					
Laurier, J. L		1					
Lawlor, H		1					
Lawlor, John J		1					
Lawrence, G. C			1				
LeBel, J. A. W			1				
Lee, Edward		1					
LeMoine, Jules		1					
Lépine, Louis		1					
LeVasseur, N				1	1		
Levêque, Hector							1
Logan, John		1					
Long, W. H. A		1					
Lyons, E		1					
Macdonald, A. B		1					
Macdonald, J. A			1				
Macfarlane, Thos							1
Macintyre, D		1					
Magness, Robt			1	1	1		
Mainville, C. P		1					
Male, Thomas				1			
Malo, T		1					
Maranda, N. A		1					
Marcon, F. E		1					
Marentette, Alex			1				
Mason, F		1					
Metcalf, W. F		1					
Miller, A				1	1		
Miller, J. E		1		1	1		
Miller, W. F		1					
Millier, Elie		1					
Milligan, R. J			1				
Milliken, E		1					
Moore, T		1					1
Moreau, A		1					
Morin, J. P		1					
Moreau, J. A			1	1			
Mulhern, M. M		1		1			
Munro, H. D		1		1			
Murdoch, James			1				
Murray, A. E		1					
Murray, David		1					
McAloney, Joseph A		1	1	1			
McCloskey, J. R		1					
McCoy, Wm		1					
McCraney, H. P		1					
McCuaig, Aug. F		1					
McCullough, A	1						
McCutcheon, H		1					
McDonald, A. J		1					

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APPENDIX B—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department, 1901–1902—*Continued.*

Names.	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
McDonald, A. W			1				
McDonald, J			1				
McFarland, C. D		1					
McFarlane, J			1				
McFee, C		1					
McGill, A							1
McGuire, T		1					
McLenaghan, N		1					
McNiven, J. D		1					
McPhie, Donald				1	1		
McPhie, W. H				1			
McSween, James		1					
Nash, A. F				1	1		
Nash, S. C		1					
Newby, F	1						
Nichols, J. T		1					
Noonan, H. T		1					
O'Brien, E. C		1					
O'Brien, J. F		1					
O'Donnell, J		1					
O'Donnell, M. J		1					
O'Donohue, M. J		1					
O'Flaherty, E. J		1					
O'Flaherty, M. J				1			
O'Leary, T. J		1					
Orr, Henry N		1					
Osborne, F. A		1					
O'Sullivan, D		1					
Panneton, G. E		1					
Pape, James				1	1		
Parent, F		1					
Parkinson, Edward B		1					1
Parson, C. H		1					
Patterson, C. E. A		1					
Pelletier, N. G		1					
Petit, J. B			1				
Poirier, J. N		1					
Pole, C. W		1					
Potvin, Napoléon	1						
Powell, J. B		1					
Préfontaine, F. H			1				
Prosser, Elijah						1	
Provost, J. J			1				
Quain, Redmond	1						
Quinn, J. D		1					
Ralston, T		1					
Renaud, A. H		1					
Rennie, George		1		1			
Richard, D			1				
Ridgman, A. H		1					
Rinfret, C. I		1					
Ritchie, A. J				1			
Robinson, R. S		1					
Roche, H. G				1	1		
Rork, T		1		1			
Ross, H. E		1	1				
Rousseau, Elzéar H		1					
Rowan, W. E		1					
Roy, L. G	1						
Rudkins, W		1		1	1		
Ryan, Wm		1					
Saucier, X		1					1
Schram, R. L. H		1					

APPENDIX B—*Continued.*

No. 8.—List of Persons employed by the Inland Revenue Department, 1901–1902—*Concluded.*

Names	Services.						
	Inside.	Excise.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Scullion, W. J.		1					
Shanacy, M.		1		1			
Shaw, J. F.	1						
Simpson, A. F.		1		1	1		
Simpson, W. A.		1					
Simon, E. H.		1					
Slattery, R.		1					
Slattery, Thomas			1				
Sloan, W.		1					
Smith, J. C.			1				
Snowdon, J. W.		1					
Sparling, J. W.		1					
Spence, F. H.		1					
Spereman, J. J.		1					
Standish, J. G.		1					
Stevens, D. B.		1					
Stewart, James		1					
St. Michel, F. X.		1					
Stratton, W. C.		1					
Swannell, F. W.		1					
Talbot, John		1					
Taylor, G. W.		1					
Tétreault, J.		1					
Thomas, J. S.			1				
Thomas, Robert		1					
Thorburn, J.		1					
Till, T. M.		1					
Timmons, P.		1					
Tomlinson, W. M.			1				
Tompkins, P.		1					
Tompin, F. X. J. A.		1					
Tracy, J. P.		1					
Valin, J. E.	1						
Verner, Francis		1					
Verner, Thomas H.		1					
Wainright, F. G.		1					
Waller, J.		1					
Walsh, Daniel, J.		1					
Wardell, R. S. R.		1					
Watson, James							1
Watson, W. W.		1					
Waugh, R. J.			1				1
Webbe, C. E. A.		1					
Weir, James		1					
Westman, T.	1						
Weyms, C.		1					
Wheatley, Alfred E.			1				
White, J. B.		1					
Whitehead, J. P.		1					
Wilmot, J. B.			1				
Wilson, David		1					
Wilson, J. E.				1	1		
Winsor, John A.			1				
Wolfenden, William		1		1			
Wood, James A.		1					
Woodward, G. W.		1					
Wright, Robert J.			1				
Wright, S. E.							1
Yetts, R. P.	1						
Young, R. E.		1					
Totals	24	351	71	39	18	4	15

APPENDIX B—*Continued.*

No. 9.—List of Persons employed by the Inland Revenue Department on salary, during a portion of the Year ended June 30, 1902.

Names.	Period.	Services.				
		Inside.	Excise.	Weights and Measures.	Gas.	Adulteration of Food.
Baikey, Daniel	From July 17, 1901 to June 30, 1902		1			
Beauchamp, J. P.	" July 1, 1901 to July 31, 1901			1		
Beaulac, J. H.	" Jan. 1, 1902 to June 30, 1902			1		
Bernier, J. A.	" March 1, 1902 to June 30, 1902		1			
Blair, A.	" July 1, 1901 to May 31, 1902		1			
Blair, J. B.	" Feb. 1, 1902 to June 30, 1902		1			
Bourgault, Alph.	" Aug. 1, 1901 "	1				
Brentnal, F. F.	" Jan. 13, 1902 "		1			
Browne, G. W.	" July 1, 1901 to Sept. 30, 1901		1			
Carroll, F. P.	" Dec. 3, 1901 to June 30, 1902		1			
Chilver, E. W.	" Aug. 12, 1901 "		1			
Conway, B. J.	" July 1, 1901 to July 31, 1901		1			
Desmarais, F.	" " to Jan. 31, 1902		1			
Dudley, W. H.	" Feb. 1, 1902 to June 30, 1902		1			
Dumbrille, J.	" July 1, 1901 to Jan. 31, 1902		1			
Dwyre, D. T.	" May 1, 1902 to June 30, 1902		1			
Francis, G. M.	" July 1, 1901 to Feb. 28, 1902			1		
Gauvin, E.	" Feb. 13, 1902 to June 30, 1902		1			
Girard, A. B.	" July 18, 1901 to Feb. 11, 1902		1			
Gow, James	" July 1, 1901 to Sept. 30, 1901		1			
Hill, A. M.	" " to July 31, 1901		1			
Ives, G. C.	" " to May 31, 1902		1			
Knolson, J. B.	" " to Aug. 31, 1901		1			
Knowlnes, Chrs.	" Jan. 1, 1902 to June 30, 1902			1		
Labelle, L. V.	" April 8, 1902 "		1			
Lecours, H. T.	" July 1, 1901 to Nov. 30, 1901		1			
Mackinzie, J. H.	" March 22, 1902 to June 30, 1902		1			
Malhoney, H.	" Feb. 13, 1902 "		1			
Marin, L. H.	" " "		1			
Marion, H. R.	" March 24, 1902 "		1			
Marion, J. E. E.	" July 1, 1901 to Mar. 31, 1902		1			
Marshal, F.	" " to Aug. 31, 1901		1			
Maurice, E.	" Feb. 12, 1902 to June 30, 1902		1			
Michon, A. E.	" May 1, 1902 "		1			
McAlister, A.	" July 1, 1901 to July 31, 1901		1			
McArthur, G. H.	" March 24, 1902 to June 30, 1902		1			
Neil, James	" July 23, 1901 "		1			
Normandin, G.	" Feb. 13, 1902 "		1			
O'Brien, James	" Oct. 1, 1901 "		1			
Parker, Thomas	" Jan. 27, 1902 "			1		
Patry, J. H.	" March 20, 1902 "		1			
Power, J. F.	" April 22, 1902 "		1			
Robins, S. W.	" March 20, 1902 "			1		
Ross, S. F.	" July 1, 1901 to July 31, 1901		1			
Rouleau, J.	" " to Sept. 30, 1901		1			
Rouleau, J. C., jr.	" Jan. 8, 1902 to June 30, 1902		1			1
Stuart, W. E.	" Aug. 12, 1901 "				1	
Thomas, Philip.	" July 1, 1901 to Nov. 30, 1901		1	1		
Trasher, W. A.	" April 1, 1902 to June 30, 1902		1			
Tyrrell, M.	" July 1, 1901 to Nov. 30, 1901					1
Villeneuve, Jacques	" July 1, 1901 to May 31, 1902		1			
Whyte, J. A.	" July 13, 1901 to June 30, 1902				1	
	Totals	1	42	7	2	2

APPENDIX B—*Concluded.*

No. 9.—List of persons employed by the Inland Revenue Department on salary, during the Year ended June 30, 1902—*Concluded.*

RECAPITULATION.

Employed during the year	420
" a portion of the year	52
Total	472

Services.

Employed in the Inside Service	24
" Excise	324
" Weights and Measures	60
" Gas	9
" Electric Light Inspection	2
" Preventive Service	4
" Food Inspection	6
" Excise and Electric Light	2
" " Weights and Measures and Electric Light	1
" " Gas	10
" " Food Inspection	7
" Weights and Measures and Gas	2
" " " Food Inspection	2
" Gas and Electric Light	9
" Excise, Gas and Electric Light	4
" Weights and Measures, Gas and Electric Light	2
" " " and Excise	4
Total corresponding with above	472

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, August 16, 1902.

INDEX.

REPORT, RETURNS AND STATISTICS

OF THE

INLAND REVENUES

OF THE

DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED JUNE 30

1902

PART II

INSPECTION OF WEIGHTS AND MEASURES, GAS AND ELECTRIC LIGHT

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY
1902

[No. 13.—1902]

REPORT

OF THE

DEPUTY MINISTER OF INLAND REVENUE

ON THE

INSPECTION OF WEIGHTS AND MEASURES, GAS AND ELECTRIC LIGHT

To the Honourable
The Minister of Inland Revenue.

SIR,—I have the honour to submit herewith my annual report on the inspection of weights and measures, gas and electric light, with the usual statements in connection therewith, for the fiscal year ended June 30, 1902.

1. The total revenue collected during the year for the inspection of weights and measures was $62,937.68, as against $54,385.56 collected during the year ended June 30, 1901.

2. The total expenditure was $76,418.32, as against $71,280.37 expended during the year ended June 30, 1901.

3. Appendix 'A' gives a summary statement of the receipts and expenditures of each inspection division.

4. In Appendices 'B' 'C' and 'D' will be found a detailed statement of weights, measures and weighing machines presented for verification verified and rejected during the year. The number of all descriptions may be summarily stated as follows :—

——	Presented.	Verified.	Rejected.	Percentage of Rejections.
Weights, Dominion	63,007	61,948	1,059	1·68
Measures of capacity, Dominion	91,622	91,358	264	0·28
Lineal measures	7,000	6,766	234	3·34
Balances, equal arms	12,275	11,997	278	2·26
" steelyards	4,703	4,581	122	2·59
" platform scales	34,623	33,781	842	2·43
Troy weights	809	809		
Irregular weights	972	965	7	0·72
" measures	1,031	1,018	13	1·26
" balances	6,802	6,555	247	3·63

Inspection of Gas.

5. The total revenue collected during the fiscal year ended June 30, 1902, for the inspection of gas and gas meters, was $24,221.80, as compared with $22,173.55 collected during the year ended June 30, 1901.

6. The total expenses were $24,066.80, as against $23,338.49 expended during the year ended June 30, 1901.

7. Appendix 'E' gives a summary statement of the receipts and expenditures of each gas inspection district.

8. A statement of the illuminating power and purity of gas inspected during the year will be found in Appendix 'F'.

9. The illuminating power, where inspection has been made, has been as follows:—

Places.	Number of Tests made.	Number of times below Standard.	Places.	Number of Tests made.	Number of times below Standard.
Barrie	12		Sarnia	12	
Belleville	28		Stratford	12	1
Berlin	12		St. Catharines	12	
Brantford	12		St. Thomas	13	
Brockville	12		Toronto	104	
Chatham	12		Windsor	14	
Cobourg	23		Woodstock	12	
Cornwall	12		Montreal	105	
Deseronto	1		Quebec	24	
Dundas	12		Sherbrooke	12	1
Galt	12		Fredericton	58	
Guelph	12		Moncton	12	
Hamilton	12		St. John, N.B	71	6
Ingersoll	12		Halifax	12	
Kingston	18		Picton	12	
Listowell	12		Yarmouth	12	
London	25		Charlottetown	17	
Napanee	8		Winnipeg	12	
Ottawa	24		Nanaimo	12	
Owen Sound	12		Vancouver	12	
Peterborough	24		Victoria	11	
Port Hope	22				

The revenue derived from the inspection of electric light was as follows :—

Fees for inspection of meters &c	$16,373 75
Registration of companies	5,055 00
	$21,428 75
The expenses of inspection (annual)	5,172 94
	$16,255 81
Expended on standard instruments, &c	4,088 74
Leaving a net revenue of	$12,167 07

Since the year 1896–97 the two services of gas and electric light inspection, which are conducted largely by the same staff of officers, have reached that point at which they have ceased to be a burden upon the general taxpayer, as shown below :—

Year.	Gas and Electric Light.	
	Revenue.	Expenditure, Exclusive of cost of Standard Instruments.
	$ cts.	$ cts.
1897–98	28,150 00	23,402 00
1898–99	30,015 25	23,436 30
1899–1900	35,523 50	26,424 48
1900–01	37,536 57	28,247 20
1901–02	45,663 05	33,328 48

The kindred service of weights and measures inspection, it will be observed, as the same as last year, earn somewhat over three-fourth of its annual cost, the expenditure as already stated having been $76,418.32, against a revenue of $62,937.68.

The annual registration fees for Electric Light Companies will, from July 1, 1902, be so graded as to bear more lightly on companies having a small installation while not increasing the fees of the larger companies.

The fees will be as follows :—

For companies having an installation of five hundred incandescent lamps and under	$ 5 00
For companies having an installation of over five hundred and not exceeding two thousand incandescent lamps	10 00
For companies having an installation in excess of two thousand incandescent lamps	25 00

The former fees were as shown below :—

For companies having an installation of one thousand incandescent lamps and under	10 00
For companies having an installation in excess of one thousand incandescent lamps	25 00

The above change will result in a direct decrease of revenue from this source but which will to some extent be made up by the installation of new plants and the gradual increase in operations of existing Companies.

Since my last report the department has received a further supply of sample sets of Metric Weights and Measures which are being supplied to Educational Institutions throughout the country. When this distribution is completed it will result in placing in such institutions over two hundred of these sets.

At the recent conference of Colonial Premiers in London it was decided that it was advisable to adopt the metric system of weights and measures for use within the Empire.

The select committee of the House of Commons of Great Britain has recommended :—

(a) That the Metrical System of weights and measures be at once legalized for all purposes.

(b) That after a lapse of two years the Metrical System be rendered compulsory by Act of Parliament and,

(c) That the Metrical System of weights and measures be taught in all public elementary schools as a necessary and integral part of arithmetic, and that, decimals be introduced at an earlier period of the school curriculum than is the case at present.

In the United States the Hon. Mr. Southard from the committee on Coinage, Weights and Measures recommended (April 21, 1902) that :—

On and after the first day of January, nineteen hundred and four, all the Departments of the Government of the United States, in the transaction of all business requiring the use of weights and measures, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system : and on and after the first day of January, nineteen hundred and seven, the weights and measures of the metric system be the legal standard weights and measures of and in the United States.

By 34 Vic. Chap. 24 (1871) it was provided that for the promotion and extension of the internal, as well as of the foreign trade of Canada, and for the advancement of science, it was expedient to legalize the use of the metric system of weights and measures.

Tables of the values of the principal denominations of measures and weights of the metric system, expressed in terms of the Standard measures and weights of Canada, were determined by the same Act.

Up to the present time weights and measures of the metric system have been used in Canada, almost solely, in connection with scientific investigation.

In view of the foregoing facts and of the great importance of this subject from a scientific as well as a commercial standpoint it seems clear that the time has arrived when Canada should consider the advisability of taking the necessary steps to adopt a system that will, in a very few years, be practically universal.

I have the honour to be, Sir,

Your obedient servant,

W. J. GERALD,
Deputy Minister.

Inland Revenue Department.
OTTAWA, August 16, 1902.

APPENDIX A.

STATEMENT of Weights and Measures Expenditures and Receipts for the year ended June 30, 1902.

Divisions.	Inspectors.	Expenditures.							Receipts.
		Salaries.	Seizure expenses.	Special assistance.	Rent.	Travelling expenses.	Sundries.	Totals.	
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Belleville	Johnson, W. Slattery, T. Irwin, S. Behan, J. J. Errett, R. W.	3,992 92	16 37	499 92	290 00	1,213 04	473 66	5,892 89	4,206 55
Hamilton	Freed, A. T. McDonald, J. Marentette, A. Fitzgerald, E. W. Laidman, R. H. Wheatley, E. A. Jarvis, H. Robins, S. H.	6,141 02	.....	.....	.....	1,058 17	108 43	7,307 62	9,653 46
Ottawa	Macdonald, J. A. Elliott, T. H. McFarlane, Jas. Breen, J. Winsor, J.	3,899 88	.....	.....	250 00	1,247 50	188 07	5,585 45	6,809 26
Toronto	Kelly, D. Milligan, R. J. Wright, R. Murdoch, J. Smith, J. C.	4,099 88	.....	.....	.....	1,637 49	110 14	5,847 51	6,881 29
Windsor	Hayward, W. J. Coughlin, D. Thomas, J. S. Hughes, R. A.	3,724 82	9 65	.....	.....	1,331 76	149 81	5,216 04	7,282 42
	Ontario	21,265 52	26 00	499 92	540 00	6,487 96	1,030 11	29,849 51	34,832 98

APPENDIX A—*Continued.*

STATEMENT of Weights and Measures Expenditures and Receipts for the year ended June 30, 1902—*Continued.*

Divisions.	Inspectors.	Expenditures. Salaries.	Seizure expenses.	Special assistance.	Rent.	Travelling expenses.	Sundries.	Totals.	Receipts.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Montreal. . .	Chalus, J. O. . .								
	Daoust, J. A. . .								
	Gervais, S. . . .								
	Hébert, J. A. P.								
	Boudet, E.								
	Collins, D.	7,874 69	. . . . .	. . . .	. . . . .	1,640 10	325 12	9,839 91	11,827 69
	Baker, J. S. . . .								
	Tomlinson, W. M.								
	Dessert, V. . . .								
	Fournier, L. A.								
Quebec.	Guay, Geo. N								
	LeBel, J. A. W								
	Kelly, M. J. . . .								
	Guay, A.								
	Chabot, F. X. .	6,016 55	. . . . .	166 59	200 00	1,525 14	251 51	8,159 79	4,339 64
	Petit, J. B. . . .								
	Prefontaine, F.								
	Knowles, Chas.								
	Moreau, A. . . .								
St. Hyacinthe.	Morin, J. P. . . .								
	Tomlinson, W. M	324 99	. . . . .	. .	. . . . .	206 41	32 51	563 91	666 27
	Fournier, L. A.								
Three Rivers..	Gravel, A. I. . .								
	Provost, J. J. . .	1,949 92	. . . . .	249 97	. . . . .	650 20	19 43	2,869 52	1,874 40
	Beaulac, J. H. .								
	Quebec.	16,166 15	. . . . .	416 56	200 00	4,021 85	628 57	21,433 13	18,707 82
St. John. . .	Wilmot, J. B. . .								
	Cowan, E. . . .								
	Richard, D. . . .	3,100 00	. . . . .	. .	. . . . .	403 20	18 18	3,521 38	1,494 75
	Bernier, J. A. .								
Cape Breton. .	Lawrence, J. C. .	800 00	. . . . .	. . . .	50 00	275 00	57 90	1,182 90	371 66
Halifax.	Frame, A. . . .								
	Waugh, R. J. . .	1,599 96	. .	419 97	225 00	420 21	153 58	2,818 72	1,030 13
Pictou.	Dustan, W. M.								
	Chisholm, J. J.	1,600 00	. . .	. . .	. . . . .	249 00	32 20	1,881 20	649 12
	Nova Scotia. . .	3,999 96	. .	419 97	275 00	944 21	243 68	5,882 82	2,050 91
Charlottetown P.E.I.	Davy, E.								
	Hughes, H. . . .	1,549 92	. . . . .	. . . .	. .	157 66	38 93	1,746 51	439 43

SESSIONAL PAPER No. 13

APPENDIX A—*Concluded.*

STATEMENT of Weights and Measures, Expenditures and Receipts for the year ended June 30, 1902—*Concluded.*

Divisions.	Inspectors and Assistants.	Expenditures. Salaries.	Seizure expenses.	Special assistance.	Rent.	Travelling expenses.	Sundries.	Totals.	Receipts.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Winnipeg, Man.	Magness, R.... McDonald, AW Francis, G. M.. Girdlestone, R. J. M..... Ross, H. E.....	2,799 84	..	1,300 08	108 00	1,740 43	101 65	6,050 00	4,065 59
Calgary, N.W.T.	Thomas, P..... Costello, J. W..	783 30	....	....	.....	201 80	22 23	1,007 33	514 25
Victoria B.C.	Findley, H..... McAloney, J. A Parker, Thos...	1,408 76	....	....	45 00	1,153 28	90 21	2,697 25	831 95

RECAPITULATION.

Ontario	21,265 52	26 00	499 92	540 00	6,487 96	1,030 11	29,849 51	34,832 98
Quebec	16,166 15	.....	416 56	200 00	4,021 85	628 57	21,433 13	18,707 82
New Brunswick	3,100 00	....	.....	.....	403 20	18 18	3,521 38	1,494 75
Nova Scotia	3,999 96	.....	419 97	275 00	944 21	243 68	5,882 82	2,050 91
Prince Edward Island	1,549 92	.....	.....	.....	157 66	38 93	1,746 51	439 43
Manitoba	2,799 84	.....	1,300 68	108 00	1,740 43	101 65	6,050 00	4,065 59
North-west Territories	783 30	.....	.....	.....	201 80	22 23	1,007 33	514 25
British Columbia	1,408 76	....	.....	45 00	1,153 28	90 21	2,697 25	831 95
General contingencies	.....	.....	.....	.....	.....	3,476 70	3,476 70	.....
Printing	.....	.....	.....	.....	.....	282 36	282 36	.....
Stationery	.....	.....	.....	.....	.....	146 34	146 34	.....
Lithographing	.....	.....	.....	.....	.....	324 99	324 99	.....
Totals	51,073 45	26 00	2,636 53	1,168 00	15,110 39	6,403 95	76,418 32	62,937 68

INLAND REVENUE DEPARTMENT,
Ottawa, August 16, 1902.

W. J. GERALD,
Deputy Minister.

APPENDIX

RETURN of Weights and Measures Inspected during the Fiscal Year ended June 30, each Division, for each Province,

INSPECTION OFFICES.	WEIGHTS.									MEASURES OF CAPACITY.					
	Dominion.			Troy.		Miscellaneous.				Dominion.			Miscellaneous.		
	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Brought for Verification.	Verified.	Rejected.		Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.
Ontario.															
Belleville	2,877	2,877	....	....	....	2	2	....		7,976	7,976	....	3	3	....
Hamilton	12,494	12,445	49	....	....	40	40	....		5,678	5,664	14	22	22	....
Ottawa	1,942	1,861	81	....	....	....	....	....		2,086	1,990	96	....	....	....
Toronto	5,459	5,459	....	....	....	....	....	....		14,377	14,377	....	295	295	....
Windsor	5,744	5,744	....	....	....	....	....	....		16,795	16,795	....	....	....	....
Totals	28,516	28,386	130	....	....	42	42	....		46,912	46,802	110	320	320	....
Quebec.															
Montreal	12,338	12,125	213	....	....	224	224	....		23,376	23,373	3	391	387	4
Quebec	8,874	8,266	608	309	309	594	587	7		6,893	6,871	22	11	11	....
Three Rivers	3,342	3,342	....	....	....	....	....	....		3,139	3,027	112	8	8	....
St. Hyacinthe	867	798	69	....	....	....	....	....		894	885	9	4	4	....
Totals	25,421	24,531	890	309	309	818	811	7		34,302	34,156	146	414	410	4
New Brunswick.															
St. John	2,987	2,987	....	....	....	29	29	....		4,139	4,138	1	52	52	....
Nova Scotia.															
Cape Breton	432	409	23	....	....	....	....	....		376	372	4	6	6	....
Halifax	1,672	1,656	16	....	....	80	80	....		1,525	1,520	3	137	128	9
Pictou	672	672	....	....	....	2	2	....		971	971	....	16	16	....
Totals	2,776	2,737	39	....	....	82	82	....		2,870	2,863	7	159	150	9
Prince Edward Island.															
Charlottetown	757	757	....	....	....	....	....	....		220	220	....	10	10	....
Manitoba.															
Winnipeg	1,723	1,723	....	....	....	....	....	....		2,575	2,575	....	66	66	....
North-west Territories.															
Calgary	304	304	....	....	....	....	....	....		386	386	....	10	10	....
British Columbia.															
Victoria	523	523	....	500	500	1	1	....		218	218	....	....	....	....

B.

1902, showing the Total Number brought for Verification, Verified and Rejected, for and for the whole Dominion.

Measures of Length.			Balances, &c.											
			Equal Armed.			Steelyards.			Platform Scales, Weigh Bridges, &c.			Miscellaneous.		
Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.
363	363	....	515	515	....	139	139	....	2,277	2,277	....	66	66	....
857	734	123	2,989	2,857	132	2,260	2,218	42	7,197	6,818	379	22	22	....
368	361	7	329	286	43	22	16	6	1,388	1,274	114	5,017	4,787	230
1,280	1,280	....	1,074	1,074	....	318	318	....	2,967	2,967	....	991	991	....
217	217	....	1,085	1,079	6	284	281	3	4,065	4,032	33	17	17	....
3,085	2,955	130	5,992	5,811	181	3,023	2,972	51	17,894	17,368	526	6,113	5,883	230
1,974	1,972	2	2,413	2,380	33	1,036	996	40	7,362	7,228	134	327	314	13
982	909	73	1,388	1,354	34	230	214	16	2,031	2,008	23	16	16	....
245	222	23	523	519	4	60	59	1	1,083	1,068	15	58	58	....
56	56	....	141	127	14	37	32	5	440	406	34	15	15	....
3,257	3,159	98	4,465	4,389	85	1,363	1,301	62	10,916	10,710	206	416	403	13
32	32	...	548	547	1	49	49	...	915	907	8	46	46	....
80	75	5	165	104	1	13	13	...	204	204	....	2	2	....
47	46	1	336	329	7	42	38	4	713	674	39	68	64	4
72	72	....	132	132	...	22	22	...	423	421	2	20	20	....
199	193	6	573	565	8	77	73	4	1,340	1,299	41	90	86	4
5	5	..	145	145	....	15	15	...	354	354	.....	12	12	....
259	259	...	352	349	3	110	105	5	2,427	2,368	59	60	60	...
161	161	....	62	62	....	17	17	..	272	270	2	31	31	....
2	2	....	138	138	...	49	49	...	505	505	.....	34	34	....

APPENDIX

RETURN of Weights and Measures Inspected during the Fiscal Year ended June 30, each Division, for each Province,

RECAPIT

PROVINCES.	WEIGHTS.								MEASURES OF CAPACITY.					
	Dominion.			Troy.		Miscellaneous.			Dominion.			Miscellaneous.		
	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.
Ontario	28,516	28,386	130	....	....	42	42	....	46,912	46,802	110	320	320	....
Quebec	25,421	24,531	890	309	309	818	811	7	34,302	34,156	146	414	410	4
New Brunswick	2,987	2,987	....	....	....	29	29	....	4,139	4,138	1	52	52	....
Nova Scotia	2,776	2,737	39	....	....	82	82	....	2,870	2,863	7	159	150	9
Prince Edward Island	757	757	....	....	....	....	....	....	220	220	....	10	10	....
Manitoba	1,723	1,723	....	....	....	....	....	....	2,575	2,575	....	66	66	....
British Columbia	523	523	....	500	500	1	1	....	218	218	....	....	....	....
North-west Territories	304	304	....	....	....	....	....	....	386	386	....	10	10	....
Grand totals	63,007	61,948	1,059	809	809	972	965	7	91,622	91,358	264	1,031	1,018	13

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

B—*Concluded.*

1902, showing the Total Number brought for Verification, Verified and Rejected, for and for the whole Dominion.

ULATION.

Measures of Length.			Balances, &c.												
			Equal Armed.			Steelyards.			Platform Scales, Weigh Bridges, &c.			Miscellaneous.		
Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.
*3,085	2,955	130	5,992	5,811	181	3,023	2,972	51	17,894	17,368	526	6,113	5,883	230
3,257	3,159	98	4,465	4,380	85	1,363	1,301	62	10,916	10,710	206	416	403	13
32	32	...	548	547	1	49	49	...	915	907	8	46	46	...
199	193	6	573	565	8	77	73	4	1,340	1,299	41	90	86	4
5	5	...	145	145	...	15	15	....	354	354	...	12	12	....
259	259	....	352	349	3	110	105	5	2,427	2,368	59	60	60	....
2	2	..	138	138	....	49	49	....	505	505	....	34	34	...
161	161	....	62	62	....	17	17	....	272	270	2	31	31	....
7,000	6,766	234	12,275	11,997	278	4,703	4,581	12[9]	34,623	33,781	842	6,802	6,555	247

W. J. GERALD,
Deputy Minister.

APPENDIX

RETURN showing the Number of Dominion Weights and Lineal Measures of each Fiscal Year ended

INSPECTION DIVISIONS.	DOMINION Avoir													
	60 lbs.	50 lbs.	30 lbs.	20 lbs.	10 lbs.	7 lbs.	5 lbs.	4 lbs.	3 lbs.	2 lbs.	1 lb.	8 ozs.	4 ozs.	2 ozs.
Ontario.														
Belleville		8			5	11	101	179	341	605	515	291	268	242
Hamilton		11		1	1	10	261	234	2,383	3,252	3,199	936	630	561
Ottawa		150			5	15	91	89	245	359	329	190	171	124
Toronto				6	15	5	134	220	611	1,217	1,107	511	451	419
Windsor					7	4	114	251	553	1,171	1,086	611	560	534
Totals		169		7	33	45	701	973	4,133	6,604	6,236	2,539	2,080	1,880
Quebec.														
Montreal	260	72	5	9	2	39	612	628	949	2,181	2,092	1,579	1,366	1,172
Quebec		106	23	29	54	143	477	668	585	1,228	1,244	1,147	1,100	953
Three Rivers		12	3	3	11	10	238	245	367	561	530	482	438	276
St. Hyacinthe				1		1	40	22	110	156	144	104	103	84
Totals	260	190	31	42	67	193	1,367	1,563	2,011	4,126	4,010	3,312	3,007	2,485
New Brunswick.														
St. John		52	3	5	16	10	141	209	237	635	573	326	274	240
Nova Scotia.														
Cape Breton		13	4	5	13		37	7	77	92	84	39	25	27
Halifax		36			1	33	51	117	158	418	325	175	141	105
Pictou						4	16	33	92	169	138	55	47	44
Totals		49	4	5	14	37	104	157	327	679	547	269	213	176
Prince Edward Island														
Charlottetown						1	19	29	47	208	157	79	64	61
Manitoba.														
Winnipeg					3	2	49	35	315	383	329	128	120	115
North-west Territories.														
Calgary						1	9	4	52	65	59	21	19	18
British Columbia.														
Victoria						1		6	45	139	136	54	51	48

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

C.

Denomination presented for Verification in each Inspection Division, during the June 30, 1902.

Weights.									Lineal Measures.										
dupois.																			
1 oz.	8 drs.	4 drs.	2 drs.	1 dr.	½ dr.	Total Number.	Troy Weights.	Miscellaneous Weights.	6 feet.	5 feet.	1 yard.	½ yard.	2 feet.	1 foot.	½ foot.	100 feet chains.	66 feet chains.	Tape or Riband.	Total Number.	Miscellaneous Measures.
187	87	28	6	1	2	2,877	....	2	....	....	363	..	..	..	..	..	..	..	363	3
521	326	143	18	7	..	12,494	..	40	....	....	857	..	..	..	..	..	..	..	857	22
97	49	19	5	3	1	1,942	....	.....	....	....	368	..	..	..	..	..	..	..	368	..
363	219	96	46	38	1	5,459	....	.....	....	....	1,280	..	..	..	..	..	..	..	1,280	295
457	274	97	17	8	....	5,744	..	.....	....	....	217	..	..	..	..	..	..	..	217	..
1,625	955	383	92	57	4	28,516	.....	42	....	....	3,085	..	..	..	..	..	..	..	3,085	320
848	375	101	64	84	....	12,338	...	224	....	....	1,974	..	..	..	..	..	..	..	1,974	391
751	286	36	17	26	1	8,874	309	594	....	....	981	1	..	..	..	..	..	..	982	11
131	35	....	....	....	....	3,342	..	....	....	....	245	..	..	..	..	..	..	..	245	8
64	30	8	....	....	....	867	..	.....	....	....	56	..	..	..	..	..	..	..	56	4
1,794	726	145	81	110	1	25,421	309	818	....	....	3,256	1	..	..	..	..	..	..	3,257	414
194	59	10	1	1	1	2,987	..	29	....	....	32	..	..	..	..	..	..	..	32	52
7	2	..	....	....	....	432	....	.....	....	....	80	..	..	..	..	..	..	..	80	6
68	26	15	2	1	....	1,672	..	80	....	....	47	..	..	..	..	..	..	..	47	137
43	22	8	1	....	....	672	....	2	....	..	72	..	..	..	..	..	..	..	72	16
118	50	23	3	1	....	2,776	....	82	....	....	199	..	..	..	..	..	..	..	199	159
58	24	6	2	2	....	757	.....	.....	....	....	5	..	..	..	..	..	..	..	5	10
107	67	44	15	8	3	1,723	.....	....	....	..	259	..	..	..	..	..	..	..	259	66
16	15	10	6	9	....	304	.....	....	....	..	156	5	..	..	..	..	..	..	161	10
35	6	2	....	....	....	523	500	1	....	..	.....	..	1	..	..	..	1	..	2	....

W. J. GERALD,
Deputy Minister.

APPENDIX

RETURN showing the Number of Dominion Weights and Lineal Measures of each Year ended

DOMINION

INSPECTION DIVISIONS.	Avoir													
	60 lbs.	50 lbs.	30 lbs.	20 lbs.	10 lbs.	7 lbs.	5 lbs.	4 lbs.	3 lbs.	2 lbs.	1 lb.	8 ozs.	4 ozs.	2 ozs.
Ontario.														
Belleville	...	8	...	..	5	11	101	179	341	605	515	291	268	242
Hamilton	...	11	..	1	1	10	261	229	2,381	3,244	3,191	929	623	556
Ottawa	...	156	...	...	5	15	80	73	228	351	316	183	164	122
Toronto	...	...	...	6	15	5	134	220	611	1,217	1,107	511	451	419
Windsor	...	...	...	...	7	4	114	251	553	1,171	1,086	611	560	534
Totals	....	169	....	7	33	45	690	952	4,114	6,588	6,215	2,525	2,066	1,873
Quebec.														
Montreal	260	72	5	9	2	39	595	609	929	2,144	2,056	1,547	1,339	1,157
Quebec	....	88	22	28	50	132	446	622	549	1,129	1,142	1,055	1,024	903
Three Rivers	...	12	3	3	11	10	238	245	367	561	530	482	438	276
St. Hyacinthe	....	...	....	1	....	1	36	21	98	138	128	99	100	80
Totals	260	172	30	41	63	182	1,315	1,497	1,943	3,972	3,856	3,183	2,901	2,416
New Brunswick.														
St. John	....	52	3	5	16	10	141	209	237	635	573	326	274	240
Nova Scotia.														
Cape Breton	....	11	4	5	11	....	30	7	72	90	84	39	21	26
Halifax	....	36	...	....	1	33	49	117	158	413	320	173	139	105
Pictou	....	..	....	....	....	4	16	33	92	169	138	55	47	44
Totals	....	47	4	5	12	37	95	157	322	672	542	267	207	175
P. E. Island.														
Charlottetown	..	....	....	....	....	1	19	29	47	208	157	97	64	61
Manitoba.														
Winnipeg	..	....	....	....	3	2	49	35	315	383	329	128	120	115
N. W. Territories.														
Calgary	..	..	....	....	...	1	9	4	52	65	59	21	19	18
British Columbia.														
Victoria	....	..	....	....	..	1	...	6	45	139	136	54	51	48

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 13

C—*Continued.*

Denomination Inspected and Verified in each Inspection Division during the Fiscal June 30, 1902.

Weights.									Lineal Measures.									
dupois.							Troy Weights.	Miscellaneous Weights.	6 feet.	5 feet.	1 yard.	½ yard.	2 feet.	1 foot.	½ foot.	100 feet chains.	66 feet chains.	Tape or Rilland.
1 oz.	8 drs.	4 drs.	2 drs.	1 dr.	½ dr.	Total Number.												
187	87	28	6	1	2	2,877	..	2	....	....	363	..	..	..	..	..	..	..
518	323	142	18	7	....	12,445	..	40	....	....	734	..	..	..	..	..	..	..
97	49	19	5	3	1	1,861	..	.....	..	....	361	..	..	..	..	..	..	..
363	219	96	46	38	1	5,459	.....	..	....	....	1,280	..	..	..	..	..	..	..
457	274	97	17	8	...	5,744	.....	..	....	....	217	..	..	..	..	..	..	..
1,622	952	382	92	57	4	28,386	....	42	...	.	2,955	..	..	..	..	..	..	..
839	174	101	64	84	..	12,125	.....	224	....	....	1,972	..	..	..	..	..	..	..
717	280	35	17	26	1	8,266	309	594	....	....	909	..	..	..	..	..	..	..
131	35	....	....	....	....	3,342	.....	.....	....	....	222	..	..	..	..	..	..	..
62	27	7	....	....	....	798	.....	.....	....	..	56	..	..	..	..	..	..	..
1,749	516	143	81	110	1	24,531	309	818	....	....	3,159	..	..	..	..	..	..	..
194	59	10	1	1	1	2,987	.....	.....	..	..	32	..	..	..	..	..	..	..
7	2	....	....	....	....	409	..	..	....	....	75	..	..	..	..	..	..	..
68	26	15	2	1	...	1,656	.....	80	....	....	46	..	..	..	..	..	..	..
43	22	8	1	....	....	672	.....	2	....	....	72	..	..	..	..	..	..	..
118	56	23	3	1	....	2,737	.....	82	...	...	193	..	..	..	..	..	..	..
58	24	6	2	2	...	757	.....	.....	....	...	5	..	..	..	..	..	..	..
107	67	44	15	8	3	1,723	.....	...	....	....	259	..	..	..	..	..	..	..
16	15	10	6	9	....	304	....	..	..	....	156	5	..	..	..	..	..	..
35	6	2	....	....	....	523	500	1	....	....	..	..	1	..	..	1	..	..

W. J. GERALD,
Deputy Minister.

APPENDIX

RETURN showing the number of Dominion Weights and Lineal Measures of each ... June 30,

DOMINION

Avoir

INSPECTION DIVISIONS.	60 lbs.	50 lbs.	30 lbs.	20 lbs.	10 lbs.	7 lbs.	5 lbs.	4 lbs.	3 lbs.	2 lbs.	1 lb.	8 ozs.	4 ozs.	2 ozs.
Ontario.														
Hamilton								5	2	8	8	7	7	5
Ottawa							11	16	17	8	13	7	7	2
Totals							11	21	19	16	21	14	14	7
Quebec.														
Montreal							17	19	20	37	36	32	27	15
Quebec		18	1	1	4	11	31	46	36	99	102	92	76	50
Three Rivers														
St. Hyacinthe							4	1	12	18	16	5	3	4
Totals		18	1	1	4	11	52	66	68	154	154	129	106	69
Nova Scotia.														
Cape Breton		2			2		7		5	2			4	1
Halifax							2			5	5	2	2	
Totals		2			2		9		5	7	5	2	6	1

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 13

C—*Concluded.*

Denomination, Rejected in each Inspection Division during the Fiscal Year ended 1902.

Weights.									Lineal Measures.										
dupois.																			
1 oz.	8 drs.	4 drs.	2 drs.	1 dr.	½ dr.	Total Number.	Troy Weights.	Miscellaneous Weights.	6 feet.	5 feet.	1 yard.	½ yard.	2 feet.	1 foot.	½ foot.	100 feet chains.	66 feet chains.	Tape or Riband.	Total Number.	Miscellaneous Measures.
3	3	1	..	..	..	49	..	..	..	..	123	..	..	..	..	..	..	..	123	..
..	..	..	..	..	..	81	..	..	..	..	7	..	..	..	..	..	..	..	7	..
3	3	1	..	..	..	130	..	..	..	..	130	..	..	..	..	..	..	..	130	..
9	1	..	..	..	..	213	..	..	..	..	2	..	..	..	..	..	..	..	2	4
34	6	1	..	..	..	608	..	7	..	..	72	1	..	..	..	..	..	..	73	..
..	..	..	..	..	..	..	..	..	..	..	23	..	..	..	..	..	..	..	23	..
2	3	1	..	..	..	69	..	..	..	..	..	..	..	..	..	..	..	..	..	..
45	10	2	..	..	..	890	..	7	..	..	97	1	..	..	..	..	..	..	98	4
..	..	..	..	..	..	23	..	..	..	..	5	..	..	..	..	..	..	..	5	..
..	..	..	..	..	..	16	..	..	..	..	1	..	..	..	..	..	..	..	1	9
..	..	..	..	..	..	39	..	..	..	..	6	..	..	..	..	..	..	..	6	9

W. J. GERALD,
Deputy Minister.

2-3 EDWARD VII., A. 1903

APPENDIX

RETURN showing the Number of Dominion Measures of Capacity, Balances and Weighing Division, during the Fiscal

MEASURES OF CAPACITY.

Dominion.

INSPECTION DIVISIONS.	Bushel.	½ Bushel.	Peck.	Gallon.	½ Gallon.	Quart.	Pint.	½ Pint.	Gill.	½ Gill.	Total Number.	Miscellaneous.	5 lbs. and under.
Ontario.													
Belleville	266	1,081	745	1,137	1,389	1,882	1,258	204	14	....	7,976	....	164
Hamilton	7	56	280	859	1,110	1,760	1,319	278	9	..	5,678	...	1,319
Ottawa	....	7	92	385	558	623	353	59	9	...	2,086	...	99
Toronto	101	134	457	2,162	2,545	3,929	4,219	823	7	....	14,377	..	369
Windsor	725	324	366	1,276	4,302	4,787	3,804	947	208	56	16,795	....	401
Totals	1,099	1,602	1,940	5,819	9,904	12,981	10,953	2,311	247	56	46,912	....	2,352
Quebec.													
Montreal	2	754	1,155	3,425	3,444	5,940	5,911	2,226	517	2	23,376	....	816
Quebec	1	159	150	1,152	1,792	1,681	1,268	589	99	2	6,893	...	193
Three Rivers	3	113	77	425	735	766	575	345	98	2	3,139	...	144
St. Hyacinthe	..	25	49	138	178	235	185	62	22	....	894	....	33
Totals	6	1,051	1,431	5,140	6,149	8,622	7,939	3,222	736	6	34,302	...	1,186
New Brunswick.													
St. John	....	235	214	907	1,224	797	736	26	....	....	4,139	....	95
Nova Scotia.													
Cape Breton	....	1	2	40	125	140	55	13	...	...	376	...	25
Halifax	2	57	55	272	388	354	211	147	37	....	1,523	...	70
Pictou	..	14	18	157	370	280	122	10	....	....	971	...	34
Totals	2	72	75	469	883	774	388	170	37	....	2,870	....	129
P. E. Island.													
Charlottetown	....	.....	.....	18	42	83	64	13	....	....	220	....	41
Manitoba.													
Winnipeg	38	7	3	482	703	719	469	115	39	....	2,575	...	93
N. W. Territories.													
Calgary	8	3	....	68	130	111	60	6	....	....	386	.	21
British Columbia.													
Victoria	..	..	...	34	39	69	50	24	1	1	218	...	86

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 13

D.

Machines of each Denomination presented for Verification, in each Inspection Year ended June 30, 1902.

BALANCES.

With Equal Arms.			Steel Yards with Divided Arms.				Weigh Bridges or Platform Scales.							
6 lbs. to 50 lbs.	51 lbs. to 100 lbs.	101 lbs. and upwards.	500 lbs. and under.	501 lbs. to 1,000 lbs.	1,001 lbs. to 2,000 lbs.	2,001 lbs. and upwards.	250 lbs. and under.	251 lbs. to 500 lbs.	501 lbs. to 2,000 lbs.	2,001 lbs. to 4,000 lbs.	4,001 lbs. to 6,000 lbs.	6,001 lbs. and upwards.	Totals.	Miscellaneous.
351	..	....	130	3	2	4	718	202	837	162	95	263	2,931	66
1,670	..	....	2,217	39	4	.....	4,283	92	2,058	498	119	237	12,446	588
230	.....	..	19	3	.....	.....	509	170	504	63	65	77	1,739	5,017
705	.....	.....	297	15	1	5	955	104	1,100	338	97	373	4,359	991
684	...	..	278	6	.....	..	1,724	119	1,534	264	70	354	5,434	17
3,640	..	.....	2,941	66	7	9	8,189	687	6,033	1,235	446	1,304	26,909	6,679
1,589	..	8	1,010	6	3	17	2,744	1,385	2,558	170	208	297	10,811	327
1,068	7	120	222	8	....	....	705	741	498	17	18	52	3,649	16
376	2	1	60	.....	.....	.....	343	338	358	8	24	12	1,666	58
108	....	.....	37	...	.....	.....	155	83	140	12	26	24	618	15
3,141	9	129	1,329	14	3	17	3,947	2,547	3,554	207	276	385	16,744	416
436	7	10	48	1	.....	.....	423	200	210	26	16	40	1,512	46
70	7	3	11	2	.....	.....	127	26	21	....	5	25	322	2
251	5	10	38	2	1	1	359	107	177	28	16	26	1,091	68
98	....	.....	21	1	..	..	198	87	76	10	17	35	577	20
419	12	13	70	5	1	1	684	220	274	38	38	86	1,990	90
104	....	.....	15	...	...	.....	103	65	154	14	7	11	514	12
259	.	....	110	.....	...	..	663	37	516	417	532	262	2,889	60
41	....	..	17	...	.....	..	107	7	112	13	11	22	351	31
52	.....	...	34	8	7	.....	274	33	145	15	11	27	692	34

W. J. GERALD,
Deputy Minister.

APPENDIX

RETURN showing the Number of Dominion Measures of Capacity, Balances and Division, during the Fiscal

MEASURES OF CAPACITY.

Dominion.

INSPECTION DIVISIONS.	Bushel.	½ Bushel.	Peck.	Gallon.	½ Gallon.	Quart.	Pint.	½ Pint.	Gill.	¼ Gill.	Total Number.	Miscellaneous.	5 lbs. and under.
Ontario.													
Belleville	266	1,081	745	1,137	1,389	1,882	1,258	204	14	....	7,976	....	164
Hamilton	7	56	279	858	1,107	1,755	1,315	278	9	....	5,664	....	1,299
Ottawa	...	4	82	352	529	610	345	59	9	....	1,990	...	74
Toronto	101	134	457	2,162	2,545	3,929	4,219	823	7	....	14,377	....	369
Windsor	725	324	366	1,276	4,302	4,787	3,804	947	208	56	16,795	....	398
Totals	1,099	1,599	1,929	5,785	9,872	12,963	10,941	2,311	247	56	46,802	...	2,304
Quebec.													
Montreal	2	754	1,155	3,424	3,414	5,939	5,916	2,226	517	2	23,373	....	810
Quebec	1	153	150	1,148	1,786	1,678	1,266	588	99	2	6,871	....	191
Three Rivers	3	102	64	407	722	746	558	330	93	2	3,027	...	144
St. Hyacinthe	...	21	47	137	178	234	184	62	22	...	885	....	31
Total	6	1,030	1,416	5,116	6,130	8,597	7,918	3,206	731	6	34,156	....	1,176
New Brunswick.													
St. John	.	235	214	907	1,224	796	736	26	...	....	4,138	...	95
Nova Scotia.													
Cape Breton	.....	1	2	40	125	136	55	13	....	....	372	....	25
Halifax	2	57	54	271	388	354	210	147	37	....	1,520	....	68
Pictou	....	14	18	157	370	280	122	10	...	....	971	....	34
Totals	2	72	74	468	883	770	387	170	37	...	2,863	...	127
P. E. Island.													
Charlottetown	....	.....	.....	18	42	83	64	13	....	...	220	....	41
Manitoba.													
Winnipeg	38	7	3	482	703	719	469	115	39	....	2,575	....	93
N. W. Territories.													
Calgary	8	3	. .	68	130	111	60	6	....	....	386	...	21
British Columbia.													
Victoria	...	. .	.....	34	39	69	50	24	1	1	218	....	86

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 13

D—*Continued.*

Weighing Machines of each Denomination Inspected and Verified, in each Inspection Year ended June 30, 1902.

BALANCES.

With Equal Arms.			Steel Yards with Divided Arms.				Weigh Bridges or Platform Scales.							
6 lbs. to 50 lbs.	51 lbs. to 100 lbs.	101 lbs. and upwards.	500 lbs. and under.	501 lbs. to 1,000 lbs.	1,001 lbs. to 2,000 lbs.	2,001 lbs. and upwards.	250 lbs. and under.	251 lbs. to 500 lbs.	501 lbs. to 2,000 lbs.	2,001 lbs. to 4,000 lbs.	4,001 lbs. to 6,000 lbs.	6,001 lbs. and upwards.	Totals.	Miscellaneous.
351	...	...	136	3	2	4	718	202	837	162	95	263	2,931	66
1,558	...	...	2,175	39	4	...	4,159	77	1,902	384	110	195	11,899	583
212	...	...	15	1	...	...	477	147	474	51	57	68	1,576	4,787
705	...	...	297	15	1	5	955	104	1,100	338	97	378	4,329	991
681	...	...	275	6	...	...	1,710	119	1,523	265	68	349	5,392	17
3,507	...	...	2,892	61	7	9	8,010	649	5,836	1,198	427	1,248	26,151	6,444
1,562	...	8	979	6	3	17	2,717	1,352	2,508	165	200	286	10,604	314
1,639	6	118	206	8	...	...	692	735	494	17	18	52	3,576	576
372	2	1	59	...	...	...	337	334	353	8	24	12	1,646	58
96	...	...	32	...	...	...	142	73	132	12	23	24	565	15
3,069	8	127	1,267	14	3	17	3,888	2,494	3,487	202	265	374	16,391	963
435	7	10	48	1	...	...	118	200	269	25	16	39	1,503	46
69	7	3	11	2	...	...	127	26	21	...	5	25	321	2
247	5	9	34	2	1	1	351	99	161	25	14	24	1,011	64
98	...	...	21	1	...	...	198	85	76	10	17	35	475	20
414	12	12	66	5	1	1	676	212	258	35	36	84	1,937	86
104	...	...	15	...	...	...	103	65	154	14	7	11	514	12
256	...	...	105	...	...	...	657	36	49	415	567	26	2,822	60
41	...	...	17	...	...	...	107	7	110	13	11	22	349	31
52	...	...	34	8	7	...	274	33	147	15	11	27	692	34

W. J. GERALD,
Deputy Minister.

APPENDIX

RETURN showing the Number of Dominion Measures of Capacity, Balances and during the Fiscal Year

INSPECTION DIVISIONS.	MEASURES OF CAPACITY. Dominion. Bushel.	½ Bushel.	Peck.	Gallon.	½ Gallon.	Quart.	Pint.	½ Pint.	Gill.	½ Gill.	Total Number.	Miscellaneous.	5 lbs. and under.
Ontario.													
Belleville													
Hamilton			1	1	3	5	4				14		20
Ottawa		3	10	33	29	13	8				96		25
Toronto											2		
Windsor													3
Totals		3	11	34	32	18	12				110		48
Quebec.													
Montreal				1		1	1				3		6
Quebec		6		4	6	3	2	1			22		2
Three Rivers		11	13	18	13	20	17	15	5		112		
St. Hyacinthe		4	2	1		1	1				9		2
Totals		21	15	24	19	25	21	16	5		146		10
New Brunswick.													
St. John						1					1		
Nova Scotia.													
Cape Breton						4					4		
Halifax			1	1			1				3		2
Pictou													
Totals			1	1		4	1				7		2
P. E. Island.													
Charlottetown													
Manitoba.													
Winnipeg													
N. W. Territories.													
Calgary													
British Columbia.													
Victoria													

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 13

D—*Concluded.*

Weighing Machines of each Denomination Rejected, in each Inspection Division, ended June 30, 1902.

BALANCES.

With Equal Arms.			Steel Yards with Divided Arms.				Weigh Bridges or Platform Scales.							
6 lbs. to 50 lbs.	51 lbs. to 100 lbs.	101 lbs. and upwards.	500 lbs. and under.	501 lbs. to 1,000 lbs.	1,001 lbs. to 2,000 lbs.	2,001 lbs. and upwards.	250 lbs. and under.	251 lbs. to 500 lbs.	501 lbs. to 2,000 lbs.	2,001 lbs. to 4,000 lbs.	4,001 lbs. to 6,000 lbs.	6,001 lbs. and upwards.	Totals.	Miscellaneous.
112			42				133	15	156	24	9	42	553	5
18			4	2			32	23	30	12	8	9	163	230
3			3				14		11	1	2	5	42	
133			49	2			189	38	197	37	19	56	758	235
27			40				27	33	50	5	8	11	207	13
29	1	2	16				13	6	4				73	7
4			1				6	4	5				20	
12			5				13	10	8	3			53	
72	1	2	62				59	53	67	8	8	11	353	20
1							5		1	1		1	9	
1													1	
4		1	4				8	8	16	3	2	2	50	
								2					2	
5		1	4				8	10	16	3	2	2	53	
3			5				6	1	23	2	25	2	67	
									2				2	

W. J. GERALD,
Deputy Minister.

APPENDIX E.

STATEMENT of Gas Expenditures and Receipts for the Year ended June 30, 1902.

Districts.	Inspectors.	Expenditures						Receipts.
		Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	Totals.	
		$ cts.	$ cts	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Barrie	Shanacy, M	100 00				2 60	102 60	75 75
Belleville	Johnson, Wm. Stuart, W. E.	438 67		136 25	16 43	84 69	676 04	105 75
Berlin	Broadfoot, S.	100 00			40 00	14 22	154 22	233 00
Brockville			99 96			11 70	111 66	192 25
Cobourg	Bickle, J. W.	100 00			83 35	34 20	167 55	162 50
Cornwall	Mulhern, M. M.	100 00				30 00	130 00	49 75
Guelph	Broadfoot, S.	200 00				13 07	213 07	174 50
Hamilton	McPhie, D. McPhie, W. H Dennis, W. N	2,499 96		36 00	171 70	99 74	2,807 40	2,002 50
Kingston	Behan, J. J.	400 00		67 56		51 13	518 69	342 50
Listowel	Male, Thos.	150 00		60 00		14 75	174 75	48 75
London	Nash, A. F.	1,059 00	48 00	25 00	391 50	59 00	1,573 50	2,187 75
Napanee	Johnson, Wm. (acting)				34 38	4 85	39 23	96 00
Ottawa	Roche, H. G.	1,050 00	540 00	300 00	35 45	82 57	2,008 02	742 50
Owen Sound	Graham, W. J.	200 00		125 00	2 85	1 85	329 70	102 00
Peterborough	Rourke, Thos.	150 00				2 00	152 00	140 25
Sarnia	Hicks, W. H.			20 00		1 75	21 75	248 25
Stratford	Rennie, Geo.	200 00				14 50	214 50	138 50
Toronto	Johnstone, J. K. Pape, J. Whyte, J. A.	3,272 54				53 86	3,326 40	8,682 50
	Ontario.	9,961 17	687 96	769 75	725 66	576 48	12,721 02	15,725 00
Montreal	Aubin, A. O'Flaherty, M. J.	2,290 92	334 00	240 00	18 00	162 18	3,054 10	5,937 55
Quebec	LeVasseur, N. Moreau, A.	1,300 00		150 00		1 78	1,451 78	431 00
Sherbrooke	Simpson, A. F.	150 00					150 00	36 00
St. Hyacinthe	Benoit, L. V.	75 00					75 00	
	Quebec.	3,824 92	334 00	390 00	18 00	163 96	4,730 88	6,404 55
Fredericton	Fowler, J. D.	200 00					200 00	58 00
St. John	Wilson, J. E.	1,050 00			88 11	9 57	1,147 68	421 25
	New Brunswick.	1,250 00			88 11	9 57	1,347 68	479 25
Halifax	Miller, A. Ritchie, A. J Munro, H. D	1,849 92		307 35	378 57	95 92	2,631 76	501 50
Charlottetown	Bell, J. H.	300 00				26 39	326 39	54 25
Winnipeg	Magness, R.	300 00		27 00	47 85	8 00	382 85	512 50
Nanaimo	McAloney, J. A.	100 00				3 00	103 00	61 75
New Westminster	Wolfenden, Wm	100 00				277 57	577 57	
Vancouver	Miller, J. E.	300 00			89 95	56 75	446 70	242 25
Victoria	Jones, R.	200 00					200 00	240 75
	British Columbia.	700 00			89 95	337 32	1,127 27	544 75

APPENDIX E *Concluded.*

STATEMENT of Gas Inspection Expenditures and Receipts for the Year ended June 30, 1902.

RECAPITULATION.

Provinces.	Expenditures.						Receipts.
	Salaries.	Special Assistance	Rent.	Travelling Expenses.	Sundries.	Totals.	
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Ontario	9,961 17	687 96	769 75	725 66	576 48	12,721 02	15,725 00
Quebec	3,824 92	334 00	390 00	18 00	163 96	4,730 88	6,404 55
New Brunswick	1,250 00			88 11	9 57	1,347 68	479 25
Nova Scotia	1,849 92		397 35	378 57	95 92	2,631 76	501 50
Prince Edward Island	300 00				26 39	326 39	54 25
Manitoba	300 00		27 00	47 85	8 00	382 85	512 50
British Columbia	700 00			89 95	337 32	1,127 27	544 75
General				30 80	91 09	121 89	
General expenses					427 84	427 84	
Printing					95 76	95 76	
Stationery					133 46	133 46	
Lithographing					20 00	20 00	
Totals	18,186 01	1,021 96	1,494 10	1,378 94	1,985 79	24,066 80	24,221 80

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER—STANDARD, 16 CANDLES.					SULPHUR PER 100 ALLOWANCE,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Barrie—								
July			19·61	0	1			
August			19·87	0	1			
September			20·16	0	1			
October			21·93	0	1			
November			19·33	0	1			
December			20·03	0	1			
January			21·25	0	1			
February			20·75	0	1			
March			22·60	0	1			
April			20·98	0	1			
May			19·87	0	1			
June			19·41	0	1			
				0	12			
Belleville—								
July	22·59	20·14	21·36	0	2			
August			20·98	0	1			
September	22·41	20·12	21·26	0	2			
October	23·39	22·41	22·96	0	3			
November	19·66	16·33	17·99	0	2			
December	20·47	17·35	18·91	0	2			
January	21·07	18·06	19·56	0	2			
February	22·42	20·37	21·53	0	3			
March	22·17	19·68	21·08	0	3			
April	23·01	20·52	21·71	0	3			
May	23·57	22·81	23·19	0	2			
June	22·26	21·65	21·90	0	3			
				0	28			
Deseronto—								
July			21·96	0	1			
August					Nil			
September					"			
October					"			
November					"			
December					"			
January					"			
February					"			
March					"			
April					"			
May					"			
June					"			
				0	1			

F.

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							2	0	2	
							1	0	1	
							2	0	2	
							3	0	3	
							2	0	2	
							2	0	2	
							2	0	2	
							3	0	3	
							3	0	3	
							3	0	3	
							3	0	3	
							2	0	2	
							3	0	3	
							28	0	28	
							1	0	1	
									Nil	No tests could be made owing to defective instruments.
									"	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
							1	0	1	

APPENDIX

Return of Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance.		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Berlin—								
July			20 86	0	1			
August			20 73	0	1			
September			21 13	0	1			
October			20 13	0	1			
November			22 69	0	1			
December			23 04	0	1			
January			20 83	0	1			
February			21 94	0	1			
March			21 83	0	1			
April			22 44	0	1			
May			17 32	0	1			
June			20 39	0	1			
				0	12			
Brockville—								
July			19 86	0	1			
August			20 38	0	1			
September			17 02	0	1			
October			18 03	0	1			
November			17 44	0	1			
December			20 30	0	1			
January			20 40	0	1			
February			20 00	0	1			
March			17 02	0	1			
April			17 80	0	1			
May			19 92	0	1			
June			20 00	0	1			
				0	12			
Cobourg—								
July			18 43	0	2			
August			19 91	0	3			
September								
October			18 19	0	1			
November			16 68	0	3			
December			17 88	0	2			
January			17 37	0	2			
February			17 92	0	2			
March			18 18	0	2			
April			17 96	0	2			
May			18 17	0	3			
June			19 31	0	2			
				0	23			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet. 35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	1	2	
							1	2	3	
							1	0	1	
							2	0	2	
							0	3	3	
							1	1	2	
							2	0	2	
							1	1	2	
							2	0	2	
							2	1	3	
							2	0	2	
							17	9	26	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance.		
	Highest.	Lowest.	Average.	No. of times be low Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Port Hope—								
July			17·44	0	2			
August			18·22	0	2			
September			17·83	0	1			
October			17·26	0	2			
November			17·79	0	2			
December			18·15	0	2			
January			17·40	0	2			
February			17·15	0	1			
March			17·99	0	2			
April			18·20	0	2			
May			18·01	0	2			
June			17·41	0	2			
				0	22			
Cornwall—								
July			18·30	0	1			
August			18·30	0	1			
September			18·40	0	1			
October			18·10	0	1			
November			19·10	0	1			
December			18·10	0	1			
January			18·50	0	1			
February			18·70	0	1			
March			18·42	0	1			
April			18·00	0	1			
May			18·10	0	1			
June			18·60	0	1			
				0	12			
Guelph—								
July			19·76	0	1			
August			20·09	0	1			
September			20·11	0	1			
October			20·05	0	1			
November			19·83	0	1			
December			19·72	0	1			
January			19·92	0	1			
February			19·58	0	1			
March			19·42	0	1			
April			18·81	0	1			
May			19·52	0	1			
June			20·30	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	1	2	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							22	1	23	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER—STANDARD, 16 CANDLES.					SULPHUR PER 100 ALLOWANCE,		
	Highest.	Lowest.	Average.	No. of times below standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Hamilton—								
July			17·30	0	1			
August			17·73	0	1			
September			16·90	0	1			
October			18·42	0	1			
November			17·50	0	1			
December			17·84	0	1			
January			18·15	0	1			
February			18·21	0	1			
March			18·42	0	1			
April			17·85	0	1			
May			18·02	0	1			
June			18·80	0	1			
				0	12			
Brantford—								
July			19·50	0	1			
August			18·88	0	1			
September			19·66	0	1			
October			18·71	0	1			
November			19·73	0	1			
December			19·90	0	1			
January			20·57	0	1			
February			20·31	0	1			
March			19·61	0	1			
April			19·95	0	1			
May			19·34	0	1			
June			19·96	0	1			
				0	12			
Dundas—								
July			19·18	0	1			
August			18·29	0	1			
September			18·47	0	1			
October			19·01	0	1			
November			18·06	0	1			
December			18·99	0	1			
January			18·60	0	1			
February			17·37	0	1			
March			18·06	0	1			
April			19·89	0	1			
May			19·18	0	1			
June			18·81	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—4 Grains.			Allowance,		Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							24	0	24	
							12	0	12	
							12	0	12	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Galt								
July			21·00	0	1			
August			20·01	0	1			
September			19·22	0	1			
October			18·98	0	1			
November			19·02	0	1			
December			21·02	0	1			
January			21·22	0	1			
February			21·02	0	1			
March			18·14	0	1			
April			19·02	0	1			
May			19·00	0	1			
June			18·76	0	1			
				0	12			
St. Catharines—								
July			19·35	0	1			
August			19·54	0	1			
September			19·28	0	1			
October			19·66	0	1			
November			19·18	0	1			
December			20·12	0	1			
January			20·12	0	1			
February			20·90	0	1			
March			20·29	0	1			
April			20·67	0	1			
May			19·57	0	1			
June			18·95	0	1			
				0	12			
Kingston—								
July	22·40	22·10	22·25	0	2			
August	22·18	22·10	22·14	0	2			
September			21·89	0	1			
October					Nil.			
November			20·74	0	1			
December	21·34	20·90	21·12	0	2			
January	22·40	21·80	22·10	0	2			
February								
March	22·32	21·80	22·06	0	2			
April	22·50	22·30	22·40	0	2			
May	21·60	21·10	21·35	0	2			
June	22·50	21·90	22·20	0	2			
				0	18			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							12	0	12	
							1	0	1	
									Nil.	
							1	0	1	
							12	0	12	
							12	0	12	
							12	0	12	
							12	0	12	
							18	0	18	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance.		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Listowel—								
July			22·04	0	1			
August			20·01	0	1			
September			22·32	0	1			
October			21·86	0	1			
November			22·04	0	1			
December			20·40	0	1			
January			22·04	0	1			
February			22·51	0	1			
March			22·04	0	1			
April			20·09	0	1			
May			19·49	0	1			
June			17·26	0	1			
				0	12			
London—								
July	18·97	17·24	18·10	0	2			
August	21·18	17·06	19·12	0	2			
September	21·38	20·16	20·77	0	2			
October	19·19	16·31	17·75	0	2			
November	18·00	17·47	17·73	0	2			
December	17·14	16·97	17·05	0	2			
January	18·91	17·17	18·26	0	3			
February	19·16	17·26	18·21	0	2			
March	19·26	18·17	18·71	6	2			
April	18·35	16·61	17·18	0	2			
May	16·81	16·42	16·61	0	2			
June	18·60	17·45	18·02	0	2			
				0	25			
Chatham—								
July			19·57	0	1			
August			18·02	0	1			
September			16·46	0	1			
October			17·48	0	1			
November			16·01	0	1			
December			17·17	0	1			
January			17·29	0	1			
February			16·59	0	1			
March			17·08	0	1			
April			17·37	0	1			
May			16·40	0	1			
June			18·53	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest. Grains.	Lowest. Grains.	Average. Grains.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Test.	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
							12	0	12	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	2	0	2	
							25	0	25	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
							12	0	12	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power. Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Ingersoll—								
July			23·04	0	1			
August			19·93	0	1			
September			21·58	0	1			
October			23·66	0	1			
November			17·92	0	1			
December			19·46	0	1			
January			20·52	0	1			
February			23·52	0	1			
March			24·94	0	1			
April			17·74	0	1			
May			19·61	0	1			
June			23·91	0	1			
				0	12			
St. Thomas—								
July			17·99	0	1			
August			18·43	0	1			
September			17·57	0	1			
October			17·48	0	1			
November	20.35	16·64	18·49	0	2			
December			16·61	0	1			
January			16·14	0	1			
February			16·50	0	1			
March			16·52	0	1			
April			18·34	0	1			
May			16·41	0	1			
June			17·87	0	1			
				0	13			
Windsor—								
July			17·78	0	1			
August			17·28	0	1			
September			18·81	0	1			
October			19·39	0	1			
November			17·95	0	1			
December	16·71	15·88	16·29	1	2			
January			17·37	0	1			
February			18·08	0	1			
March	19·70	18·49	19·09	0	2			
April			17·98	0	1			
May			18·03	0	1			
June			18·32	0	1			
				1	14			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet. 35 Grains.		Ammonia per 100 Cubic Feet. Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							2	0	2	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							13	0	13	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							2	0	2	
							1	0	1	
							1	0	1	
							2	0	2	
							1	0	1	
							1	0	1	
							1	0	1	
							14	0	14	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power. Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Woodstock—								
July			22·29	0	1			
August			25·22	0	1			
September			20·98	0	1			
October			19·78	0	1			
November			20·53	0	1			
December			21·16	0	1			
January			25·88	0	1			
February			26·12	0	1			
March			26·57	0	1			
April			23·70	0	1			
May			26·31	0	1			
June			24·84	0	1			
				0	12			
Napanee—								
July			20·40	0	1			
August			22·41	0	1			
September			18·15	0	1			
October			16·84	0	1			
November								
December								
January								
February								
March			23·47	0	1			
April			24·12	0	1			
May			22·31	0	1			
June			21·59	0	1			
				0	8			
Ottawa—								
July	22·31	21·94	22·12	0	2	15·10	14·25	14·67
August	21·95	21·55	21·75	0	2	14·77	14·41	14·59
September	21·07	21·00	21·04	0	2	15·03	14·19	14·65
October	21·58	20·56	21·07	0	2	15·10	14·03	14·56
November	21·53	20·95	21·24	0	2	14·59	14·37	14·48
December	21·95	20·72	21·33	0	2	14·41	14·21	14·31
January	22·19	21·30	21·74	0	2	14·64	14·19	14·41
February	21·75	21·61	21·68	0	2	14·81	14·19	14·50
March	21·58	21·07	21·32	0	2	14·97	14·52	14·74
April	21·85	21·10	21·47	0	2	15·78	14·59	15·18
May	21·49	20·80	21·14	0	2	15·19	15·17	15·18
June	21·76	21·65	21·70	0	2	14·81	14·52	14·66
				0	24			

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet. 35 Grains.		Ammonia per 100 Cubic Feet. Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest. Grains.	Lowest. Grains.	Average. Grains.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
							12	0	12	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	0	1	1	
...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	1	0	1	
					...	...	7	1	8	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
0	2	...	...	0	0	2	2	0	2	
					0	24	24	0	24	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Owen Sound—								
July			22·66	0	1			
August			23·00	0	1			
September			22·05	0	1			
October			22·70	0	1			
November			23·85	0	1			
December			22·84	0	1			
January			22·05	0	1			
February			21·88	0	1			
March			22·90	0	1			
April			22·05	0	1			
May			22·00	0	1			
June			22·66	0	1			
				0	12			
Peterborough—								
July	21·00	17·00	19·00	0	2			
August	21·00	20·00	20·50	0	2			
September	22·00	20·00	21·00	0	2			
October	21,00	18·00	19·50	0	2			
November	22·00	21·00	19·50	0	2			
December	22·00	21·00	21·50	0	2			
January	23·00	22·00	22·50	0	2			
February	20·00	18·00	19·00	0	2			
March	21·00	20·00	20·50	0	2			
April	21·00	20·00	20·50	0	2			
May	23·00	19·00	21·00	0	2			
June	21·00	20·00	20·50	0	2			
				0	24			
Sarnia—								
July			19·31	0	1			
August			19·65	0	1			
September			20·28	0	1			
October			20·56	0	1			
November			20·90	0	1			
December			20·24	0	1			
January			20·55	0	1			
February			20·20	0	1			
March			20·90	0	1			
April			21·25	0	1			
May			20·35	0	1			
June			20·98	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	1	2	
							2	0	2	
							2	0	2	
							2	0	2	
							2	2	4	
							2	0	2	
							2	6	8	
							2	2	4	
							2	0	2	
							2	0	2	
							1	1	2	
							1	1	2	
							19	7	26	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Stratford								
July			17·22	0	1			
August			16·95	0	1			
September			16·03	0	1			
October			15·93	1	1			
November			16·23	0	1			
December			16·40	0	1			
January			16·26	0	1			
February			17·33	0	1			
March			16·92	0	1			
April			16·46	0	1			
May			16·84	0	1			
June			16·20	0	1			
				1	12			
Toronto—								
July	20·17	19·10	19·71	0	9	11·41	9·87	10·64
August	20·70	19·51	20·15	0	9	16·92	12·88	14·90
September	20·62	19·30	19·75	0	8	16·64	11 81	14·23
October	20·69	19·71	20·07	0	9	18·13	12 63	15·38
November	20·73	19·74	20·14	0	9	14·00	12·59	13·29
December	20·38	19·24	19·91	0	9	17·60	15·50	16·50
January	20·23	19·45	19·86	0	8	15·86	12·48	14·17
February	20·82	19 98	20·31	0	8	11 26	9·67	10·46
March	20·73	18·90	19·99	0	9	16·92	15·36	16·14
April	20·34	18·78	19 60	0	9	20·08	18·24	19·16
May	20·36	18·74	19·29	0	9	13·79	11·83	12·81
June	19·85	19·16	19·46	0	8	16·64	12·91	14 77
				0	104			
Montreal—								
July	23·83	19·84	22·68	0	10	31·66	30·12	30·89
August	25·62	18·43	21·76	0	9	31·07	30·88	30·97
September	25·43	17·00	19·44	0	8	8·31	5·56	6·93
October	19·54	16·91	18·06	0	9	16·27	4·82	10·54
November	19·65	17 38	18·58	0	9	18·47	5·83	12·15
December	20·81	18·56	19 80	0	9	7·52	3·26	5 39
January	20·32	19·08	19·67	0	9	24·65	13·29	18·97
February	19·03	17 54	18·02	0	8	26·37	5·53	15·95
March	18·68	16·75	17·64	0	8	24·70	23·57	24 13
April	19·87	17·21	18·29	0	9	29·13	18·45	23·79
May	20·09	17·60	18·62	0	8	24·06	10·77	17·41
June	19 35	18·67	18·98	0	9	21·84	8·30	15·07
				0	105			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
0	2	0·30	0·10	0·20	0	2	9	0	9	
0	2	0·41	0·26	0·33	0	2	9	0	9	
0	2	0·60	0·40	0·30	0	2	8	0	8	
0	2	1·32	0·30	0·81	0	2	9	0	9	
0	2	0·61	0·40	0·50	0	2	9	0	9	
0	2	1·17	0·87	1·02	0	2	9	0	9	
0	2	1·24	0·56	0·90	0	2	9	0	9	
0	2	0·15	0·00	0·07	0	2	8	0	8	
0	2	0·25	0·20	0·22	0	2	9	0	9	
0	2	1·26	0·76	1·01	0	2	9	0	9	
0	2	1·31	1·26	1·28	0	2	9	0	9	
0	2	1·21	0·57	0·89	0	2	8	0	8	
0	24				0	24	105	0	105	
0	2			0·00	0	2	13	0	13	
0	2			0·00	0	2	12	0	12	
0	2			0·00	0	2	11	0	11	
0	2			0·00	0	2	12	0	12	
0	2			0·00	0	2	12	0	12	
0	2	0·50	0·00	0·25	0	2	12	0	12	
0	2	2·50	0·00	1·25	0	2	12	0	12	
0	2			0·00	0	2	11	0	11	
0	2			0·00	0	2	11	0	11	
0	2			0·00	0	2	12	0	12	
0	2			0·00	0	2	11	0	11	
0	2	1·00	0·51	0·75	0	2	12	0	12	
0	24				0	24	141	0	141	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Quebec—								
July			17 33	0	1	20·54	14·23	17·38
August			17·95	0	1	17·65	14·51	16 08
September			18·18	0	1	19·66	18·57	19·11
October			17·99	0	1	20·34	14·43	17·38
November			18·01	0	1	20·23	14·36	17·29
December			17·85	0	1	19·88	16·84	18·36
January			18·21	0	1	19·71	18·82	19·26
February			18·19	0	1	20·60	17·27	18·93
March			18·40	0	1	19·40	14·91	17·15
April			18·11	0	1	20·14	12·36	16·25
May			17·32	0	1	17·84	14 58	16·21
June			17·73	0	1	20·67	17·47	19·07
				0	12			
Sherbrooke—								
July			18·67	0	1			
August			16·68	0	1			
September			15·28	1	1			
October			16·63	0	1			
November			17·23	0	1			
December			16·79	0	1			
January			17.24	0	1			
February			16·53	0	1			
March			18·40	0	1			
April			20·64	0	1			
May			19·54	0	1			
June			20·04	0	1			
				1	12			
St. Hyacinthe—								
July				Nil.				
August				"				
September				"				
October				"				
November				"				
December				"				
January								
February								
March								
April								
May								
June								

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet. 35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
0	12			0·00	0	12	12	0	12	
0	12			0·06	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	12			0·60	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	12			0 00	0	12	12	0	12	
0	12			0 00	0	12	12	0	12	
0	12			0·00	0	12	12	0	12	
0	24				0	24	24	0	24	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
										Nil.
										"
										"
										"
										"

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER. STANDARD, 16 CANDLES.					SULPHUR PER 100 ALLOWANCE,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Fredericton—								
July	17·53	16·42	16·86	0	5			
August	17·57	16·30	16·90	0	5			
September	17·63	16·47	16·95	0	4			
October	17·82	16·15	16·90	0	4			
November	17·22	16·14	16·57	0	5			
December	17·68	16·93	17·32	0	5			
January	17·10	16·23	16·70	0	5			
February	17·07	16·23	16·76	0	5			
March	17·03	16·55	16·74	0	5			
April	16·86	16·48	16·71	0	5			
May	16·55	16·13	16·36	0	5			
June	17·81	16·56	17·09	0	5			
				0	58			
St. John—								
July	17·53	16·75	17·08	0	4	22·14	19·77	20·95
August	16·91	16·21	16·58	0	4	29·42	19·83	24·62
September	16·72	16·33	16·57	0	6	20·36	14·92	17·64
October	16·63	15·91	16·27	2	6	29·03	17·65	23·34
November	16·88	15·07	16·02	2	6			16·51
December	16·50	15·98	16·28	1	9	29·04	14·89	21·90
January	17·90	16·02	16·54	0	7	23·32	20·76	22·08
February	17·01	16·06	16·58	0	6	27·23	18·64	22·63
March	16·57	16·14	16·30	0	6	27·34	23·36	25·85
April	16·97	16·20	16·51	0	6	29·67	27·46	28·56
May	16·63	15·74	16·23	1	5	25·39	23·51	24·45
June	16·88	16·01	16·48	0	6	28·81	27·37	28·09
				6	71			
Moncton—								
July			17·82	0	1			
August			18·70	0	1			
September			19·70	0	1			
October			18·30	0	1			
November			18·59	0	1			
December			17·34	0	1			
January			17·24	0	1			
February			17·85	0	1			
March			17·47	0	1			
April			18·02	0	1			
May			20·36	0	1			
June			20·92	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet. 35 grains.		Ammonia per 100 cubic feet. Allowance, 4 grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							5	0	5	
							5	0	5	
							3	1	4	
							4	0	4	
							4	1	5	
							5	0	5	
							5	0	5	
							5	0	5	
							5	0	5	
							5	0	5	
							5	0	5	
							56	2	58	
0	2	1·02	0·00	0·51	0	2	4	0	4	
0	2	1·02	0·00	0·51	0	2	4	0	4	
0	2	0·00	0·00	0·00	0	2	6	0	6	
0	2	1·02	0·51	0·76	0	2	6	0	6	
0	1			1·00	0	1	6	0	6	
0	3	2·04	0·74	1·17	0	3	9	0	9	
0	3	1·58	0·00	0·76	0	3	7	0	7	
0	2	0·89	0·00	0·44	0	2	6	0	6	
0	2	0·77	0·00	0·38	0	2	6	0	6	
0	2	0·76	0·00	0·38	0	2	6	0	6	
0	2	1·32	0·70	1·01	0	2	5	0	5	
0	2			0·00	0	2	6	0	6	
0	25				0	25	71	0	71	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power. Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Halifax—								
July			17·62	0	1			
August			17·26	0	1			10·16
September			17·64	0	1			10·16
October			16·25	0	1			9·88
November			16·68	0	1			10·46
December			16·14	0	1			10·53
January			16·07	0	1			10·77
February			18·09	0	1			11·33
March			17·24	0	1			9·60
April			17·56	0	1			9·88
May			17·26	0	1			10·25
June			18·06	0	1			9·39
				0	12			
Picton—								
July			18·20	0	1			
August			18·15	0	1			
September			18·27	0	1			
October			18·42	0	1			
November			18·04	0	1			
December			18·35	0	1			
January			18·20	0	1			
February			17·15	0	1			
March			18·52	0	1			
April			18·11	9	1			
May			18·60	0	1			
June			18·10	0	1			
				0	12			
Yarmouth—								
July			17·57	0	1			
August			16·91	0	1			
September			17·65	0	1			
October			18·76	0	1			
November			18·21	0	1			
December			19·00	0	1			
January			18·10	0	1			
February			18·17	0	1			
March			18·20	0	1			
April			18·76	0	1			
May			19·61	0	1			
June			18·26	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30 1902.

Cubic Feet. 35 grains.		Ammonia per 100 Cubic Feet. Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
0	1				0	1	1	0	1	
0	1				0	1	1	0	1	
0	1				0	1	1	0	1	
0	1				0	1	1	0	1	
0	1				0	1	1	0	1	
0	1				0	1	1	0	1	
0	1				0	1	1	0	1	
0	1			0·00	0	1	1	0	1	
0	1			0·00	0	1	1	0	1	
0	1			0·00	0	1	1	0	1	
0	1			0·00	0	1	1	0	1	
0	11				0	11	12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	

APPENDIX

Return of the Illuminating Power and Purity of Gas

Inspection Offices.	Illuminating Power—Standard, 16 Candles.					Sulphur per 100 Allowance,		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Charlottetown—								
July			18·99	0	1			
August			18·26	0	1			
September			21·02	0	1			
October			18·73	0	1			
November			19·35	0	1			
December			19·00	0	1			
January	19·04	18·68	18·86	0	2			
February	18·38	17·35	17·86	0	2			
March			17·21	0	1			
April	21·00	17·80	19·40	0	2			
May	21·48	19·47	20·47	0	2			
June	18·80	18·38	18·54	0	2			
				0	17			
Winnipeg—								
July			20·97	0	1			
August			20·61	0	1			
September			20·80	0	1			
October			20·67	0	1			
November			19·36	0	1			
December			19·73	0	1			
January			19·95	0	1			
February			19·79	0	1			
March			18·21	0	1			
April			19·54	0	1			
May			19·73	0	1			
June			19·60	0	1			
				0	12			
Nanaimo—								
July			18·69	0	1			
August			19·64	0	1			
September			19·29	0	1			
October			17·99	0	1			
November			18·37	0	1			
December			19·50	0	1			
January			18·33	0	1			
February			19·51	0	1			
March			17·88	0	1			
April			18·81	0	1			
May			18·42	0	1			
June			18·30	0	1			
				0	12			

SESSIONAL PAPER No. 13

F—*Continued.*

Inspected during the Year ended June 30, 1902.

Cubic Feet. 35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							17	0	17	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							11	0	11	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER—STANDARD, 16 CANDLES.					SULPHUR PER 100 ALLOWANCE.		
	Highest.	Lowest.	Average.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
New Westminster—								
July					Nil.			
August					"			
September					"			
October					"			
November					"			
December					"			
January					"			
February					"			
March								
April								
May								
June								
Vancouver—								
July			18·31	0	1			
August			18·20	0	1			
September			18·24	0	1			
October			19·32	0	1			
November			19·26	0	1			
December			19·10	0	1			
January			18·56	0	1			
February			19·10	0	1			
March			18·85	0	1			
April			18·35	0	1			
May			18·42	0	1			
June			18·12	0	1			
				0	12			
Victoria—								
July			18·81	0	1			
August			18·24	0	1			
September			18·26	0	1			
October			18·10	0	1			
November			18·17	0	1			
December			18·02	0	1			
January								
February			18·10	0	1			
March			18·26	0	1			
April			18·44	0	1			
May			18·07	0	1			
June			18·24	0	1			
				0	11			

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

SESSIONAL PAPER No. 13

F—*Concluded.*

Inspected during the Year ended June 30, 1902.

Cubic Feet—35 Grains.		Ammonia per 100 Cubic Feet—Allowance, 4 Grains.					Sulphuretted Hydrogen.			Remarks.
No. of times in excess of allowance.	No. of Tests.	Highest.	Lowest.	Average.	No. of times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
		Grains.	Grains.	Grains.						
									Nil.	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
									"	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							12	0	12	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							1	0	1	
							11	0	11	

W. J. GERALD,
Deputy Minister.

APPENDIX G.

STATEMENT of Gas Meters presented for Verification, Verified, Verified after first Rejection and Rejected during the Year ended June 30, 1902.

INSPECTION OFFICES.	Presented for Verification	Kind.		Verified as coming within the Error tolerated by Law.			Verified after first Rejection.			Rejected.			Totals, Verified and Rejected.	
		Wet.	Dry.	Correct.	Fast.	Slow.	Correct.	Fast.	Slow.	Unsound.	Fast.	Slow.	Verified.	Rejected.
Barrie	44		44	1	18	22		2				1	43	1
Belleville	17		17	4	7	5						1	16	1
Berlin	175		175	5	96	67					1	6	168	7
Brockville	164		164	50	44	66		1			2	1	161	3
Cobourg	88		88	5	27	55					1		87	1
Cornwall	8		8	2	3	3							8	
Guelph	140		140	8	73	51	2	1	1		4		136	4
Hamilton	1,493	2	1,491	271	228	990					4		1,489	4
Kingston	225		225	77	26	122							225	
Listowel	11		11	4	2	5							11	
London	1,862		1,862	440	492	916					10	4	1,848	14
Napanee	35		35	2	21	8				1	3		31	4
Ottawa	562		562	48	40	467					1	6	555	7
Owen Sound	61		61	61									61	
Peterborough	86		86	37	12	37							86	
Sarnia	220		220	217		1	1					1	219	1
Stratford	102		162	11	48	28				4	5	6	87	15
Toronto	7,726		7,726	1,010	2,443	4,221				25	22	5	7,674	52
Montreal	6,269		6,269	582	634	5,014				1	12	26	6,230	39
Quebec	174		174	34	28	109		1		1	1		172	2
St. Hyacinthe														
Sherbrooke														
Fredericton	22		22	2		16						4	18	4
St. John	226		226	43	19	157					2	5	119	7
Halifax	187	145	42	148	16	23							187	
Charlottetown	14		14	1	6	3		3		1			13	1
Winnipeg	464	4	460	32	9	419	4						464	
Nanaimo	24		24	6	4	14							24	
New Westminster														
Vancouver	168		168	36	71	61							168	
Victoria	198		198	53	47	98							198	
Totals	20,765	151	20,614	3,190	4,414	12,978	7	8	1	33	68	66	20,598	67

W. J. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX H.

STATEMENT of Electric Light Inspection Expenditures and Receipts for the Year ended June 30, 1902.

Districts.	Inspectors.	Expenditures.						Receipts.	
		Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	Totals.	Registration Fees.	Inspection Fees.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Belleville	Johnson, Wm.				294 06	7 40	301 46	590 00	588 50
Hamilton	McPhie, D.				110 75	0 70	111 45	380 00	1,014 75
London	Nash, A. F.				188 35	5 00	193 35	682 50	803 50
Ottawa	Roche, H. G.							380 00	1,772 00
Toronto	Johnston, J. K.				190 35	48 06	238 41	980 00	3,056 25
	Ontario				783 51	61 16	844 67	3,012 50	7,235 00
Montreal	Aubin, A.		396 00		46 10	12 00	454 10	275 00	4,575 75
Quebec	LeVasseur, N.				3 36	69 55	72 91	160 00	1,005 50
Sherbrooke	Simpson, A. F.				71 40	8 45	79 85	240 00	195 00
St. Hyacinthe	Fontaine, A. A.	300 00			20 40	1 40	321 80	175 00	120 00
	Quebec	300 00	396 00		141 26	91 40	928 66	850 00	5,896 25
St. John	Wilson, J. E.				72 46	21 66	94 12	185 00	647 00
Halifax	Miller, A.				209 76	3 20	212 96	375 00	824 00
Charlottetown	Bell, J. H.				18 45	34 14	52 59	60 00	16 00
Winnipeg	Magness, R.			81 00		23 00	104 00	290 00	459 50
Vancouver	Miller, J. E.							235 00	926 75
Victoria	Jones, R.				11 60	1 25	12 85	60 00	369 25
	Br. Columbia				11 60	1 25	12 85	295 00	1,296 00

RECAPITULATION.

Ontario					783 51	61 16	844 67	3,012 50	7,235 00
Quebec	300 00	396 00			141 26	91 40	928 66	850 00	5,896 25
New Brunswick					72 46	21 66	94 12	185 00	647 00
Nova Scotia					209 76	3 20	212 96	375 00	824 00
Prince Edward Island					18 45	34 14	52 59	60 00	16 00
Manitoba				81 00		23 00	104 00	290 00	459 50
British Columbia					11 60	1 25	12 85	295 00	1,296 00
Chief Electrical Engineer	2,400 00				273 85	153 02	2,826 87		
General						4,088 74	4,088 74		
Printing						81 99	81 99		
Stationery						14 23	14 23		
Totals	2,700 00	396 00		81 00	1,510 89	4,573 79	9,261 68	5,067 50	16,373 75

N.B.—Refund of $12.50 to be deducted from Registration Fees. (See Statements Nos. 16, page 41 and 23, page 56, part 1).

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

APPENDIX I.

STATEMENT showing the number of Electric Light Meters Verified, Rejected, and Verified after first Rejection, in each Inspection District, for the fiscal year ended June 30, 1902.

DIVISIONS.	Number Presented.	Verified as within the error tolerated by law.			Rejected.			Verified after First Rejection.		
		Correct.	Fast.	Slow.	Unsound.	Fast.	Slow.	Correct.	Fast.	Slow.
Belleville	463	270	84	109						
Hamilton	658	320	231	106					1	
London	640	216	202	218		2	2			
Ottawa	2,036	384	529	1,090	7	8	3	9	1	5
Toronto	1,609	174	714	642		57	22			
Montreal	2,895	1,581	827	417	4	21	3	23	14	5
Quebec	1,029	400	374	252		1			1	
Sherbrooke	27	5	2	18			2			
St. Hyacinthe	88	88								
St. John	491	105	111	275						
Halifax	656	434	119	66	1	14	3	14	2	3
Charlottetown	12	1	4	5			2			
Winnipeg	373	101	61	211						
Vancouver	797	187	196	391				5	6	12
Victoria	502	166	116	220						
Totals	12,276	4,432	3,570	4,020	12	103	37	51	25	26

W. G. GERALD,
Deputy Minister.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

APPENDIX J.

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1902.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fees.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Belleville	H. L. Eggleton, Madoc	1	C. I. R., Belleville	1901 1902		400	400	10 00	
	The Corporation of Picton	2	" "	"	68	2,800	3,180	25 00	
	The Marmora Electric Co.	3	" "	"		320	320	10 00	
	The Trenton Electric and Water Co., Ltd.	4	" "	"	32	3,320	3,640	25 00	
	Steinhoff & Gordon, Tweed	5	" "	"		750	750	10 00	
	Frankford Electric Light Co.	6	" "	"		205	205	10 00	
	Vankleek Hill Electric Light Co., Ltd.	1	Cornwall			950	950	10 00	
	Stormont Electric Light and Power Co.	2	"	"		1,400	1,400	25 00	
	Municipality of Alexandria	3	"	"		950	950	10 00	
	M. P. Davis, Mille Roches	4	"	"	218	124	2,304	12 50	
	Kingston Light, Heat and Power Co.	1	Kingston		115	2,700	3,850	25 00	
	Napanee Water and Electric Light Co., Ltd.	2	"	"	21	890	1,130	25 00	
	Standard Electric Light Co., Napanee	3	"	"		1,700	1,700	25 00	
	Benjamin Manufacturing Co. of Yarker, Ltd.	4	"	"		200	200	10 00	
	A. A. Connoley, Yarker	5	"	"		105	105	10 00	
	Fenelon Falls Electric Light Co., Ltd.	1	Peterborough			500	500	10 00	
	The Light, Heat and Power Co. of Lindsay, Ltd.	2	"	"		7,000	7,000	25 00	
	Duncan James Galbraith, Newcastle	3	"	"		500	500	10 00	
	Cobourg Water and Electric Co., Ltd.	4	"	"	24	2,000	2,240	25 00	
	Colborne Electric Light Co.	5	"	"	20	600	800	10 00	
	G. H. Davidson, Brighton	6	"	"		600	600	10 00	
	Port Hope Electric Light and Power Co., Ltd.	7	"	"	39	901	1,291	25 00	
	Peterborough Light and Power Co., Ltd.	8	"	"	110	5,000	6,100	25 00	
	W. C. Harrison, Norwood	9	"	"	17	330	500	10 00	
	Lakefield Electric Co.	10	"	"	11	200	310	10 00	
	H. W. Foulds & Co., Hastings	11	"	"	11	422	532	10 00	
	Waterworks and Electric Light Commission of Campbellford	12	"	"	36	1,587	1,947	25 00	
	H. R Carrothers, Millbrook	13	"	"	6	456	516	10 00	
	Bowmanville Electric Light Co., Ltd.	14	"	"	17	1,033	1,203	25 00	
	Cardinal Electric Light Co., Ltd	1	Prescott			800	800	10 00	

For half year.

APPENDIX J—*Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1902.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fees.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Belleville—*Con.*	Kemptville Electric Light Co.	2	C. I. R., Prescott	1901 1902	.....	800	800	10 00	
	A. H. Merkley, Morrisburg	3	" "	"	.....	850	850	10 00	
	Water and Light Commission of Prescott	4	" "	"	16	1,833	1,983	25 00	
	Merrickville Electric Light and Power Co.	5	" "	"	.....	450	450	10 00	
	Brockville Light and Power Department	6	" "	"	13	4,000	4,130	25 00	
	Gananoque Electric Light and Water Supply Co., Ltd.	7	" "	"	21	1,500	1,710	25 00	
	Municipality of the Village of Morrisburg	8	" "	"	.....	1,700	1,700	12 50	
									600 00
Hamilton	Brantford Electric and Operating Co., Ltd.	1	" Brantford	"	200	6,000	8,000	25 00	
	James Munro, Embro	2	" "	"	.....	360	360	10 00	
	Municipality of Paris	3	" "	"	26	600	860	10 00	
	Herbert Webster, Norwich	4	" "	"	.....	603	603	10 00	
	Tilsonburg Electric Works	5	" "	"	9	850	940	10 00	
	Brantford Street Railway Co.	6	" "	"	1	2,954	2,964	25 00	
	Woodstock Water and Light Works	7	" "	"	71	600	1,310	25 00	
	Simcoe Gas and Water Co., Ltd.	8	" "	"	32	.....	320	10 00	
	Mrs. Collina Frenn, Port Rowan	9	" "	"	9	135	225	10 00	
	Ingersoll Electric Power and Light Co., Ltd.	10	" "	"	37	1,200	1,570	25 00	
	Port Dover Electric Light Syndicate	11	" "	"	8	250	330	10 00	
	Hamilton Electric Light and Cataract Power Co.	1	" Hamilton	"	.....	200	200	10 00	
	Hamilton Electric Light and Power Co., Ltd.	2	" "	"	600	32,000	38,000	25 00	
	Electrical Power and Manufacturing Co., Ltd., Hamilton	3	" "	"	.....	200	200	10 00	
	Dundas Electric Co	4	" "	"	6	858	918	10 00	
	Maple Leaf Rubber Co., Ltd., Port Dalhousie	1	" St. Catharines	"	15	306	456	10 00	
	Corporation of the Town of Niagara Falls	2	" "	"	60	2,800	3,400	25 00	
	Cayuga Electric Light and Power Co.	3	" "	"	9	350	410	10 00	
	Town of Thorold	4	" "	"	26	500	760	10 00	
	Ontario Electric Light and Power Co., Beamsville	5	" "	"	.....	406	406	10 00	
	Town of Niagara	6	" "	"	.....	800	800	10 00	
	Welland Electric Light Co.	7	" "	"	18	225	405	10 00	
	John W. Van Dyke, Grimsby	8	" "	"	.....	800	800	10 00	
	Lincoln Electric Light and Power Co., Ltd., St. Catharines	9	" "	"	81	3,500	4,310	25 00	

	Dunnville Electric Light Co., Ltd	10	"	"	1901	1902	17	935	1,165	25 00		
	Merriton Electric Light Co	11	"	"	"	"	21	671	881	10 00		
												380 00
London	London Electric Light Co., Ltd	1	C. I. R.,	London	"	"	351	20,660	23,510	25 00		
	Sarnia Gas and Electric Light Co	2	"	"	"	"	75	500	1,050	25 00		
	Petrolia Electric Light, Heat and Power Co., Ltd	3	"	"	"	"	41	2,000	2,410	25 00		
	St. Thomas Gas Co	4	"	"	"	"	112	1,500	2,620	25 00		
	Strathroy Electric Co., Ltd	5	"	"	"	"	20	600	800	10 00		
	Hamilton and Prout, Forest	6	"	"	"	"	12	500	620	10 00		
	Alviston Electric Light Plant	7	"	"	"	"	13	250	350	10 00		
	Cook and Sons, Lucan	8	"	"	"	"		600	600	10 00		
	Fitzgerald and Sauermann, Watford	9	"	"	"	"	12	218	368	10 00		
	H. C. Baird and Sons, Parkhill	10	"	"	"	"	12	550	670	10 00		
	Della A. Gordon, Glencoe	11	"	"	"	"	30	350	650	10 00		
	West Lorne Electric Light Co., Ltd	12	"	"	"	"	6	265	265	10 00		
	Aylmer Electric Co	13	"	"	"	"		900	900	10 00		
	Dutton Electric Light Co., Ltd	14	"	"	"	"	4	526	566	10 00		
	E. I. Sifton, London	15	"	"	"	"	20	1,200	1,100	12 50		
	Clinton Electric Light Co	1	"	Stratford	"	"	11	1,700	840	10 00		
	Jacob L. Bide, Auburn	2	"	"	"	"		175	175	10 00		
	Town of Mitchell	3	"	"	"	"	31	550	860	10 00		
	Palmerston Electric Light Co	4	"	"	"	"	5	380	430	10 00		
	Listowel Gas and Electric Light Co., Ltd	5	"	"	"	"	25		550	10 00		
	Town of Goderich	6	"	"	"	"	10	1,900	2,300	25 00		
	J. A. Williams and Co., Zurich	7	"	"	"	"		300	300	10 00		
	Corporation of the Town of St. Marys	8	"	"	"	"	38	1,500	1,880	25 00		
	Stratford Gas Co	9	"	"	"	"	125	2,000	1,250	25 00		
	Brussels Electric Light Co	10	"	"	"	"	9	375	165	10 00		
	Wingham Electric Light Co	11	"	"	"	"	21	1,100	1,820	25 00		
	Seaforth Electric Light, Heat and Power Co., Ltd	12	"	"	"	"	15	1,300	1,770	25 00		
	Thomas Welsh, Hensall	13	"	"	"	"	1	600	610	10 00		
	Conrad Rees, Wroxeter	14	"	"	"	"		360	360	10 00		
	Blyth Electric Light Plant	15	"	"	"	"	15	400	550	10 00		
	J. C. Field, Tavistock	16	"	"	"	"		100	160	10 00		
	Tremaine and Snell, Exeter	17	"	"	"	"	10	800	900	10 00		
	Hiram Walker and Sons, Ltd. (Walkerville)	1	"	Windsor	"	"	96	2,500	2,500	5 00		
	The Peoples Electric Co., Ltd., Windsor	2	"	"	"	"	2	6,278	6,998	25 00		
	Kingsville Electric Light Co	3	"	"	"	"		800	800	10 00		
	Corporation of the Town of Dresden	4	"	"	"	"		550	550	10 00		
	Town of Bothwell	5	"	"	"	"		320	170	10 00		
	James Galloway, Thamesville	6	C. I. R.,	Windsor	"	"	15	600	600	10 00		
	Leamington Electric Light Co., Ltd	7	"	"	"	"	17	1,200	1,170	25 00		
	Chatham Gas Co., Ltd	8	"	"	"	"	38	3,500	3,350	25 00		
	Essex Electric Light Co	9	"	"	"	"	12	600	720	10 00		
	Ridgetown Electric Light Works	10	"	"	"	"	10	800	900	10 00		
	Alexander Fowler Nelson, Tilbury	11	"	"	"	"	13	500	650	10 00		
	Lewis Goodchild, Harrow	12	"	"	"	"		300	200	10 00		
	Walkerburg Electric Light Co., Ltd	13	"	"	"	"	20	1,200	1,100	25 00		

For half year.

APPENDIX J. *Continued.*

STATEMENT showing the Electric Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1902.

District	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps. Arc.	Incandescent.	Totals.	Registration Fees.	Totals.
								$ cts.	$ cts.
London *Con.*	Amherstburg Electric Light, Heat and Power Co., Ltd.	11	C. I. R., Windsor	1901 1902		850	850	10 00	
	Corporation of the Town of Blenheim	15	" "	"	13	500	630	10 00	
									682 50
Ottawa	Ottawa Electric Co.	1	C. I. R., Ottawa	"	650	93,207	99,707	25 00	
	Albert McLaren, Buckingham	2	" "	"		990	990	10 00	
	Hull Electric Co.	3	" "	"	15	3,500	3,650	25 00	
	Deschênes Electric Co., Ltd., Ottawa	4	" "	"		1,500	1,500	25 00	
	Pembroke Electric Light Co., Ltd.	1	C. I. R., Perth	"	21	2,950	3,160	25 00	
	William Alexander MacKay, Renfrew	2	" "	"		990	990	10 00	
	Pakenham Electric Light Co.	3	" "	"		350	350	10 00	
	Smiths Falls Electric Power Co., Ltd.	4	" "	"	12	3,000	3,420	25 00	
	John Bourke, North Bay	5	" "	"	15	950	1,100	25 00	
	Mattawa Electric Light and Power Co., Ltd.	6	" "	"	1	961	971	10 00	
	Carleton Place Electric Light Co., Ltd.	7	" "	"	28	1,900	2,180	25 00	
	Perth Electric Light Co., Ltd.	8	" "	"	10		100	10 00	
	Arnprior Electric Light and Power Co., Ltd.	9	" "	"		2,000	2,000	25 00	
	Renfrew Electric Co., Ltd.	10	" "	"	8	600	680	10 00	
	Canadian Electric and Water Power Co., Perth	11	" "	"		2,500	2,500	25 00	
	Almonte Electric Light Co., Ltd.	12	" "	"	7	2,040	2,110	25 00	
	Sturgeon Falls Electric Light and Power Co., Ltd.	13	" "	"		600	600	10 00	
	Citizens Electric Co., Ltd., Smith Falls	14	" "	"		1,300	1,300	25 00	
	Eganville Star Electric Light and Power Co.	15	" "	"		450	450	10 00	
	Corporation of the Town of Sudbury	16	" "	"	11	1,250	1,360	25 00	
									380 00
Toronto	Waterloo Electric Light and Power Co.	1	C. I. R., Guelph	"	20	1,667	1,867	25 00	
	Guelph Light and Power Co., Ltd.	2	" "	"	100	3,465	4,465	25 00	
	Corley & Collins, Mount Forest	3	" "	"	14	800	940	10 00	
	Berlin Gas Co.	4	" "	"	81	897	1,707	25 00	
	W. C. Shearer, Preston	5	" "	"		500	500	10 00	
	Jos. Fenwick, Preston	6	" "	"	29		290	10 00	
	Howes & Leighton, Harriston	7	" "	"	12	409	520	10 00	
	Galt Gas Light Co., Ltd.	8	" "	"	59	1,250	1,840	25 00	

Town of Hespeler	9													
Regos Electric Light Plant	10													
Adams Bros., Drayton	11													
Jacob Morley, New Hamley	12													
W. Wenger & Bros., Ayton	1	C. L. R.,	Owen Sound											
Bearman & Co., Chesley	2													
Thos. Andrews, Thornbury	3													
H. Gruetzner, Hanover	4													
Owen Sound Electric Illuminating and Manufacturing Co., Ltd.	5													
Paisley Electric Co.	6													
Kincardine Water Works and Electric Light	7													
Minnis Bros., Markdale	8													
Saugeen Elec. Light and Power Co., Pt. Elgin and Southampton	9													
Walkerton Electric Light and Power Co., Ltd.	10													
Teeswater Light and Power Co.	11													
Corporation of the Town of Collingwood	12													
Walter Stewart & Son, Lucknow	13													
Crawford & McIntyre, Durham	14													
Canada Furniture Manufacturers, Ltd., Wiarton	15													
W. Moore & Sons, Meaford	16													
Corporation of the Village of Dundalk	17													
Ontario Electric Light and Power Co., Burlington	1	C. L. R.,	Toronto											
Toronto Electric Light Co., Ltd	2													
Corporation, Village of Weston	3													
Midland Electric Co., Ltd	1													
Alliston Electric Light Co.	5													
Joseph Knox, Elmvale	6													
Sunderland Electric Power Co., Ltd	7													
Cannington Electric Light Co.	8													
Alexander Dobson, Beaverton	9													
Port Perry Electric Light Co.	10													
Lakefield & Whitby Electric Co.	11													
Town of Orillia	12													
John Philip, Grand Valley and Arthur	13													
Penetanguishene & Midland Electric Street Railway, Light and Power Co., Ltd.	14													
Corporation of the Town of Huntsville	15													
Aurora Electric Light Co.	16													
Hutton Electric Co., Brampton	17													
W. H. Summerfeldt & Sons, Sutton	18													
Simon Plewes, Cheapside	19													
Gravenhurst Electric Light and Power Co.	20													
Tagona Water and Light Co., Sault Ste. Marie	21													
J. J. Gould, Uxbridge	22													
Light and Power Department, Town of Parry Sound	23													
Corporation of the Village of Beeton	24													
Georgetown Electric Light and Power Co., Ltd.	25													
Corporation of the Town of Newmarket	26													

19	500	690	10 00											
7	600	760	10 00											
6	275	325	10 00											
20	500	560	10 00											
	130	130	10 00											
15	720	870	10 00											
11	150	360	10 00											
17	1,200	1,370	25 00											
15	500	950	10 00											
	623	623	10 00											
	841	841	10 00											
	600	600	10 00											
	1,187	1,187	25 00											
17	1,350	1,529	25 00											
	130	130	10 00											
33	2,500	2,850	25 00											
13	400	530	10 00											
	850	850	10 00											
13	1,000	1,130	25 00											
25	625	875	10 00											
	500	500	10 00											
	100	100	10 00											
1,672	100,000	116,730	25 00											
17	500	670	10 00											
19	1,500	1,690	25 00											
6	615	675	10 00											
	600	660	10 00											
	191	191	10 00											
10	310	410	10 00											
	150	150	10 00											
18	350	538	10 00											
26	600	860	10 00											
17	3,000	3,170	25 00											
3	700	790	10 00											
15	1,100	1,250	25 00											
	900	900	10 00											
2	338	418	10 00											
30	615	915	10 00											
	300	350	10 00											
	160	160	10 00											
	900	900	10 00											
32	4,336	5,176	25 00											
13	500	630	10 00											
	1,925	1,925	25 00											
	500	500	10 00											
15	585	635	10 00											
	1,600	1,600	25 00											

APPENDIX J.—*Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1902.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fees.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Toronto—*Con.*	Corporation of the Town of Bracebridge	27	C. I. R., Toronto	1901-1902	.....	2,600	2,600	25 00	
	Orangeville Electric Light and Power Co.	28	" "	"	24	1,600	1,840	25 00	
	Archibald Wright, Shelburne	29	" "	"	27	600	870	10 00	
	Corporation of the Village of Acton	30	" "	"	.....	850	850	10 00	
	Knights Brothers Co., Burks Falls	31	" "	"	.....	516	516	10 00	
	Tottenham Electric Light and Power Co.	32	" "	"	.....	175	175	10 00	
	Oshawa Electric Light Co., Ltd.	33	" "	"	10	700	800	10 00	
	Corporation of the Town of Barrie	34	" "	"	51	4,000	1,510	25 00	
	Milton Electric Light and Power Co., Ltd.	35	" "	"	20	150	650	10 00	
	Cataract Electric Co., Erin	36	" "	"	.....	500	500	10 00	
	Corporation of Markham Village	37	" "	"	.....	400	400	10 00	
	Joseph Knox, Stayner	38	" "	"	.....	700	700	10 00	
	Oakville Electric Light Plant	39	" "	"	26	758	1,018	25 00	
									980 00
Montreal	North Shore Power Co., Three Rivers	1	" Three Rivers		81	6,080	6,840	25 00	
	Shawinigan Electric Light Co.	2	" "		.....	800	800	10 00	
	Corporation de la ville de Joliette	1	C. I. R., Joliette	1901-1902	35	1,850	2,200	25 00	
	John T. Ayers, Lachute	1	" Montreal	"	.....	950	950	10 00	
	Corporation of the Village of Huntingdon	2	" "	"	.....	780	780	10 00	
	Compagnie d'Eclairage Electrique, Terrebonne	3	" "	"	.....	341	341	10 00	
	St. Jérôme Power and Electric Light Co., Limited	4	" "	"	.....	900	900	10 00	
	Gazette Printing Co., Montreal	5	" "	"	.....	800	800	10 00	
	Royal Electric Co., Montreal	6	" "	"	1,982	97,713	117,533	25 00	
	Valleyfield Electric Co., Limited	7	" "	"	81	2,200	3,040	25 00	
	Corporation of the Town of Lachine	8	" "	"	50	1,500	2,000	25 00	
	Beauharnois Electric Light Co	9	" "	"	.....	350	350	10 00	
	Jean Roux, Ste. Thérèse de Blainville	10	" "	"	.....	200	200	10 00	
	Lachine Rapids Hydraulic and Land Co., Ltd., Montreal	11	" "	"	130	73,012	77,312	25 00	
	Cie de Lumière Electrique Impériale, Montreal	12	" "	"	62	14,253	14,873	25 00	
	Laurentian Water and Power Co., Ste. Agathe des Monts	13	" "	"	1	900	910	10 00	
	Lachute Electric Light Co.	14	" "	"	.....	350	350	10 00	
									275 00

Quebec	Montmagny Light and Pulp Co.	1	"	Quebec	"	...	1,230	1,230	25 00		
	Jacques Cartier Water Power Co., Quebec	2	"	"	"	107	40,000	41,169	25 00		
	M. A. & H. Grandbois, St. Casimir	3	"	"	"	....	275	275	10 00		
	Canadian Electric Light Co., Lévis	4	"	"	"	1	4,807	4,817	25 00		
	Quebec Railway Light and Power Co.	5	"	"	"	500	40,000	45,000	25 00		
	Cie des Eaux et de l'Electricité, Chicoutimi	6	"	"	"	....	2,000	2,000	25 00		
	Fraserville Co., Limited	7	"	"	"	10	1,500	1,600	25 00		
										160	00
Sherbrooke	Coaticook Electric Light and Power Co.	1	"	Sherbrooke	"	28	1,500	1,780	25 00		
	Richmond County Electric Co.	2	"	"	"	.....	1,525	1,525	25 00		
	D. Champoux, Disraeli	3	"	"	"	.....	775	775	10 00		
	Knowlton Electric Light Co	4	"	"	"	.....	375	375	10 00		
	Parker & Howe, Dixville	5	"	"	"	....	135	135	10 00		
	Cie. d'Eclairage Electrique de Mégantic	6	"	"	"	.....	850	850	10 00		
	Corporation of the Town of Magog	7	"	"	"	....	1,348	1,348	25 00		
	French Bros., Sawyerville	8	"	"	"	1	90	100	10 00		
	Eastern Townships Electric Co., Hatley	9	"	"	"	....	950	950	10 00		
	Thos. Crockett, Danville	10	"	"	"	....	800	800	10 00		
	Corporation of the Village of Granby	11	"	"	"	50	2,500	3,000	25 00		
	Sherbrooke Gas and Water Co	12	C. I. R.,	Sherbrooke	"	92	9,441	10,361	25 00		
	Stanstead Electric Light Co	13	"	"	"	18	715	895	10 00		
	Brome Lake Electric Power Co., Waterloo	14	"	"	"	.....	1,500	1,500	25 00		
	N. P. Tanguay, Weedon	15	"	"	"	.....	120	120	10 00		
										240	00
St. Hyacinthe	La Cie Electrique de Plessisville	1	C. I. R.,	St. Hyacinthe	"	.....	1,383	1,383	25 00		
	Achille Gagnon & Co., Victoriaville	2	"	"	"	.....	5,250	5,250	25 00		
	G. K. Nesbitt, Cowansville	3	"	"	"	....	300	300	10 00		
	Farnham Electric Light Co.	4	"	"	"	....	1,083	1,083	25 00		
	Corporation of the Town of Drummondville	5	"	"	"	....	780	780	10 00		
	Cie de Gaz, Electricité & Pouvoir, St. Hyacinthe	6	"	"	"	35	6,000	6,350	25 00		
	M. S. Cornell & Son, Stanbridge	7	"	"	"	.....	175	175	10 00		
	St. John Electric Light Co., Ltd	8	"	"	"	20	3,000	3,200	25 00		
	Canadian Woollen Mills, St. Hyacinthe	9	"	"	"	....	125	125	10 00		
	Cosey & Campbell, Bedford	10	"	"	"	.....	600	600	10 00		
										175	00
St. John, N.B.	Carleton Electric Light Co.	1	C. I. R.,	St. John	"	28	500	780	10 00		
	St. John Railway Co	2	"	"	"	425	10,000	14,250	25 00		
	Fredericton Gas Light Co	3	"	"	"	79	257	1,017	25 00		
	Sackville Electric Light and Telephone Co	4	"	"	"	....	600	600	10 00		
	Sussex Water and Electric Light Co	5	"	"	"	3	700	730	10 00		
	Woodstock Electric Light Co., Ltd	6	"	"	"	....	900	900	10 00		
	St. Stephen Electric Light Co	7	"	"	"	50	1,320	1,820	25 00		
	Town of Campbellton	8	"	"	"	23	720	950	10 00		
	City of Moncton Water and Light Dept.	9	"	"	"	91	3,688	4,598	25 00		
	Corporation of the Town of Chatham	10	"	"	"	.....	2,500	2,500	25 00		
	Small & Fisher Co., Ltd., Woodstock	11	"	"	"	.....	500	500	10 00		
										185	00
Halifax	Digby Electric Light Plant	1	C. I. R.,	Halifax	"	....	450	450	10 00		
	Halifax Electric Tramway Co., Ltd	2	"	"	"	293	21,232	24,462	25 00		

APPENDIX J *Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the year ended June 30, 1902.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps. Arc.	Incandescent.	Totals.	Registration Fees.	Totals.
Halifax	Oxford Electric Co., Ltd.	3	I. C. R. Halifax	1901 1902	..	500	500	10 00	
	Kentville Electric Light & Power Co., Ltd.	4	" "	"	.....	950	950	10 00	
	Dartmouth Gas, Electric Light, Heating & Power Co., Ltd	5	" "	"	.....	900	900	10 00	
	Windsor Electric Light & Power Co., Ltd	6	" "	"	9	2,700	2,790	25 00	
	Bear River & Digby Electric Light, Heating & Power Co., Ltd.	7	" "	"	....	400	400	10 00	
	Acadia Electric Light Co., Wolfville	8	C. I. R., Halifax	"	.. ..	900	900	10 00	
	Town of Parrsboro Light Plant	9	" "	"	.....	988	988	10 00	
	Edison Electric Light and Power Co., of Springhill, Ltd	10	" "	"	...	600	600	10 00	
	Yarmouth Gas Light Co., Ltd	11	" "	"	...	.....	360	10 00	
	Yarmouth Street Railway Co., Ltd.	12	" "	"	36	200	200	10 00	
	Chambers Electric Light and Power Co., Ltd., of Truro	13	" "	"	...	1,500	1,500	25 00	
	Bridgewater Power Co., Ltd.	14	" "	"		900	900	10 00	
	Bridgetown Electric Light, Heat and Power Co., Ltd	15	" "	"	.....	400	400	10 00	
	John Christie, Shubenacadie	16	" "	"	... ..	350	350	10 00	
	Lunenburg Gas Co., Ltd.	17	" "	"	....	1,700	1,700	25 00	
	Town of Annapolis Royal	18	" "	"	.....	850	850	10 00	
	Canada Electric Co. Ltd., Amherst	19	" "	"	15	2,300	2,450	25 60	
	Town of Liverpool	20	" "	"	23	800	1,030	25 00	
	Antigonish Electric Co.	1	" Pictou	"	.....	955	955	10 00	375 00
	New Glasgow Electric Co., Ltd.	2	" "	"	26	4,000	4,260	25 00	
	Cape Breton Electric Co. Ltd., Sydney	3	" "	"	7	1,400	1,470	25 00	
	North Sydney Electric Light Co., Ltd	4	" "	"	.....	1,500	1,500	25 00	
Charlottetown	Montague Electric Co., Ltd.	1	" Charlottetown	"	....	350	350	10 00	60 00
	Charlottetown Light and Power Co.	2	" "	"	87	9,680	10,550	25 00	
	Summerside Electric Co., Ltd.	3	" "	"	.....	1,300	1,300	25 00	
Winnipeg	Corporation of the town of Port Arthur.	1	" Port Arthur	"	..	1,205	1,205	25 00	
	Town of Fort William	2	" "	"	400	2,800	6,800	25 00	
	Winnipeg Electric Street Ry. Co.	1	" Winnipeg	"	25	15,975	16,225	25 00	
	Corporation of the town of Neepawa	2	" "	"	16	1,060	1,220	25 00	

	Central Electric Co. Ltd., Portage la Prairie	3	C. I. R., Winnipeg	1901	1902.	12	2,200	2,320	25 00		
	Morden Electric Light Co	3	" "	"		.....	700	700	10 00		
	Prince Albert Electric Light and Power Co., Ltd	5	" "	"		.....	506	506	10 00		
	Regina Electric Light and Power Works	6	" "	"		6	1,200	1,260	25 00		
	Citizens Telephone and Electric Co. of Rat Portage, Ltd	7	" "	"		19	3,500	3,690	25 00		
	W. J. Bruce & Co., West Selkirk	8	" "	"		...	700	700	10 00		
	Brandon Electric Light Co., Ltd	9	" "	"		.....	6,000	6,000	25 00		
	Calgary Water Power Co., Ltd	1	C. I. R., Calgary	"		25	1,975	2,225	25 00		
	Edmonton Electric Lighting and Power Co., Ltd	2	" "	"		...	1,500	1,500	25 00		
	Lethbridge Waterworks and Electric Light Co., Ltd	3	" "	"		...	900	960	10 00		
											290 00
Vancouver	British Columbia Electric Railway Co., Ltd	1	C. I. R., Vancouver	"		474	36,141	41,181	25 00		
	Corporation of New Westminster	2	" "	"		98	5,700	6,680	25 00		
	Corporation of the City of Nelson	3	" "	"		12	3,750	3,870	25 00		
	West Kootenay Power and Light Co., Ltd	4	" "	"		63	4,900	5,530	25 00		
	Revelstoke Water, Light and Power Co., Ltd	5	" "	"		3	1,500	1,530	25 00		
	Kootenay Electric Co., Ltd	6	" "	"		...	1,000	1,000	10 00		
	Canadian Smelting Works, Trail	7	" "	"		10	500	600	10 00		
	Sandon Water Works and Light Co	8	" "	"		4	900	940	10 00		
	Cranbrooke Electric Light Co., Ltd	9	" "	"		.....	489	489	10 00		
	Corporation of the City of Kamloops	10	" "	"		...	2,000	2,000	25 00		
	Greenwood Electric Co., Ltd	11	" "	"		7	1,903	2,063	25 00		
	Crows Nest Pass Electric Light and Power Co., Ltd	12	" "	"		...	650	659	10 00		
	Corporation of the City of Grand Forks	13	" "	"		1	950	960	10 00		
											235 00
Victoria	Victoria Electric Co., Ltd	1	" "	"		1	314	324	10 00		
	Nanaimo Electric Light, Power and Heating Co., Ltd	2	" "	"		54	1,350	1,890	25 00		
	British Columbia Electric Railway Co., Ltd., Victoria	3	" "	"		13	22,998	23,428	25 00		
											60 00
											5,077 50
	Less—Peterborough No. 1, collected in June, 1901								10 00		
	" Refund as per Statements Nos. 16, page 11, and 23, page 56, part I								12 50		
											22 50
											5,055 00

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1902.

W. J. GERALD,
Deputy Minister.

REPORT, RETURNS AND STATISTICS

OF THE

INLAND REVENUES

OF THE

DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED JUNE 30

1902

PART III

ADULTERATION OF FOOD

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1902

No. 14—1902.]

CONTENTS.

REPORT

OF THE

DEPUTY MINISTER OF INLAND REVENUE.

INSPECTION OF FOODS, DRUGS AND FERTILIZERS.

To the Honourable M. E. Bernier,
Minister of Inland Revenue.

Sir,—I have the honour herewith to submit the reports of the official analysts of the Dominion for the fiscal year ended June 30, 1902.

The following is a summary statement of the whole number of samples analysed by them :—

Description of Samples.	Genuine.	Adulterated.	Doubtful.	Total.
Tea	59			59
Milk for preservatives	173	3	0	176
" ordinary constituents	116	30	36	182
Drugs, &c. for arsenic	252	13	29	294
Coffee	34	24	1	59
Cocoa and chocolate	15	1	0	16
Fertilizers	67	10	8	85
Cheese	12	0	0	12
Total	728	81	74	883

I have the honour to be, sir,

Your obedient servant,

W. J. GERALD,
Deputy Minister.

Inland Revenue Department,
Ottawa, October 18, 1902.

REPORT OF CHIEF ANALYST.

LABORATORY OF THE INLAND REVENUE DEPARTMENT,
317 QUEEN STREET,
OTTAWA, October 25, 1902.

W. J. GERALD, ESQ.,
Deputy Minister of Inland Revenue.

SIR.—In accordance with your request of 22nd September last, I beg to supply the following statement as regards the examination of samples in this Branch during the last three years.

	During the fiscal year ended 30 June, 1900.	30 June, 1901.	30 June, 1902.
1. Number of samples collected by the food inspectors for examination	895	885	883
2. Number of these samples examined by the public analysts	756	881	883
3. Number of these samples examined in the Laboratory here	181	243	270
4. Number of samples examined at the Laboratory here, duplicates of which were not analysed by the public analysts	730	802	600
This number however includes the following :—			
Samples of beer	44	25	32
Samples of vinegar	360	413	346
Samples examined for other Departments,—			
Marine and Fisheries	1	3	15
Public Works	0	0	3
Militia and Defence	2	0	3
Indian Affairs	0	0	6
Agriculture	0	0	15
Police Branches	1	1	1
Interior	0	0	2
Trade and Commerce	0	2	0

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

REPORTS OF PUBLIC ANALYSTS.

LABORATORY OF THE OFFICIAL ANALYST FOR
NOVA SCOTIA AND PRINCE EDWARD ISLAND,
66 BEDFORD ROW,
HALIFAX, N.S., July 8, 1902.

The Deputy Minister of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit my annual report on the samples of food, &c., analysed by me during the year ending June 30, 1902, as follows :

Sample.	Genuine.	Adulterated.	Doubtful.	Total.
Tea	8			8
Milk for preservatives	22	2		24
" ordinary constituents	20	3	4	27
Drugs	31	9		40
Coffee		8		8
Fertilizers	8	2		10
Total	89	24	4	117

I have the honour to be, sir,
Your obedient servant,

MAYNARD BOWMAN.

ANNUAL REPORT of Samples analysed in the Quebec Laboratory, from July 1, 1901 to June 30, 1902,

Kind of Samples.	Month in which analysed.	Number of Samples.	Genuine.	Adulterated.	Doubtful.	Sold as Compound
	1901.					
Tea	July	8	8			
Milk for preservatives	August	24	24			
Milk, ordinary analysis	September	24	18	2	4	
Drugs, etc., for Arsenic	October	40	29		11	
Coffee	November	8	5	3		
Fertilizers	March	10	10			
Total		114	94	5	15	

DR. M. FISET,
District Analyst.

BUREAU DE L'ANALYSTE PUBLIC,
ST-HYACINTHE, QUÉ., 26 juillet 1902.

Monsieur le sous-ministre,
Département du Revenu de l'Intérieur,
Ottawa.

MONSIEUR,—J'ai l'avantage de vous présenter le résumé du travail qui m'a été adressé par le département durant l'année fiscale finissant le 30 juin 1902.

Le tableau suivant renferme mes conclusions sur les 165 échantillons examinés.

Nature des échantillons.	Purs.	Adultérés.	Douteux.	Total.	Remarques.
Thé	9			9	Ce qui fait une moyenne d'adultération de 7 3 p.c.
Lait (pour préservatif)	27			27	
Lait (analyse générale)	17	4	6	27	
Produits Pharmaceutiques divers (pour Arsenic)	45			45	
Café	5	3	1	9	
Cacaos et Chocolats	8	1		9	
Engrais	9	2		11	
Fromages	12			12	
Total	132	10	7	149	

THÉ.

Sur 9 échantillons, aucun n'était adultéré, mais quelques-uns renfermaient beaucoup de débris de thé.

LAIT.

Il est à remarquer que sur les 27 échantillons examinés au point de vue des préservatifs, aucun n'en contenait; je pense qu'il serait prudent de ne pas abaisser les "types" pour le gras et les solides totaux, car la spéculation aidant, bientôt les consommateurs n'auraient plus pour aliment que "de l'eau blanchie par le lait." Sur 27 échantillons examinés (analyse générale) 4 étaient adultérés et 6 douteux, comme étant un peu en dessous des types admis.

PRODUITS PHARMACEUTIQUES, DIVERS.

Examinés pour l'arsenic, aucun ne contenait de ce poison; c'est une amélioration sur les précédents examens, mais j'ai signalé à l'attention 1 échantillon de sulfate de fer contenant du sulfate de cuivre, sans doute accidentellement.

CAFÉ.

Sur 9 échantillons, 3 étaient adultérés, 2 par le "classique adultérant", la chicorée; 1 autre par une préparation de ce produit dépassant la quantité déclarée par le vendeur.

CACAOS ET CHOCOLATS.

Sur 9 échantillons, un seul était fraudé par de la farine de maïs.

ENGRAIS.

Sur 11 échantillons, 2 étaient en dessous de la garantie.

FROMAGES.

Sur 12 échantillons examinés, il n'y en avait aucun d'adultéré, mais en général le fromage canadien offre encore le défaut de ne pas être pressé progressivement et suffisamment, ce qui laisse dans sa pâte non homogène, ces veines d'un gris verdâtre dues aux champignons (Moisi).

J'ai l'honneur d'être, monsieur le sous-ministre,
Votre obéissant serviteur,
A. L. TOURCHOT.

(Translation.)

OFFICE OF THE PUBLIC ANALYST,
ST. HYACINTHE, QUE., July 26, 1902.

To the Deputy Minister,
Department of Inland Revenue,
Ottawa.

SIR,—I have the honour of presenting to you a resumé of the work which has been submitted to me by the department during the fiscal year ended June 30, 1902.

The following table contains my conclusions regarding the 149 samples examined :—

——	Genuine.	Adulterated.	Doubtful.	Total.
Tea	9	..	..	9
Milk for preservatives	27	..	..	27
Milk for ordinary constituents	17	4	6	27
Drugs, &c., for arsenic	45	..	..	45
Coffee	5	3	1	9
Cocoas and chocolates	8	1	..	9
Fertilizers	9	2	..	11
Cheese	12	..	..	12
	132	10	7	149

TEA.

Of nine samples none were found adulterated, but some of them contained tea debris.

MILK.

It is to be remarked concerning the twenty-seven samples examined for preservatives, that none of them contained any. I am of opinion that it would not be prudent to lower the standards for fat and total solids, otherwise speculation would soon produce the result that consumers would not have more for aliment than 'water coloured by milk'. Of twenty-seven samples, examined for the ordinary constituents, four were found adulterated and six doubtful.

DRUGS, &C., FOR ARSENIC.

Of the drugs and other substances examined for arsenic none contained any of this poison, but I call attention to the fact that one sample of sulphate of iron contained sulphate of copper, no doubt accidentally.

COFFEE.

Of nine samples three were adulterated ; two by the classical adulterant chicory, and one by a preparation of this product exceeding the quantity declared by the vendor.

COCOA AND CHOCOLATE.

Of nine samples only one was found adulterated, and that by the addition of maize flour.

FERTILIZERS.

Two of eleven samples were found below guarantee.

CHEESE.

Twelve samples were examined, and none found adulterated, but in general Canadian cheese still shows the defect of not being pressed gradually and sufficiently, which leaves in its mass veins of a greenish grey colour due to mushrooms (Moisi).

I have the honour to be, sir,
Your obedient servant,

A. L. TOURCHOT.

112 St. FRANÇOIS XAVIER STREET,
MONTREAL, June 30, 1902,

The Deputy Minister of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit my report on the samples submitted to me since my appointment in November, 1901, to June, 30, 1902.

Ten samples of fertilizers have been analysed by me. Two of these contained over one per cent less than the guaranteed amount of one or more ingredient and were therefore returned as adulterated. The remaining eight samples were genuine.

I have the honour to be, sir,
Your obedient servant,

J. T. DONALD.

OTTAWA, July 14, 1902.

The Deputy Minister of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit to you a statement of the work reported on by me during the fiscal year ending June 30, 1902.

During this period ninety-nine samples were submitted to me for analysis. Of these eight were found unadulterated, eight adulterated and four doubtful as may be seen from the following table:—

	Genuine.	Adulterated	Doubtful.	Total.
Tea	7			7
Milk for preservatives	21			21
Milk ordinary analysis	11	6	4	21
Coffee	6	1		7
Fertilizers	8	1		9
Drugs, etc., for arsenic—				
Alum	2			2
Acetic acid	2			2
Ammonium chloride	2			2
Epsom salts	3			3
Sulphate of soda	4			4
Acid phosphoric dilute	2			2
Ammonium sulphate	2			2
Effervescent phosphate of soda	4			4
Ferrous sulphate	3			3
Glucose syrup	2			2
Acid phosphate	2			2
Baking powder	6			6
Total	87	8	4	99

I have the honour to be, sir,
Your obedient servant,

F. X. VALADE, M.D.

SCHOOL OF PRACTICAL SCIENCE,
TORONTO, July 12, 1902.

The Deputy Minister of Inland Revenue,
Ottawa.

SIR,—I have the honour to report the work done in my laboratory during the past year.

I have analysed during that time 112 samples, of which I reported 94 as genuine, 19 as doubtful and nine as adulterated.

Among the doubtful samples are classed fertilizers which were not registered according to the Act.

I append a tabular statement of my work.

I have the honour to be, sir,
Your obedient servant,

W. H. ELLIS.

TABLE showing work done in the Laboratory of the District Analyst at Toronto for the year 1901–2.

Samples.	Genuine.	Adulterated.	Doubtful.	Total.
Tea	8			8
Milk for preservatives	23	1		24
Milk for ordinary constituents	12	12	2	26
Drugs, &c., for arsenic	31	3	2	36
Coffee	5	3		8
Fertilizers	5		5	10
Total	84	19	9	112

OFFICE OF PUBLIC ANALYST,
LONDON, June 30, 1902.

The Deputy Minister of Inland Revenue,
Ottawa.

SIR,—I have the honour to present a tabulated statement of results of the analysis of samples submitted to me by the department during the past year :—

Samples.	Genuine.	Adulterated.	Doubtful.	Total.	Remarks.
Tea	7			7	
Milk for preservatives	21			21	21 of these samples were examined only for preservatives.
Milk for ordinary constituents	12	1	8	21	
Cocoa and chocolate	7			7	
Chemicals (soda phosphate, &c.)	35			35	These were examined only for arsenic, and while it was present in many cases the quantity was too small in my judgment to be termed an adulteration.
Coffee	4	3		7	
Fertilizers	6	3		9	Two samples classed as adulterated were not registered.
	92	7	8	107	

I have the honour to be, sir,
Your obedient servant,

FRANKLIN T. HARRISON.

282 Assiniboine Ave.,
Winnipeg, Canada, July 10, 1902.

The Deputy Minister of Inland Revenue,
Ottawa.

Sir,—I beg to report the number of samples analysed for the department during the past year as follows :—

——	Genuine.	Adulterated.	Doubtful.	Total.
Tea	6			6
Milk for preservatives	17			17
Milk for ordinary constituents	15		3	18
Drugs, &c., for arsenic	25		7	32
Coffee	6			6
Fertilizers	5		3	8
	74		13	87

Your obedient servant,

EDGAR B. KENRICK,

LABORATORY OF THE OFFICIAL ANALYST FOR BRITISH COLUMBIA,
VICTORIA, June 30, 1902.

The Deputy Minister of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit my annual report on the samples of food, &c., analysed by me during the year ending June 30, 1902, as follows :—

Samples.	Genuine.	Adulterated.	Doubtful.	Total.
Milk for preservatives	18			18
Milk (ordinary analysis)	11	2	5	18
Tea	6		None.	6
Coffee	3	3	"	6
Drugs, &c., for arsenic—				
Sulphate of iron	2		"	2
Dried alum	1		2	3
Phosphate of soda	1		1	2
Chloride of ammonia	2			2
Baking powder		1	5	6
Acetic acid	2			2
Sulphate of ammonia	1		1	2
Glauber salts	3		None.	3
Dilute phosphoric acid	2		"	2
Epsom salts	3		"	3
Effervescing phosphate soda	2		"	2
Glucose	2		"	2
Sulphite of soda	1		"	1
Commercial fertilizers	8		"	8
	68	6	14	88

I have the honour to be, sir,

Your obedient servant,

C. J. FAGAN.

APPENDIX A.—INSPECTION OF

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of				
				Moisture.	Total aqueous extract by prolonged boiling.	Substances extracted by 10 minutes infusion.		
						Total.	Theine.	Tannin.
1901.	*Official Analyst, M. Bowman, Halifax, N.S.*			p. c.	p. c.	p. c.	p. c.	p. c.
Aug. 6.	Tea, green, Salada	12972	20054	..	.....	31·76	2·28	10·85
" 6.	"	12973	20055	.....	..	31·70	2 31	15·90
Oct. 3.	" green	17501	20068	...	.....	30·12	2·38	11·42
" 4.	" "	17502	20069	...	....	26·40	2·01	9·68
July 17.	" " Japan	12968	17790	...	....	30·34	2·64	12·79
" 17.	" " uncoloured, Japan	12969	17791	..	.....	29·50	2·69	13·37
" 19.	" " green, Japan	12970	17792	.....	.. ..	30·74	2 24	13·18
" 22.	" " black, Salada	12971	17793	....	....	27·38	3·28	10·08
	Official Analyst, Dr. M. Fiset, Quebec.							
" 12.	Tea, Japan	13821	19864	6 70	39·25	27·40	2·00	8·96
" 12.	" "	13822	19865	6·66	40 40	30·40	2·26	9·13
" 12.	" "	13823	19866	5·52	40·00	30·90	2.30	8·63
" 15.	" "	13824	19867	4·64	42·40	32·85	2·36	11·78
" 15.	" "	13825	19868	4·48	43·90	32·55	2·52	7·31
" 15.	" "	13826	19869	5·84	35·00	28·00	1·84	5·81
" 16.	" "	13827	19870	6·68	40·00	27·10	2·12	8·30
" 16.	" green, Ceylon, Salada	13828	19871	5·04	50 05	33·65	2·90	14·94
	Official Analyst, A. L. Tourchot, St. Hyacinthe, P.Q.							
" 4.	Tea, Japan	2917	19855	3·50	63·75	30·25	2·86	13·62
" 4.	" "	2918	19856	4·80	57 50	30·75	2·04	10·05
" 4.	" "	2919	19857	5·30	56·25	21·50	1·28	9·30
" 10.	" "	2920	19858	4·32	46·88	25·25	2·52	13·41
" 10.	" "	2921	19859	5·28	43·75	25·00	2·30	11 30
" 11.	" Ceylon, green, Salada	2922	19860	4·04	53 74	24·85	2·72	12·97
" 17.	" Japan	2923	19861	5·14	53·75	26·50	1·26	13·73
" 17.	" "	2924	19862	4·80	40·00	15·90	1·35	11·19
" 17.	" "	2925	19863	6·94	65·02	22 50	1 29	9 68
	Official Analyst, Dr. F. X. Valade, Ottawa.							
June 26.	Tea, Salada, Ceylon, green	14910	20868	...	46 64	30·30	3·37	8·06
" 26.	" green, Salada	14911	20869	..	38·83	29·10	3 04	8·12
" 26.	" Japan	14912	20870	.....	40 71	30·70	2·88	6·98
" 26.	" "	14913	20871	....	45 10	29·80	3·32	7·21
" 28.	" green, Ceylon	14914	20872	.....	49·83	32 90	3 34	9·69
" 28.	" Japan	14915	20873	.....	44·55	30·00	3·03	7·80
" 28.	" "	14916	20874	.....	40·30	28 80	2 90	8·35
	Official Analyst, Dr. W. H. Ellis, Toronto.							
July 19.	Tea, green, Ceylon	16111	20883	....	44·00	35·50	1·90	17·21
" 19.	" Japan	16112	20884	.....	42·35	35·00	1·66	12 48
" 20.	" "	16113	20885	..	39·00	30·80	2·18	17·55
" 20.	" "	16114	20886	...	42·70	31·60	2·08	15·21
" 20.	" "Salada," Ceylon, green	16115	20887	..	47·25	33 60	1 95	20·67
" 20.	" mixed	16116	20888	.....	43·75	31·40	1·78	18 72
" 20.	" Japan	16117	20889	.....	43·00	33·80	1·60	18·72
" 20.	" "	16118	20890	....	41·00	35·80	1 93	18·14

SESSIONAL PAPER No. 14

TEA—Tabulated Statement.

Analysis.

Ash.				Foreign Leaves.	Facing.	Remarks by Analyst.	Name and Address of Vendor of Sample.
Total.	Soluble in Water.	Soluble in Acid.	Sand.				
p. c.	p. c.	p. c.	p. c.				
4·94	2·97			None	None	Genuine	E. W. Crease, Halifax, N.S.
4·40	2·65			"	"	"	G. S. McPherson "
6·22	3·36			"	"	"	Dimock Bros., Windsor, N.S.
6·90	3·26			"	"	"	A. P. Torrens "
6·38	3·51			"	"	"	Vanwart Bros., St. John, N.B.
6·15	3·70			"	"	"	W. A. Porter "
6·07	3·44			"	"	"	G. M. & A. A. Barker, St. John, N.B.
5·07	3·04			"	"	"	Phillips & Watson "
6·12	4·04		0·28	"	"	"	Porrier & Obran, Three Rivers.
6·16	3·69		0·68	"	"	"	J. M. Spenard "
7·92	4·24		1·36	"	"	"	A. J. Nadeau "
6·48	4·48		0·36	"	"	"	W. Boissoneault "
6·84	4·00		0·80	"	"	"	J. B. Roussean, Quebec.
6·72	3·64		0·92	"	"	"	J. P. Latulippe "
6·56	3·32		0·88	"	"	"	C. Dionne, Fraserville, Que.
5·00	3·36		0·28	"	"	"	H. E. Thivierge "
6·26	3·44	2·13	0·69	"	"	"	Geo. Dixon, Huntingdon, P.Q.
5·82	3·56	1·85	0·41	"	"	"	R. E. Kelly "
5·80	3·02	2·02	0·76	"	"	"	A. L. Hurtubise, Montreal.
6·21	3·64	1·87	0·79	"	"	"	H. J. Giles & Bros., Lachute, Que.
5·26	3·10	1·74	0·42	"	"	"	Hugh Fraser, jr. "
5·02	3·16	1·67	0·19	"	"	"	Godfroy Pilon, Montreal.
5·79	3·09	2·17	1·53	"	"	"	L. Hannan, Danville, Que.
6·61	3·22	2·66	0·33	"	"	"	Josh. Masson "
5·90	2·88	2·62	0·40	"	"	"	H. Gerard, Montreal.
4·95	2·90			"	"	"	C. Esmonde, Ottawa.
6·46	3·52			"	"	"	" "
6·22	3·68			"	"	"	A. E. Cowan "
6·54	3·63			"	"	"	Bryson, Graham & Co., Ottawa.
4·86	2·66			"	"	"	A. Daron, Carleton Place.
6·43	3·62			"	"	"	Wm. M. Sumner "
6·22	4·64			"	"	"	Weir & Labron "
5·87	2·45	0·40		None	"	Unadulterated	W. E. Baker, Lindsay, Ont.
6·20	2·65	0·55		"	"	"	P. J. Hurley "
5·90	2·65	0·65		"	"	"	W. Bradshaw, Peterboro, Ont.
6·00	2.75	0·55		"	"	"	J. H. Savigny "
4·75	2·05	0·15		"	"	"	H. T. Kidd "
5·50	2·30	0·30		"	"	"	R. Barrow, Toronto, Ont.
5·90	2·50	0·40		"	"	"	Geo. Messer "
5·95	2·75	0·50		"	"	"	R. May "

APPENDIX A.—INSPECTION OF

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of				
				Moisture.	Total aqueous extract by prolonged boiling.	Substance extracted by 10 minutes infusion.		
						Total.	Theine.	Tannin.
1901.	*Official Analyst, F. T. Harrison, London.*				p.c.	p.c.	p.c.	p.c.
July 3.	Tea, Ceylon, black	14353	21901	.....	40·5	30·8	3·49	7·21
" 3.	" mixed	14354	21902	.....	40·5	28·0	3·31	5·20
" 4.	" Ceylon	14355	21903	.....	43·0	31·7	3·36	6·87
" 4.	" " mixed	14356	21904	..	40·5	29·7	3·60	6·21
" 4.	" "	14357	21905	.....	45·7	32·0	3·60	7·04
" 4.	" mixed	14358	21906	.....	41·1	29·4	2·94	6·37
" 4.	" Blue Ribbon	14359	21907	.. ....	45·0	30·5	3·25	6·87
	Official Analyst, E. B. Kenrick, Winnipeg.							
July 4.	Tea, Japan	17060	17338	..	36·51	29·32	2·33	8·92
" 4.	" "	17061	17339	...	34·11	26·52	1·97	8·35
" 4.	" "	17062	17340	.. ..	31·03	26·42	1·95	8·38
" 4.	" "	17063	17341	.. ..	31·00	25·60	2·11	8·12
" 4.	" "	17064	17342	.....	36·25	29·29	2·42	8·94
" 4.	" Salada, green	17065	17343	..	41·03	28·78	2·12	8·68
	Official Analyst, Dr. C. J. Fagan, B.C.							
July 18.	Tea, green	16807	21587	.....	38·20	31·20	2·80	...
" 18.	"	16808	21588	...	40·70	33·00	2·10	.....
" 18.	"	16809	21589	....	37·20	28·80	2·60	.....
" 18.	" "	16810	21590	....	36·30	31·60	2·90	....
" 19.	"	16811	21591	....	40·70	31·70	2·40	... .
" 19.	" "	16812	21592	....	36.20	27·80	2.20	.....

SESSIONAL PAPER No. 14

TEA—Tabulated Statement—*Concluded.*

Analysis.							
Ash.				Foreign Leaves.	Facing.	Remarks by Analyst.	Name and Address of Vendor of Sample.
Total.	Soluble in Water.	Soluble in Acid.	Sand.				
p.c.	p.c.	p.c.	p.c.				
5·12	3·22			A few present unidentified	None	Unadulterated	C. A. Nairn, Goderich, Ont.
5·43	3·36			None	"	"	T. G. Tipling "
5·80	3·87			"	"	"	John Fisher, Stratford, Ont.
5·25	3·27			"	"	"	C. McIlhargey "
5·93	3·39			"	"	"	John Easton, Guelph, Ont.
5·94	3·61			"	Some of the tea in the mixture had facing.	"	Jackson & Son "
5·45	3·48			"	None	"	G. W. Crawford, Brampton, Ont.
6·77	3·92			None. None.	Genuine		Thos. Hartley, Winnipeg.
6·55	3·37			" "	"		Hardy & Buchanan, Winnipeg.
7·24	3·83			" "	"		Jackson & Campbell, "
6·19	3·41			" "	"		Nelson & Co. "
7·66	3·67			" "	"		A. Macdonald "
5·27	3·39			" "	"		W. B. Francis "
5·7	1·8			" "	"		Dickson Importing Tea Co., Vancouver, B.C.
5·67	2·52			" "	"		Vanir Grocery Co., Vancouver, B.C
6·28	2·73			" "	"		H. T. N. Dorner & Co. "
5·35	2·50			" "	"		H. H. Edgett & Co. "
6·62	2·92			" "	"		Orient Tea Co. "
7·40	4·40			" "	"		Colombo Tea Co. "

APPENDIX B. INSPECTION OF MILK (for preservatives) Tabulated Statement.

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Sp. Gr. at 15 C.	Result of Analysis. Ash—Grams. in 100cc.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, M. Bowman, Halifax.*			p. c.	p. c.		
Sept. 9..	Milk	12956	20056	1·0299	0·73	Boron compounds absent; genuine and contains no preservatives	Mrs. Coulstring, Halifax.
" 9..	"	12957	20057	1·0307	0·72	Boron compounds present; adulterated	J. Sutherland "
" 9..	"	12958	20058	1·0295	0·74	Boron compounds absent; genuine and contains no preservatives	Mrs. Fahey "
" 9..	"	12959	20059	1·0313	0·73	" "	J. P. Buckley "
" 9..	"	12960	20060	1·0275	0·74	Boron compounds present; adulterated	J. Power "
" 9..	"	12961	20061	1·0302	0·70	" absent; genuine and contains no preservatives	Walter Payne "
" 11..	"	12962	20062	1·0307	0·72	" "	W. H. Snook, Truro, N.S.
" 11..	"	12963	20063	1·0309	0·75	" "	T. B. Smith "
" 11	"	12964	20064	1·0330	0·83	" "	J. F. Deforest "
" 12	"	12965	20065	1·0317	0·72	" "	E. A. Fraser, New Glasgow, N.S.
" 12..	"	12966	20066	1·0315	0·76	" "	D. C. McKay "
" 12..	"	12967	20067	1·0305	0·71	" "	Fraser Bros. "
" 15..	"	12944	17791	1·0315	0·71	" "	J. R. Veale, St. John, N.B.
" 15..	"	12945	17795	1·0329	0·79	" "	Dunlop & Noakes "
" 15..	"	12946	17796	1·0261	0·72	" "	Pure Milk & Dairy Co., St. John, N.B.
" 15..	"	12947	17797	1·0300	0·71	" "	Timothy Desmond "
" 15..	"	12948	17798	1·0305	0·70	" "	A. E. Trentowski "
" 15	"	12949	17799	1·0307	0·69	" "	Geo. Martin "
" 15	"	12950	17800	1·0311	0·72	" "	Powys & Bodkin, Fredericton, N.B.
" 15..	"	12951	17801	1·0274	0·71	" "	Isaac Peabody "
" 15..	"	12952	17802	1·0320	0·74	" "	C. Kelly "
" 15..	"	12953	17803	1·0315	0·70	" "	Cyrus Vanwart, Woodstock, N.B.
" 15..	"	12954	17804	1·0317	0·74	" "	A. D. Smith "
" 15	"	12955	17805	1·0317	0·76	" "	J. J. Bedell "
	Official Analyst Dr. M. Fiset, Quebec.						
Aug. 7..	Milk	13829	19873	1·0317	0·67	Found no preservatives present; genuine	J. B. Lacombe, Quebec.

" 7..	"	13830	19871	1·0327	0·75	"	"	" .. Louis Caron "
" 7..	"	13831	19875	1·0290	0·66	"	"	" .. André Mahen "
" 7..	"	13832	19876	1·0310	0·69	"	"	" .. L. Filion "
" 7..	"	13833	19877	1·0302	0·60	"	"	" .. Jos. Pouliot "
" 7..	"	13834	19878	1·0310	0·72	"	"	" .. Jos. Drolet "
" 7..	"	13835	19879	1·0295	0·63	"	"	" .. Jos. Bussière "
" 7..	"	13836	19880	1·0310	0·67	"	"	" .. Edward Faucher "
" 7..	"	13837	19881	1·0302	0·62	"	"	" .. L. Ratté "
" 12..	"	13838	19882	1·0335	0·70	"	"	" .. W. Pratte, Three Rivers, P.Q.
" 12..	"	13839	19883	1·0313	0·71	"	"	" .. P. Gouin "
" 12..	"	13840	19884	1·0330	0·69	"	"	" .. Armand Beaudry "
" 12..	"	13841	19885	1·0330	0·58	"	"	" .. Elie Leblanc "
" 12..	"	13842	19886	1·0331	0·76	"	"	" .. Theodore Beaudry "
" 14..	"	13843	21001	1·0300	0·62	"	"	" .. J. N. Gendreau Magog, P.Q.
" 14..	"	13844	21002	1·0314	0·69	"	"	" .. G. H. Stinfelt "
" 14..	"	13845	21003	1·0300	0·72	"	"	" .. John Bryce "
" 14..	"	13846	21004	1·0322	0·75	"	"	" .. Pierrre Vincellette "
" 15..	"	13847	21005	1·0304	0·76	"	"	" .. Wm. Hunt, Sherbrooke, P.Q.
" 15..	"	13848	21006	1·0329	0·74	"	"	" .. J. Cartmell "
" 15..	"	13849	21007	1·0319	0·58	"	"	" .. R. Armitage "
" 15..	"	13850	21008	1·0325	0·74	"	"	" .. D. Gagnier "
" 15..	"	13851	21009	1·0320	0·50	"	"	" .. J. Lacombe "
" 15..	"	13852	21010	1·0319	0·73	"	"	" .. Wm. Gravison "
	Official Analyst, A. L. Tourchot, St. Hyacinthe.							
Aug. 17..	Milk	2926	21011	1·031	0·75	Preservatives, none; genuine		E. Clapin, St. Hyacinthe, Que.
" 17..	"	2927	21012	1·031	0·72	"	"	.. L. Carrier "
" 17..	"	2928	21013	1·032	0·67	"	"	.. J. B. Lemieux "
" 17..	"	2929	21014	1·031	0·69	"	"	.. L. Marchessault "
" 17..	"	2930	21015	1·0296	0·65	"	"	.. J. B. Laplante "
" 17..	"	2931	21016	1·030	0·67	"	"	.. X. Blanchard "
" 17..	"	2932	21017	1·0289	0·61	"	"	.. Cadieux & Co. "
" 17..	"	2933	21018	1·029	0·62	"	"	.. B. Labonté "
" 20..	"	2934	21019	1·0304	0·69	"	"	.. A. Viau, Valleyfield, Que.
" 20..	"	2935	21020	1·0314	0·72	"	"	.. V. Pilon, "
" 20..	"	2936	21021	1·032	0·72	"	"	.. Donat Tremblay, Valleyfield, Que.
" 20..	"	2937	21022	1·0304	0·69	"	"	.. Jos. Lefebvre "
" 20..	"	2938	21023	1·0309	0·69	"	"	.. Louis Renaud "
" 20..	"	2939	21024	....	0·75	"	"	.. F. Provost, Hull, Que.
" 20..	"	2940	21025	....	0·64	"	"	.. T. Lacroix "
" 20..	"	2941	21026	....	0·65	"	"	.. Marcil Guenette "
" 20..	"	2942	21027	....	0·68	"	"	.. V. Thibodeau "
" 21..	"	2943	21028	1·030	0·64	"	"	.. N. Daignault, St. Henri, Que.
" 21..	"	2944	21029	1·028	0·63	"	"	.. Jos. Lemieux "
" 21..	"	2945	12030	1·0306	0·66	"	"	.. L. Prudhomme "
" 21..	"	2946	21031	1·0306	0·65	"	"	.. J. A. Groulx "
" 21..	"	2947	21032	1·0309	0·69	"	"	.. O. Doré "
" 22..	"	2948	21033	1·0306	0·63	"	"	.. N. Massé, Sorel, Que.

APPENDIX B. INSPECTION OF MILK (for preservatives) Tabulated Statement *Continued.*

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analyses: Sp. Gr. at 15 C.	Result of Analyses: Ash—Grams in 100cc.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, A. L. Tourehot, St. Hyacinthe.*			p. c.	p. c.		
Aug. 22.	Milk	2949	21034	1·0304	0·61	Preservatives, none; genuine	H. Diotte, Que.
" 22.	"	2950	21035	1·0296	0·63	" "	D. Lavallée "
" 22.	"	2951	21036	1·0314	0·66	" "	R. Latraverse "
" 22.	"	2952	21037	1·0316	0·70	" "	Dr. Prevost "
	Official Analyst, Dr. F. X. Valade, Ottawa.						
Aug. 6.	Milk	14917	20901	1·0304	0·65	Preservatives by the Blyth process; white in 12 hours; genuine	James Sorly, Ottawa.
" 6.	"	14918	20902	1·0322	0·62	" "	Ottawa Dairy Co., Ottawa.
" 6.	"	14919	20903	1·9298	0·66	" "	E. Honeywell "
" 6.	"	14920	20904	1·0306	0·65	" "	W. L. Scott "
" 6.	"	14921	20905	1·0323	0·54	" "	G. F. Benedict "
" 6.	"	14922	20906	1·0320	0·67	" "	Wm. Gorman, Bros. "
" 6.	"	14923	20907	1·0326	0·72	" "	John Frith "
" 6.	"	14924	20908	1·0319	0·57	" "	Maple Leaf Dairy "
" 6.	"	14925	20909	1·0307	0·68	" white in 17 hours	Robt. Magee "
" 2.	"	14926	20910	1·0324	0·63	" " 27 "	W. C. Gardiner, Kingston.
" 2.	"	14927	20911	1·0316	0·70	" " 19 "	John Gillespie "
" 2.	"	14928	20912	1·0296	0·62	" " 22 "	McGraue Bros. "
" 2.	"	14929	20913	1·0334	0·71	" " 27 "	J. E. Wilders "
" 2.	"	14930	20914	1·0320	0·70	" " 19 "	J. P. H. Ferris "
" 2.	"	14931	20915	1·0325	0·74	" " 19 "	Oak Point Farm "
" 2.	"	14932	20916	1·0316	0·74	" " 19 "	Robt. Rosevear "
" 1.	"	14933	20917	1·0291	0·73	" " 19 "	Booth Bros., Brockville.
" 1.	"	14934	20918	1·0318	0·57	" " 19 "	J. Morrison "
" 1.	"	14935	20919	1·0317	0·55	" " 19 "	N. J. Crippin "
" 1.	"	14936	20920	1·0324	0·66	" " 19 "	H. B. Wright "
" 1.	"	14937	20921	1·0299	0·64	" " 19 "	Grand Central Hotel, Brockville.
	Official Analyst, F. T. Harrison, London.						

Aug.	19	Milk	14360	21908	1·0322	0·76	Preservatives none; not adulterated	H. Kerby, Stratford, Ont.
"	19	"	14361	21909	1·0306	0·74	" "	J. L. Linkslater, Stratford, Ont.
"	19	"	14362	21910		0·72	" "	A. J. Clark "
"	19	"	14363	21911	1·0305	0·68	" "	Wm. McKim "
"	20	"	14364	21912	1·0299	0·66	" "	A. Howard, London, Ont.
"	20	"	14365	21913	1·0300	0·73	" "	W. J. Walker "
"	20	"	14366	21914	1·0297	0·63	" "	Sage Dairy Co. "
"	20	"	14367	21915	1·0305	0·66	" "	Sanitary Dairy Co. "
"	20	"	14368	21916	1·0316	0·68	" "	W. W. Wilkinson "
"	20	"	14369	21917	1·0301	0·64	" "	Sanitary Dairy Co. "
"	21	"	14370	21918	1·0312	0·67	" "	S. Skelly, St. Thomas, Ont.
"	21	"	14371	21919	1·0322	0·66	" "	H. Dunsford "
"	21	"	14372	21920	1·0311	0·66	" "	F. Carr "
"	21	"	14373	21921	1·0317	0·70	" "	T. Rackey "
"	22	"	14374	21922	1·0327	0·69	" "	A. A. McCachey, Chatham, Ont.
"	22	"	14375	21923	1·0313	0·72	" "	E. Main "
"	22	"	14376	21924	1·0320	0·71	" "	A. Cameron "
"	23	"	14377	21925	1·0320	0·75	" "	A. S. Skelly, Windsor, Ont.
"	23	"	14378	21926	1·0310	0·71	" "	R. Nicholls "
"	23	"	14379	21927	1·0311	0·70	" "	C. Cook "
"	23	"	14380	21928	1·0257	0·55	" "	D. G. Parient "
		Official Analyst, Dr. W. H. Ellis, Toronto.						
Aug.	28	Milk	16119	21929	1·0315	0·72	Preservatives, none; unadulterated	A. Forsyth, Toronto.
"	28	"	16121	21930		0·68	" "	H. R. Renolds, Toronto.
"	28	"	16122	21931		0·67	" "	D. Fleming "
"	28	"	16123	21932		0·75	" "	J. Fletcher "
"	28	"	16124	21933	1·028	0·65	" "	A. Arnold "
"	28	"	16125	21934		0·79	" "	A. Dundas "
"	28	"	16126	21935		0·70	" "	Price & Sons "
"	28	"	16127	21936	1·0305	0·73	" "	City Dairy "
"	30	"	16128	21937	1·031	0·73	" "	N. Wright, Orangeville, Ont.
"	30	"	16129	21938	1·031	0·75	" "	Henry Laverty "
"	30	"	16130	21939	1·032	0·72	" "	A. McKinnon "
Sept.	1	"	16131	21941	1·032	0·74	" "	F. Smith, Barrie, Ont.
"	4	"	16132	21942	1·0325	0·77	" "	S. Dymont "
"	4	"	16133	21943	1·0320	0·75	" "	Wm. Caldwell "
"	1	"	16134	21944	1·0310	0·71	" "	Mrs. Guilfoil "
"	1	"	16135	21945	1·0325	0·83	" "	Chas. Lloyd "
"	6	"	16136	21946	1·0320	0·77	" "	Thos. Wyer, Orillia, Ont.
"	6	"	16137	21947	1·032	0·72	" "	D. J. Dunn "
"	6	"	16138	21948	1·0335	0·68	Borates present; mixed with borax	Thos. Hughes "
"	6	"	16139	21949	1·0325	0·83	Preservatives, none; unadulterated	Mrs. D. Donaldson "
"	6	"	16140	21950	1·0320	0·77	" "	B. R. Kean "
"	6	"	16141	21951	1·0320	0·76	" borates present; adulterated by admixture with borax	Chas. Brennan "
"	6	"	16142	21952	1·032	0·76	None	J. R. Ditchburn, Gravenhurst, Ont.
"	6	"	16143	21953	1·0320	0·72	"	Jas. Passmore "

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Sp. Gr. at 14 C.	Result of Analysis. Acid—Grms. per 100cc.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, E. B. Kenrick, Winnipeg.*			p. c.	p. c.		
Sept. 23.	Milk	17066	17344	1·0332	0·70	Free from preservatives.	N. Corbeil, St. Boniface, Man.
" 23.	"	17067	17345	1·0315	0·69	" "	P. Seamson, Winnipeg, Man.
" 23.	"	17068	17346	1·0345	0·72	" "	Guay & Son, St. Boniface, Man.
" 23.	"	17069	17347	1·0338	0·75	" "	J. C. Dalmon, Winnipeg, Man.
" 23.	"	17070	17348	1·0341	0·71	" "	S. Slowson "
" 23.	"	17071	17349	1·0340	0·69	" "	J. Hutchinson "
" 24.	"	17072	17350	1·0283	0·67	" "	J. Balderston "
" 24.	"	17073	17351	1·0313	0·69	" "	Ottawa Dairy "
" 24.	"	17074	17352	1·0314	0·71	" "	R. H. Dickson "
" 24.	"	17075	17353	1·0314	0·71	" "	H. N. Craig "
" 24.	"	17076	17354	1·0300	0·72	" "	G. Einarson "
" 24.	"	17077	17355	1·0305	0·68	" "	Dominion Dairy "
" 24.	"	17078	17356	1·0318	0·69	" "	Norwood Dairy "
" 25.	"	17079	17357	1·0280	0·68	" "	R. L. Barber "
" 25.	"	17080	17358	1·0305	0·70	" "	A. Kirk "
" 28.	"	17082	17359	1·0300	0·68	" "	W. McLean, Morden, Man.
" 28.	"	17083	17360	1·0328	0·72	" "	M. Connors "
	Official Analyst, Dr. C. J. Fagan, B.C.						
Aug. 23.	Milk	16996	21593		0·61	No preservatives; genuine	C. H. Brown, Vancouver, B.C.
" 23.	"	16995	21594		0·53	" "	S. Garvin "
" 23.	"	16993	21595		0·63	" "	F. Worster "
" 23.	"	16994	21596		0·63	" "	J. G. Kirkwood "
" 23.	"	16990	21597		0·70	" "	D. Beare "
" 23.	"	16992	21598		0·61	" "	W. Clark "
" 23.	"	16989	21599		0·50	" "	Valley Dairy Co. "
" 23.	"	16991	21600		0·53	" "	Eligh & Metcalfe "
" 23.	"	16997	21601		0·55	" "	F. Ellison "
" 28.	"	16998	21603	1·031	0·60	" "	Buhant & Booth, New Westminster, B.C.
" 28.	"	16999	21604	1·030	0·55	" "	J. E. Murphy "

28			17000	21605	1·030	0·52		F. W. Smith
28			16801	21606	1·030	0·59		A. Douglas
28			16802	21607	1·029	0·54		J. McMartin
28			16803	21608	1·031	0·58		J. Jones, Vancouver, B.C.
28			16804	21609	1·029	0·54		J. Armstrong
28			16805	21610	1·031	0·59		J. Wolfer
28			16806	21611	1·029	0·62		C. H. Brown

APPENDIX C. INSPECTION OF DRUGS AND OTHER ARTICLES FOR ARSENIC—Tabulated Statement.

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Arsenious Acid.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, M. Bowman, Halifax, N.S.*					
Nov 7	Glaubers salts	17503	20085	None		M. D. Logan, Halifax, N.S.
" 7	Glucose	17504	20086	"		Moir, Son & Co. "
" 7	Epsom salts	17505	20087	"		Buckley Bros. "
" 7	Sulphite of soda	17506	20088	"		G. H. Colwell "
" 7	Glaubers salts	17507	20089	"		H. Taylor "
" 8	Sulphate of iron	17508	20090	"		Hattie & Mylins "
" 8	Chloride of ammonium	17509	20091	"		" "
" 8	Sulphate of iron	17510	20092	"		J. R. Rawley "
" 8	Phosphate of soda	17511	20093	$\frac{1}{1500}$ grain per oz.	Adulterated	" "
" 8	Alum	17512	20094	$\frac{1}{1500}$ " "		Simson Bros. "
" 11	Glaubers salts	17513	20095	None		A. A. Thompson "
" 11	Acid phosphate	17514	20096	"		Simson Bros. "
" 15	Epsom salts	17515	20097	"		W. H. Stevens, Dartmouth, N.S.
" 15	Acetic acid	17516	20098	"		" "
" 15	Acid phosphoric dilute	17517	20099	"		Brown Bros. & Co., Halifax.
" 15	Alum	17518	20100	$\frac{1}{500}$ of a grain per oz	Adulterated	" "
" 18	Acid phosphate	17519	20101	$\frac{1}{400}$ " "	"	Hattie & Mylius "
" 18	Eff. phosphate of soda	17520	20102	$\frac{1}{1500}$ " "		" "
" 18	Sulphate of ammonia	17521	20103	$\frac{1}{1500}$ " "		Brown & Webb "
" 18	Baking powder, 'New Process'	17522	20104	None		E. S. Tracey "
" 18	" 'English Cream'	17523	20105	"		E. W. Crease "
" 18	" 'Fast Line'	17524	20106	$\frac{1}{750}$ of a grain per oz	Adulterated	H. W. Wentzell & Co "
" 18	" 'English Cook School'	17525	17818	$\frac{1}{1500}$ " "		Vanwart Bros., St. John, N.B.
" 18	" 'Cream'	17526	17819	None		McPherson Bros. "
Dec. 1	"	17527	17820	"		P. Nase & Son "
" 2	Sulphate of iron	17528	17821	"		G. A. Moore "
" 2	Phosphate of soda	17529	17822	"		Chipman, Smith & Co "
" 2	Sulphite of soda	17530	17823	"		Silas McDiarmid "
" 4	Eff. phosphate of soda	17531	17824	"		T. B. Barker & Son "
" 5	Glucose	17532	17825	"		The White Candy Co. "

"	6	Chloride of ammonium	17533	17826	$\frac{1}{5000}$ of a grain per oz		G. W. Hobin	"
"	16	Phosphate of soda	17534	17827	None		C. A. Burchill, Fredericton, N.B.	
"	16	Acid phosphate	17535	17828	$\frac{1}{500}$ of a grain per oz		Hunt & McDonald	"
"	16	Sulphate of ammonia	17536	17829	None		J. M. Wiley	"
"	18	Sulphite soda	17537	17830	"		Baird Drug Co., Woodstock, N.B.	
"	18	Acetic acid (strong)	17538	17831	"		Garden Bros.	"
"	18	Alum	17539	17832	"		Connell's Drug Co.	"
"	21	Phosphoric acid dilute	17540	17833	"		F. Smith, St. Stephen, N.B.	
"	21	Epsom salts	17541	17834	"		F. Waterson	"
"	21	"	17542	17835	"		Johnston & Johnston	"
		Official Analyst, Dr. M. Fiset, Quebec.						
Oct.	3	Phosphate of soda	13877	21101	0·0	Free from arsenic	T. R. Goulden, Montreal.	
"	3	Alum	13878	21102	Faint trace	Contains faint trace of arsenic	"	"
"	3	Glaubers salts	13879	21103	0·0	Free from arsenic	"	"
"	3	Epsom salts	13880	21104	0·0	"	"	"
"	3	Alum	13881	21105	Faint trace	Contains faint trace of arsenic	H. Lanctot	"
"	3	Sulphate of iron	13882	21106	0·0	Free from arsenic	"	"
"	3	Phosphate of soda	13883	21107	0·0	"	J. L. Lyons	"
"	3	Alum	13884	21108	0·0	"	"	"
"	3	Phosphoric acid dilute	13885	21109	0·0	"	"	"
"	3	Epsom salts	13886	21110	0·0	"	"	"
"	4	Glaubers salts	13887	21111	0·0	"	Dr. Sabourin, St. Johns, P.Q.	
"	4	Phosphoric acid dilute	13888	21112	0·0	"	"	"
"	4	Chloride of ammonium	13889	21113	0·0	"	"	"
"	4	Sulphate of iron	13890	21114	0·0	"	Wright & Co.	"
"	4	Phosphate of soda	13891	21115	0·0	"	"	"
"	4	Sulphite of soda	13892	21116	0·0	"	"	"
"	7	Acetic acid	13893	21117	0·0	"	V. Giroux, Quebec.	
"	7	Eff. phosphate of soda	13894	21118	0·0	"	"	"
"	7	Epsom salts	13895	21119	0·0	"	"	"
"	7	Glaubers salts	13896	21120	0·0	"	"	"
"	7	Chloride of ammonium	13897	21121	0·0	"	W. Brunet & Co., Quebec.	
"	7	Sulphate of ammonia	13898	21122	0·0	"	"	"
"	7	Sulphite of soda	13899	21123	0·0	"	"	"
"	7	Acetic acid	13900	21124	0·0	"	"	"
"	7	Sulphate of iron	13901	21125	0·0	"	J. Laroche, St. Valier.	
"	7	Acid phosphate	13902	21126	0·0	"	"	"
"	8	Baking powder—'Kitchen Queen'	13903	21127	Faint trace	Contains faint trace of arsenic	E. Remillard, Montmagny, P.Q.	
"	8	" "	13904	21128	"	" "	J. P. Lespérance	"
"	8	" 'Cooks' Pride'	13905	21129	"	" "	Labrecque et frère, Lévis, P.Q.	
"	8	" "	13906	21130	"	" "	G. Carrier	"
"	8	Sulphite of soda	13907	21131	0·0	Free from arsenic	O. J. Dion	"
"	8	Sulphate of ammonia	13908	21132	0·0	"	J. E. Livernois, Quebec.	
"	8	Acid phosphate	13909	21133	Traces, about ·001 % (arsenious acid) or less	Contains traces of arsenic	"	"
"	8	Eff. phosphate of soda	13910	21134	0·0	Free from arsenic	W. Rogers	"
"	8	Glucose	13911	21135	Faint trace	Contains faint trace of arsenic	"	"

Date of Collection.		Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Arsenious Acid.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.		*Official Analyst, Dr. M. Fiset, Quebec.* Continued.					
Oct.	11	Baking powder 'English Cream'	13912	21136	Traces	Contains traces of arsenic	W. D. Bradford, Granby, P.Q.
"	11	" "	13913	21137	Faint trace	Contains faint trace of arsenic	Monty Bros. "
"	11	Glucose	13914	21138	"	" "	J. E. Dozois "
"	14	Acid phosphate	13915	21139	0·0	Free from arsenic	J. A. Simard & Co., Montreal.
"	11	Sulphate of ammonia	13916	21140	0 0	"	Lyman, Sons & Co. "
		Official Analyst, A. L. Tourchot, St. Hyacinthe.					
Oct.	29	Sulphate of iron	2980	21141	None		A. Decary, Montreal.
"	29	"	2981	21142	"		A. Goyette "
"	29	"	2982	21143	Adulterated, not by arsenic, but by sulphate of copper.		J. H. Levesque "
"	29	Phosphate of soda	2983	21144	None		A. Decary "
"	29	"	2984	21145	"		J. H. Levesque "
"	29	"	2985	21146	"		J. E. W. Lecours "
"	29	Chloride of ammonia	2986	21147	"		J. H. Levesque "
"	29	"	2987	21148	"		J. E. W. Lecours "
"	29	"	2988	21149	"		T. D. McLeish "
"	29	Baking powder, 'Oxford'	2989	21150	"		P. Brunean "
"	29	" '1900 Daisy'	2990	21151	"		J. L. Desaulniers "
"	30	Acetic acid	2991	21152	"		Dr. J. E. St. Onge, Valleyfield, Que.
"	30	Sulphite of soda	2992	21153	"		" "
"	30	Alum	2993	21154	"		" "
"	30	"	2994	21155	"		Mde. St. Louis "
"	30	Glaubers salts	2995	21156	"		" "
"	30	Alum	2996	21157	"		Dr. T. A. Gauthier "
"	30	Epsom salts	2997	21158	"		" "
"	30	Baking powder, 'Cook's Confort'	2998	21159	"		J. Morand "
"	31	Acetic acid	2999	21160	"		J. Peltier, Three Rivers, Que.
"	31	Sulphite of soda	3000	21161	"		" "

"	31	Glaubers salts	17701	21162	"			"	"
"	31	Sulphite of soda	17702	21163	"			R. W. Williams	"
"	31	Phosphoric acid dilute	17703	21164	"			"	"
"	31	Epsom salts	17704	21165	"			"	"
"	31	Glucose	17705	21166	"			"	"
"	31	Eff. phosphate of soda	17706	21167	"			L. Hoerner	"
"	31	Acetic acid	17707	21168	"			"	"
Nov.	4	Eff. phosphate of soda	17708	21169	"			J. R. McBain, Sherbrooke, Que.	
"	4	Phosphoric acid dilute	17709	21170	"			W. H. Griffiths	"
"	4	" "	17710	21171	"			G. Richard	"
"	4	Glaubers salts	17711	21172	"			W. J. R. McKindesly, Lennoxville, Que.	
"	4	Epsom salts	17712	21173	"			"	"
"	4	Phosphoric acid dilute	17713	21174	"			F. T. Ansell, Sherbrooke, Que.	
"	4	Baking powder, 'Diamond Star'	17714	21175	"			T. A. Bourque	"
"	4	" 'English Cream'	17715	21176	"			Bray Bros.	"
"	4	" 'Kitchen Queen'	17716	21177	"			"	"
"	4	" 'English Cream'	17717	21178	"			J. B. Orr, Lennoxville, Que.	
"	5	Sulphate of ammonia	17718	21179	"			D. J. Leduc & Co., Montreal.	
"	5	Glucose	17719	21180	"			T. Papmetrion	"
"	6	Sulphate of ammonia	17720	21181	"			Dart & Chapman	"
"	6	"	17721	21183	"			M. Albert	"
"	6	Phosphoric acid dilute	17722	21184	"			"	"
"	6	"	17723	21185	"			Kerry, Watson & Co.	"
"	6	Eff. phosphate of soda	17724	21186	"			A. D. Sawyer	"
		Official Analyst, Dr. F. X. Valade, Ottawa.							
Oct.	1	Alum	14871	20944	None			W. H. Roger, Ottawa.	
"	1	Acetic acid	14872	20945	"			"	"
"	1	Chloride of ammonia	14873	20946	"			"	"
"	1	Epsom salts	14874	20947	"			"	"
"	1	Sulphate of soda	14875	20948	"			E. J. Leger	"
"	1	Phosphoric acid dilute	14876	20949	"			"	"
"	1	Alum	14877	20950	"			"	"
"	1	Sulphate of ammonia	14878	20951	0·0003 p. c.			"	"
"	2	Chloride of ammonia	14879	20952	Faint trace, less than one part in one million.			Dr. K. D. Graham	"
"	2	Acetic acid	14880	20953	None			"	"
"	2	Eff. phosphate of soda	14881	20954	About two parts per million.			"	"
"	2	Sulphite of soda	14882	20955	Less than one part in one million.			"	"
"	2	Sulphate of iron	14883	20956	" "			Graham & Elliott	"
"	2	Phosphate of soda	14884	20957	None			"	"
"	2	Eff. phosphate of soda	14885	20958	Less than one part in one million.			"	"
"	2	Phosphoric acid dilute	14886	20959	None			"	"
"	2	Glucose	14887	20960	Less than one part in one million.			"	"
"	2	"	14888	20961	None			E. J. Leger	"

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Arsenious Acid.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, Dr. F. X. Valade, Ottawa.*—Continued.			p. c.		
Oct. 2	Acid phosphate (Horsford's)	14889	20962	None		W. H. Roger, Ottawa.
" 2	"	14890	20963	"		Dr. K. D. Graham "
" 4	Baking powder, 'English Cream'	14891	20964	"		B. W. Granger "
" 4	"	14892	20965	0·0003 p. c.		Mrs. J. Martin "
" 4	" 'Ajax'	14893	20966	0·0001 p. c.		P. Foisy "
" 4	" 'Forest City'	14894	20967	Very faint trace.		" "
" 8	Sulphate of soda	14895	20968	Faint trace		Abbotts Drug Store, Smith's Falls.
" 8	Epsom salts	14896	20969	None		" "
" 8	Sulphate of iron	14897	20970	Faintest trace		" "
" 8	Phosphate of soda	14898	20971	Very faint trace		Dr. G. S. McCallum "
" 8	Sulphite of soda	14899	20972	"		" "
" 8	Sulphate of ammonia	14900	20973	"		" "
" 8	Sulphate of iron	14694	20974	About one part in 200,000		Wm. Johnston "
" 8	Alum	14695	20975	Very faint trace		" "
" 8	Epsom salts	14696	20976	None		" "
" 8	Baking powder, 'Crown'	14697	20977	0·00001 p. c.		L. J. Laland "
" 8	" 'Magic'	14698	20978	0·0005 p. c.		Aberdeen Fruit Store "
	Official Analyst, Dr. W. H. Ellis, Toronto.					
Oct. 9	Chloride of ammonium	16175	22530	None	Free from arsenic	Jas. Lynch, Peterboro', Ont.
" 9	Sulphate of iron	16176	22531	"	"	H. S. Macdonold "
" 9	Phosphate of soda	16177	22532	"	"	" "
" 9	Phosphoric acid dilute	16178	22533	"	"	" "
" 9	Phosphate of soda	16170	22525	"	"	J. D. Tully "
" 9	Epsom salts	16171	22526	A trace	Contains a trace of arsenic	" "
" 9	Sulphate of soda	16172	22527	None	Free from arsenic	" "
" 9	Alum	16173	22528	"	"	Jas. Lynch "
" 9	Sulphate of ammonia	16174	22529	"	"	" "
" 10	Acetic acid	16179	22534	"	"	Sniders Pharmacy, Toronto.
" 10	Eff. phosphate of soda	16180	22535	"	"	" "

"	10	Sulphite of soda	16181	22536	"	"	"	"	"
"	10	Epsom salts	16182	22537	"	"	"	"	"
"	10	Sulphate of soda	16183	22538	"	"	"	"	"
"	10	Phosphoric acid dilute	16184	22539	"	"	Lyman Bros. & Co.	"	
"	10	Alum	16185	22540	"	"	"	"	
"	10	Sulphate of ammonia	16186	22541	Trace in 5 grains	Contains a trace of arsenic	"	"	
"	10	Chloride of ammonium	16187	22542	None	Free from arsenic	"	"	
"	10	Sulphate of iron	16188	22543	"	"	Evans & Sons	"	
"	10	Glucose	16189	22544	"	"	"	"	
"	10	Phosphate of soda	16190	22545	"	"	"	"	
"	10	Sulphite of soda	16191	22546	"	"	"	"	
"	10	Acid phosphate	16192	22547	"	"	Standard Fertilizer Co., Smith's Falls, Ont.		
"	11	Chloride of ammonium	16193	22549	"	"	R. Dezell, Port Hope.		
"	11	Acetic acid	16194	22550	"	"	"	"	
"	11	Epsom salts	16195	22552	"	"	"	"	
"	11	Alum	16196	22553	0·0027 p. c.	Contains arsenic in the proportion of 0·0027 p. c. arsenic trioxide.	S. T. Hopper	"	
"	11	Sulphate of ammonia	16197	22554	None	Free from arsenic	"	"	
"	11	Sulphate of soda	16198	22555	0·0093 p. c.	Contains arsenic in the proportion of 0·0093 p. c. arsenic trioxide.	"	"	
"	11	Sulphate of iron	16199	22556	None	Free from arsenic	T. G. Watson	"	
"	11	Glucose	16200	22557	"	"	"	"	
"	11	Phosphate of soda	16201	22558	"	"	"	"	
"	11	Baking powder, "English Cream"	16202	22560	"	"	Miller & Barfat	"	
"	11	" "Our 1900 Daisy"	16203	22561	"	"	F. H. Brown	"	
"	11	" "Social"	16204	22562	"	"	C. P. Collins, Peterboro'.		
"	11	" "Kitchen Queen"	16206	22563	0·004 p. c.	Contains arsenic in the proportion of 0·004 p. c. arsenic trioxide.	W. H. Wrighton	"	
		Official Analyst, F. T. Harrison, London.							
Oct.	4	Sulphite of soda	14409	21975	0·0005	Result obtained by comparing with standard tubes	L. R. Clark, Berlin, Ont.		
"	4	Sulphite of iron	14410	21976	0·00005	A possible trace.	"	"	
"	4	Baking powder, 'Kitchen Queen'	14411	21977	0·0003	"	S. A. Brubacker	"	
"	4	Acid phosphate	14412	21978	None		C. J. Dickson	"	
"	4	Sulphate of soda	14413	21979	"		"	"	
"	4	Chloride of ammonium	14414	21980	0·0003	By comparing with stan'rd tubes	L. H. Cant	"	
"	5	Alum	14415	21981			S. Snyder, Waterloo, Ont.		
"	5	Acetic acid	14416	21982	None		"	"	
"	5	Eff. phosphate of soda	14417	21983	0·0001	A possible trace.	"	"	
"	5	Epsom salts	14418	21984	0·00005	" "	E. O. Flaherty, Stratford, Ont.		
"	5	Baking powder, 'English Cream'	14419	21985	0·00297		C. McKhargey	"	
"	5	Sulphate of ammonia	14420	21986	0·0001	A possible trace.	Westbrook & Stalker	"	
"	8	Baking powder, 'Kitchen Queen'	14421	21987	0·0005	By comparing with stan'rd tubes	Beattie & Co., St. Mary's Ont.		
"	8	" 'English Cream'	14422	21988	0·0066		"	"	
"	8	Eff. phosphate of soda	14423	21989	0·0003	By comparing with stan'rd tubes	Sidney Fraleigh	"	
"	8	Acetic acid	14424	21990	None		"	"	

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Arsenious Acid.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, F. T. Harrison, London.*—Continued.			p. c.		
Oct. 9	Alum	14425	21991			John Callard, London, Ont.
" 9	Chloride of ammonium	14426	21992	0·0001	A possible trace	" "
" 9	Phosphoric acid dilute	14427	21993	Merest trace		D. McCallum & Co., London, Ont.
" 9	Alum	14428	21994	0·0002	By comparing with stan'rd tubes	Kerry, Watson & Co. "
" 9	Glucose	14429	21995	None		D. S. Perrin & Co. "
" 9	Sulphate of soda	14430	21996	"		Cairncross & Lawrence "
" 9	Phosphate of soda	14431	21997	"		" "
" 10	Glauber's salts	14432	21998	None		N. J. McDermot "
" 10	Phosphate of soda	14433	22000	0·00005	A possible trace	Geo. E. Kennedy "
" 10	Sulphate of iron	14434	22001	0·00003	" "	" "
" 10	Glucose	14435	22002	None		McCormac "
" 10	Alum	14436	22003	0·0046		London Coffee and Spice Co., London, Ont.
" 10	Acid phosphate	14437	22004	0·0004	By comparing with stan'rd tubes	" "
" 10	Alum	14437	22005	Trace		Gorman & Eckhart "
" 10	Acid phosphate	14439	22006	0·0004	By comparing with stan'rd tubes	" "
" 10	Glauber's salts	14440	22008	0·0001	A possible trace	J. E. Platt "
" 10	Epsom salts	14441	22009	None, or not more than the merest trace.		J. Callard "
" 10	"	14442	22010	" "		W. T. Strong "
" 11	Baking powder, 'Cooks' Friend'	14443	22011	" "		T. Gray, Toronto.
" 11	Sulphate of iron	14444	22012	0·00003	A possible trace	G. Marshall "
" 11	Baking powder, 'Cooks' Friend'	14445	22013	None, or not more than the merest trace.		Michie & Co. "
" 11	Sulphate of ammonia	14446	22014	None		Lyman Bros. & Co., Toronto.
	Official Analyst, E. B. Kendrick, Winnipeg.					
Oct. 11	Phosphoric acid dilute	17101	17381	Practically free from arsenic	Genuine	D. E. Clement, Brandon, Man.
" 11	Sulphate of iron	17102	17382	" "	"	" "
" 11	Chloride of ammonium	17103	17383	" "	"	" "

"	11	Phosphate of soda	17104	17384	"	"	"	Fleming & Sons "
"	11	Acetic acid	17105	17385	"	"	"	" "
"	11	Sulphite of soda	17106	17386	"	"	"	" "
"	11	Baking powder, 'Flemmings'	17107	17387	Present		"	" "
"	11	Epsom salts	17108	17388	Practically free from arseme		"	N. J. Halpin "
"	11	Alum	17109	17389	"	"	"	" "
"	11	Glaubers salts	17110	17390	"	"	"	" "
"	17	Sulphate of iron	17111	17391	"	"	"	H. A. Wise, Winnipeg, Man.
"	17	Phosphate of soda	17112	17392	"	"	"	" "
"	17	Chloride of ammonium	17113	17393	Present		"	W. R. Inman & Co. "
"	17	Acetic acid	17114	17394	Practically free from arsenic		"	" "
"	17	Sulphate soda	17115	17395	"	"	"	R. L. Morrison "
"	17	Epsom salts	17116	17396	"	"	"	" "
"	18	Phosphoric acid dilute	17117	17397	"	"	Not diluted phosphoric acid of B.P. Adulterated if sold as such	W. Pulford "
"	18	Epsom salts	17118	17398	"	"	Genuine	" "
"	18	Sulphate of ammonia	17119	17399	Present		"	J. C. Gordon "
"	18	Alum	17120	17400	"		"	" "
"	19	Eff. phosphate of soda	17121	17401	Practically free from arsenic		"	Hudson Bay Co. "
"	21	" "	17122	17402	"	"	"	Flexon & Co. "
"	21	Glaubers salts	17123	17403	"	"	"	" "
"	21	Alum	17124	17404	"	"	"	Jackson & Co. "
"	21	Glucose	17125	17405	"	"	"	Martin Bole Wynne Co. "
"	21	Sulphate of ammonia	17126	17406	"	"	"	W. J. Mitchell "
"	22	Glucose	17127	17407	"	"	"	Paulin Chambers & Co. "
"	22	Baking powder 'Shield'	17128	17408	"	"	"	Campbell Bros. & Wilson "
"	22	" 'Price's Cream'	17130	17410	"	"	"	Hudson Bay Co. "
"	22	" 'White Star'	17131	17411	Present		Adulterated	" "
"	22	" 'Blue Ribbon'	17132	17412	"		"	A. Macdonald "
		Official Analyst, Dr. C. J. Fagan, Victoria, B.C.						
Nov.	18	Sulphate of iron	16840	21630	None			C. Woodward, Vancouver, B.C.
"	18	Alum	16841	21631	Present, less than gr. in 10 grains.	$\frac{1}{1000}$		McDowell, Atkins Watson Co., Vancouver, B.C.
"	18	Phosphate of soda	16842	21632	"	"		" " "
"	19	Chloride of ammonium	16843	21633	None			C. Muddell, Vancouver, B.C.
"	19	Baking powder, 'Cook's Choice'	16844	21634	Present, less than gr. in 5 grains.	$\frac{1}{1000}$		J. Deal, Vancouver, B.C.
"	19	" 'Forest City'	16845	21635	"	"		C. Anderson & Co., Vancouver, B.C.
"	20	" 'Champion'	16846	21636	"	"		H. Alberts, Vancouver, B.C.
"	20	Alum	16847	21637	None			Red Cross Pharmacy, Vancouver, B.C.
"	20	Acetic acid	16848	21638	"			Nelson McPherson, Sunderland Drug Co., Vancouver, B.C.
"	21	Sulphate of ammonia	16849	21639	Present, less than gr. in 10 grains.	$\frac{1}{1000}$		" " "

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Arsenious Acid.	Remarks by Analyst.	Name and Address of Vendor of Sample.
1901.	*Official Analyst, Dr. C. J. Fagan, Victoria, B.C.*—Concluded.					
Nov. 21	Phosphoric acid dilute	16850	21640	None		C. M. Eddington, Vancouver, B.C.
" 21	Glaubers salts	16851	21641	"		J. R. Seymour "
" 21	Epsom salts	16852	21642	"		McDowell, Atkins Watson Co., Vancouver, B.C.
" 21	Eff. phosphate of soda	16853	21643	"		" " "
" 21	Glucose	16854	21644	"		" " "
" 22	Sulphite of soda	16855	21645	"		J. K. Patton, Vancouver, B.C.
" 22	Epsom salts	16856	21646	"		J. Reed "
Dec. 1	Sulphate of iron	16857	21647	"		Moore & Co., Victoria, B.C.
" 1	Chloride of ammonium	16858	21648	"		" "
" 1	Phosphoric acid dilute	16859	21649	"		B. C. Drug Co. "
" 1	Alum	16860	21650	Present, less than $\frac{1}{1000}$ gr. in 10 grains.		T. Shotbolt "
" 1	Acetic acid	16861	21651	None		W. Jackson & Co. "
" 1	Glaubers salts	16862	21652	"		J. Cochrane "
" 1	Epsom salts	16863	21653	"		Dean & Hiscock "
" 3	Eff. phosphate of soda	16864	21654	"		C. H. Bowes "
" 3	Phosphate of soda	16865	21655	"		G. Mornson & Co. "
" 3	Sulphite of soda	16866	21656	"		F. W. Fawcett & Co. "
" 3	Baking powder	16867	21657	Present, less than $\frac{1}{1000}$ gr. in 5 grains.		L. Dickinson & Co. "
" 3	" 'Golden Cream'	16868	21658	" "		C. M. Cameron "
" 3	Sulphate of ammonia	16869	21659	None		W. Jackson & Co. "
" 3	Glucose	16870	21660	"		H. A. Tilley "
" 3	Baking powder, 'Hygiene'	16871	21661	Present, = 0·003 grains in 10 grains.	Adulterated	W. A. Burt "

INSPECTION OF COFFEE.

APPENDIX D.—INSPECTION OF

Date of Certificate.	Description of Sample, together with Name and Address of Manufacturer, when known.	Date of Analyst's Certificate.	No. of Sample.	Result of					
				Moisture.	Fat.	Aqueous Extract.	Caffeine.	Starch.	Sp. Gr. of 10 p.c. Solution.
1901.	*Official Analyst, M. Bowman, Halifax.*			p. c.	p. c.	p. c.	p. c.		
Jan. 10..	Coffee.....	17543	20207	3·06	10·73	25·76	1·32	None...	1·0101
" 10..	"	17544	20208	3·21	9·71	34·15	1·11	" ...	1·013
" 17..	"	17545	20209	4·09	9·02	32·58	0·99	" ...	1·013
" 17..	"	17546	20210	3·21	10·16	26·56	1·12	" ...	1·011
" 17..	"	17547	20111	4·81	5·69	35·92	0·70	Present.	1·014
" 18..	"	17548	20212	7·18	10·50	24·48	1·00	None...	1·010
" 18..	"	17549	20213	3·89	4·20	32·38	0·37	Present.	1·012
" 18..	"	17550	20214	3·24	9·40	26·39	1·14	None...	1·010
	Official Analyst, Dr. M. Fiset, Quebec.								
Nov. 13..	Coffee.....	13917	21187	4·48	8·92	27·86	1·08	Wheat .	1·0215
" 13..	"	13918	21188	2·64	9·74	23·66	1·22	None...	1·01011
" 13..	"	13919	21189	2·66	9·72	23·20	1·24	" ...	1·0099
" 13..	"	13920	21190	6·76	8·28	29·92	1·04	Wheat .	1·0138
" 13..	"	13921	21191	4·02	7·10	31·98	1·00	None...	1·0141
" 13..	"	13922	21192	4·96	8·90	23·06	1·10	" ...	1·0099
" 13..	"	13923	21193	2·22	8·40	23·82	1·18	" ...	1·0098
" 13..	"	13924	21194	3·84	9·20	23·62	1·20	" ...	1·0099
	Official Analyst, A. L. Tourchot, St. Hyacinthe.								
Jan. 9..	Coffee.....	17725	21201	3·33	8·86	25·28	0·94	.....	1·0108
" 9..	"	17726	21202	2·32	9·99	25·96	0·84	.....	1·0103
" 10..	"	17727	21204	2·04	9·80	30·24	0·60	.....	1·0126
" 10..	"	17728	21205	2·47	8·48	30·30	1·00	.....	1·0132
" 11..	"	17729	21206	1·70	7·58	36·90	0·72	.....	1·0534
" 11..	"	17730	21207	1·96	10·80	27·20	1·17	.....	1·0108
" 14..	"	17731	21208	2·37	9·91	26·10	0·96	.....	1·0106
" 14..	"	17732	21209	3·30	8·22	29·16	0·87	.....	1·0117
" 14..	"	17733	21210	2·10	7·75	29·70	0·31	.....	1·0125
	Official Analyst, Dr. F. X. Valade, Ottawa.								
Nov. 11.	Coffee.....	17901	22576	4·88	6·22	33·80	0·77	.....	1·0117
" 11..	"	17902	22577	2·83	8·54	22·56	0·97	.....	1·0070
" 11..	"	17903	22578	5·70	9·39	23·70	1·00	.....	1·0082
" 11..	"	17904	22579	2·73	8·68	18·65	1·05	.....	1·0050
" 11..	"	17905	22580	2·84	9·20	20·96	1·01	.....	1·0064
" 11..	"	17906	22581	3·24	9·04	21·37	1·02	.....	1·0065
" 11..	"	17907	22582	2·42	9·62	21·28	1·01	.....	1·0067

SESSIONAL PAPER No. 14

COFFEE—Tabulated Statement.

Analysis.						
Ash.						
Total.	Water Soluble.	Acid Soluble.	Insoluble.	Foreign Substances by Microscope	Remarks by Analyst.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
4·16	3·36	0·74	0·06	.....	Adulterated with a little chicory	W. A. Smith, Kentville, N.S.
4·13	3·17	0·83	0·13	.....	" "	DeWolf & Lamont "
4·85	3·60	0·93	0·32	.....	" "	B. O. Bishop, Dartmouth, N.S.
4·61	3·60	0·81	0·20	.....	" "	G. A. Orman "
4·62	3·12	1·11	0·39	.....	Adulterated with chicory, also with farinaceous matter.	S. Thomson "
4·59	3.67	0·79	0·13	.....	Adulterated with a little chicory	J. A. Deaman & Co., Halifax.
5·14	2·97	1·63	0·54	.....	Adulterated with chicory, also with farinaceous matter.	H. W. Wentzell "
5·03	3·69	1·06	0·28	.....	Adulterated with a little chicory	A. P. Torrens "
4·84	3·74	0·72	0·38	.....	Adulterated with chicory and wheat starch.	D. Audette, Windsor Mills, Que
4·90	3·70	0·78	0·42	.....	Genuine	W. S. Samson "
4·26	3·38	0·80	0·08	.....	"	C. A. Miller "
5·26	3·26	1·16	0·84	.....	Adulterated with wheat and chicory.	P. J. Girard, Richmond, Que.
4·28	3·16	0·98	0·14	.....	Adulterated with about 20 p.c. chicory.	Theo. Julien, Quebec.
4·38	3·52	0·82	0·04	.....	Genuine	J. E. Blais "
4·30	3·52	0·74	0·04	.....	"	A. St. Cyr "
4·62	3·66	0·60	0·36	.....	"	D. Teiczervitz "
4·25	3·61	0·57	0·07	.....	Pure	H. Robert, St. Hyacinthe.
4·12	3·30	0·71	0·11	.....	"	V. Marceau "
4·95	3·69	0·93	0·33	.....	Contains 10 to 15 p.c. chicory.	J. Raby, St. Henri.
4·88	3·78	0·88	0·22	.....	" 15 to 20 "	J. A. Dore, St. Cunegonde.
4·72	3·50	0·86	0·36	.....	Adulterated with from 20 to 25 p.c. chicory.	A. Marsolais, 1660 Ontario St., Montreal.
4·28	3·50	0·68	0·10	.....	Pure	E. Mercier, 1270 De Montigny, Montreal.
4·28	3·64	0·58	0·06	.....	"	C. Brossean & Co., St. John, Que
4·76	3·08	1·28	0·40	.....	Adulterated with about 10 p.c. chicory.	A. Gibeau "
4·54	3·50	0·80	0·24	.....	Adulterated with from 10 to 15 p.c. chicory and starch.	Simard, Brossard & Co. "
3·93	1·32	2·43	0·18	About 10 p.c. roasted peas and chicory.	Adulterated	M. H. McVeity, Ottawa.
4·49	1·15	3·33	0·01	None	Genuine	C. Moreland "
4·99	2.11	2·52	0·36	"	"	E. Lafontaine "
4·19	0·98	3·17	0·04	"	"	Mrs. A. Macdonald "
4·48	1·11	3·35	0·02	"	"	R. A. Cochrane, Almonte, Ont.
4·79	1·27	3·36	0·16	"	"	Robt. Cochrane "
4·71	1·37	3·26	0·08	"	"	Jas. Robertson "

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of					
				Moisture.	Fat.	Aqueous Extract.	Caffeine.	Starch.	Sp. Gr. of 10 p.c. Solution.
1901.	*Official Analyst, Dr. W. H. Ellis, Toronto.*			p. c.	p. c.	p. c.	p. c.	p. c.	
Nov. 29.	Coffee	16207	22583	2·15	10·62	23·12	1·26	.....	1·0105
" 29.	" Compound	16208	22584	5·27	5·28	23·12	0·82	.. ..	1·0103
" 29.	"	16209	22585	2·52	8·04	22·23	0·45	.. ..	1·0103
" 29.	"	16210	22586	1·82	4·75	22·41	0·32	.....	1·0105
29.	"	16211	22587	2·97	6·65	37·05	0·50	.....	1·0146
29.	"	16212	22588	2·33	8·40	23·94	0·42	.....	1·0106
" 30.	"	16213	22591	4·70	5·10	34·76	0·26	3·62	1·0158
" 30.	"	16214	22592	3·59	7·67	31·41	0·40	7·16	1·0124
	Official Analyst, F. T. Harrison, London, Ont.								
" 25.	Coffee	14444	22015	4·88	13·30	21·14	1·35	None	1·0103
" 25.	"	14445	22016	3·48	11·02	30·42	1·19	"	1·0139
" 25.	"	14446	22017	2·10	14·00	22·25	1·42	"	1·0103
" 25.	"	14447	22018	2·05	14·18	23·02	1·54	"	1·0102
" 26.	"	14448	22019	4·43	11·05	23·14	1·20	"	1·0103
" 26.	"	14449	22020	4·76	11·46	25·70	1·16	"	1·0112
" 26.	"	14450	22021	3·39	10·92	25·76	1·21	"	1·0113
	Official Analyst, E. B. Kenrick, Winnipeg.								
Dec. 9.	Coffee	17133	17413	2·98	10·88	21·57	1·30	.....	1·0080
" 9.	"	17134	17414	2·14	11·73	21·60	1·30	.....	1·0080
" 9.	"	17135	17415	2·36	11·75	22·40	1·28	.....	1·0083
" 9.	"	17136	17416	2·35	10·90	21·42	1·35	.....	1·0080
" 9.	"	17137	17417	1·73	12·23	24·03	1·41	.....	1·0089
" 9.	"	17138	17418	3·18	11·83	27·60	1·34	.....	1·0100
	Official Analyst, Dr. C. J. Fagan, Victoria, B.C.								
" 19.	Coffee	16834	21662	5·41	9·41	32·25	1·40	.....	1·008
" 19.	"	16835	21663	1·20	6·80	28·50	1·10	.....	1·01
" 20.	"	16836	21664	3·75	4·90	50·20	0·50	7·20	1·016
" 20.	"	16837	21665	12·68	6·80	33·45	1·30	.....	1·008
" 21.	"	16838	21666	3·01	6·90	37·20	0·70	4·10	1·013
" 21.	"	16839	21667	4·46	8·00	27·25	1·50	.....	1·010

COFFEE.—Tabulated Statement—*Concluded.*

Analysis.						
Ash.						
Total.	Water Soluble.	Acid Soluble.	Insoluble.	Foreign Substances by Microscope.	Remarks by Analyst.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
4·15	3·10	0·77	0·28		Genuine	F. H. Wiley, Hamilton, Ont.
3·94	3·13	0·73	0·08		"	J. Allen "
4·63	3 73	0·72	0·18		"	Holt & Co. "
3·95	3·25	0 66	0·04		"	M. E. Bush & Co., 285 College St., Toronto.
4·17	3·07	0 90	0 20	Chicory	Adulterated by admixture with about 25 p.c. of chicory.	Case's Grocery, 455 Yonge St., Toronto.
3 84	3·10	0·62	0·12		Genuine	F. Patience, 455 Yonge St., Toronto.
4·01	2·85	0·90	0·26	A chicory and pea starch.	Adulterated by chicory and farinaceou matter to the extent of 25 p.c. or more.	Miss Ledingham, Myrtle, Ont.
3·85	2·93	0·80	0·12	Chicory and wheat starch.	Adulterated by admixture with chicory and wheat starch to the extent of at least 10 p.c.	" "
4·08	3·35	0 70	0·12		Unadulterated	P. Conlon, London, Ont.
4·18	3·20	0·93	0·13		Adulterated with chicory.	Mrs. Smith "
4·11	3·38	0 70	0 10		Unadulterated	W. E. Ross, St. Thomas, Ont.
4·04	3·36	0·82	0·10		"	A. McKenzie "
4·23	3·38	0 78	0·09		"	Tudhope Bros., Woodstock, Ont.
4·18	3·11	0·84	0·23		Adulterated with chicory.	John Scott & Co. "
4·32	3 30	0·92	0·17		" "	C. A. O'Neill, Ingersoll.
4 72	3·65				Genuine	C. McDonald, Winnipeg.
4·26	3·37				"	Thos. Hartley "
4·35	3 30				"	Hardy & Buchanan "
4·36	3·42				"	Matheson Bros. "
4·50	3·48				"	A. Macdonald "
4 32	3·38				"	J. A. McKircher "
3·82	2·56	1·10	0·16		"	J. R. Johnson, Vancouver, B.C.
3·92	2·91	0·93	0·08	Chicory	Adulterated	City Grocery Company, Vancouver, B.C.
3·48	2·38	0·92	0·18	Chicory and starch.	"	Clarke & Rogerson, Vancouver. B.C.
3·92	2·88	0·72	0·12		Genuine	J. Donald & Co. "
3·76	2·74	0·94	0·08	Chicory and starch.	Adulterated	Eagett & Co. "
3·90	2·75	1·04	0·11		Genuine	C. E. Tanner "

APPENDIX E.—INSPECTION OF COCOA

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Results of							
				Moisture.	Cacao Butter.	Extract by (0.825) Alcohol.	In Alcohol Extract.			Warm Water Extract.	Residue.
							Theobroma.	Reducing substances as Dextrose.	Cane Sugar.		
1902.	*Official Analyst, A. L. Tourchot, St. Hyacinthe.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Jan.	25 Cocoa (bulk), Cowan & Co., Toronto.	17734	20980	7·56	9·60	11·00	1·14	1 80	2·77	17·02	54·82
"	25 Cocoa (Huyler's), Huyler, New York.	17735	20981	4·36	35·18	8·04	0·61	0 90	1·39	14·09	38·76
"	25 Chocolate Powder, Crosse & Blackwell, London, Eng.	17736	20982	5·50	19·86	29·68	0·30	2·80	18·59	7·11	38·63
	25 Cocoatina, H. Schweitzer & Co., London, Eng.	17737	20983	5 12	28·68	9 33	0·65	1·44	0·28	11·55	45·30
	25 Cocoa Essence, Cadbury, London, Eng.	17738	20984	5·02	23·77	10 27	0·40	1·05	0 65	10·34	50·59
"	25 Chocolate (Ceylon Rock), Cowan & Co., Toronto.	17739	20985	1·09	20·15	29·76	0·33	0·52	10·27	38·04	11·06
	25 Cocoa (bulk), Dominion Mills Co., Toronto.	17740	20986	3·46	16·82	44·16	0·28	0·67	25·72	5·51	30·04
"	25 Cocoa Beans, Baker & Co..	17741	20987	4·75	43 77	9 76	0·48	0·88	0·43	9 67	32·16
"	25 Cocoa Nibs, Baker & Co...	17742	20988	2·90	48·31	10 67	0·38	0·50	0·11	8 00	30·12

AND CHOCOLATE—Tabulated Statement.

ANALYSIS

Melting point of Fat.	Ash.				Reaction of warm water extract with Tincture Iodine.	Starch.	Remarks by Analyst.	Name and Address of Vendor of Sample.
	Water Soluble.	Soluble in Hydrochloric Acid.	Insoluble in Hydrochloric Acid.	Total.				
	p. c.	p. c.	p. c.	p. c.		p. c.		
30 to 31 C.	3·82	2·24	0·50	6 56	None	None.	No foreign starch; not adulterated.	Messrs. Bate & Co., Ottawa.
31 to 33 C.	1·80	2·58	0·20	4·58	"	11·92	" "	" "
29 to 31 C.	1·33	1·09	0·18	2·60	Blue	21·52	Wheat starch; not adulterated, being sold as a mixture.	Kavanagh Bros., Ottawa.
31 to 33 C.	4·67	1·52	0·06	6 25	None	10·42	No foreign starch; not adulterated.	" "
33 to 35 C.	1·46	3·18	0·10	4 74	"		" "	" "
33 to 35 C.	0.68	0·55	0·03	1 26			" "	" "
33 to 35 C.	1·89	0·40	0·08	2 37	Intense blue.	3·36	Maize starch; no mention of it being sold as a mixture, therefore adulterated.	" "
33 to 36 C.	1·76	1·18	0·08	3·32			Pure, no other constituents than those of cacao.	Messrs. Baker & Co., Dorchester, Mass., U.S.A.
34 to 35 C.	1·44	1·46	0·02	2·92	None		" "	" "

APPENDIX E. INSPECTION OF COCOA AND CHOCOLATE Tabulated Statement *Concluded.*

Date of Collection.	Description of Sample, together with Name and Address of Manufacturer when known.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Loss by Drying at 100° C.	Fat.	Loss in Lixiviating with Warm Water.	Residue, Starch, Fibre, &c.	Reducing Sugar as Dextrose.	Cane Sugar.	Total Nitrogen.	Theobromine.	Proteids.	Remarks by Analyst.	Name and Address of Furnisher of Sample.
1901.	*Official Analyst, F. T. Harrison, London, Ont.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
July 27..	Cacao Nibs	14402		3·28	51·68	.....	....	None.	None.	2·18	1·03	11·62	.....	Walter Baker & Co.
" 27..	Cacao-mass	14403		4·57	51·70	13·40	30·33	...	....	2·06	1·05	10·81	.....	Ganong, St. Stephens, N.B.
" 27..	Chocolate; Walter Baker & Co.	14404	....	3·33	52·90	12·60	31·17	.....	.....	2·09	1·12	10·88		
" 27..	Baker's Breakfast Cocoa	14405	...	6·40	26·15	19·00	48·45	...	...	3·31	1·65	17·43	.....	Walter Baker & Co.
" 27..	German Sweet Chocolate, Baker & Co.	14406	...	1·63	23·03	64·10	11·24	1·41	52·14	0·88	0·73	4·13	.....	" "
" 27..	Baker's Broma	14407	...	1·96	21·00	34·60	36·28	5·12	24·40	1·02	0·74	4·94		" "
" 27..	Epps' Cocoa	14408	...	1·62	27·35	32·27	35·76	1·31	25·56	1·17	0·74	5·87		

APPENDIX F.—INSPECTION OF CHEESE—Tabulated Statement.

Date of Collection.		Description of Sample, together with Name and Address of Manufacturer when known.	No. of Sample.	Result of Analysis.									Remarks by Analyst.	Name and Address of Vendor of Samples.	
				Total acidity stated as Lactic ac.	Total Nitrogen.	Caseids N. 6·25.	Total Ash.	Moisture.	Fat.	Alcohol Extract.	Hot Water Extract.	Insoluble Caseine.			
1902.		*Official Analyst, A. L. Tourchot, St. Hyacinthe.*		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
April,	28	Cheese—'Imperial Potted,' A. F. Maclaren, Toronto	23317	3·56	4·20	26·25	4·01	29·99	35·79	10·48	7·16	16·58		Longtin, Freres & Cie, St. Johns, P.Q.	
"	28	" 'Roquefort,' Imported	23318	4·46	3·68	22·97	5·63	33·65	34·89	15·53	5·87	10·06		"	"
"	28	" 'Gruyere,' Imported	23319	4·41	4·48	28·00	3·95	33·44	32·49	8·90	6·28	18·89		"	"
"	28	" 'Limbourg,' Imported	23320	3·56	4·02	25·11	3·32	42·04	26·12	12·59	7·72	11·53		"	"
"	28	" 'Canadian,'	23321	2·93	4·17	26·07	3·52	33·14	34·59	12·43	5·87	13·97		"	"
"	2	" 'Oka,' The Trappists Oka, P.Q.	23322	2·48	4·03	25·20	4·82	47·40	20·54	11·03	5·49	15·54		Alf. Francœur & Son	"
"	2	" 'Canadian,'	23323	3·47	4·31	27·32	3·21	32·88	32·01	11·82	6·17	17·12		"	"
"	2	" 'Imperial Potted,' A. F. Maclaren, Toronto	23324	3·51	4·17	26·07	4·29	30·86	33·34	11·98	5·41	18·41		F. X. Chagnon, Sorel, P.Q.	
"	30	" 'Pine Apple,' made in the U.S.A.	23325	4·37	4·72	29·49	5·96	19·49	42·78	13·45	6·67	17·61		Pagnuelo & Freres, St. Hyacinthe.	
"	30	" 'Canadian,' W. Jeannotte, St. Hyacinthe	23326	4·09	4·16	25·99	3·43	33·35	31·47	8·97	3·32	22·89		V. Marceau	"
May,	2	" 'Imperial Potted,' A. F. Maclaren	23327	3·87	4·17	26·08	4·32	30·72	34·19	9·58	6·76	18·75		Pagnuelo & Freres	"
"	2	" 'Meadow Sweet,' Meadow Sweet Cheese Company, Montreal	23328	4·05	3·95	24·67	3·92	35·59	30·48	15·44	4·94	13·55		"	"

APPENDIX G.

BULLETIN No. 79.—OIL OF TURPENTINE.

OTTAWA, October 29, 1901.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—In January last, application was made to the department by certain dealers in the article to have this branch examine samples of oil of turpentine in order to determine whether or not they were genuine. It was alleged that impure oil of turpentine was being imported into Canada, that the impurity was foreign matter of the nature of petroleum, and that sometimes the article contained an excessive percentage of resinous matter. Samples were offered for analysis by parties engaged in the trade, but their origin being unknown it was not deemed wise to undertake their examination. At the same time, oil of turpentine being a standard article and a drug distinctly defined in the British Pharmacopœia, it was thought advisable to recommend that a collection of samples should be made in the manner prescribed by the Adulteration Act, and that they should be submitted to the district analysts for examination as to their purity. This proposal was approved by the Hon. the Minister of Inland Revenue in February, but it was not found possible to make the collection until June of the present year. The source of the samples is stated in table No. 1. of this report together with the results obtained by the analysts in testing them and the opinions which they express concerning them. The duplicate samples were submitted to Mr. A. McGill, B.A., of this laboratory, who subjected them to a very detailed and thorough examination, the results of which are given in his report hereto appended. In all fifty samples were collected, of which only two were pronounced adulterated by the district analysts. Mr. McGill, however, points out six other cases, the genuine character of which is very doubtful. This would indicate that sixteen per cent of the oil of turpentine sold in the open market is adulterated, and justifies the suspicions entertained by the parties who brought the subject to the attention of the department.

I have to recommend the publication of this and Mr. McGill's report.

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

SAMPLES OF OIL OF TURPENTINE.

TABLE

RESULTS of the Examination of 48

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	RESULTS			
					Sp. gr. at 15·5 C.	Colour.	Boiling Point. Centigrade.	Distillate from 100cc. under:
1901.			$ cts.	*Official Analyst, Mr. Bowman, Halifax, N.S.*				
				Halifax, N.S.				
June 6	20049	1 quart.	0 40	T. M. Power & Sons, druggists, Gottingen street.	0·8699	....	156° ..	180°C. 95 p.c.
" 7	20050	" ..	0 18	W. B. Arthur & Co., hardware merchants.	0·8666	....	158° ..	180°C. 95 p.c.
" 7	20051	" ..	0 25	A. A. Thompson, druggist, Agricola street.	0·8680	....	157° ..	180°C. 94 p.c.
				St. John, N.B				
" 4	17785	1 lb....	0 75	The McDiarmid Drug Co., Ltd., Market Square.	.... ..	....	.....	.....
" 4	17787	2 lbs...	1 00	T. B. Barker & Son, druggist, 37 King street.	.....	....	.....	.....
				Official Analyst, Dr. M. Fiset, Quebec.				
				Montreal.				
" 3	19830	1 quart.	0 20	J. Denis, hardware merchant, 236 St. Lawrence street.	0·864	White, but turbid.	160	....
				Quebec.				
" 6	19833	" ..	0 20	Lajeunesse et Frere, hardware merchant, 773 St. Valier street.	0·8679	White, but not quite clear.	159° ..	.....
				Richmond, P.Q.				
" 7	19835	" ..	0 20	J. Sullivan, painter, Main street.	0·8708	White and clear.	159·5 ..	....
				St. Hyacinthe, P.Q.				
" 11	19837	"	0 35	E. St. Jacques, druggist, Cascade street.	0·8928	Yellowish, but clear.	162·5 ..	.....
" 11	19838	" ..	0 20	U. Beaunoyer, paint and oil merchant, Cascade street.	0·8690	" ...	160 ..	.....
				Official Analyst, A. L. Tourchot, St. Hyacinthe.				
				Granby, P.Q.				
June 18	19839	"	0 20	Montly Bros., general store..	0·866	....	156 ..	180°C. 96 p.c.
" 18	19840	"	0 20	N. Mitchell, general store...	0·867	.. . .	156° ..	96 p.c.
" 18	19841	"	0 30	Dy. St. Onge, druggist....	0·892	.....	150 ..	87 p.c.
" 18	19842	"	0 30	J. E. Dozois, Druggist..	0·870	....	154 ..	95 p.c.

I.

Samples of Oil of Turpentine.

Residue from 100cc. grammes.	Solubility in Glacial Acetic Acid.	Specific Rotation.	Flash Point.	Residue in Asbestos at 100°c.	Residue in Asbestos at 180 c	Loss between 100 c. and 180 c. in Asbestos.	No. of Sample.	Remarks by Analyst.	Serial Number.
			OF ANALYSIS.						
					p. c.	p. c.			
.....	Soluble.....	.....	.....	.....	.....	.....	20049	Genuine	33
.....	"	.....	.....	.....	.....	.....	20050	"	34
.....	"	.....	.....	.....	.....	.....	20051	"	35
.....	.....	.....	.....	.....	.....	.....	17785	.....	5
.....	.....	.....	.....	.....	.....	.....	17787	.....	6
1·060	Not quite homogeneous.	.....	46–48 c.	.....	.....	.....	19830	Genuine.....	12
0·915	"	.....	46–48 c.	.....	.....	.....	19833	"	13
1·913	"	.....	41–43 c.	.....	.....	.....	19835	"	14
5·76	Homogeneous.	.....	42–43 c.	.....	.....	.....	19837	Adulterated with rosin oil.	15
0·968	Not quite homogeneous.	.....	42–44 c.	.....	.....	.....	19838	Genuine.....	16
3·10	Soluble. ...	.....	.....	24·45	15·38	9·07	19839	.....	17
2·0	"	.....	.....	22·58	13·54	9·04	19840	.....	18
14·0	Incomplete ...	.....	.....	33·33	19·99	13·34	19841	Impure containing resin...	19
4·0	Soluble and limpid.....	.....	.....	24·27	15·78	8·69	19842	.....	20

RESULTS of the Examination of 48

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Results: Sp. Gr. at 15·5 C.	Results: Colour.	Results: Boiling Point. Centigrade.	Results: Distillate from 100cc. under.
1901.			8 cts.	*Official Analyst, A. L. Tourchot, St. Hyacinthe.*				
				Magog, P.Q.				180°C.
June 20	19843	1 quart.	0 25	Gilbert Morrier, paints	0·871		154°	95 p.c.
" 20	19844	"	0 25	A. D. Martin, paints	0·875		152° to 153°	93 p.c.
				Sherbrooke, P.Q.				
" 20	19845	"	0 25	J. R. McBain, druggist	0·868		154°	96 p.c.
" 20	19846	"	0 20	Kerr & Foss, hardware	0·867		154°	98 p.c.
" 20	19847	"	0 19	Coderre Bros. & Co., hardware	0·866		153 to 154°	98 p.c.
" 20	19848	"	0 22	G. N. Bourque, paints	0·869		154°	96 p.c.
" 20	19849	"	0 30	G. Richard, Druggist	0·869		155°	98 p.c.
				St. John, P.Q.				
25	19850	"	0 20	Côté et Frère, hardware	0·868		153 to 154°	97 p.c.
" 25	19851	"	0 30	Dr. Savarin, druggist	0.893		148°	85 p.c.
" 25	19852	"	0 20	Gervais et Frère, general store	0·869		153 to 154°	97 p.c.
				Cowansville, P.Q.				
" 25	19853	"	0 20	McClatchie Bros., hardware	0·862		153°	96 p.c.
				Sweetsburg, P.Q.				
" 25	19854	"	0 23	C. H. Boright, general store	0·875		153 to 154°	92 p.c.
				Official Analyst, Dr. F. X. Valade, Ottawa.				
				Ottawa.				
May 30	20848	"	0 30	J. Skinner & Co., druggist	0·8698		150°	162°C. 80 p.c.
" 30	20849	3 pints.	0 30	Josh. Archambault, oil and colour merchant, Dalhousie St.	0·8659		148°	165°C. 80 p.c.
" 30	20850	1 quart.	0 23	J. B. Duford, oil and colour merchant, Rideau St.	0·8662		156°	163°C, 80 p.c.
				Peterboro', Ont.				
June 5	20851	"	0 23	A. E. Micks & Co., oil and colour merchants.	0·8669		159°	162°C. 80 p.c.
" 5	20852	"	0 20	Peterboro' Hardware Co.	0·8637		158°	165°C. 80 p.c.
		"						
				Official Analyst, Dr. W. H. Ellis, Toronto.				
				Peterboro', Ont.				
5	20862		0 25	Peterboro' Hardware Co.	0·8654		155°	185°C.

Samples of Oil of Turpentine.—*Continued.*

OF ANALYSIS.

Residue from 100cc. grains	Solubility in Glacial Acetic Acid.	Specific Rotation.	Flash Point.	Residue in Asbestos at 100°c.	Residue in Asbestos at 180 c.	Loss between 100 and 180 c in Asbestos.	No. of Sample.	Remarks by Analyst.	Serial Number.
				p. c.	p. c.	p. c.			
4·0	Sol. and limp.			26·45	15·77	10·68	19843		21
6·0	"			26·04	15·54	10·50	19844	Doubtful	22
3·0	"			21·15	14·49	6·66	19845		23
2·0	"			18·39	10·20	8·19	19846		24
2·0	"			16·71	9·87	6·84	19847		25
3·0	"			21·28	13·59	7·69	19848		26
3·0	"			22·13	13·48	8·65	19849		27
2·50	"			20·48	11·80	8·68	19850		28
16·0	Incomplete			30·28	15·45	14·83	19851	A bad product—contains resin	29
3·0	Soluble			22·33	12·96	9·37	19852		30
3·0	"			17·93	9·58	8·35	19853		31
6·0	Soluble and limpid			26·69	16·33	10·36	19854	Doubtful	32
2cc. of red oil.	1 in 1						20848	Genuine	36
7cc. of red oil.	1 in 1						20849	"	37
"	1 in 1						20850	"	38
3cc. of yellow oil.	1 in 1						20851	"	39
6cc. of yellow oil.	1 in 1						20852	"	40
	Incomplete	15·2					20862	"	41

RESULTS of the Examination of 48

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	RESULTS			
					Sp. gr. at 15·5° C.	Colour.	Boiling Point. Centigrade.	Distillate from 100cc. under.
1901.			8 cts.	*Official Analyst, Dr. W. H. Ellis, Toronto.*				
				Toronto.				
June	6	20863	1 quart.	0 15 Elliott & Co., wholesale druggist, Front St.	0·8692		160°	165° C.
"	6	20864	"	0 20 Thos. Meredith & Co., hardware merchants, King St.	0·8680		155	165° C.
"	6	20865	"	0 20 The Harris Co., Ltd., oil and colour merchants, King St.	0·8683		158	163° C.
"	6	20866	"	0 20 Lyman Bros. & Co., wholesale druggist.	0·8688		160°	165° C.
"	6	20867	"	0 20 Russill & Co., hardware merchants, King St.	0·8555		158°	185° C.
				Official Analyst, F. T. Harrison, London, Ont.				
				Stratford, Ont.				
June	3	19492	"	0 25 W. H. Thomson, druggist	0·8692		154°	170 C. 99·11 p.c
				Windsor, Ont.				
"	4	19495	"	0 25 H. O. Fleming, druggist	0·8676		155°	170° C. 99·59 p.c
				London, Ont.				
"	5	19497	"	0 25 C. McCallum, druggist	0·8620		155°	180° C. 99·68 p.c
"	5	19499	"	0 25 James Wright, hardware merchant.	0·8664		156°	174° C. 97·71 p.c
"	5	19500	"	0 25 A. Westman, hardware merchant.	0·8681		154°	172° C. 99·38 p.c
				Official Analyst, E. B. Kenrick, Winnipeg.				
				Winnipeg, Man.				
"	4	17330	"	0 25 Graham & Rolston, hardware merchants.	0·8666	Yellow, with a strongly marked blue fluorescence.	156·5°	167·5° C. 95·5 p.c.
"	4	17331	"	0 25 R. Wyatt, hardware merchant.	0·8680	"	156·5°	165·5° C. 95·2 p.c
"	4	17332	"	0 25 J. H. Ashdown, hardware merchant.	0·8674	"	156	166° C. 94·4 p.c
"	4	17333	"	0 20 G. F. Stephens & Co., oil and colour merchant.	0·8680	"	156·5°	167·5 c. 96·1 p.c
				Official Analyst, Dr. C. J. Fagan, Vancouver, B.C.				
				Vancouver, B.C.				
"	4	21579	"	0 50 J. K. Patton, druggist	0·8715	Limpid colourless.	155	161° C.

Samples of Oil of Turpentine—*Continued.*

OF ANALYSIS.

Residue from 100cc. grammes.	Solubility in Glacial Acetic Acid.	Specific Rotation.	Flash Point.	Residue in Asbestos at 100 c.	Residue in Asbestos at 180 c.	Loss between 100 c. and 180 c. in Asbestos.	No. of Sample.	Remarks by Analyst.	Serial Number.
				p. c.	p. c.	p. c.			
.....	Complete....	13·03	.....	.....	.....	.....	20863	Genuine	42
.....	"	15·54	.....	.....	.....	.....	20864	"	43
.....	Incomplete....	14·39	.....	.....	.....	.....	20865	"	44
.....	" ...	15·14	.....	.....	.....	.....	20866	"	45
.....	Complete.....	15·35	.....	.....	.....	.....	20867	Specific gravity too low, of doubtful composition.	46
0·89	Soluble in own volume.	.....	.....	.....	.....	.....	19492	Character and tests correspond to B.P. except residue is high. Genuine.	7
0·41	"	.....	.....	.....	.....	.....	19495	Corresponds to B.P. tests and character. Genuine.	8
0·32	"	.....	.....	.....	.....	.....	19497	" "	9
0·29	"	.....	.....	.....	.....	.....	19499	" "	10
0·62	"	.....	.....	.....	.....	.....	19500	" "	11
.....	.....	.....	.....	.....	.....	.....	17330	Genuine.	1
.....	.....	.....	.....	.....	.....	.....	17331	"	2
.....	.....	.....	.....	.....	.....	.....	17332	"	3
.....	.....	.....	.....	.....	.....	.....	17333	"	4
A small quantity.	In an equal volume.	.....	.....	.....	.....	.....	21579	"	47

RESULTS of the Examination of 48

Date of Collection.	No. of Sample.	Quantity Purchased.	Cost.	Name and Address of Vendor.	RESULTS			
					Sp. gr. at 15·5 C.	Colour.	Boiling Point. Centigrade.	Distillate from 100cc. under.
1901.			8 cts.	*Official Analyst, Dr. C. J. Fagan, Vancouver, B.C.*				
				Vancouver, B.C.				
June 4	21582	1 quart.	0 20	McLennan & McFeely, hardware merchants.	0·869	Limpid greenish yellow.	154°..	158°C. 99 p.c.
				Victoria, B.C.				
„ 5	21585	1 „ ..	0 30	J. W. Mellor..	0·869	Limpid colourless.	154°..	160°C. 98·8 p.c.
„ 5	21586	1 „ ..	0 35	R. Lettier	.....	Limpid yellowish.	154 ..	158 C. 98·5 p.c.

Samples of Oil of Turpentine—*Concluded.*

OF ANALYSIS.

Residue from 100cc. grammes.	Solubility in Glacial Acetic Acid.	Specific Rotation.	Flash Point.	Residue in Asbestos at 100 c.	Residue in Asbestos at 180 c.	Loss between 100 c. and 180 c. in Asbestos.	No. of Sample.	Remarks by Analyst.	Serial Number.
				p. c.	p. c.	p. c.			
1cc.	In an equal volume.	.....	.....	.....	.....	.....	21582	Genuine.	48
1·20cc.	"	.....	.....	.....	.....	.....	21585	"	49
1·5cc.	"	.....	.....	.....	.....	.....	21586	"	50

LABORATORY OF THE INLAND REVENUE DEPARTMENT,
OTTAWA, October 24, 1901.

THOS. MACFARLANE, Esq., F.R.S.C., &c.,
Chief Analyst.

SIR,—I have the honour to submit herewith the results of my investigation of oil of turpentine. This matter was placed in my hands in June last, and would have been reported upon some time ago but for illness. Other demands upon me, since returning to the laboratory, have delayed its completion, and must also account for any deficiencies in it.

Owing to the fact that most of the tests applicable to turpentine are physical rather than chemical in the strict sense, and require larger quantities of material, I should recommend that at least two pints of each sample be furnished to the analysts, where practicable.

I have the honour to be, sir,
Your obedient servant

A. McGILL.

Oil of Turpentine,

Oil of turpentine, or Terebinthinæ Oleum of the British Pharmacopœia, is thus described by that authority: 'The oil distilled, usually by the aid of steam, from the oleoresins obtained from Pinus sylvestris and other species of Pinus; rectified if necessary.'

Squire's Companion to the Pharmacopœia gives the following additional information as to the sources of oil of turpentine. 'The oil of turpentine sold in Britain is almost wholly imported from America, and is the product (mainly) of Pinus australis and P. teda. German and Russian oil is chiefly distilled from P. sylvestris, French oil from P. maritima, Hungarian turpentine is distilled from the cones of P. pumilis, and Carpathian turpentine from P. cembra or P. pumilio.'

According to Long (1) American turpentine is distilled from gum which is collected from notches cut in the trees, or from that (technically known as *Scrape*) which hardens on the bark and surface of the tree. After four or five years the yield is too small to be profitably collected. This gum was formerly distilled dry, but it is now usually distilled with water, from copper stills holding from eight to fifty barrels. The yield of oil is about one-fifth the weight of the gum. The Virgin dip and scrape yield more oil than the later produce of the tree.

The specific characters of oil of turpentine, are given as follows by the British Pharmacopœia—'Limpid, colourless, with a strong peculiar odour which varies in the different kinds of oil, and a pungent and bitter taste. It is soluble in its own weight of glacial acetic acid. It commences to boil at about 160° C., and almost entirely distils below 180° C.—little or no residue remaining.'

Squire's Companion adds the following:—'The specific gravity varies from ·860 to ·880. French oil is strongly lævorotatory. Oil of turpentine, especially Russian, when exposed to the continuous action of air, in presence of water, develops a large quantity of hydrogen-peroxide, camphoric acid, and other oxygenated products. It dissolves beeswax, iodine, sulphur, phosphorus, fixed oils and resins, with the latter forming varnish. It is soluble in 6·5 volumes of 90 per cent alcohol: in all proportions in absolute alcohol, carbon-bisulphide, chloroform, ether (0·720) and glacial acetic acid.'

The opinions expressed by the public analysts regarding the genuineness of the forty-eight samples of oil of turpentine reported upon in Table 1, of this Bulletin, are

1. Journal Analyt. & App. Chem.—VI. 1.—

based upon a study of the characters enumerated above. The analysts have reported all of the samples as genuine, with exception of two; and in these cases the genuineness is called in question on the ground of want of conformity to B.P. requirements, as follows:—

No. 19837—High gravity, dark colour, high boiling point and large (15) residue on drying, indicate rosin oil.

No. 20867—Low gravity, probable presence of some ingredient having (46) a less density than turpentine.

In addition to corroborating this finding, I have given reason in the sequel for calling in question the genuineness of Nos. 9, 19, 22, 29, 31, 40, and 51.

Commercial oil of turpentine is not a definite chemical substance. When carefully distilled it consists chiefly of *pinene*, $C_{10}H_{16}$; but other terpenes, and products of the oxidation of these are always present. Owing to the readiness with which oil of turpentine undergoes oxidation, in the presence of air and moisture, its composition is continually changing, and for this reason it is not easy to fix numerical constants by means of which the genuineness of a given sample may be judged.

The adulteration of turpentine spirit is no new thing. Materials for effecting this have been made the subject of patents in England and in Germany. (See English patent 12249 granted October 14, 1885,) P. H. Conradson (1) described a so-called 'wood turpentine,' having a specific gravity 0·845 and a flash point below 80 Fah. The most usual adulterant of our time is probably certain fractions of petroleum obtained in the refining of burning oils. In order to disguise their presence, resin oil may be added, or suitable resins (Kaori) dissolved.

In addition to the examination of the samples recorded in Table I. I have done some work on certain petroleum products similar to those which are employed in the sophistication of oil of turpentine, a so-called 'spiritine', a by-product of the refining of wood naphtha, and a sample of resin oil. Since these substances are themselves of very indeterminate composition, it is evident that their presence in a sample of oil of turpentine must be ascertained rather by attention to physical than to chemical properties.

The following list comprises the chief characters which are available for this purpose.

Physical characters:—

1. Colour,
2. Clearness,
3. Odour,
4. Taste.
5. Density,
6. Boiling point,
7. Volatility—presence of a fixed residue,
8. Vapour Density,
9. Flash point,
10. Viscosity,
11. Solubility,
12. Solvent power,
13. Rotatory power for polarised light,
14. Refraction,
15. Fluorescence.

Chemical Characters.—

16. Oxidisability,
17. Bromine Absorption,
18. Rise of temperature with sulphuric acid.

1. *Colour.*—Although recently distilled oil of turpentine is colourless, in thin layers, it has a distinctly yellowish-red tint when viewed through a column of from 20—60cm. After settling quite clear, I find the colour in a 60cm. column to be equivalent to yellow, 5 units + red, 1 unit of the Lovibond scale; and I have not been able to obtain

(1) Journal Soc. Chem. Indus. 1897—519.

any sample with less colour than this. Samples, as purchased, are always much darker. The following numbers are stated for columns of 16 cm., viewed against a strongly illuminated, white wall.

	Yellow.	Red.
No. 7. First 75cc. distilled from 100cc.	0·8	0·1
" 44. The sample	1·0	0·1
" 46. "	1·9	0·1
" 48. "	6 0	1·9
" 51. "	2·6	0·5
" 59. Gasoline	1·0	0·3
" 54. Spiritine	5 0	0·2
Redistilled turpentine + 5 per cent resin oil	20·0	29·0

So far as I know the colour of pure turpentine does not undergo change, if kept in the dark and in air-tight vessels. My experience only covers a period of two months. A sample exposed to sunlight (diffused) has not darkened perceptibly, during a period of one month.

Among the adulterants of turpentine, gasoline is indistinguishable, in this regard, from oil of turpentine, and appears to undergo no change of colour by keeping either in darkness or in sunlight. Spiritine, recently distilled, is nearly as free from colour, but rapidly becomes yellow on exposure to sunlight. The sample quoted above had been exposed to sunlight for two weeks since distillation. Rosin oil gives to turpentine a decided coloration in which red predominates.

Many of the samples which I have examined have been coloured by traces of linseed oil or varnish, due to their having been poured through the same funnels, or stored in the same containers which had been used for these substances. It would perhaps be too much to expect perfect freedom from traces of oil and varnish in the case of oil of turpentine which is avowedly sold for the use of painters. It is evident, however, that such impurity must prevent the colour test from having any value. As applied to the redistilled turpentine sold by druggists, the colour test has a decided value.

2. *Clearness.*—Oil of turpentine is perfectly clear and transparent. A very minute trace of water, if mixed with the turpentine by shaking, suffices to give a distinct turbidity. —Upon standing for some time, most of the water separates, and may be identified by giving a blue colour to anhydrous sulphate of copper. The clear supernatant oil of turpentine is not, however, absolutely anhydrous, and if subjected to distillation, the first portions of the distillate will be found quite turbid – only after 20 or 30 per cent by volume has come over will the distillate become clear. Samples of turpentine distilled from recently fused chloride of calcium come over turbid, and on settling clear the liquid at the bottom of the cylinder gives a blue colour to anhydrous sulphate of copper. It would therefore seem impossible, by any ordinary care, to obtain oil of turpentine perfectly anhydrous. This difficulty may be due to the fact that turpentine in presence of air and sunlight is continually producing hydrogen peroxide, which, by decomposition into oxygen and water, accounts for the traces of water always found in oil of turpentine.

Light petroleum products such as are used to adulterate turpentine, are rendered momentarily turbid by being shaken up with a trace of water, but the water separates in minute droplets almost instantly, so that the difference between oil of turpentine and petroleum is very marked in this respect.

When oil of turpentine containing 10 per cent of gasoline is submitted to distillation, the first fraction comes over quite clear, behaving in this respect quite differently from genuine samples. A faint turbidity appears when about 15 to 20 p. c. volume has passed over, in cases where the amount of the adulterant is not large. No doubt this clearness of the first portions of the distillate is connected with the lowered boiling point of the sample, which causes the water to come over with a fraction very rich in petroleum.

Although the opacity to which I have referred is largely due to presence of water, I am not convinced that it is altogether due to this cause. The indefinite character of oil of turpentine, and the great number of oxidation products being constantly formed in it when in contact with air and sunlight, make it not unlikely that some of the less soluble products, passing into the distillate, or mechanically carried over with it, may partly explain the opacity referred to.

Another cause of opacity in oil of turpentine is the difference in refractive power possessed by its different components, and by the same component under different conditions of temperature. Unless very great care be taken to have the whole sample at uniform temperature and thoroughly mixed it is usually impossible to fill the (20 cm.) tube of the polarimeter so that an immediate reading can be made. A peculiar 'troubled' appearance is seen which makes the clear definition of the polariscope field impossible. On allowing the tube to lie at rest for some time, this troubled effect disappears, and very often a peculiar blackness is seen at a point in the top of the field (which as it is inverted, corresponds with the bottom of the tube) caused by the optical disturbance of droplets of water, (or other liquid) which has separated from the sample.

3. *Odour.*—The odour of such of these samples of turpentine as I have reason to believe genuine, is very characteristic and uniform. It is sufficiently strong to disguise effectively the presence of 10 to 20 per cent of gasoline (B. P. 90° C). Higher percentages of gasoline can be detected by its characteristic odour; and, in the first fraction, of one-tenth volume, from a turpentine containing 5 per cent of gasoline, this can be recognized.

Spiritine has a distinct acetone smell, but this is very effectively hidden, up to 20 per cent, by the odour of turpentine.

Rosin oil has a very persistent and characteristic odour of rosin. This is fairly well disguised, up to 10 per cent by that of oil of turpentine, but becomes distinct in the later fractions, and rosin oil constitutes a large part, if not the whole of the residue which is left after the B. P. has reached 210° C.

4. *Taste.*—This property has not been examined.

5. *Density.*—As was to be expected from its indefinite composition, the Density of oil of turpentine is very variable. Pinene, $C_{10}H_{16}$, which is the principal component, has a density 0·858 at 20° C. The oxidation products of turpentine possess a higher gravity than this, H. E. Armstrong[1] is of opinion that pinol hydrate, (which he proposes to name Sobrerol, after Sobrero, who first described it in 1851) is the initial product of the oxidation of turpentine. Pinol hydrate, $C_{10}H_{16}(OH)_2$ is a crystalline substance M.P.—150° isomeric with pinene glycol, another oxidation product of turpentine. Resinous bodies are also among the products of oxidation, and their presence in solution, raises the density of oil of turpentine. Allen[2] quotes the following densities for pine resin :—

Yellow, transparent = 1·083—1·084.
Whitish, opaque = 1·044—1·047.
Dark, colophony = 1·100.
and for *rosin oil*, 0·980—1·100.

[1] Proc. Chem. Soc. 1890, 99; abstracted in the Jour. Soc. Chem. Indus. 1890, 819.
[2] Commercial Org. Anal. II, 453 and 461.

TABLE II.

SPECIFIC Gravity of Oil of Turpentine, and fraction of 10 p. c. volume.

Temp.=15·5° C.

Serial Number.	Description.	JUNE, 1901.		SEPTEMBER, 1901.		OCTOBER, 1901.	
		Sample.	Fraction.	Sample.	Fraction.	Sample.	Fraction.
1	17330	·8672		·9472			
2	17331	·8691		·9418			
3	17332	·8687		·9560			
4	17333	·8694					
5	17785	·8673					
6	17787	·8674					
7	19492	·8704		·8991		·9007	·8688
8	19495	·8656		·9013			·8719
9	19497	·8622	·8560				
10	19499	·8670		·8958		·8978	
11	19500	·8685		·9561			
12	19830	·8673		·8879		·8891	·8698
13	19833	·8678		·8965		·8980	·8669
14	19835	·8712	·8627				
15	19837	·8927	·8638				
16	19838	·8693		·8811		·8825	·8689
17	19839	·8720					
18	19840	·8709	·8630				
19	19841	·8938					
20	19842	·8729					
21	19843	·8714					
22	19844	·8744		·8821		·8890	·8647
23	19845	·8682		·8819	·8641		
24	19846	·8664		·8717	·8641		
25	19847	·8672		·8839			
26	19848	·8678		·8745			
27	19849	·8703			·8694		
28	19850	·8691	·8639	·8931	·8630	·8944	·8684
29	19851	·8832		·9030			
30	19852	·8696		·8747	·8605		
31	19853	·8622	·8571	·8690	·8624		
32	19854	·8746		·8789	·8672		
33	20049	·8694					
34	20050	·8670	·8616				
35	20051	·8675		·8797		·8821	·8686
36	20848	·8709	·8597				
37	20849	·8685		·8716			
38	20850	·8685	·8601				
39	20851	·8664		·9162			
40	20852	·8646	·8577	·9364			
41	20862	·8650	·8583				
42	20863	·8675		·8985	·8700		
43	20864	·8672		·9003		·9004	·8669
44	20865	·8683		·8794		·8798	·8650
45	20866	·8693		·9216		·9251	·8716
46	20867	·8600	·8564	·8671	·8590	·8714	·8566
47	21579	·8692		·8969			
48	21582	·8658		·8849		·8859	·8666
49	21585	·8691		·9037		·9060	·8684
50	21586	·8675		·8762		·8771	·8654
51	M	·8548	·8041	·8611	·8170	·8666	·8122
52	Resin oil	·9893				·9896	
53	Coal oil	·7830	·7539	·7852			
54	Spiritine	·8600	·8540	·8663		·8679	·8592
55	V	·8619		·8831			
56	W	·8202		·8268	·8169	·8288	

M. A suspected sample of turpentine sent in for examination.
V. Mixed fractions of turpentine boiling at 155° to 156°.
W. A mixture of equal volumes of No. 53 and No. 55.

TABLE II *Concluded.*

SPECIFIC Gravity of Oil of Turpentine, and fraction of 10 p. c. volume.

Temp. 15·5 C.

Serial Number.	Descripti	JUNE, 1901.		SEPTEMBER, 1901.		OCTOBER, 1901.	
		Sample.	Fraction.	Sample.	Fraction.	Sample.	Fraction.
57	X			·8698		·8726	
58	Y			·8873	·8646		
59	Gasoline			·7289	·7185	·7290	
60	T			·8007	·7412	·8007	·7473
61	S						
62	R					·8808	·8598
63	P					·7462	

X. and Y. Turpentine samples believed to be genuine.
T. A mixture of equal volumes of No. 57 and No. 59.
S. A mixture of turpentines, probably genuine.
R. A mixture of turpentines, probably genuine.
P. A substance sold for the purpose of adulterating turpentine.

In the accompanying table (II) I have arranged the observed specific gravities of a number of samples of turpentine oil. The specific gravity was determined in June, immediately after collection of the samples. These were contained in glass bottles of about 12 to 20 ounces capacity. After work upon them had been completed as far as was possible at that time, the samples were placed in a dark cupboard, the bottles being corked, and approximately half full of the sample. After three months it was found that the specific gravity had increased as shown in the colums headed 'September 1901.'

A third determination of the density, about a month later showed a further increase, in every sample examined, although in this case, the increase is less considerable.

The mean density found in June for 47 samples, is 0·8687. The highest density among these samples is 0·8832 and the lowest is 0·8622. From independent considerations the genuineness of these two samples is questioned.

Thirty-two of these samples were examined after a period of three months, and their mean density was found to be 0·8982, an average increase of 0·0295, or 3·4 per cent. This increase is, however, very different in different samples. The most noted increases are as follows:—

No. 3—10·05 per cent,
" 11—10·08 "
" 40— 8·30 "

In certain samples the increase is slight: such samples are:—

No. 12—2·37 per cent.
" 16—1·35 "
" 22—0·88 "
" 24—0·61 "
" 26—0·79 "
" 32—0·48 "
" 37—0·36 "

There is, however, no exception to the fact of increase in weight. The volume of the sample left in each bottle was about 8 ounces. An increase of weight of 3 per cent upon this would mean the absorption of nearly 7 grammes (or 4·9 litres) of oxygen. Since no special precautions were taken in the closing of the bottles, and most of the

corks had been perforated by a cork-screw, there can be no difficulty in accounting for access of oxygen; but it may be that some of the corks were too closely fitting to permit ready passage of air, so that no certain inferences can be drawn from those cases in which little increase in weight occurred.

If this study had been pre-arranged, I would have taken pains to expose the samples to atmospheric oxygen under defined conditions. The results above tabulated are only of value as showing the very large increase in density which results from oxidation. The maximum specific gravity quoted by Squire (1) 0·880, may be exceeded by a genuine sample as a result of exposure to air for a few months, so that, unless certain conditions of storage are fulfilled, a determination of specific gravity is of limited value in fixing the genuineness of oil of turpentine.

The only sample of Rosin oil (See No. 52) which I examined, had a specific gravity 0·9893 in June, and 0·9896 in October, so that during 4 months, the increase in density was insignificant. It was stored during this interval, in a loosely corked bottle.

Petroleum products likely to be used in turpentine adulteration have a lower density than any of the genuine samples examined. (See No. 53 and 59.) They show but a trifling increase of density, due probably to evaporation of the lighter constituents.

Spiritine shows an increase of density amounting to 0·92 per cent for 4 months. Whether a free exposure to air would effect a greater increase is not known.

It is evident that admixture of petroleum with oil of turpentine would be indicated by a lower density as well as by a lower rate of increase in density through absorption of oxygen. No. 56, a mixture of coal oil and rectified turpentine in equal volumes, illustrates this. During three months the turpentine increased 2·46 p.c.

coal oil	"	0·28 "
mixture	"	0·80 "

Long (2) found 13 samples of oil of turpentine, distilled in his own laboratory, to vary from 0·8622 to 0·8655. With *pure* commercial samples he found the gravity from 0·8656 to 0·8748.

In order to eliminate as far as possible the influence of oxidation upon the samples, I distilled these, and collected apart the first 10 per cent by volume. The mean density of this fraction for 10 samples, presumably genuine, was found to be 0·8600 in June, 1901. (see Table II.) The highest gravity found among these was 0·8639 and the lowest 0·8560. The specific gravity of pinene is 0·858 at 20 C.(3).

In September, I fractioned in the same way, 8 samples, and obtained a mean density of 0·8651 for the first fraction of one-tenth volume.

In October, 5 samples were examined and a mean density of 0·8693 obtained.

The results may be summarized as follows:—

June.		September.		October.	
Samples.	Fraction.	Samples.	Fraction,	Samples.	Fraction.
8671	·8600	·8811	·8651	·9035	·8693

1. Companion to B. P., 1899, 625.
2. Jour. Analyt. and App. Chem. VI., 2.
3. Richter, Org. Chem., Trans. II, 322.

TABLE III.

DENSITIES OF RESIDUAL FRACTIONS OF ONE-TENTH VOLUME.

Serial Number.	Description.	June.	September.	Remarks.
9	19497	·8639		
14	19835	·9665		
15	19837	1·0142		Adulterated with resin oil.
18	19840	·8950		
21	19843	·8758		
24	19846		·9125	
28	19850	·8918		
32	19854		·9524	
34	20050	·9502		
36	20848	·9265		
38	20850	·8891		
40	20852	·8849		
41	20862	·8724		
46	20867		·8973	Probably adulterated.
51	M	·8949	·9416	
54	Spiritine	·8648		
60	T		·8852	Mixture turpentine and gasoline.
44	20865		·9660	
59	Gasoline		·7526	

Thus it is seen that although the first fraction of one-tenth volume increases in density, its rate of increase is very much less than that of the whole sample; and a fraction falling well within the limits for turpentine may be obtained from a sample of oil of turpentine which much exceeds these limits.

When a sample is adulterated with gasoline, or other adulterant of low density and boiling point, this constitutes the main part of the first fraction, and the sophistication is clearly indicated by the reduced gravity. See samples 51, 56 and 60.

When the distillation is carried on until 90 per cent of the sample comes over, there is usually left a residue of more or less well-defined brown colour. This contains the resins formed by oxidation, and any rosin oil added as an adulterant. It sometimes happens that the temperature rises considerably above 180° C., before 90 per cent comes over. I have not as a rule carried the distillation beyond 200°, and in a few cases a residue of more than 10 per cent of volume has then remained. In table III. I have given the densities of some of these residues. They are usually characterised by a high index of refraction and a well-marked odour of resin.

6. *Boiling Point.*—The boiling point of pinene is 155° C. Long (1) found the initial B. P. for pure commercial turpentines to be uniformly 155° to 156° C, and 85 per cent distilled over between this temperature and 163° C. He states that the distillation is practically complete below 185° C.

I have read the B. P. when 2 or 3 cc. from 100 cc. had distilled over, and I find this point, in presumably genuine turpentine, to vary from 153° C to 158°, (See Table VII). In most cases the B. P. is 155° to 156°; and it always rises to 155° before 5 per cent of the sample has come over.

The initial temperature of distillation appears to be but little affected by oxidation of the sample.

Rosin oil has an initial B. P. above 200° C.

Spiritine begins to distil at 151° C. The various fractions of petroleum which may be used to adulterate oil of turpentine, usually have lower boiling points than 150° C. Gasoline (No. 59) begins to distil at 90° C, and 90 per cent of its volume comes over below 114° C.

(1) Jour. Analyt. ,and App. Chem. VI. 2.

The effect of oxidation is to raise the B. P. of the last fraction. No general conclusions can, however, be drawn as to the rate of this increase, since these samples have not been oxidized under similar or definite conditions. The results, as observed, are summarized below.

Samples.			Initial Boiling Point for last fraction of 10 per cent volume.	
Serial Number.		Description.	June.	September.
7		19492	167°	198°
8		19495	169°	210°
12		19830	164°	179°
13		19833	163°	200°
16		19838	168°	170°
28		19850	167°	195
35		20051	163°	186
43		20864	164°	201
44		20865	164°	174°
45		20866	167°	200°
48		21582	163°	196
49		21585	175°	200
51		M	164°	169°
54		Spiritine	175°	175°
56		W	200°	250°
60		T	155°	159
Mean for first 12 samples			166°	192°

7. *Volatility.*—When the distillation of a sample of oil of turpentine is pushed to its furthest, there is always found a residuum which cannot be volatilized without decomposition. I find this to be true even in the case of a rectified oil of turpentine. The residue is usually very small, but sometimes amounts to nearly 10 per cent of the sample. This residue is resinous, and an attempt to volatilize it results in a decomposition which is probably analogous to the *cracking* of petroleums. An oil (resin oil) comes over, and a carbonised mass is left in the retort. Decomposition begins soon after a temperature of 210° C. is reached. It would be interesting to carry the distillation of a series of samples to this point, and to ascertain the weight of the residue. This would be a measure of the degree to which resinification had been carried, and might lead to the fixing of a number above which the addition of rosin or rosin oil should be indicated.

Vulpius (1) suggests the evaporation of 1 gramme of a suspected sample side by side with 1 gramme of a pure oil of turpentine, on watch glasses, floated on water kept at 80° C. This test assumes that pure turpentine so treated leaves a fairly constant amount of residue, an assumption which does not agree with my experience. Oxidation proceeds *pari passu* with evaporation, and since different turpentines have very different capacity for taking up oxygen (2) the residual resin must vary in amount. Even with a recently distilled oil of turpentine a decided residue is left on evaporating in an open dish. (See No. 55.) I have found that the conditions under which evaporation is conducted produce so large variation in the result, that unless the process is carried out with strict attention to detail the estimation has little value. If too small a quantity be operated on, the unavoidable variation due to error of experiment becomes relatively great.

The numbers given in the third column of Table IV. were obtained by evaporation of 25 grammes of the sample in a porcelain dish of 4 inch diameter and hemispherical shape. The dish was placed on a water bath, in contact with the water, (which was kept in vigorous ebullition), and was weighed from time to time until the residue ceased to lose more than a few milligrammes in 30 minutes. Even under these condi-

tions duplicates were not always satisfactory, and in a few cases showed differences of 0·5 per cent when the total residue was less than 2 per cent.

The numbers in the fourth column of Table IV. were obtained by heating 10 grams of the sample, (spread over fibrous asbestos in a large sized Macfarlane tube (3) to 100° C. during 24 hours. I hoped in this way to secure a maximum oxidation and maintained a rapid current of hot air through the oven during the whole time of the experiment. The duplicates were very unsatisfactory, and I was led to conclude that the shape of the tube prevented access of air to the centre of the mass. On using a shallow tube, the numbers in column 5 were obtained, and duplicates were much closer. These percentages, bear no consistent relation to the residue obtained by drying in an open dish; and if they are functions of the capacity of absorbing oxygen from hot air, this fact has not been made clear by a study of other characters.

The numbers given in the next three columns were obtained by treating 10cc. of the sample, absorbed by 3 grammes of loosely packed fibrous asbestos contained in a shallow and wide Macfarlane tube, with a current of air at the ordinary temperature for 48 hours and for a second period of 24 hours. This was followed by exposure in a current of air at 100° C. for 24 hours. The object sought was to obtain a maximum oxidation of the sample under given conditions. The duplicates finally obtained are good. This may indicate that a method of working could be devised which should give some idea of the oxidisability of oil of turpentine, and thus afford a means of ascertaining whether the resinous residue has been produced by oxidation of the sample through long keeping, or has been added as an adulterant in the form of rosin oil. It has not been possible for me to further investigate this subject.

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(1) Apoth. Zeit, 1891.—6, 289. Abstracted in Jour. Soc. Ch. Indus. 1891, 800.
(2) Kingzett, Jour. Soc. Ch. Indus. 1886, 7.
(3) Analyst, Vol. xvii, 79.

TABLE IV.

Serial Number.	Description.	Residue — evaporation in open dish. — at 100 C.	Residue — Macfarlane tubes—large — 24 hrs. 100 C.	Residue — using Short tubes. —	10cc. in Short tubes with 3 grms. Asbestos for successive periods of			Duplicates.
					48 hrs. Cold.	21 hrs. Cold.	24 hrs. Hot.	
1	17330	2·864	21·14	.....	.....	.....	.....	
2	17331	1·064	21·21	17·30	32·02	23·66	6·30	= 6·39 / 6·31
3	17332	1·348	26·64	.....	.....	.....	.....	
4	17333	1·388	22·08	.....	.....	.....	.....	
5	17785	0·816	17·60	.....	.....	.....	.....	
6	17787	.....	11·73	.....	.....	.....	.....	
7	19492	1·490	18·06	12·50	18·99	11·78	4·60	= 4·53 / 4·68
8	19495	1·360	.....	.....	.....	.....	.....	
9	19497	.....	23·00	.....	.....	.....	.....	
10	19499	1·196	.....	9·40	18·80	10·25	3·63	= 3·45 / 3·81
11	19500	1·436	22·20	.....	.....	.....	.....	
12	19830	1·896	.....	6·65	11·10	4·84	2·00	= 2·14 / 1·87
13	19833	1·016	.....	.....	.....	.....	.....	
14	19835	1·932	.....	.....	.....	.....	.....	
15	19837	5·988	31·70	22·22	40·37	32·71	12·16	= 12·01 / 12·30
16	19838	1·324	.....	.....	.....	.....	.....	
17	19839	1·654	.....	.....	.....	.....	.....	
18	19840	0·948	.....	.....	.....	.....	.....	
19	19841	2·584	22·25	.....	.....	.....	.....	
20	19842	1·680	.....	.....	.....	.....	.....	
21	19843	1·920	.....	.....	.....	.....	.....	
22	19844	3·032	.....	.....	.....	.....	.....	
23	19845	1·304	.....	.....	.....	.....	.....	
24	19846	0·572	.....	.....	.....	.....	.....	
25	19847	0·636	.....	.....	.....	.....	.....	
26	19848	1·488	.....	.....	.....	.....	.....	
27	19849	1·320	.....	.....	.....	.....	.....	
28	19850	0·764	.....	.....	.....	.....	.....	
29	19851	5·024	.....	13·25	32·81	23·50	7·46	= 7·46 / 7·46
30	19852	1·456	.....	.....	.....	.....	.....	
31	19853	0·732	.....	.....	.....	.....	.....	
32	19854	3·340	.....	.....	.....	.....	.....	
33	20049	1·272	.....	.....	.....	.....	.....	
34	20050	0·816	.....	.....	.....	.....	.....	
35	20051	0·872	.....	6·58	16·52	7·64	2·78	= 2·60 / 2·97
36	20848	1·564	21·00	.....	.....	.....	.....	
37	20849	1·962	21·40	.....	.....	.....	.....	
38	20850	1·168	.....	.....	.....	.....	.....	
39	20851	1·036	.....	.....	.....	.....	.....	
40	20852	2·352	.....	.....	.....	.....	.....	
41	20862	1·280	.....	.....	.....	.....	.....	
42	20863	1·140	.....	.....	.....	.....	.....	
43	20864	0·928	.....	.....	.....	.....	.....	
44	20865	1·220	.....	.....	.....	.....	.....	
45	20866	1·508	.....	12·56	26·87	13·50	4·64	= 4·48 / 4·80
46	20867	1·250	.....	6·56	14·77	7·67	1·83	= 2·01 / 1·65
47	21579	1·296	.....	.....	.....	.....	.....	
48	21582	0·468	.....	.....	.....	.....	.....	
49	21585	0·980	.....	12·32	.....	.....	.....	
50	21586	1·542	.....	8·51	18·88	8·74	2·78	= 2·69 / 2·87
51	M (1)	1·280	.....	.....	.....	.....	.....	
52	Resin oil.	95·980	.....	.....	.....	.....	.....	
53	Coal oil.	10·272	.....	.....	.....	.....	.....	
54	Spiritine.	1·400	.....	7·42	.....	.....	.....	
55	V (1)	2·400	.....	.....	.....	.....	.....	
56	W (1)	7·268	.....	.....	.....	.....	.....	
57	X (1)	.....	.....	.....	.....	.....	.....	
58	Y (1)	.....	.....	.....	.....	.....	.....	
59	Gasoline.	0·004	.....	.....	.....	.....	.....	
60	T (1)	.....	.....	.....	.....	.....	.....	
61	S (1)	.....	.....	.....	.....	.....	.....	
62	R (1)	3·912	.....	.....	.....	.....	.....	
63	P (1)	0·296	.....	.....	.....	.....	.....	

(1). See explanatory note to Table II.

Petroleum products of low boiling point volatilize completely without oxidation. When the B.P. of the petroleum adulterant is high, a large residue is left (see No. 53) but this is of an oily character, not resinous ; and when obtained in asbestos, is easily washed out with petroleum ether.

I think that determinations of vapour tension, made with an instrument on the same principle as Geissler's well known vaporimeter, might give useful indications, but I have not found time to investigate this point.

8. *Vapour Density.*—The molecular weight of pinene, $C_{10}H_{16}$ = 136 corresponds to a vapour density of 68 (Hydrogen = 1), or 4·72 (air = 1). That of the paraffins which are generally used to adulterate oil of turpentine corresponds to a V.D. of about 57 (or 3·96). For a petroleum benzine distilling between 80° and 150°, Long (1) obtained a V.D. = 4·09. For a fraction of oil of turpentine distilled at 156° he obtained V.D. = 4.67 ; while fifteen commercial samples gave V.D. from 4·80 to 5·11.

I have repeatedly attempted the determination of the vapour density of oil of turpentine with Victor Meyer's apparatus, using methyl salicylate as a bath, but without satisfactory result. The temperature of boiling methyl salicylate (224° C.) is not high enough to secure the complete vaporisation of oil of turpentine. I have also tried a bath of Rose's metal kept as nearly as possible at 300° C. The results are better, but are not such as to justify expectation of the method proving available in assay work ; at least until the glass vessel shall have been replaced by something less fragile. I am now experimenting in this direction, but results are yet too incomplete to justify publication.

9. *Flash Point.*—The usual flash point for oil of turpentine, according to Long, is 32° C. He used a Stoddard apparatus. (2).

Most of the petroleum products used to adulterate turpentine have a lower flashing point. Comradson (3) describes a so-called 'wood turpentine' having a flash point below 27° C. The following numbers have been obtained with Abel's well-known apparatus.

Serial Number.	Description.	Flash Point.
—	Turpentine spirit	32°
62	" " R	32°
57	" " X	28°
53	Coal oil	35°
59	Gasoline	20°
60	Mix turpentine and gasoline	23°
51	Sample M	26°

The flash point is apparently a valuable indication of the presence of low boiling petroleum adulterants. It would, however, fail to detect mineral oils of flash test above 32° C—such as the ordinary burning oils (kerosene).

10. *Viscosity.*—The viscosity of a sample of oil of turpentine having a sp. grav. 0·8710 at 12° C. was found by E. J. Mills to be 177·48 (water = 100 (1).

(1) Jour Analyt. and App. Chem. VI.
(2) American Chem. Jour.—4, 287
(3) Jour. Soc,, Chem. Indus. 1897, 519.

The following determinations of viscosity were made with a viscosimeter which I designed in 1894. (2). A cylindrical nozzle of $\frac{1}{32}$ inch diameter was used.

Sample.	Temp. 20° C.	
	Seconds for 50 cc.	Ratio.
Water	128·5	1.000
(S. g. ·785) Coal Oil (No. 53)	181·0	1.408
(S. g. ·729) Gasoline (No. 59)	114·0	0.887
T (No. 60)	126·5	0.984
Turpentine	157·5	1.226
" + 5 % Resin oil	166·0	1.291
" + 10 " "	172·0	1.338
M. (No. 51)	153·0	1.191

No. 60 is a mixture of equal volumes of genuine turpentine with gasoline. It is evident from the above results that the admixture of a low gravity petroleum with turpentine could be detected by the change in viscosity. Also, that a mixture of petroleums could easily be prepared having the same viscosity as oil of turpentine. Since mineral oil is not chemically affected by contact with air, it is probable that a study of the change in viscosity produced by aspirating a current of air through turpentine (under conditions which should prevent loss by volatilization) might be made a simple and reliable means of detecting adulteration with petroleum products.

11. *Solubility.*—The solubility of oil of turpentine in glacial acetic acid is usually regarded as demonstrating the absence of petroleums. Care must be taken in using the test, for the following reasons:—(1) The presence of a very small amount of water suffices to determine the separation of the liquids. Hence, many commercial samples of glacial acetic acid fail to mix with oil of turpentine. (2) Petroleums of B. P. 150° to 200° C. may be present to the extent of nearly 50 per cent without affecting the solubility of oil of turpentine in glacial acetic acid. Light petroleums are easily separated by fractioning, and the test may be applied to the fraction boiling below 150° C.

Rosin oil and spiritine are both quite miscible with glacial acetic acid.

12. *Solvent Power.*—I have examined the relative solvent power of spirit of turpentine and of certain adulterants for asphaltum in the following way: 10cc. of the sample is poured upon 1 gram of powdered asphaltum in a test tube and shaken at intervals for an hour. 1cc. of the resulting solution is filtered into a second tube, and the filtrate is diluted with 10 to 15cc. of the sample until a transparent solution is obtained. When genuine turpentine is treated in this way, it is found that a much darker solution is obtained than when petroleum is present, owing to the greater solvent power of turpentine. An approximate estimation of the quantity of mineral oil adulterant may be made by noting the relative depth of colour.

The process has been tested upon the following samples with the results given.

Serial No.	Description.	Intensity of colour.	Remarks.
46	20867	Very black	Doubtful sample.
	Genuine	" "	Pure.
51	M	Much lighter	Doubtful sample.
63	P	" "	Surrogate.
59	Gasoline	" "	Petroleum.
53	Coal Oil	" "	"

(1) Journal of the Society of Chem. Indus. 1886, 149.
(2) Canadian Record of Science, 1894, 153 and transactions Roy. Soc. of Can. 1895, p. 97.

13. *Rotatory power for polarised light.*—Kingzett (1) asserts that the oxidisability of oil of turpentine and its capability of producing hydrogen peroxide varies much in different samples. Those having a high rotatory power are most marked in this regard, next coming those of very low rotation. He claims that American oil of turpentine is not readily oxidisable, and is not a prolific source of peroxide of hydrogen. H. E. Armstrong holds (2) that there are two terpenes (dextro and lævoterebenthene) represented by the essential components of French and Burmese oil of turpentine respectively, and that American and other turpentines are mixtures of these.

J. H. Long (3) finds American oil of turpentine to vary through wide limits in its rotatory power. He is of opinion that the presence of small quantities of the resin from *Pinus palustris*, which is strongly lævorotatory

$$\left([a]\,\mathrm{D} = -34{\cdot}83 \right)$$

may account for the left-handed rotation of many American samples. He notes the following peculiarities: "After carefully fractionating distilled turpentine, the first portions possess a higher, both + and — rotation than the last portions. The lower rotation of the last fractions is probably not due to the presence of oxygenated bodies. Exposure to light appears to increase the specific rotation. In one case it did so from 16·15° to 17·08° in 50 days. Combination with oxygen during exposure to air increases the rotation. In one sample, air at 90° C. passed through for 55 hours, changed the rotation from 9·79 to 13·56."

My results with these samples are stated in Table V. The readings made in June were made in a 20 cm. tube, using sodium light. The polarimeter was graduated in circular degrees, and the specific rotation is calculated by the usual formula—

$$\left[S \right]\mathrm{D} = \frac{100\,a}{2 \times sp.\ grav.}$$

The later readings were made with a triple field instrument of Schmidt & Haensch new pattern. I find that the solution of bi-chromate of potash recommended as a light filter (the white light of a small incandescent electric lamp is employed) is less satisfactory with turpentines than a solution of fuchsin red, (0·2 gramme per 100cc. water) which gives a very evenly lighted field. The scale is graduated in sugar degrees, and the specific rotation for this light is calculated by the formula—

$$\left[S \right]\mathrm{R} = \frac{\cdot 352 \times a}{2 \times sp.\ grav.} = \frac{\cdot 176a}{sp.\ grav.}$$

The factor ·352 was determined by reading a series of samples in both instruments, using the sodium flame for the circular polarimeter. The numbers obtained are therefore comparable with each other.

Of 51 samples of oil of turpentine examined, 5 proved to be lævorotatory. The effect of keeping these samples in loosely corked bottles for three months has been to reduce the specific rotation in the three lævorotatory samples which were examined at both dates.

Of the samples exhibiting dextro-rotation, only 9 show any marked reduction of rotatory power by keeping; 5 show a decided increase, and 11 are but little changed in this regard.

The specific rotation of the first distillate of $\frac{1}{10}$ volume is always higher than that of the sample; and this agrees with Long's observation.

(1) Jour. Soc. Ch. Indus., 1886-7.
(2) Proc. Chem. Soc., 1890, 99.
(3) Jour. Analyst and App. Ch., VI, 1.

TABLE V.

SPECIFIC ROTATION $[S]\frac{D}{20^{\circ}}$ for Oil of Turpentine.

Serial No.	Description.	The Sample.		First Fraction of $\frac{1}{10}$ Volume.		Last Fraction of $\frac{1}{10}$ Volume.	
		June.	Sept.	June.	Sept.	June.	Sept.
1	17330	−16·95	− 8·06				
2	17331	+15·53	+12.33				
3	17332	+16·46	+11·04				
4	17333	+ 5·00					
5	17785	+ 9·40					
6	17787	+ 9·07					
7	19492	+12·06	+12·13	....	+16·11		
8	19495	+ 4·23	+ 5·47	....	+ 7·47		
9	19497	+14·78					
10	19499	+11·96	+12·18				
11	19500	+14·01	+10·41				
12	19830	−16·43	−14·19	... ...	−15·26		
13	19833	−13·68	+14·29	. . ..	+18·68		
14	19835	+13·67					
15	19837	+14·16					
16	19838	+ 4·17	+ 4·95	.. ..	+ 7·74		
17	19839	− 4·87					
18	19840	−11·21					
19	19841	−11·35					
20	19842	+ 1·15					
21	19843	+15·63					
22	19844	+14·5	−13·95	....	+18·65		
23	19845	+14·22	+14·07				
24	19846	+14·41					
25	19847	+ 5·94	+ 6·85				
26	19848	+15·55	+15·51				
27	19849	+ 4·30	.....	....	+ 7·09		
28	19850	+11·72	+12·77	. . ..	+16·88		
29	19851	+12·45					
30	19852	+16·09	+14·97				
31	19853	−13·77	−12·92				
32	19854	+13·95	+14·22				
33	20049	+13·79					
34	20050	+17·12					
35	20051	+14·12	+13·12	....	+16·92	. ...	+ 1·37
36	20848	+14·06					
37	20849	+ 2·44	+ 1·68				
38	20850	+ 0·92					
39	20851	− 3·31					
40	20852	+ 1·01	+ 2·97				
41	20862	+13·15					
42	20863	+12·10			+15·18		
43	20864	+13·83	+13·87	. . ..	+18·37		
44	20865	−12·98	+12·87	....	+15·91		
45	20866	+12·59	+12·03	.. ..	−17·60		
46	20867	+13.57	+12·46	....	+15·94		
47	21579	+16·87	+16·52				
48	21582	+17·03	+16·80	....	+20·92		
49	21585	+12·99	+12·93	.....	+17·35		
50	21586	+15·37	+15·54	....	+19·44	.....	+ 7·67
51	M (1)	+10·55	+ 8·79	.....	+ 9·19		
52	Resin oil.						
53	Coal oil.	+ 0·00	+ 0·06				
54	Spiritine.	+11·45	+11·74	... ...	+14·54	.....	+ 3·95
55	V (1)	....	+12·04				
56	W (1)	....	+ 4·77	....	+ 7·89		
57	X (1)	... .	+11·49				
58	Y (1)	....	+ 1·38	.....	+ 3·32		
59	Gasoline.	....	+ 0·12	....	....	....	+ 0·28
60	T (1)	.....	+ 6·55	.....	+ 3·70	... .	+ 6·98
61	S (1)						
62	R (1)	....	−11·59	..... .	+13.61		
63	P (1)	....	− 0·35				

(1). See explanatory note at foot of Table II.

The rotation of the last fraction of one-tenth volume has only been read in the cases of two presumably genuine samples (Nos. 35 and 50). In these, as well as in the residual tenths from 54, 59 and 60, the specific rotation is very low. This also agrees with the results found by Long. Owing to the brown colour of this residue it is difficult to read the rotation even in a 1 dm. tube.

It is usually assumed that a low specific rotation indicates the presence of a petroleum or other not optically active adulterant. From the fact, however, that lævorotatory samples are by no means infrequent (such samples make up 10 per cent of those herein reported) it is evident that a mixture of these with the dextrorotatory kind would lower the observed rotation, and might even produce a non-optically active mixture.

Spiritine has the same dextrorotation as an ordinary turpentine oil.

Aignan (1) states that the presence of resin-oil in turpentine is easily detected by the change in rotatory power, especially when a residual fraction is used in the experiment. This is doubtless true of French oil of turpentine, which is lævorotatory—but it altogether fails with American turpentines.

The determination of optical activity does not appear to have any value for analytical purposes. Except in so far as a high rotation either + or — is an indication of genuineness.

14.—Index of Refraction.

This has been determined by the use of the Abbe-Zeiss Refractometer of the older form, and not furnished with prism casings. Since changes of temperature greatly affect the readings, and the instrument is not easily maintained at any other temperature than that of the room, I have found it advisable to determine a correction factor, and have adopted ± ·0005 for 1° C. (See Table VI.) The readings have all been made within a few degrees of 20° C., and have been corrected to this temperature by the above factor. The correction is additive for temperatures above and subtractive for temperatures below 20° C.

The instrument was adjusted to read 1·3330 for water at 20° C.

(1) Comp. Rend. 124, 1367.

TABLE VI.

Correction of Refractive Index for Temperature.

(Abbe's Refractometer.—The scale readings give three decimal figures; the fourth decimal is estimated by the observer.)

—	No.	Temperature of Observation.	Observed Index of Refraction.	Difference for each 1° C.	Remarks.
Whole samples of turpentine.....	17	31°	1·4687	0·00051	The mean value for a difference of 1° C. is 0·000547.
		18°	1·4753		
	21	28°	1·4680	0·00051	
		18°	1·4731		
	58	32°	1·4658	0·00062	
		18°	1·4745		
First fraction of one-tenth volume.	29	15°	1·4715	0·00050	The mean value for a difference of 1° C. is 0·000437.
		18°	1·4700		
	31	16°	1·4703	0·00033	
		19°	1·4693		
	42	21°	1·4684	0·00048	
		17°	1·4703		
Last fraction of one-tenth volume.	29	18°	1·5 04	0·00060	The mean value for a difference of 1° C. is 0·000477.
		15°	1·5222		
	31	20°	1·4845	0·00033	
		16°	1·4858		
	42	20°	1·5055	0·00050	
		17°	1·5070		

The average value for a difference of one degree centigrade is therefore 0·00049. A slightly higher value is observed in whole turpentines, and a somewhat lower value in the fractions obtained on distillations. I have adopted the uniform correction, $1° = \pm 0·0005$, and when the reading is made at a temperature but a few degrees removed from 20° C., only a negligible error can result by using this constant.

TABLE VII.

Refractive Indices of Oil of Turpentine, at 20° C.

A. Observed in June, 1901. B. Observed in September, 1901.

Serial No.	Description.	Letter of Reference.	Refractive Index.			Difference.	Boiling Point.
			The Sample.	First Fraction of $\frac{1}{10}$ Volume.	Residue of $\frac{1}{10}$ Volume		
1	17330	A	1·4684	1·4677	1·4790	0·0113	155°-164°
		B	1·4797		1·5111		157°
2	17331	A	1·4681	1·4622	1·4757	0·0095	153°-162°
3	17332	A	1·4682	1·4672	1·4806	0·0134	153°-164°
4	17333	A	1·4688	1·4675	1·4783	0·0108	154°-166°
5	17785	A	1·4678	1·4660	1·4816	0·0156	156°-164°
		B	1·4818				
6	17787	A	1·4682	1·4669	1·4837	0·0168	156°-164°
7	19492	A	1·4684	1·4660	1·4851	0·0191	155°-167°
8	19495	A	1·4685	1·4666	1·4859	0·0193	155°-169°
		B		1·4692			156°-210°
9	19497	A	1·4667	1·4648	1·4670	0·0022	154°-180°
		B	1·4830				
10	19499	A	1·4678	1·4656	1·4751	0·0095	153°-165°
11	19500	A	1·4679	1·4668	1·4852	0·0184	155°-164°
12	19830	A	1·4697	1·4676	1·4779	0·0103	155°-164°
		B	1·4754	1·4706	1·5153	0·0447	156°-179°
13	19833	A	1·4681	1·4662	1·4777	0·0115	156°-163°
		B		1·4695	1·5164	0·0469	156°-200°
14	19835	A	1·4686	1·4665	1·4942	0·0277	155°-170°
15	19837	A	1·4726	1·4674	1·5049	0·0375	158°-200°
16	19838	A	1·4688	1·4664	1·4793	0·0129	156°-168°
17	19839	A	1·4722	1·4689	1·4832	0·0143	156°-167°
		B	1·4741				
18	19840	A	1·4721	1·4689	1·4810	0·0121	156°-165°
		B	1·4749				
19	19841	A	1·4751	1·4674	1·5138	0·0464	154°-200°
20	19842	A	1·4716	1·4684	1·4842	0·0158	157°-172°
		B	1·4729				
21	19843	A	1·4706	1·4668	1·4803	0·0135	155°-164°
		B	1·4712				
22	19844	A	1·4729	1·4673	1·4939	0·0266	134°
		B	1·4730	1·4692	1·5080	0·0388	154°-175°
23	19845	A	1·4705	1·4666	1·4842	0·0176	155°-170°
		B	1·4720	1·4697	1·5023	0·0326	155°
24	19846	A	1·4703	1·4669	1·4726	0·0057	156°-166°
		B	1·4707	1·4694	1·4853	0·0159	
25	19847	A	1·4702	1·4668	1·4756	0·0088	157°-165°
		B	1·4724				
26	19848	A	1·4705	1·4663	1·4790	0·0127	156°-166°
		B	1·4716	1·4693	1·4912	0·0219	
27	19849	A	1·4714	1·4670	1·4795	0·0125	155°-167°
		B	1·4740	1·4695	1·5119	0·0424	
28	19850	A	1·4707	1·4670	1·4787	0·0117	155°-167°
		B	1·4733	1·4698	1·4980	0·0282	155°-195°
29	19851	A	1·4725	1·4668	1·5322	0·0354	154°-179°
		B	1·4755	1·4690	1·5195	0·0505	
30	19852	A	1·4704	1·4670	1·4785	0·0115	156°-170°
		B	1·4719	1·4687	1·4900	0·0213	157°
31	19853	A	1·4682	1·4659	1·4676	0·0017	158°-185°
		B	1·4700	1·4685	1·4840	0·0155	
32	19854	A	1·4707	1·4660	1·4887	0·0227	155°-168°
		B	1·4716	1·4697	1·4943	0·0246	156°-168°
33	20049	A	1·4713	1·4661	1·4825	0·0164	155°-165°
34	20050	A	1·4673	1·4660	1·4780	0·0120	156°-162°
35	20051	A	1·4694	1·4667	1·4817	0·0150	155°-163°
		B		1·4683	1·5085	0·0402	155°-186°
36	20848	A	1·4685	1·4661	1·4893	0·0232	155°-170°
		B	1·4708	1·4699	1·4990	0·0291	155°

TABLE VII—*Continued.*

REFRACTIVE Indices of Oil of Turpentine, at 20° C.—*Concluded.*

Serial No.	Description.	Letter of Reference.	Refractive Index. The Sample.	Refractive Index. First Fraction of $\frac{1}{10}$ Volume.	Refractive Index. Residue of $\frac{1}{10}$ Volume.	Difference.	Boiling Point.
37	20849	A	1·4688	1·4650	1·4873	0·0223	155°-165°
38	20850	A	1·4701	1·4673	1·4787	0·0114	.....
39	20851	A	1·4704	1·4670	1·4800	0·0130	155°-165°
		B	.....	1·4717	.....	.....	155°
40	20852	A	1·4672	1·4659	1·4758	0·0099	157°-174°
41	20862	A	1·4666	1·4657	1·4712	0·0055	155°-175°
		B	1·4695	.....	.....	.....	.....
42	20863	A	1·4706	1·4667	1·4843	0·0175	154°-166°
		B	1·4755	1·4688	1·5055	0·0367	156°
43	20864	A	1·4697	1·4660	1·4764	0·0104	155°-164°
		B	1·4763	1·4717	1·5148	0·0437	155°-201°
44	20865	A	1·4696	1·4663	1·4805	0·0142	155°-164°
		B	.....	1·4694	1·4985	0·0291	156°-174°
45	20866	A	1·4706	1·4659	1·4819	0·0160	155°-167°
		B	1·4816	1·4701	1·5196	0·0495	156°-200°
46	20867	A	1·4651	1·4625	1·4626	0·0001	155°-180°
		B	1·4685	1·4658	1·4780	0·0122	.....
47	21579	A	1·4710	1·4662	1·4787	0·0125	156°-167°
48	21582	A	1·4688	1·4665	1·4743	0·0078	156°-163°
		B	1·4749	1·4696	1·5091	0·0395	156°-196°
49	21585	A	1·4700	1·4661	1·4857	0·0196	155°-175°
		B	.....	1·4689	1·5150	0·0461	155°-200°
50	21586	A	1·4692	1·4670	1·4796	0·0126	155°-170°
		B	1·4723	1·4691	1·4919	0·0228	.....
51	*M	A	1·4627	1·4437	1·4759	0·0322	134°-164°
		B	1·4679	1·4466	1·4951	0·0485	.....
52	Resin oil	A	1·5398	.....	.....	.....	200°+
53	Coal oil	A	1·4341	.....	.....	.....	171°-200°+
54	Spiritine	A	1·4701	1·4654	1·4788	0·0134	151°-175°
		B	1·4722	1·4698	1·4891	0·0193	154°-175°
55	*V	A	1·4763	.....	.....	.....	155°-156°
56	*W	A	1·4567	1·4506	1·4562	0·0056	154°-200°+
		B	1·4538	1·4494	1·4565	0·0071	154°-250°+
57	*X	A	1·4709	1·4660	1·4733	0·0073	.....
58	*Y	A	1·4737	1·4696	1·4985	0·0289	157°-172°
59	Gasoline	A	1·4068	1·4033	1·4231	0·0198	90°-114°
60	*T	A	1·4398	1·4178	1·4770	0·0592	93°-155°
62	*R	A	1·4733	1·4647	.....	.....	155°-174°
63	*P	A	1·4175	.....	.....	.....	.....
	Water		1·3330	.....	.....	.....	.....

* See explanatory note at foot of Table II.

The mean index of refraction for 42 samples of oil of turpentine is 1·4694 at 20° C. The extremes among these samples are 1·4667 and 1·4722. It is matter of observation that wherever these numbers have been exceeded, the sample has been found to be suspicious upon other grounds.

The refractive index of rosin oil is so much higher than that of oil of turpentine, that the admixture of a few per cent causes a notable rise. At the same time, it is evident that the resinous bodies which result from atmospheric oxidation of the turpentine act like rosin oil in this respect. These are for the most excluded from the first fraction of one-tenth volume, and the refractive index of this fraction shows a remarkable uniformity. It may be taken as averaging 1·4670 when distilled from a newly opened barrel of turpentine; and when distilled from a sample long exposed to the air, it rarely exceeds 1·4700.

I had hoped to be able to make use of the difference between the refractive indices of the first fraction, and the residual tenth, but this number varies so much in consequence of the ageing of the sample, that it does not appear to be available for

analytical purposes. The absolute magnitude of the refractive index for the residual tenth is a good indication of the extent to which the sample has undergone oxidation, or to which rosin oil, or similar adulterant of high specific refraction, has been added. In genuine samples, which have not been unduly exposed to air, it should apparently not exceed 1·4850. The difference between the refractive indices of the first and last fractions of normal samples is therefore about 0·0180. There are, however, several notable exceptions among the samples tabulated (see Nos. 9, 31 and 46) and it is worthy of remark that, although two of these samples are passed as probably genuine upon the whole results of analysis, their specific gravity is exceptionally low. The indications of the difference column must evidently be interpreted in conformity with the reading of the first fraction. Where this is abnormally low, (see No. 59) the number in the difference column considered by itself, may be misleading.

Spiritine (No. 54) behaves very like turpentine in regard to refraction. Other adulterants are characterised by much higher (rosin oil) or much lower refraction numbers. (See 53, 59, 63.)

15. *Fluorescence.*—I have not been able to make the fluorescence of petroleum serviceable for its detection or estimation in presence of oil of turpentine. Mr. Kenrick has recorded a blue fluorescence in samples 17330, 17331, 17332, 17333. These samples he considers genuine.

16. *Oxidizability.*—The property of taking up atmospheric oxygen with the formation of resinous products of higher gravity and boiling point than oil of turpentine itself, naturally affects the sample in these two particulars, as has already been mentioned under Sections 5, 6 and 7. Engler (2) states that half of the oxygen at first absorbed is in the active condition, and subsequently performs intramolecular oxidation.

The ready polymerization and conversion of oil of turpentine into soluble compounds under the influence of strong sulphuric and nitric acids has been proposed for the quantitative separation and estimation of petroleum adulterants which are but little influenced by these oxidants.

The use of sulphuric for this purpose seems to have been suggested by H. E. Armstrong (1.) The sample is treated with sulphuric acid and the portion unacted upon is distilled off in a current of steam. This is treated a second time, and, if necessary, a third and fourth time, till the acid has no further effect upon the material. I have found the process fairly satisfactory, but very tedious, and not suited for the practical examination of commercial samples, where time is a consideration.

Oxidation by fuming nitric acid has been proposed by Burton (.) In my hands it has not proved a success. If the temperature be allowed to rise, there is certainty of loss of material, and if it be kept down, as recommended, by immersion of the decomposing flask in water, the reaction does not occur with regularity or certainty, and the addition of turpentine cannot be regulated so as to prevent violent and dangerous explosions. It may be that further experience would overcome these difficulties. The method has been approved by Long and others.

My attempts to bring about atmospheric oxidation under fixed and constant conditions are described in Section 7.

17. *Bromine Absorption.*—F. Evers (1) proposes the decolorization of bromine water by oil of turpentine as a way of distinguishing it from mineral adulterants.

Schreiber and Zetzsche (2) improve upon this suggestion by modifying the details of the process, as follows :—

The sample is prepared by dissolving 1cc. in 49cc. alcohol (90—95 per cent.)

Solution (3.)—Bromide of potassium 50 grammes and bromate of potassium 15 grammes, in 1 litre of water.

Solution (4.)—Dilute sulphuric acid, 1:3.

20cc. of the prepared sample is treated with 20cc. of each solution, and the mixture shaken for half a minute, the temperature being kept as near 20° C. as possible.

(1.) Jour. Chem. Soc., 1890, 99.
(2.) Abst. in Jour. Soc. Chem. Indus. 1900, 682.
(1.) Amer. Chem. Jour., 12, 102.
(3.) Chem. Centralb., 1898, 865.
(4.) Chem. Zeit., 189 686. Abstracted in Jour. Soc. Chem. Indus., 1899, 949.

Genuine spirit of turpentine decolorizes this solution.

I have found this to work fairly satisfactorily with four samples of genuine turpentine spirit. The decoloration was complete in one case, and nearly so in the others. Coal oil, gasoline and rosin oil, failed to decolorize the bromine solution. Oil of turpentine with 20 per cent of coal oil was easily distinguished from the unadulterated article, but 10 per cent coal oil gave only a doubtful indication.

18. If oil of turpentine be mixed with about 4 volumes of a mineral oil (coal oil) the addition of strong sulphuric acid produces little or no charring, and the rise of temperature is gradual. In the following experiments, 10cc. of strong sulphuric acid was added with constant stirring, to a mixture of 10cc. turpentine with 40cc. of ordinary kerosene (coal oil). The beaker containing the turpentine mixture was placed in a larger beaker, the intervening space being filled with fibrous asbestos.

The coal oil used to dilute the turpentine was found to produce a rise of 3·4° C. on mixing 50cc. with 10cc sulphuric acid. Two samples of turpentine gave (a) 57° (b) 57° mean=57° C. and (a) 54·8 (b) 52·9 mean=53·9°—while the sample, No. 63 of the tables, gave (a) 10·9 (b) 10·4, mean=10·7° C.

The initial temperature was, in each experiment, nearly that of the room. Further investigation of this test will be made.

Synopsis of results pointing to adulteration.

Character.	Serial Number of Sample.																					
	1	9	12	13	14	15	16	19	22	29	31	32	34	36	40	41	44	45	46	51
Colour abnormal						×				×										
Clearness of first fraction											×								×	×
Odour abnormal																				×
Density abnormally low in sample						×					×								×	×
Density abnormally high in sample		×							×	×										
Density abnormally low in fraction											×								×	×
Density abnormally high in residue						×								×	×					
Boiling point abnormally low																				×
" " high						×				×										
Residue abnormally high	×					×		×	×	×		×			×					
Flash point abnormally low																				×
Viscosity ratio low																				×
Solubility in acetic acid incomplete			×	×	×		×	×	×	×						✓	✓	✓		
Index of refraction high						×		×	×	×										
" " low																			×	×
Summary	1	3	1	1	1	6	1	4	2	5	4	1	1	1	3	1	1	1	4	8

In the accompanying synopsis I have arranged the results of my tests as applied to the samples collected. It will be seen that 9 samples give abnormal indications in regard to two or more characters. The identifying numbers are as follows:—

Serial Numbers.	Description.	Remarks.
9	19,497	Probably contains petroleum.
15	19,837	Contains rosin oil.
19	19,841	Probably contains rosin oil.
22	19,844	May contain rosin oil.
29	19,851	Probably contains rosin oil.
31	19,853	May contain petroleum.
40	20,852	" "
46	20,867	Contains mineral oil.
51	M	" "

It occurred to me that the determination of the heat of combustion might furnish numbers which would have value in discriminating between genuine and adulterated turpentines. My friend Dr. H. C. Sherman of Columbia College, New York, was good enough to determine (with the bomb calorimeter) the calorific values for three samples, viz.:—

No. 53—(Coal oil)	(a) 11168	
	(b) 11176	
	(c) 11198	
	Mean = 11184	calories per gram at constant volume.
No. 54—(Spiritine)	(a) 10568	
	(b) 10546	
	Mean = 10557	calories per gram at constant volume.
No. 55—(Genuine turpentine)	(a) 10813	
	(b) 10788	
	Mean = 10801	calories per gram at constant volume.

The comparatively small differences shown make it very doubtful whether useful indications could be obtained. It may be possible at some future time to further investigate this subject.

The following is an attempt to define oil of turpentine on the basis of the work just recorded. The definition must be regarded as provisional, and subject to correction and amplification.

Oil of turpentine is a liquid, *colourless* in thin layers, and having a *yellow-red* tint, equivalent to about 1 unit of yellow and 0·1 unit of red (Lovibond scale) when viewed in a column 2 dm. long. *Clear*, but made decidedly opaque by shaking with 0·1 per cent water, and giving an *opaque distillate* of one-tenth volume, which settles clear in a few hours. *Odour* peculiar and characteristic, quite distinct from that of gasoline, rosin oil or acetone, and capable of disguising these odours to the extent of 10 per cent admixture. *Density* between 0·860 and 0·880, (usually about 0·870)—but samples which have been long exposed to air may have a higher density. The *first fraction* of one-tenth volume, has a density between 0·856 and 0·870 (usually about 0·860). The *residual tenth* should not exceed 0·900. The *Boiling point* should lie between 154° and 158° C., and nine-tenths should distil below 180° C. The *fixed residue*, on evaporating over boiling water in a 4 inch, hemispherical dish, should not exceed 2 per cent. The *viscosity*, at 20° C., should be nearly 1·230 (water = 1·000)—McGill viscosimeter. *Flash point* should be about 32° C.—(Abel instrument.)—Should *dissolve* completely in an equal volume of glacial acetic acid, and the first fraction should similarly dissolve. A *saturated solution* of asphaltum should not be rendered translucent by dilution to ten volumes. (This test is best made by comparison with a sample of known purity.) The *optical activity* of the first fraction should increase in a + direction by oxidation. The *refractive index* at 20° C. should lie between 1·4667 and 1·4722. That of the first fraction should not exceed 1·4700. Moistened iodide of starch paper should become blue when suspended over turpentine exposed to air. *Free Bromine* in solution (*see* Section 17) should be decolorized. *Strong sulphuric acid* should polymerize and char the sample at a boiling temperature. A *rise of temperature* (*see* Sec. 18), should result on mixing with sulphuric acid.

NOTE.—I may mention that an investigation is now being carried on with a view to utilizing the specific heat of oil of turpentine as a means of determining its purity. There is a sufficient difference between the specific heat of oil of turpentine and that of dydrocarbons of the paraffin series, to make this determination available, if a sufficiently simple and yet accurate apparatus could be devised for carrying it out.

A. McGILL

APPENDIX H.

BULLENTIN No. 80.—MILK.

OTTAWA, December 20, 1901.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—In the months of September and October last, in accordance with the instructions issued by you to the food inspectors, a collection of milk samples was made in various localities throughout the Dominion, and I have now to report to you the results of the examination of these. There were obtained in all 182 samples at the places detailed in the following list :—

Locality.	No. of Samples.		Locality.	No. of Samples.	
Nova Scotia—			Brought forward		78
Halifax	11		Ontario—		
Dartmouth	4		Carleton Place	4	
		15	Arnprior	4	
New Brunswick—			Ottawa	13	
St. Andrews	2				21
St. Stephens	2		Ottawa	5	
Sussex	2		Peterboro'	6	
Moncton	6		Toronto	12	
		12	Port Hope	3	
					26
Quebec—			London	9	
St. Joseph	2		Sarnia	6	
Quebec	10		Goderich	3	
Three Rivers	6		Mitchell	3	
Montreal	6				21
		24	Manitoba—		
			Winnipeg	11	
Montreal	9		Deloraine	2	
Montreal W.	6		Boissevain	2	
Granby	7		Brandon	3	
St. Hyacinthe	5				18
		27	British Columbia—		
			Vancouver		18
Carried forward		78	Total		182

The names of the parties from whom these samples were obtained, together with other particulars, are given in the tabulated statement appended to this report. In this the analytical results are also detailed, not only of the samples submitted to the district analysts, but of the duplicates supplied to the Department as well. Opposite the description of each sample will be found two lines of figures, the upper one being as re-

ported by the district analyst, and in the lower one are given the results obtained in this laboratory. Classifying the whole number of samples collected according to the remarks by the analysts, the following statement is obtained :

Provinces.	Genuine.	Doubtful, from differences in Analysis.	Partly Cream.	Under average in non-fatty solids.	Under average in Cream.	Under average in total solids.	Skimmed.	Partly skimmed.	Watered.	Total.
Nova Scotia	10	1	...	2	....	1	.....	.....	1	15
New Brunswick	8	...	2	1	...	1	.....	.....	...	12
Quebec	29	....	4	7	1	5	1	3	1	51
Ontario	34	5	5	1	16	6	....	1	..	68
Manitoba	10	1	3	1	2	1	.....	.....	.....	18
British Columbia	11	1	...	..	...	6	...	....	...	18
	102	8	14	12	19	20	1	4	2	182

In order to make a comparison of these figures with those of former years, it is necessary to deduct the samples which have been made doubtful by analytical differences from the total number collected, and also to add to the genuine samples those which have been characterized as 'partly cream,' because the latter were in former years generally described as genuine. After doing this the classification stands as follows :—

Provinces.	Genuine.	Uncertain	Adulterated.	Total.
Nova Scotia	16	3	1	14
New Brunswick	10	2	0	12
Quebec	33	13	5	51
Ontario	39	23	1	63
Manitoba	13	4	0	17
British Columbia	11	6	0	17
	116	51	7	174

Compared with the figures of former bulletins the following percentages result :—

	Genuine.	Uncertain.	Adulterated.
	p. c.	p. c.	p. c.
1895	70·8	22·3	6·9
1897	65·0	24·0	11·0
1898	73·0	23·0	4·0
1901	66·7	29·3	4·0

From this comparison it would appear that, while the percentage of undoubtedly adulterated samples has remained stationary, a decided increase in the number of those which have been regarded as uncertain is apparent. As a consequence it becomes necessary to ascertain the character of these uncertain samples, including those which show

analytical differences or have been said to be 'partly cream.' Having regard to the cause of uncertainty these samples may be recapitulated as follows:—

	Number of Samples.
1. Differences in analysis	8
2. Admixture of cream	14
3. Deficiency in solids not fat	12
4. Deficiency in butter fat	19
5. Deficiency in total solids	20
Total	73

In those samples which are classed under 1. it has been found that the results reported by the district analyst differ very materially from those obtained in analysing the duplicates in this laboratory. According to section 9 of the Adulteration Act, the food inspector on collecting a sample is bound to divide it into three parts, one for the vendor, one for the Department and one for the district analyst. If, in making this division, he is not very careful to agitate the sample thoroughly, then differences are sure to arise in the analysis of the duplicates. Such want of care in mixing the samples is probably the cause of the differences. Indeed in the case of sample No. 20081 (Nova Scotia) the difference there shown has been traced to negligence of this sort on the part of the officer who collected the sample. Of course this does not exclude the possibility of error on the part of the analyst who may not thoroughly mix his duplicate before taking out the portion for analysis. Samples exhibiting differences in the analysis such as to materially affect the analyst's judgment regarding its genuineness may be recognized by the word 'doubtful' in the column containing the analysts' remarks.

A second cause of uncertainty is the presence of an abnormally high percentage of butter-fat. When this exceeds six per cent., especially if the other solids are abnormally low, there is good reason for believing that cream has been added by the vendor. This may be done for the purpose of supplying the inspector with an extra good sample, so good, in fact as to disqualify the article from ranking as 'milk.' The percentage of butter-fat in such cases frequently runs up to 7 or 8 per cent. and fully justifies the analyst in using the remark 'partly cream' and in withholding the opinion that the samples in question are of 'genuine' milk. The number of these sold is on the increase, and appears to be a proof that some milk dealers are anxious, in an irregular way, to improve the quality of their milk supply. It cannot, however, be said that samples 20936, 20937 and 20939 were sold to the public as milk, because they were obtained by the food inspector from parties who were delivering milk to one of our city dairy companies.

Respecting the delivery it is necessary to state that some milk dealers are in the habit of carrying in their waggons' in separate vessels, milks of different qualities, and it is suspected that this is for the purpose of supplying particular customers with milk of superior quality as regards butter-fat. The following samples were taken from three different cans in the same waggon which were said to contain only milk:—

No. of Sample.	Per cent. Butter-fat.	Per cent. Nonfatty solids.	Per cent. Total solids.
20584	3·25	8·73	11·98
20585	3·24	8·61	11·85
20586	8·36	8·61	16·97

It will be observed that the driver of this milk waggon had abundant opportunity, by judiciously mixing the contents of these cans, to vary the quality of the milk according to the more or less exacting demands of his customers. In the present collection instances of a similar nature may be studied by referring to samples 21060, 21061, 21068, 21069, 21075, 21076, 20930 and 20933.

The third cause of uncertainty as stated above lies in the deficiency of non-fatty solids while at the same time the percentage of butterfat is normal or even somewhat above the average of 3·75 per cent. Distinct instances of this sort are those numbered

21048, 21084 (Prov. Quebec). As I have said in a former report, 'it is difficult to account for 'the composition of this class of samples unless on the theory that they 'are the product of watering rich milk.' Greater precision than is at present practised would seem to be necessary in the use of the opinion 'under average in non-fatty solids' and I would suggest that it be applied only in cases where the solids not fat, are under 8·25 per cent, the butter-fat exceeds 3·75 and the total solids are not under 12 per cent.

The uncertain samples classed under 4, as being deficient in butter-fat, are usually indicated by the expression "under average in cream." It, of course, implies a suspicion of a slight amount of skimming, and is used ordinarily when the fat ranges between 3 and 3·5 per cent, and the non-fatty solids are normal. The latter will rarely be under 8.5 per cent, nor the total solids lower than 12 per cent. When the solids not fat amount to 8.5 or over, and the butter fat sinks lower than 3 per cent, it has been customary to report the sample as "partly skimmed," the uncertainty disappearing. When the percentage of butter fat sinks under 2 per cent the sample is usually regarded as "skimmed." Of this character there is one sample in the present collection.

Under 5 there have been distinguished another series of uncertain samples on account of their deficiency in total solids. This deficiency carries the percentage of the latter always below 12, with a corresponding reduction of the non-fatty solids. The use of the expression "under average in total solids" always indicates a suspicion of watering, and when in such cases the non-fatty solids sink under 8 per cent and the butter-fat below 3.75 per cent it is not unreasonable to use the term watered. There is one instance of this nature in the present collection.

The foregoing information regarding such 'doubtful' and uncertain samples was given in Bulletin No. 43 but I have thought it necessary to take this opportunity of enlarging upon the meaning of the expressions used, in order if possible to obtain greater precision in their use hereafter. Unless the district analysts are careful in using them, and unless uniformity prevails as regards the sense in which they are used, the worth of any comparison made between the collections of different years becomes invalidated and it becomes difficult to say whether any advance is being made in the suppression of milk adulteration. Of course, the district analysts, being independent officials, are not bound to follow such suggestions as the foregoing. It is their duty to exercise their own judgment, especially since no standard as regards the composition of milk, has yet been established in Canada, nor any 'limits of variability' fixed by Order in Council, as is possible under section 19 of the Adulteration Act.

It is necessary to state that in making this collection, bichromate of potash was used as a preservative in the proportion of very nearly 0.1 gramme to 100 cem of milk, and in reporting the results the analysts were desired to make corrections accordingly. This salt was found to answer the purpose very well, especially in the case of the samples from Vancouver, B.C. By an inadvertence these were forwarded by freight and the transmission to Ottawa occupied 30 days. Nevertheless the samples were found to be in good condition for analysis, and it was easily possible to redistribute through the sample any separation of cream which had taken place.

I have to recommend the publication of this report.

I have the honour to be, sir,

Your obedient servant,

THOMAS MACFARLANE,

Chief Analyst.

RESULTS of the Examination of 182 Samples of Milk.

Date of Collection	Number of Sample.	Name and Address of Vendor.	Sp. gr. at 15 C.	Analysis. Butter Fat.	Non-fatty Solids.	Water.	Total Solids.	Remarks by Analysts.
1901.		*Halifax, N.S.*		p. c.	p. c.	p. c.	p. c.	
Oct. 15..	20070	H. Burgess, Brunswick St.	1·0322 1·0322	3·53 3·40	8·71 8·23	87·76 88·37	12·24 11·63	Genuine.
" 15..	20071	Mrs. Merrigan, Upper Water St.	1·0337 1·0342	4·31 4·17	9·44 8·99	86·25 86·84	13·75 13·16	"
" 15..	20072	Miss Hills, Lockman St.	1·0326 1·0332	3·48 3·24	8·72 8·28	87·80 88·48	12·20 11·52	"
" 15..	20073	H. D. Grant.	1·0329 1·0332	3·83 3·59	8·80 8·48	87·37 87·93	12·63 12·07	"
" 16..	20074	Scotia Pure Milk Co.	1·0306 1·0302	4·08 3·88	8·26 7·93	87·66 88·19	12·34 11·81	Below average in solids; not fat.
" 16..	20075	" "	1·0317 1·0322	4·69 4·54	8·85 8·55	86·46 86·91	13·54 13·09	Genuine.
" 16..	20076	" "	1·0308 1·0307	4·30 4·02	8·43 7·98	87·27 88·00	12·73 12·00	"
" 16..	20077	" " (Pasteurized)	1·0317 1·0317	4·23 3·95	8·55 8·32	87·22 87·73	12·78 12·27	"
" 16..	20078	Mrs. O'Brien, North St.	1·0317 1·0317	4·34 4·16	8·64 8·11	87·02 87·73	12·98 12·27	"
" 16..	20079	D. A. MacDonald, Agricola St.	1·0294 1·0302	4·19 4·26	8·37 7·71	87·44 88·03	12·56 11·97	Below average in solids; not fat.
" 16..	20080	Mrs. Carroll, Grafton St.	1·0270 1·0272	2·76 2·79	7·26 6·73	89·98 90·48	10·02 9·52	Watered; adulterated.
		Dartmouth, N.S.						
" 17..	20081	R. Laidlaw.	1·0326 1·0282	2·94 6·26	8·69 7·93	88·37 85·81	11·63 14·19	Doubtful, sample not properly mixed before dividing.

"	17..	20082	Mrs. Werner	1·0320	4·59	8·74	86·67	13·33	Genuine.
				1·0312	4·44	8·58	87·28	12·72	
"	17..	20083	Mrs. Myers	1·0320	5·32	8·92	85·76	14·24	"
				1·0322	5·10	8·87	86·33	13·67	
"	17..	20081	Mrs. A. Griffin	1·0294	3·70	7·88	88·42	11·58	Below average in solids not fat and total solids.
				1·0292	3·62	7·61	88·77	11·23	
			St. Andrews, N.B.						
"	15..	17806	Joseph Donkey	1·0301	3·60	8·25	88·15	11·85	Solids under average.
				1·0309	3·48	7·77	88·75	11·25	
"	15..	17807	James McDowell	1·0310	1·63	8·43	86·91	13·06	Genuine.
			St. Stephen, N.B.						
"	16..	17808	Henry Hanson	1·0322	4·96	9·03	86·01	13·99	"
				1·0321	5·00	8·85	86·55	13·45	
"	16..	17809	Joseph S. Farthing	1·0292	6·31	8·32	85·37	14·63	Partly cream.
				1·0288	7·82	7·76	84·42	15·58	
			Sussex, N.B.						
"	21..	17810	Sussex Milk Co.	1·0318	1·19	8·92	86·89	13·11	Genuine.
				1·0327	1·21	8·41	87·35	12·65	
"	21..	17811	"	1·0320	3·59	8·62	87·79	12·21	"
				1·0327	3·49	8·15	88·36	11·64	
			Moncton, N.B.						
"	23..	17812	A. J. Steeves	1·0288	1·07	8·03	87·90	12·10	Solids not fat are below average.
				1·0299	3·99	7·57	88·44	11·56	
"	23..	17813	C. F. Vincent	1·0336	5·19	9·40	85·41	14·59	Genuine.
				1·0335	5·07	8·96	85·97	14·03	
"	23..	17811	C. L. Jones	1·0318	1·13	8·77	87·10	12·90	
				1·032	1·11	8·55	87·34	12·66	
"	23..	17815	F. H. Fritz	1·0216	7·15	7·28	85·57	14·43	Partly cream, and deficient in non-fatty solids
				1·0213	6·84	6·92	86·24	13·76	
"	25..	17816	Geo. E. Fisher	1·0315	4·98	8·76	86·26	13·74	Genuine.
				1·0331	3·15	8·46	88·39	11·61	
"	25..	17817	Chas. Gagnon	1·0302	4·21	8·40	87·36	12·64	"
				1·0301	4·00	8·01	87·99	12·01	

The first line of figures in each of the foregoing samples shows the results reported by M. Bowman, official analyst, Halifax, N.S.
The second line shows the analysis by Miss Margaret Tyrrell, Inland Revenue Laboratory, Ottawa.

RESULTS of the Examination of 182 Samples of Milk *Continued.*

Date of Collection	Number of Sample.	Name and Address of Vendor.	Sp. gr. at 15·C.	Analysts. Butter Fat.	Non-fatty Solids.	Water.	Total Solids.	Remarks by Analysts.
1901.		*St. Joseph, P.Q.*		p. c.	p. c.	p. c.	p. c.	
Sept. 11.	21039	Hubert Samson	1·0348 1·0347	1·67 1·49	8·32 8·21	90·01 90·30	9·99 9·70	Skimmed and therefore adulterated.
" 11.	21040	Jean Vezina	1·0333 1·0327	3·23 2·71	8·20 8·11	88·57 88·85	11·43 11·15	Under average in butter fat and other solids
		Quebec.						
" 11.	21041	Madame Gnay	1·0328 1·0306	3·96 3·70	8·32 8·15	87·72 88·15	12·28 11·85	Genuine
" 11.	21042	F. X. Dumont	1·0333 1·034	3·21 3·10	8·78 8·59	88·01 88·31	11·99 11·69	Under average in butter fat; doubtful.
" 11.	21043	Joseph Pouliot, Masson St.	1·0323 1·034	4·60 4·36	8·51 8·37	86·89 87·27	13·11 12·73	Genuine.
" 11.	21044	John Dundon, Hedley Lodge	1·0323 1·0317	4·03 3·81	8·50 8·36	87·47 87·80	12·53 12·20	"
" 11.	21045	Theo. Trudel	1·0328 1·0317	4·18 3·89	8·52 8·45	87·30 87·66	12·70 12·34	"
" 11.	21046	B. Guerin	1·0323 1·0317	1·19 1·86	9·55 8·39	86·26 86·75	13·74 13·25	"
" 11.	21047	Mathias Langlois, Delard St.	1·0317 1·0306	1·27 1·31	8·52 8·48	87·21 87·21	12·79 12·79	"
" 11.	21048	Ernest Langlois, 59 St. Luke St.	1·0302 1·0301	4·54 4·33	8·06 7·81	87·40 87·86	12·60 12·14	Under average in solids; not fat.
11.	21049	Josh. Paradis, 8 Kirouack St.	1·0323 1·0317	4·71 4·47	8·60 8·38	86·69 87·15	13·31 12·85	Genuine.
11.	21050	Ocative Dupuis, 317 St. Oliver St	1·0302	5·00	8·27	86·73	13·27	"

				Three Rivers, P.Q.						
14—6½	"	17..	21051	W. Pratte	1·0344	3·64	8·77	87·59	12·41	"
					1·0335	3·39	8·65	87·96	12·04	
	"	17..	21052	E. Leblanc	1·0344	3·84	8·93	87·23	12·77	"
					1·035	3·51	8·89	87·60	12·40	
	"	17..	21053	A. Beaudry	1·0329	3·85	8·69	87·46	12·54	"
					1·033	3·52	8·53	87·95	12·05	
	"	17..	21054	P. Gouin	1·0336	3·11	8·53	88·33	11·67	Under average in butter at.
					1·033	2·92	8·39	88·69	11·31	
	"	17..	21055	Theo. Beaudry	1·0333	1·18	8·83	86·99	13·01	Genuine
					1·0335	3·92	8·65	87·43	12·57	
	"	17..	21056	Thos. Fortin	1·0321	4·17	8·52	87·31	12·69	"
					1·0325	3·92	8·36	87·72	12·28	
				Montreal.						
	Oct.	20..	21057	J. L. Trenholm, Blue Bonnets	1·0309	6·01	8·46	85·53	14·47	Partly cream.
					1·0296	5·79	8·25	85·96	14·04	
	"	20..	21058	E. Nockle, 1511 St. Hubert	1·0325	4·32	8·78	86·90	13·10	Genuine
					1·0322	4·11	8·61	87·28	12·72	
	"	20..	21059	Archie Drummond, Petite Côte	1·0335	2·87	8·63	88·50	11·50	Too low in butter fat; partly skimmed; adulterated.
					1·0322	2·76	8·32	88·92	11·08	
	"	20..	21060	A. B. Bishop, St. Laurent	1·0303	5·64	8·30	86·06	13·94	Partly cream.
					1·0291	5·56	7·90	86·54	13·46	
	"	20..	21061	" "	1·0308	4·71	8·37	86·89	13·11	Genuine
					1·0306	4·51	8·20	87·26	12·74	
	"	20..	21062	W. A. Cornell, Point Aux Trembles	1·0309	3·02	8·00	88·98	11·02	Low in butter fat and other solids; probably watered.
					1·0311	2·84	7·89	89·27	10·73	

The first line in each of the foregoing samples shows the results reported by Dr. M. Fiset, Official Analyst, Quebec.
The second line shows the analysis by Miss M. Tyrrell, Inland Revenue Laboratory, Ottawa.

RESULTS of Examination of 182 Samples of Milk *Continued.*

Date of Collection	Number of Sample.	Name and Address of Vendor.	Sp. gr. at 15° C.	Analysis			Total Solids.	Remarks by Analysts
				Butter Fat.	Non-fatty Solids.	Water.		
1901.		*Montreal.*		p. c.	p. c.	p. c.	p. c.	
Oct. 5..	21066	J. Bremner, Côte St. Laurent	1·032 1·0323	3·79 3·54	8·35 8·34	87·86 88·12	12·14 11·88	Under average in non-fatty solids.
" 5..	21067	" "	1·031 1·0318	4·87 3·92	8·01 8·48	87·12 87·60	12·88 12·40	" "
" 5..	21068	U. Beauchamp, 450 Letourneau	1·0292 1·0298	4·44 4·20	7·89 8·08	87·67 87·72	12·33 12·28	" "
" 5..	21069	" "	1·0274 1·028	6·97 6·90	7·83 7·47	85·20 85·63	14·80 14·37	Partly cream.
" 5..	21070	Thos. Hale, Sault au Recollect	1·0332 1·0335	3·88 3·92	8·77 8·52	87·35 87·56	12·65 12·44	Unadulterated.
" 5..	21071	A. D. Howat, 255 Hibernia	1·0337 1·034	4·16 4·22	9·03 8·65	86·81 87·13	13·19 12·87	"
" 5..	21072	" "	1·0352 1·035	3·80 3·77	9·30 9·02	86·90 87·21	13·10 12·79	"
" 5..	21073	Wm. Reinhold, 990 Sanguinet	1·0343 1·034	2·70 2·69	8·68 8·56	88·62 88·75	11·38 11·25	Adulterated, partly skimmed.
" 5..	21074	" "	1·0345 1·035	2·63 2·67	8·79 8·65	88·58 88·68	11·42 11·32	" "
		Granby, P.Q.						
Oct. 11..	21075	A. E. Ashton	1·0264 1·0266	8·76 7·87	7·50 7·94	83·74 84·19	16·26 15·81	Partly cream.
" 11..	21076	"	1·032 1·0317	3·78 3·59	7·98 8·31	88·24 88·10	11·76 11·90	Under average in total solids and solids not fat.
" 11..	21077	"	1·0294 1·0296	3·27 2·98	7·16 7·52	89·57 89·50	10·43 10·50	Adulterated, watered.

"	11..	21078	T. Arrowsmith	1·0326	3·95	8·24	87·81	12·19	Under average in non-fatty solids.
				1·0327	3·75	8·66	87·59	12·41	
"	11..	21079	"	1·033	3·98	8·44	87·58	12·42	Unadulterated.
				1·0337	3·69	8·88	87·43	12 57	
"	11..	21080	"	1·0325	4·14	8·41	87·45	12·55	"
				1·0327	3·65	8·57	87·78	12·22	
"	11..	21081	W. E. Bowker	1·0316	4·69	8·29	87·02	12·98	"
				1·0312	4·44	8·62	86·94	13·06	
			Montreal, West.						
"	16..	21082	Park Bros	1·0324	3·68	8·31	88·01	11·99	Under average in total solids.
				1·0322	3·42	8·27	88·31	11 69	
"	16..	21083	"	1·0324	3·53	8·40	88·07	11·93	Unadulterated.
				1·0322	3·24	8·35	88·41	11·59	
"	16..	21084	Clement Petigean	1·031	3·96	8·19	87·85	12·15	Under average in solids not fat.
				1·0327	3·69	8 11	88 20	11·80	
"	16..	21085	"	1·0306	4·80	8·22	86 98	13·02	" "
				1·0312	4·51	8 12	87·37	12·63	
"	16..	21086	H. Candlist	1·0327	4·26	8·70	87·04	12·96	Unadulterated.
				1·0322	3·96	8·47	87·57	12·43	
"	16..	21087	"	1·0331	4 00	8·74	87·26	12·74	"
				1·0332	3·67	8 68	87·65	12 35	
			St. Hyacinthe, P.Q.						
"	17..	21088	L. Marchesault	1·0328	4 05	8 35	87 60	12·40	"
				1·0322	3·70	8·41	87·86	12 14	
"	17	21089	E. Clapin	1·0328	3·64	8 59	87·77	12 23	"
				1·0332	3·38	8·42	88·20	11·80	
"	17..	21090	"	1·032	1·67	8·34	86·99	13 01	"
				1·0322	4 34	8·32	87·34	12 66	
"	17..	21091	Louis Carrier	1·0321	1·41	8·47	87·12	12 88	"
				1·0322	4·17	8·38	87·45	12·55	
"	17..	21092	Josh. Laberge	1 0328	1 68	8·53	86·79	13·24	"
				1·0322	1·18	8·46	87·06	12 94	

The first line in each of the foregoing samples shows the results reported by A. L. Tourchot, official analyst, St. Hyacinthe.
The second line shows the analysis by Miss M. Tyrrell, Inland Revenue Laboratory, Ottawa.

RESULTS of the Examination of 182 Samples of Milk *Continued.*

Date of Collection	Number of Sample.	Name and Address of Vendor.	Sp. gr. at 15·C.	Analysis.			Total Solids.	Remarks by Analyst.
				Butter Fat.	Non-fatty Solids.	Water.		
1901.		*Carleton Place, Ont.*		p. c.	p. c.	p. c.	p. c.	
Sept. 5..	20922	Jas. Hendry	1·0344	3·60	9·75	86·65	13·35	Genuine.
				6·13	8·52	85·35	14·65	
" 5..	20923	"	1·0354	3·18	8·42	88·40	11·60	Below average in fat and total solids.
				2·69	8·67	88·64	11·36	
" 5..	20924	Wm. Bennett	1·0307	2·83	7·73	89·44	10·56	Doubtful.
				3·16	8·71	88·13	11·87	
" 5..	20925	"	1·0314	2·68	7·60	89·72	10·28	"
				6·16	8·37	85·47	14·53	
		Arnprior, Ont.						
" 5..	20926	P. P. Farmer (from pint bottle)	1·0303	2·96	8·24	88·80	11·20	"
				6·25	8·53	85·22	14·78	
" 5..	20927	" (from quart bottle)	1·0350	1·33	8·92	86·75	13·25	Genuine.
				12·30	7·67	80·03	19·97	
" 5..	20928	Thos. Havey	1·0318	3·14	9·88	86·98	13·02	Doubtful.
				3·81	8·74	87·45	12·55	
" 5..	20929	"	1·0362	3·58	9·19	87·23	12·77	Genuine.
				3·70	8·80	87·50	12·50	
		Ottawa.						
" 9.	20930	W. Graham, a sample from each can in wagon.	1·0368	7·29	9·37	83·34	16·66	Partly cream.
			1·0304	7·21	8·27	84·52	15·48	
" 9..	20931	" "	1·0357	5·57	8·59	85·84	14·16	Genuine.
			1·0309	5·00	8·14	86·86	13·14	
" 9..	20932	" "	1·0377	5·64	8·61	85·75	14·25	"
			1·0314	4·78	8·18	87·04	12·96	

"	9..	20933	" " ..	1·0380	4·78	9·19	86·03	13·97	
				1·0334	4·23	8·59	87·18	12·82	
"	9..	20934	" " ..	1·0350	5·28	8·82	85·90	14·10	"
				1·0329	4·33	8·75	86·92	13·08	
"	9..	20935	" " ..	1·0369	5·31	8·90	85·79	14·21	
				1·0324	4·70	8·63	86·67	13·33	
Sept.	9..	20936	Taken from wagons at Dairy Company's Offices, Ottawa, before delivery.	1·0269	20·72	7·40	71·88	28·12	Partly cream.
				.....	19·55	6·54	73·91	26·09	
"	9..	20937	" " " ..	1·0230	20·86	4·91	74·23	25·77	"
				1·0146	17·14	6·84	76·02	23·98	
"	9..	20938	" " "	1·0380	3·25	11·11	85·64	14·36	Genuine.
				1·0299	5·61	8·15	86·24	13·76	
"	9..	20939	" " " .	1·0292	12·27	9·67	78·06	21·94	Partly cream.
				1·0177	12·93	7·41	79·66	20·34	
"	9..	20940	" " " ..	1·0286	8·12	9·68	82·20	17·80	"
				1·0258	8·85	8·04	83·11	16·89	
"	9	20941	Taken from Dairy Company's wagons on street as being supplied to customers.	1·0340	3·96	9·64	86·40	13·60	Genuine.
				1·032	3·59	8·38	88·03	11·97	
"	9..	20942	" " " ..	1·0378	3·39	8·71	87·90	12·10	"
				1·0325	3·22	8·58	88·20	11·80	

The first line in each of the foregoing samples shows the results reported by Dr. F. X. Valade, Official Analyst, Ottawa.
The second line shows the analysis by Miss M. Tyrrell, Inland Revenue Laboratory, Ottawa.

Peterborough, Ont.

Oct.	9..	22501	J. H. Bell	1·0308	3·12	9·05	87·83	11·17	Under average in cream.
				1·033	3·45	8·41	88·11	11·89	
"	9..	22502	" .. .	1·0286	3·26	8·89	87·85	12·15	"
				1·0319	3·27	8·15	88·58	11·42	
"	9..	22503	"	1·047	3·66	9·65	86·69	13·31	Genuine.
				1·0336	3·84	8·94	87·22	12·78	
"	9..	22504	T. Lillico	1·0312	3·94	9·22	86·84	13·16	"
				1·0314	3·99	8·41	87·59	12·41	
"	9..	22505	"	1·0315	3·79	9·27	86·94	13·06	"
				1·0320	3·76	8·50	87·74	12·26	
9	9	22506	"	1·0334	4·01	9·14	86·85	13·15	
				1·0314	3·97	8·44	87·59	12·41	

RESULTS of the Examination of 182 Samples of Milk *Continued.*

Date of Collection	Number of Sample.	Name and Address of Vendor.	Sp. gr. at 15° C.	Analysis.			Total Solids.	Remarks by Analysts.
				Butter Fat.	Non Fatty Solids.	Water.		
1901.		*Toronto.*		p. c.	p. c.	p. c.	p. c.	
Oct. 10.	22507	R. W. Dockeray, 175 Christie St.	1·048	3·78	8·80	87·42	12·58	Genuine.
			1·0319	3·60	8·19	88·21	11·79	
" 10.	22508	W. J. McColl, Eglington, P. O.	1·0324	3·28	9·11	87·61	12·39	Under average in cream.
			1·0319	3·18	8·23	88·59	11·41	
" 10.	22509	E. Leadley, 105 Markham St.	1·5311	3·32	9·24	87·44	12·56	"
			1·0324	3·24	8·38	88·38	11·62	
" 10.	22510	" "	1·0331	3·33	9·21	87·46	12·54	"
			1·0334	3·26	8·34	88·40	11·60	
" 10.	22511	City Dairy Co. (from wagon on street).	1·031	3·24	9·02	87·74	12·26	"
			1·0309	3·19	8·07	88·74	11·26	
" 10.	22512	Oakville Dairy Co. (from wagon on street).	1·0283	2·97	8·12	88·91	11·19	Under average in total solids.
			1·0291	2·86	7·16	89·98	10·02	
" 10.	22513	S. Price & Son, King St.	1·0311	3·75	8·78	87·47	12·53	Genuine.
			1·0314	3·10	8·23	88·67	11·33	
" 10.	22514	" "	1·0307	3·43	9·00	87·57	12·43	"
			1·0319	3·23	8·12	88·65	11·35	
" 10.	22515	City Dairy Co., (taken from wagons on delivery at company's premises, Toronto).	1·033	3·32	8·80	87·88	12·12	Under average in cream.
			1·0319	3·27	8·19	88·54	11·16	
" 10.	22516	" " "	1·0338	3·52	9·25	87·23	12·77	Genuine.
				3·47	8·68	87·85	12·15	
" 10.	22517	" " "	1·0305	3·13	8·80	88·07	11·93	Under average in cream
			1·0319	3·06	8·13	88·81	11·19	
" 10.	22518	" " "	1·0342	3·25	9·35	87·40	12·60	"
			1·0331	3·15	8·62	88·23	11·77	

			Port Hope.							
"	11..	22519	G. R. Race	1·0308 1·0312	3·34 3·35	9·11 8·22	87·55 88·43	12·45 11·57	"
	11..	22520	Geo. Bennett	1·0334 1·0337	2·46 2·60	9·23 8·41	88·31 88·99	11·69 11·01	Partly skimmed and therefore adulterated.
"	11..	22521	"	1·0318 1·0327	3·00 3·17	11·00 8·32	86·00 88·51	14·00 11·49	Under average in cream.
			Ottawa.							
Oct.	21..	22571	Ottawa Dairy Company, from cans, as being delivered on company's premises.	1·0312 1·030	5·71 6·21	9·36 8·10	84·93 85·69	15·07 14·31	Genuine.
"	21..	22572	" "	1·0302 1·030	5·46 5·35	8·89 7·88	85·65 86·77	14·35 13·23	"
"	21..	22573	" "	1·0315 1·032	4·91 4·60	9·23 8·27	85·86 87·13	14·14 12·87	"
"	21..	22574	Ottawa Dairy Company, from milk wagons on street as being delivered to customers.	1·0312 1·0315	3·86 3·87	9·00 8·31	87·14 87·82	12·86 12·18	"
"	21..	22575	" "	1·0308 1·032	5·82 3·82	7·38 8·55	86·80 87·63	13·20 12·37	Under average in solids, not fat.

The first line in each of the foregoing samples shows the results reported by Dr. W. H. Ellis, Official Analyst, Toronto.
The second line shows the analysis by Miss M. Tyrrell, Inland Revenue Laboratory.

			London, Ont.						
Sept.	11..	21954	Sanitary Dairy Co.: From wagon on street	1·0328 1·0260	2·57 7·67	8·60 7·47	88·83 84·86	11·17 15·14	Doubtful.
"	11..	21955	John Rodgers	1·0326 1·0323	3·22 3·23	8·61 8·01	88·17 88·76	11·83 11·24	Below average in cream.
"	11..	21956	Chas. O'Brien	1·0316 1·0312	3·49 3·32	8·29 7·77	88·22 88·91	11·78 11·09	Under average in total solids.
"	11..	21957	Frank Fortner, 406 Colbourne St	1·0333 1·0333	3·10 2·66	8·71 8·28	88·19 89·06	11·81 10·94	Under average in cream.
"	11..	21958	Sanitary Dairy, company's factory	1·0325 1·0323	3·71 3·43	8·61 8·08	87·68 88·49	12·32 11·51	Genuine.
"	11..	21959	John Hill, Forest City Dairy	1·0312 1·0312	3·17 2·55	8·21 7·80	88·62 89·65	11·38 10·35	Under average in cream and in solids not fat. Probably adulterated.

Results of the Examination of 182 Samples of Milk *Continued.*

Date of Collection.	Number of Sample.	Name and Address of Vendor.	Sp. gr. at 15°C.	Analysis. Butter Fat.	Non Fatty Solids.	Water.	Total Solids.	Remarks by Analysts.
1901.		*London, Ont,* Concluded.		p. c.	p. c.	p. c.	p. c.	
Sept. 11..	21960	Sanitary Dairy Co.: From factory...	1·0321	3·82	8·51	87·61	12·36	Genuine.
			1·0318	3·22	8·32	88·46	11·54	
" 11..	21961	" "	1·0314	3·05	8·18	88·77	11·23	Below average in cream and in solids not fat.
			1·0312	2·72	7·83	89·45	10·55	Probably adulterated by addition of water.
" 11..	21962	" "	1·0320	3·95	8·38	87·67	12·33	Genuine.
			1·0308	3·65	8·17	88·18	11·82	
		Sarnia, Ont.						
" 13..	21963	J. Smith..	1·0310	3·69	8·23	88·08	11·92	Under average in total solids.
			1·0318	3·55	8·06	88·39	11·61	
" 13..	21964	Wm. Battle....	1·0272	5·80	7·83	86·37	13·63	Partly cream.
			1·0265	5·67	7·62	86·71	13·29	
" 13..	21965	Chas. Carr...	1·0320	3·29	8·13	88·28	11·72	Below average in cream.
			1·0323	3·16	8·32	88·52	11·48	
" 13..	21966	N. L. Hiller....	1·0307	4·49	8·16	87·05	12·95	Genuine.
			1·0302	4·37	8·21	87·42	12·58	
" 13..	21967	John McWhorter.	1·0316	3·88	8·72	87·40	12·60	"
			1·0328	3·71	8·46	87·83	12·17	
" 13..	21968	Andrew McRitchie.....	1·0328	5·36	9·21	85·40	14·60	" very rich milk.
				4·83	8·59	86·58	13·42	
		Goderich, Ont.						
" 17..	21969	Gordon Bessett.....	1·0319	3·40	8·56	88·04	11·96	Under average in cream.
			1·031	3·32	7·92	88·76	11·24	
" 17..	21970	John Porter, jr.....	1·0312	4·11	8·42	88·17	12·83	Genuine.
			1·0315	3·92	8·13	87·95	12·05	
" 17..	21971	Gordon Imrie.....	1·0329	3·60	8·44	87·96	12·04	"
			1·033	3·08	8·23	88·69	11·31	

			Mitchell, Ont.							
"	18..	21972	Westie Parrish..	1·0306 1·0312	4·06 4·01	8·40 8·08	87·54 87·88	12·46 12·12	"
"	18..	21973	Geo. Milligan	1·0308 1·0322	4·23 3·89	8·47 8·20	87·30 87·91	12·70 12·09	"
"	18..	21974	Allen Casey.....	1·0323 1·0321	4·25 3·77	8·43 8·23	87·32 88·00	12·68 12·00	"

The first line in each of the foregoing samples shows the results reported by Mr. F. T. Harrison, Official Analyst, London, Ont.
The second line shows the analysis by Miss M. Tyrrell, Inland Revenue Laboratory, Ottawa.

			Winnipeg, Man.						
Oct.	2..	17362	C. Johnson.	1·0316 1·0317	4·27 4·28	8·72 8·61	87·01 87·11	12·99 12·89	Genuine.
"	2..	17363	Hy. Corbeil..	1·0313 1·0323	4·22 3·92	8·76 8·58	87·02 87·50	12·98 12·50	"
"	2..	17364	Aberdeen Ave. Dairy.	1·0253 1·0276	4·11 4·11	7·16 7·11	88·40 88·75	11·60 11·25	Non fatty solids below average.
"	2..	17365	J. W. Ferguson ..	1·0283 1·0317	3·71 3·40	7·80 7·80	88·49 88·80	11·51 11·20	Below average.
"	2..	17366	W. S. Craig .	1·0313 1·0327	5·59 5·17	8·89 8·55	85·52 86·28	14·48 13·72	Genuine.
"	2..	17367	Wm. Craig..... ..	1·0288 1·0296	7·29 6·99	8·71 8·16	83·97 84·85	16·03 15·15	Partly cream.
"	2..	17368	J. G. Dolman..	1·0311 1·0333	5·02 4·54	8·84 8·70	86·14 86·76	13·86 13·24	Genuine.
"	2..	17369	E. Taylor, Dorset Dairy .	1·0288 1·0296	7·83 7·23	8·65 8·33	83·52 84·44	16·48 15·56	Partly cream.
"	2..	17370	E. W. Edwards, Toronto Dairy .	1·0308 1·0313	5·55 4·98	8·92 8·57	85·53 86·45	14·47 13·55	Genuine.
"	2..	17371	Stone Stoneson	1·0316 1·0327	5·31 4·76	8·91 8·58	85·78 86·66	14·22 13·34	"
"	2	17372	S. Filbeau, St. Boniface Dairy.. .	1·0307 1·0291	6·60 6·43	8·90 8·62	84·50 85·25	15·50 14·75	Partly cream.

RESULTS of the Examination of 182 Samples of Milk *Concluded.*

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Sp. gr. at 15° C.	Analysis. Butter Fat.	Non-fatty Solids.	Water.	Total Solids.	Remarks by Analyst.
1901.		*Deloraine, Man.*		p. c.	p. c.	p. c.	p. c.	
Oct. 4	17373	Mr. Castle	1·0343	4·24	9·42	86·34	13·66	Genuine.
			1·0327	4·69	8·63	86·68	13·32	
" 5	17374	Mrs. Shanks	Bottle broken in transit					
			1·0317	2·92	7·93	89·15	10·85	Doubtful.
		Boissevain, Man.						
" 5	17375	J. H. McCalpin	1·0320	4·42	8·86	86·72	13·28	Genuine.
			1·0342	3·90	8·88	87·22	12·78	
" 5	17376	D. McCuag	1·0330	3·38	8·94	87·68	12·32	Under average in cream.
			1·0357	2·96	8·91	88·13	11·87	
		Brandon, Man.						
" 10	17377	Andrew Mutter	1·0313	3·34	8·50	88·16	11·84	Below average.
			1·0312	3·65	8·37	87·98	12·02	
" 10	17378	Geo. Coombe	1·0333	4·67	9·24	86·09	13·91	Genuine.
			1·0306	5·92	8·34	85·74	14·26	
" 10	17379	A. Milly	1·0322	3·86	8·81	87·33	12·67	"
			1·0317	4·25	8·35	87·40	12·60	

The first line in each of the foregoing samples shows the results reported by E. B. Kenrick, Official Analyst, Winnipeg, Man.
The second line shows the analysis by Miss M. Tyrrell, Inland Revenue Laboratory, Ottawa.

		Vancouver, B.C.						
Oct. 11	21612	C. H. Brown	1·030	4·02	8·08	87·90	12·10	Genuine.
				3·66	7·99	88·35	11·65	
" 11	21613	D. Beare	1·031	3·62	7·64	88·74	11·26	Below average in non-fatty solids.
				3·99	8·47	87·54	12·46	

"	11..	21614	J. G. Kirkwood	1·030	3·32 3·31	8·08 8·55	88·60 88·14	11·40 11·86	Under average in total solids.
"	11..	21615	W. Clarke	1·032	4·83 4·80	8·31 8·71	86·86 86·49	13·14 13·51	Genuine.
"	11..	21616	Valley Dairy Co.	1·031	3·22 3·15	8·05 8·43	88·73 88·42	11·27 11·58	Under average in total solids.
"	11..	21617	J. N. Bond	1·030	2·99 2·91	8·01 8·42	89·00 88·67	11·00 11·33	Under average in fat and total solids; a poor milk.
"	12..	21618	Eligh & Metcalfe	1·031	3·75 3·61	8·21 8·18	88·04 87·91	11·96 12·09	Genuine.
"	12..	21619	J. W. McLeod	1·032	3·78 3·93	8·68 8·92	87·54 87·15	12·46 12·85	"
"	12..	21620	T. F. Newington	1·031	4·03 3·82	8·00 8·16	87·97 87·72	12·03 12·28	"
"	12..	21621	J. Wolfor	1·030	4·87 3·54	7·80 8·35	87·32 88·11	12·68 11·89	"
"	12..	21622	D. McDougall	1·031	3·95 3·87	8·28 8·80	87·77 87·33	12·23 12·67	"
"	12..	21623	T. Moserop	1·032	4·15 4·13	8·54 8·87	87·31 87·00	12·69 13·00	"
"	11..	21624	D. McDougall	1·030	3·99 3·92	8·08 8·56	87·93 87·52	12·07 12·48	"
"	14..	21625	J. McGeer	1·030	3·65 3·56	8·00 8·16	88·35 88·28	11·65 11·72	Below average in total solids.
"	14..	21626	Jas. Armstrong	1·031	3·98 3·91	8·06 8·43	87·96 87·66	12·04 12·34	Genuine.
"	14..	21627	N. Newman	1·029	2·80 3·63	7·68 8·56	89·52 87·81	10·48 12·19	Doubtful.
"	11..	21628	S. Grass	1·031	3·66 3·01	8·22 7·92	88·12 89·07	11·88 10·93	Below average in total solids.
"	14..	21629	Valley Dairy	1·030	4·26 1·17	7·85 8·59	87·89 87·24	12·11 12·76	Genuine.

The first line in each of the foregoing samples shows the results reported by Dr. C. J. Fagan, Official Analyst, British Columbia.
The second line shows the analysis by T. Macfarlane, Chief Analyst, Inland Revenue Laboratory, Ottawa.

APPENDIX I.

BULLETIN No. 81.—FERTILIZERS.

OTTAWA, June 26, 1902.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—In accordance with the provisions of the Fertilizers Act, 1890, which requires manufacturers or importers to transmit standard samples to the Department of the goods they propose to sell in Canada, 106 such samples were received for the present year and have been analysed in this laboratory. Table I., accompanying this report, gives the results of examining these standard samples, together with the names of their manufacturers or importers. The commercial names of the various brands, statements as regards the materials from which they were produced, and the guaranteed analyses of the manufacturers will also be found recorded in Table I. It will be observed that the upper line opposite each brand gives the percentages of fertilizing constituents guaranteed by the manufacturers, and the lower line the results of the analyses carried out in this laboratory. As required by the Act the table also contains a column in which 'the relative value of each fertilizer calculated from its contents in fertilizing ingredients is given,' the prices of these ingredients being as follows:—

	Cents per pound.
Nitrogen in salts of ammonia or nitrates	13
Organic nitrogen in ground bone, fish, blood or tankage	12
Phosphoric acid, soluble in water	6
" soluble in a 1 p.c. solution of citric acid	5½
" insoluble, in Thomas' Phosphate Powder	3½
" insoluble, in ground rock phosphate or in compound fertilizers	1½
Potash, contained in wood ashes	6
" from high grade potash salts	5¼

Besides Table I. there is also attached to this report a tabulated statement giving the results of obtaining samples of fertilizers in the open market. The collection was made, in accordance with your instructions, in the months of March and April last, and all the information obtained, as well as the results of submitting them to the district analysts for examination, are given in Table II. It will be observed with regard to each of these 'fertilizers as sold' that, in most cases, there are three lines of figures opposite the description of each sample. The uppermost of these shows the contents guaranteed by the manufacturer; the next lower line gives the percentage of fertilizing constituents found in the standard sample, and the lowest line gives the same percentages as found by the district analysts in the sample collected. In cases where no standard samples have been submitted to the department, and, nevertheless, in contravention of the Fertilizers Act, the brands in question have been offered for sale, the two upper lines will, of course, show no figures. The number of such samples of fertilizers, not registered and therefore illegally sold, and to which I called your attention in a report dated April 28, 1902, amounts to ten, which, compared with the number of similar samples in 1901 (eleven), does not show much improvement. In such cases it has been customary heretofore to warn offending parties, but this does not seem to have

the effect of preventing these contraventions of the Fertilizers Act, and I have to submit for your consideration the question as to whether some more severe method of dealing with such infractions should not be resorted to.

According to the opinions expressed by the district analysts, five out of the 85 samples collected have been found to be adulterated, being deficient in available phosphoric acid or other fertilizing constituents, while eight others have been characterized as being 'below guarantee.' This is not quite such a favourable showing as that of last year.

I beg to recommend the publication of this report, with the tables attached to it, as well as the 'Memoranda on Manures' which it is customary to print at the same time.

I have the honour to be, Sir
Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1250	The American Agricultural Chemical Co., Boston, Mass.	Manufacturers		'Bradley's B. D. Sea Fowl Guano'— Guaranteed ..... Found .....
1251	" " "	"		'Bradley's Complete Manure for Potatoes and Vegetables'— Guaranteed ..... Found .....
1252	Canadian Pacific Fish Oil and Guano Co., Ladner, B.C..	"		'Guano or Fish Fertilizer — Guaranteed ..... Found .....
1253	The William Davies Co., Ltd., Toronto.	"	Dried blood, bones and tankage.	Fertilizer 'Exhibit A'— Guaranteed ..... Found .....
1254	The Harris Abbatoir Co., Ltd., Toronto.	"	" "	Fertilizer 'Exhibit A'— Guaranteed ..... Found .....
1255	Ingersoll Packing Co. Ingersoll, Ont.	"	Blood, tankage and bone from the hog.	'Ingersoll Fertilizer'— Guaranteed ..... Found .....
1256	The Nichols Chemical Co., Ltd., Capelton, P.Q.	"		'Capelton Brand'— Guaranteed ..... Found .....
1257	" " "	"		'The Royal Canadian'— Guaranteed ..... Found .....
1258	" " "	"	Phosphate rock, sulphuric acid, sulphate of ammonia and muriate of potash.	'The Victor'— Guaranteed ..... Found .....
1259	" " "	"		'The Reliance'— Guaranteed ..... Found .....
1260	" " "	"		'No. 1 Brand'— Guaranteed ..... Found .....
1261	" " "	"		'Our Crown Brand'— Guaranteed ..... Found .....
1262	The American Agricultural Chemical Co., Great Eastern Fertilizer Branch, Rutland, Vt.	Great Eastern Fertilizer Branch, Rutland, Vt.		'Great Eastern Northern Corn Special'— Guaranteed ..... Found .....
1263	" " "	" "		'Great Eastern Potato Manure'— Guaranteed ..... Found .....
1264	" " "	" "		'Great Eastern General'— Guaranteed ..... Found .....
1265	" " "	" "		'Great Eastern Grass and Oats'— Guaranteed ..... Found .....
1266	The American Agricultural Chemical Co., Bradley Fertilizer Works, Boston, Mass.	" "		'Plain Superphosphate'— Guaranteed ..... Found .....

SESSIONAL PAPER No. 14

Samples of Commercial Fertilizers, registered for 1902.

Results of Analysis.										
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	Number of Sample.
Total; including that of Nitric Acid or Ammonia, if present.	Total; calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
2·06	2·50	6·00	2·00	1·00	9·00	8·00	1·50	.....	16 22	1250
2·46	2·97	5·20	3·95	1·30	10·45	9·15	2·45	7·20	19 45	
3·29	4·00	6·00	2·00	1·00	9·00	8·00	7·00	.....	24 95	1251
3·99	4·84	8·45	2·04	1·25	11·74	10·49	6·80	10·00	29 47	
10·46	12·70	1·10	8·60	6·70	16·40	9 70	Traces.	3·50	37 89	1252
6·78	8·23	3·99	4·82	3·99	12·80	8·81	2·24	5·40	29 91	
7·22	8·76	.....	.....	.....	17·06	.....	.....	7·22	.....	1253
6·36	7·73	0·96	12·29	2·04	15·29	13·25	0·65	7·58	32 65	
7·52	9·13	.....	.....	.....	5·74	.....	.....	13·10	.....	1254
8·14	9·89	0·45	4·54	1·08	6·07	4·99	0·33	12·36	26 50	
.....	9·60	.....	.....	.....	11·20	10·40	0·64	8·10	.....	1255
6·41	7·80	Trace.	10·68	4 00	14·68	10·68	0.52	9·23	31 68	
.....	.....	.....	.....	.....	.....	8·00	.....	.....	.....	1256
0·29	0·36	8·95	1·86	4·48	15·29	10·81	1·00	14·60	15 90	
.....	4·00	.....	.....	.....	.....	9·00	5·00	.....	.....	1257
4·01	4·87	9·30	0·60	3·20	13·10	9·90	6 64	6·92	29 37	
.....	2·00	.....	.....	.....	.....	7·00	3·00	.....	.....	1258
2 58	3·13	8·55	1·30	3·90	13·75	9·85	4·58	11·35	24 86	
.....	2·00	.....	.....	.....	.....	6·00	2·00	.....	.....	1259
2·48	3·01	5·97	1·74	3·96	11·67	7·71	3·44	13·78	19 84	
.....	.....	.....	.....	.....	.....	11·50	.....	.....	.....	1260
.....	.....	11·83	1·19	3·20	16·22	13·02	0·46	10·85	16 96	
.....	2·00	.....	.....	.....	.....	11·00	2·50	.....	.....	1261
3·20	3·89	10·91	1·50	3·20	15·61	12·41	3·46	8·73	27 00	
2·06	2·50	5·00	3 00	1·00	9·00	8·00	2·00	.....	16·41	1262
2·25	2·73	4·95	6·67	1·08	12·70	11·62	1·81	10·50	20·90	
2·06	2·50	5·00	3·00	1·00	9·00	8 00	3·00	.....	17·99	1263
1·89	2·30	6·39	3·53	1·27	11·19	9·92	3·36	10·25	20·00	
0·82	1·06	5·00	3·00	1·00	9·00	8·00	4·00	.....	16·07	1264
1·30	1·58	4·33	6·93	0·79	12·05	11·26	4·24	10·40	20·63	
.....	.....	11·00	.....	1·00	12·00	11·00	2·00	.....	.....	1265
0·	0·	7·00	3·71	1·44	12·15	10·71	2·57	13·30	15·61	
.....	.....	11·00	3·00	1·00	15·00	14·00	.....	.....	16·80	1266
.....	.....	9·00	2·16	2·56	13·72	11·16	.....	13·10	13·95	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1267	The American Agricultural Chemical Co., Great Eastern Fertilizer Branch, Rutland, Vt.	Manufacturers		'William & Clark's Americus Potato Manure'— Guaranteed Found
1268	" "	"		'William & Clark's Americus Corn Phosphate'— Guaranteed Found
1269	" "	"		'William & Clark's Royal Bone Phosphate for all Crops'— Guaranteed Found
1270	" "	"		'Pacific Potato Special'— Guaranteed Found
1271	" "	"		'Pacific Nobsque Guano'— Guaranteed Found
1272	" "	"		'Pacific Fine Ground Bone'— Guaranteed Found
1273	" "	"		'Soluble Pacific Guano'— Guaranteed Found
1274	" "	"		'Tucker's Imperial Bone Superphosphate'— Guaranteed Found
1275	" "	"		'Cleveland Fertilizer for all Crops'— Guaranteed Found
1276	" "	"		'Bradley's Eclipse Phosphate'— Guaranteed Found
1277	The American Agricultural Chemical Co., Bradley Fertilizer Works, Boston, Mass.	"		'Bradley's XL Superphosphate'— Guaranteed Found
1278	" "	"		'Bradley's Potato Fertilizer'— Guaranteed Found
1279	" "	"		'Bradley's Farmer's New Method Fertilizer'— Guaranteed Found
1280	" "	"		'Bradley's Niagara Phosphate'— Guaranteed Found
1281	" "	"		'Bradley's Fine Ground Bone'— Guaranteed Found
1282	" "	"		'Read's Leader Blood and Bone'— Guaranteed Found

SESSIONAL PAPER No. 14

Samples of Commercial Fertilizers, registered for 1902 *Continued.*

Results of Analysis.										
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	Number of Sample.
Total; including that of Nitric Acid or Ammonia, if present.	Total; calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	3·00	.....	17·99	1267
3·60	4·38	6·71	2·44	2·04	11·19	9·15	3·34	13·55	23·67	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	1·50	.....	16·41	1268
2·22	2·72	7·99	0·87	3·20	12·06	8·86	1·31	13·40	18·22	
1·03	1·25	6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	1269
1·40	1·70	5·44	2·05	3·00	10·49	7·49	1·67	15·00	14·79	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	3·00	.....	17·99	1270
2·04	2·48	5·25	3·20	2·24	10·69	8·45	4·17	14·05	19·77	
1·03	1·25	6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	1271
1·37	1·66	7·36	1·53	2·56	11·45	8·89	2·49	14·90	17·18	
2·50	3·00	.....	.....	.....	21·06	.....	.....	.....	.....	1272
2·06	2·51	Trace.	16·44	7·99	24·43	16·44	0·29	4·70	31·31	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	1·50	.....	16·41	1273
2·25	3·94	6·39	2·18	4·28	12·85	8·57	1·72	13·25	20·96	
1·03	1·25	6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	1274
1·36	1·66	5·11	3·53	2·36	11·00	8·64	2·29	12·95	16·38	
1·03	1·25	6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	1275
1·56	1·90	6·39	2·28	2·36	11·03	8·67	2·30	10·85	17·05	
1·03	1·25	6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	1276
1·37	1·66	5·76	2·81	2·87	11·44	8·57	2·32	16·15	16·59	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	1·50	.....	16·41	1277
1·81	2·19	6·07	2·82	3·32	12·21	8·89	1·83	12·20	17·64	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	3·00	.....	17·99	1278
1·95	2·36	5·76	3·35	1·92	11·03	9·11	3·46	13·85	19·48	
1·03	1·65	6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	1279
1·34	1·43	6·07	2·28	3·00	11·35	8·35	2·54	15·45	17·58	
0·82	6·00	5·00	2·00	1·00	8·00	7·00	6·00	.....	11·52	1280
0·88	1·07	6·10	1·58	2·87	10·55	7·68	1·56	15·70	13·67	
2·50	3·00	.....	.....	.....	21·60	.....	.....	.....	.....	1281
3·38	4·11	0·00	15·58	9·46	25·04	15·58	.....	.....	34·71	
0·82	1·00	5·00	2·00	1·00	8·00	7·00	1·00	.....	11·52	1282
1·41	1·87	5·59	2·00	3·03	10·62	7·59	1·54	14·65	14·82	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1283	The American Agricultural Chemical Co., Bradley Fertilizer Works, Boston, Mass.	Manufacturers		'Read's Standard Superphosphate'— Guaranteed . . . . Found . . . .
1284	" "	"	"	'Read's Practical Potato Special'— Guaranteed . . . . Found . . . .
1285	" "	"	"	'Read's Farmer's Friend'— Guaranteed . . . . Found . . . .
1286	" "	"	"	'Read's Sure Catch Fertilizer'— Guaranteed . . . . Found . . . .
1287	" "	"	"	'Quinnipiac Potato Phosphate'— Guaranteed . . . . Found . . . .
1288	" "	"	"	'Quinnipiac Climax Phosphate for all Plants'— Guaranteed . . . . Found . . . .
1289	" "	"	"	'Quinnipiac Mohawk Fertilizer'— Guaranteed . . . . Found . . . .
1290	" "	"	"	'Cumberland Superphosphate'— Guaranteed . . . . Found . . . .
1291	" "	"	"	'Cumberland Potato Fertilizer'— Guaranteed . . . . Found . . . .
1292	" "	"	"	'Cumberland Fine Ground Bone'— Guaranteed . . . . Found . . . .
1293	Chemical Works, late H. & E. Albert, London, Eng.	"		Thomas' Phosphate Powder— Guaranteed . . . . Found . . . .
1294	The Laing Packing and Provision Co., Ltd., Montreal.	"	Offal, bone and tankage from the hog	'Fertilizer'— Guaranteed . . . . Found . . . .
1295	The Provincial Chemical Fertilizer Co., St. John, N.B.	"		'Imperial Superphosphate'— Guaranteed . . . . Found . . . .
1296	" "	"		'Potato Phosphate'— Guaranteed . . . . Found . . . .
1297	" "	"		'Victor Guano'— Guaranteed . . . . Found . . . .
1298	" "	"		'Fruit Tree Fertilizer'— Guaranteed . . . . Found . . . .
1299	" "	"		'Bone Meal'— Guaranteed . . . . Found . . . .

SESSIONAL PAPER No. 14

Samples of Commercial Fertilizers registered for 1902—*Continued.*

Result of Analysis.

Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	Number of Sample.
Total; including that of Nitric Acid or Ammonia, if present.	Total; calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
0·82	1·00	5·00	3·00	2·00	10·00	8·00	4·00	.....	16 07	1283
1·27	1·54	6·52	1·67	3·19	11·38	8·19	4·30	11·70	18 32	
0·82	1·00	2·00	2·00	1·00	5·00	4·00	8·00	.....	15 27	1284
1·76	2·14	4·00	2·75	2·39	9·14	6·75	7·82	6·37	20 98	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	3·00	.....	17 99	1285
2·20	2·70	7·67	0·97	2·55	11·19	8·64	3·03	13·15	19 50	
.....	.....	6·00	4·00	1·00	11·00	10·00	2·00	.....	.....	1286
0·23	0·28	6·87	3·21	2·07	12·15	10·08	2·51	13·40	15 58	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	3·00	.....	17 99	1287
1·87	2·28	5·87	2·30	2·55	11·32	8·77	3·10	13·55	18 75	
1·03	1·25	6·00	2·00	2·00	10·00	8·00	2·00	.....	14 67	1288
1·09	1·32	5·11	3·85	2·23	11·19	8·96	2·53	13·90	16 32	
0·82	1·00	5·00	2·00	1·00	8·00	7·00	1·00	.....	11 52	1289
1·13	1·37	5·11	1·93	1·91	8·95	7·04	1·25	16·05	12 84	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	1·50	.....	16 41	1290
2·34	2·84	6·84	1·37	3·52	11·73	8·21	1·60	13·80	18 08	
2·06	2·50	5·00	3·00	2·00	10·00	8·00	3·00	.....	17 99	1291
2·17	2·63	6·52	1·08	3·33	10·93	7·60	2·56	14·30	17 91	
2·50	3·00	.....	.....	.....	21·00	.....	.....	.....	.....	1292
3·64	4·42	.....	15·87	8·19	24·06	15·87	0·21	6·30	34 61	
.....	.....	.....	.....	.....	17·00	.....	.....	.....	.....	1293
.....	.....	.....	13·53	4·13	17·66	13·53	.....	0·17	17 77	
4·12	5·00	.....	.....	.....	14·71	.....	.....	5·52	.....	1294
4·70	5·69	1·00	8·55	3·53	13·08	9·55	.....	5·75	25 42	
2·31	2·80	.....	2·70	7·88	17·77	9·89	2·02	.....	.....	1295
2·39	2·90	7·67	2·25	7·03	16·95	9·92	2·64	9·55	22 30	
2·80	3·40	.....	1·92	7·22	15·62	8·40	7·55	.....	.....	1296
2·50	3·03	6·71	2·89	5·43	15·03	9·60	7·72	7·20	26 96	
1·77	2·15	.....	3·35	8·17	17·32	9·15	1·55	.....	.....	1297
2·56	3·11	6·84	2·82	6·59	16·25	9·66	3·42	9·85	23 02	
.....	3·21	.....	3·54	3·83	14·07	6·70	5·77	.....	.....	1298
2·82	3·43	7·35	2·56	5·44	15·35	9·91	4·69	3·95	24 96	
4·68	5·68	.....	.....	.....	24·28	.....	.....	.....	.....	1299
2·97	3·60	.....	13·57	6·07	19·64	13·57	.....	5·50	28 13	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizers.
1300	W. Harris & Co., Danforth Ave., Toronto.	Manufacturers		Brand 'H'— Guaranteed ... Found ...
1301	" "	"		'Bone Meal'— Guaranteed ... Found ...
1302	The Standard Fertilizer and Chemical Co., Ltd., Smith's Falls, Ont.	"	Nitrate of soda, sulphate of ammonia, potash and magnesia salts, mineral superphosphate, bone char and fine bone meal.	'Special Fertilizer'— Guaranteed ... Found ...
1303	" "	"		'No. 1 Fertilizer'— Guaranteed ... Found ...
1304	" "	"		'Standard Fertilizer'— Guaranteed ... Found ...
1305	" "	"		'Corn and Grass Fertilizer'— Guaranteed ... Found ...
1306	" "	"		'Royal Fertilizer'— Guaranteed ... Found ...
1307	" "	"	Made from mineral phosphate.	'Superphosphate of Lime'— Guaranteed ... Found ...
1308	" "	"		'Bone Meal'— Guaranteed ... Found ...
1309	" "	"		'Nitrate of Soda'— Guaranteed ... Found ...
1310	W. Faint, Peterboro', Ont.	"		'Bone Meal'— Guaranteed ... Found ...
1311	The Palmerston Pork Packing Co., Palmerston, Ont.	"		'Tankage'— Guaranteed ... Found ...
1312	The W. A. Freeman Co., Ltd., Hamilton, Ont.	"	Bone, tankage, blood, phosphate, muriate of potash, sulphate of potash, nitrate of soda, sulphate of ammonia and sulphuric acid.	'Freeman's Pure Bone Meal'— Guaranteed ... Found ...
1313	" "	"		'Freeman's Sure Growth Manure'— Guaranteed ... Found ...
1314	" "	"		'Freeman's Potato Manure'— Guaranteed ... Found ...
1315	" "	"		'Freeman's Bone and Potash'— Guaranteed ... Found ...
1316	" "	"		'Freeman's Celery and Early Vegetable Manure'— Guaranteed ... Found ...
1317	" "	"		'Freeman's Tankage Manure'— Guaranteed ... Found ...
1318	" "	"		'Freeman's Tobacco Manure' Guaranteed ... Found ...
1319	" "	"		'Freeman's Phosphate Powder'— Guaranteed ... Found ...

SESSIONAL PAPER No. 14

Samples of Commercial Fertilizers, registered for 1902—*Continued.*

Results of Analysis.										
Nitrogen.		Phosphoric Acid.								
Total; including that of Nitric Acid or Ammonia, if present.	Total; calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total available	Potash.	Moisture.	Relative value per ton of 2,000 lbs.	Number of Sample.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
.....	8·68	.....	.....	.....	9·11	9·11	.....	8·21	.....	1300
6·02	7·31	1·27	7·66	3·19	12·12	8·93	0·65	1·95	28 27	
.....	4·76	.....	.....	.....	20·14	.....	.....	7·16	.....	1301
5·02	6·10	.....	12·23	4·15	16·38	12·23	0·38	0·65	30·05	
.....	3·50	.....	.....	.....	10·00	8·00	6·00	.....	.....	1302
3·32	4·04	8·12	0·90	1·28	10·30	9·02	7·39	9·20	26·85	
.....	2·00	.....	.....	.....	11·00	9·00	1·00	.....	.....	1303
1·76	2·14	7·67	1·68	3·99	13·34	9·35	2·33	9·85	18·92	
.....	2·50	.....	.....	.....	11·00	9·00	2·00	.....	.....	1304
2·67	3·24	9·72	1·16	1·91	12·79	10·88	2·78	8·95	22·84	
.....	2·00	.....	.....	.....	9·00	7·00	4·00	.....	.....	1305
2·49	3·02	7·80	0·83	1·92	10·55	8·63	4·92	8·85	22·00	
.....	2·00	.....	.....	.....	9·00	8·00	3·00	.....	.....	1306
1·64	1·98	8·13	1·91	1·92	11·96	10·04	3·95	7·65	20·54	
.....	.....	.....	.....	.....	16·00	14·00	.....	.....	.....	1307
0·11	0·13	12·47	0·49	3·51	16·47	12·96	.....	10·30	16·83	
.....	4·00	.....	.....	.....	22·00	.....	.....	.....	.....	1308
4·22	5·13	.....	16·32	5·43	21·75	16·32	.....	6·50	33·51	
.....	19·00	.....	.....	.....	.....	.....	.....	.....	.....	1309
14·98	17·79	.....	.....	.....	.....	.....	.....	0·70	38·95	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1310
5·06	6·15	.....	9·92	10·88	20·80	9·92	.....	6·65	33·93	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1311
5·51	6·69	Trace.	10·83	2·60	13·43	10·83	1·04	3·00	28·83	
.....	3·00	.....	.....	.....	23·00	.....	.....	.....	.....	1312
5·04	6·12	.....	11·52	7·80	19·32	11·52	0·11	7·70	32·69	
.....	3·50	.....	.....	.....	8·00	.....	3·00	.....	.....	1313
4·00	4·86	5·44	2·38	3·84	11·66	7·82	5·79	9·20	25·98	
.....	3·00	.....	.....	.....	8·00	.....	5·00	.....	.....	1314
2·76	3·35	4·95	3·04	3·67	11·66	7·99	4·54	10·40	21·77	
.....	2·00	.....	.....	.....	9·00	.....	6·00	.....	.....	1315
2·60	3·16	5·59	1·30	3·67	10·56	6·89	6·50	10·50	22·31	
.....	6·00	.....	.....	.....	9·00	.....	6·00	.....	.....	1316
5·29	6·33	4·48	1·47	3·33	9·28	5·95	7·15	8·40	28·21	
.....	5·00	.....	.....	.....	12·00	.....	.....	.....	.....	1317
5·44	6·61	.....	9·91	2·24	12·15	9·91	Trace.	4·35	26·20	
.....	6·00	.....	.....	.....	7·00	.....	7·00	.....	.....	1318
5·81	7·05	5·25	2·23	2·24	9·72	7·48	7·15	8·75	30·87	
.....	.....	.....	.....	.....	15·00	.....	.....	.....	.....	1319
Trace.	.....	12·60	0·19	3·97	16·76	12·79	Trace.	8·25	16·52	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1320	The American Agricultural Chemical Company.	Buffalo Sales Dept., Buffalo, N.Y.	.....	'Crocker's Wheat and Corn Fertilizer'— Guaranteed.. ..... Found .....
1321	" " ..	"	.....	'Crocker's Cabbage and Potato Manure'— Guaranteed..... Found .....
1322	" " ..	" ..	.....	'Crocker's Harvest Jewel Fertilizer' Guaranteed.. ..... Found .....
1323	" " ..	" ..	.....	'Bradley's Complete Manure for potatoes and Vegetables'— Guaranteed..... Found .....
1324	" " ..	"	.....	'Bradley's New Method Fertilizer'— Guaranteed..... Found .....
1325	" " ..	"	.....	'Bradley's B.D. Sea Fowl Guano'— Guaranteed..... Found .....
1326	Thos. Reid, St. John, N.B.	Manufacturers.....	.....	'Superphosphate'— Guaranteed ..... Found .....
1327	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	" ..	Made from bone, bone black, phosphatic guano, bone phosphates, dried blood, meat or fish, sulphate of ammonia or nitrate of soda, sulphate of potash or muriate of potash and sulphuric acid.	'Fresh Ground Bone'— Guaranteed ..... Found .....
1328	" " ..	"		'Bowker's Farm and Garden Fertilizer'— Guaranteed ..... Found .....
1329	" " ..	"		'Bowker's Square Brand Bone and Potash Fertilizers'— Guaranteed ..... Found .....
1330	" " ..	"		'Bowker's Potato and Vegetable Fertilizer' Guaranteed ..... Found .....
1331	" " ..	"		'Bowker's Vermont Fertilizer'— Guaranteed..... Found .....
1332	Victoria Chemical Co., Ltd., Victoria, B.C.	Victoria Chemical Co., Ltd., Victoria, B.C.	Nitrate of soda, muriate of potash and superphosphate of lime.	Fertilizer 'A'— Guaranteed ..... Found .....
1333	" " ..	" " ..		Fertilizer 'B'— Guaranteed ..... Found .....
1334	" " ..	" " ..	Muriate of potash and superphosphate of lime.	Fertilizer 'C'— Guaranteed ..... Found .....
1335	" " ..	" " ..	Treating spent bone char with sulphuric acid.	'Superphosphate of Lime'— Guaranteed..... Found .....

Samples of Commercial Fertilizers, registered for 1902.—*Continued.*

Results of analysis.

Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative Value per Ton of 2,000 lbs	Number of Sample.
Total; including that of Nitric Acid or Ammonia, if present.	Total; Calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
2·06	2·50	6·00	2·00	1·00	9·00	8·00	1·50	.....	16 22	1320
2·53	3·08	6·71	2·08	1·28	10·07	8·79	2·22	9·50	18 91	
2·47	3·00	6·00	2·00	1·00	9·00	8·00	6·00	.....	21 92	1321
2·82	3·43	7·16	2·12	1·43	10·71	9·28	6·37	9·95	24 81	
1·65	2·00	6·00	2·00	1·00	9·00	8·00	2·00	.....	15 76	1322
2·06	2·49	7·03	3·20	0·64	10·87	10·23	2·06	10·20	19 25	
3·29	4·00	6·00	2·00	1·00	9·00	8·00	7·00	.....	24 95	1323
3·60	4·36	9·28	0·00	1·08	10·36	9·28	7·14	10·30	27 60	
0·82	1·00	6·00	2·00	1·00	9·00	8·00	2·00	.....	13 77	1324
1·29	1·56	7·16	1·92	1·28	10·36	9·08	1·73	9·50	16 06	
2·06	2·50	6·00	2·00	1·00	9·00	8·00	1·50	.....	16 22	1325
2·38	3·09	8·31	0·52	1·40	10·23	8·83	2·16	10·40	18 92	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1326
2·41	2·92	2·23	6·60	3·32	12·15	8·83	2·62	18·05	19 47	
.....	3·00	.....	.....	.....	24·00	.....	.....	.....	.....	1327
2·96	3·37	.....	22·50	3·32	25·82	22·50	.....	6·90	35 17	
.....	2·00	.....	.....	.....	10·00	8·00	2·00	.....	.....	1328
1·53	1·85	5·25	2·31	3·64	11·20	7·56	2·60	7·95	16 33	
.....	2·00	.....	.....	.....	12·00	6·00	2·00	.....	.....	1329
2·10	2·55	2·56	3·58	5·76	11·90	6·14	1·80	9·95	15 67	
.....	2·00	.....	.....	.....	11·00	9·00	2·00	.....	.....	1330
1·90	2·31	5·25	1·41	4·60	11·26	6·66	2·12	9·60	16 02	
.....	3·00	.....	.....	.....	10·00	8·00	4·00	.....	.....	1331
2·70	3·28	6·40	0·95	3·33	10·68	7·35	3·49	5·50	19 88	
4·00	.....	.....	.....	.....	10·00	.....	7·00	.....	.....	1332
3·99	4·84	11·20	.....	0·45	11·65	11·20	6·87	9·20	32 41	
3·50	.....	.....	.....	.....	9·00	.....	11·00	.....	.....	1333
3·85	4·68	9·40	0·89	Trace.	10·29	10·29	11·90	9·10	35 79	
.....	.....	.....	.....	.....	12·50	.....	11·00	.....	.....	1334
0·77	0·93	12·47	0·96	Trace.	13·43	13·43	11·16	11·80	29 97	
.....	.....	.....	.....	.....	16·00	.....	.....	.....	.....	1335
0·89	1·08	14·20	0·60	0·45	15·25	14·80	.....	10·55	20 43	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1336	Imported from Chili.	Victoria Chemical Co., Ltd., Victoria, B.C.		'Nitrate of Soda'— Guaranteed ... Found ...
1337	Imported from Germany.	" "		'Kainite'— Guaranteed ... Found ...
1338	" "	" "		'Sulphate of Potash'— Guaranteed ... Found ...
1339	" "	" "		'Muriate of Potash'— Guaranteed ... Found ...
1340	" "	" "		'Thomas Phosphate Powder'— Guaranteed ... Found ...
1341	F. D. Burris, Truro, N.S.	Manufacturer.	Muriate of potash, nitrate of soda and dissolved bone, with black mud and plaster for a base.	'Potato Phosphate'— Guaranteed ... Found ...
1342	" "	"		'Bone Meal' (coarse ground)— Guaranteed ... Found ...
1343	Nova Scotia Fertilizer Co., Halifax, N.S.	Manufacturers	Bone char, bone, dried blood, tankage, bone phosphates, sulphate of ammonia, nitrate of soda, high grade muriate of potash or sulphate of potash and sulphuric acid.	'Cere's Superphosphate'— Guaranteed ... Found ...
1344	" "	"		'Apple Tree Phosphate'— Guaranteed ... Found ...
1345	" "	"		'Strawberry Phosphate'— Guaranteed ... Found ...
1346	" "	"		'Potato Phosphate'— Guaranteed ... Found ...
1347	" "	"		'Pure Ground Bone'— Guaranteed ... Found ...
1348	B. & M. Rattenbury, Charlottetown, P.E.I.	"		'Blood, Bone and Tankage'— Guaranteed ... Found ...
1349	" "	"		'Ground Bone'— Guaranteed ... Found ...
1350	The American Agricultural Chemical Co.	Buffalo Sales Dept., Buffalo, N.Y.		'Crocker's New York Special Fertilizer'— Guaranteed ... Found ...
1351	" "	" "		'Crocker's Dissolved Bone and Potash'— Guaranteed ... Found ...
1352	The Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	Manufacturers	Mineral superphosphate of lime, sulphate of ammonia, potash salts and nitrate of soda.	'Star Brand'— Guaranteed ... Found ...

Samples of Commercial Fertilizers, registered for 1902 *Continued.*

Results of Analysis.

Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	Number of Sample.
Total; including that of Nitric Acid or Ammonia, if present.	Total; calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
16·00										1336
15·62	18·97							1 25	49 32	
							12·00			1337
							14·40	14·40	15 12	
							50·00		53 00	1338
							44·96	1·00	47 21	
							50·00		53 00	1339
							41·40	4·80	46 62	
					16 00					1340
			12·03	5·56	17·59	12.03		0·35	17 12	
										1341
1·71	2·07	1·92	3·51	Trace.	5·43	5·43	5·81	11·95	16·56	
										1342
4·38	5·32		11·36	7·99	19·35	11·36		5·80	31·00	
	2·00				9·20		2·14			1343
1·89	2·30	5·11	2·92	3·00	11·03	8·03	2·97	9·85	17·90	
	3·25				7·80		6·53			1344
2·67	3·25	2·88	2 87	3·52	9·27	5·75	6·06	7·80	20·45	
	2·02				8·30		6·50			1345
1·75	2·12	4 16	1·27	3·53	8·96	5·43	6·12	4·22	18·08	
	3·71				7·80		4 70			1346
2·60	3·16	4 79	1·30	3·51	9·60	6·09	4 63	8·95	19·33	
	4·53				22·66					1347
3·33	4 04		11·18	11 98	23·16	11·18		8·95	32·25	
										1348
5·56	6 75		11·35	4·16	15·51	11·35	0·62	9·65	30·64	
										1349
1·61	2·06		19 20	6 39	25·59	19·20	1·62	16 75	33·07	
		8·00	2·00	1·00	11·00	10·00	8·00		20·50	1350
		10·87	0·93	1·44	13·24	11·80	8·32	6·45	23·23	
		8·00	2·00	1 00	11 00	10·00	2 00		14·20	1351
		10·23	1 93	1·72	13·88	12·16	3·45	12·95	18·54	
	2·00					5·00	2·00			1352
1·94	2·36	7·03	1 66	0·90	9 59	8·69	2·86	6·10	18 20	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1353	The Leeds Phosphate Works, Leeds, Eng.	G. W. Campbell Arnott, Agent General in Canada, Toronto.	.....	'Thomas' Phosphate Flour'— Guaranteed ..... Found .....
1356	Provincial Chemical Fertilizer Co., St. John, N.B			'Imperial Superphosphate'— Found .....
1357	" " ..			'Victor Guano'— Found .....

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Samples of Commercial Fertilizers, registered for 1902 *Concluded.*

RESULTS OF ANALYSIS.

Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	Number of Sample.
Total; including that of Nitric Acid or Ammonia, if present.	Total; calculated as Ammonia.	Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
.....	.....	.....	.....	.....	18·00	.....	.....	.....	.....	1353
.....	.....	.....	10·69	7·92	18·61	10·69	.....	0·11	17·30	
2·82	3·43	10·04	1·95	5·76	17·75	11·99	2·20	10·80	25·00	1356
1·86	2·26	7·68	2·01	8·76	18·45	9·69	3·07	11·25	21·74	1357

TABLE II.—Result of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Halifax, N.S.*	*Analyst, M. Bowman, Halifax, N.S.*		p. c.	p. c.
April 11	20215	A. L. Melvin.....	Provincial Chemical Co., St. John, N.B.	'Potato Phosphate'—		
				Guaranteed.....	2·80	3·40
				Standard sample..	2·50	3·03
				Sample as sold..... ...	1·76	2·14
"	11	20216	"	" .. 'Imperial Superphosphate'—		
				Guaranteed...	2·31	2·80
				Standard sample.....	2·39	2·90
				Sample as sold.....	2·27	2·75
"	12	20217	F. T. De Wolfe...	Bowker Fertilizer Co., Boston, Mass. 'Ground Bone'—		
				Guaranteed..	.....	3·00
				Standard sample	2·96	3·37
				Sample as sold..... . ..	2·46	2·99
"	12	20218	"	" .. 'Bone and Potash'—		
				Guaranteed.....	.....	2·00
				Standard sample.....	2·10	2·55
		Dartmouth, N.S.		Sample as sold..... ..	1·76	2·14
	14	20219	E. M. Walker	American Agricultural Chemical Co., Boston, Mass. 'Pacific Guano'—		
				Guaranteed...	1·03	1·25
				Standard sample.....	1·37	1·66
				Sample as sold.....	1·68	2·04
	14	20220	"	" .. 'Potato Special'—		
				Guaranteed.....	2·06	2·50
				Standard sample.....	2 04	2·48
				Sample as sold..	1·88	2·28
	14	20221	Colin McNab.....	Alberts Thomas Phosphate Co., London, Eng. 'Thomas' Phosphate Powder'—		
				Guaranteed.....	.. ....	.. ....
				Standard sample.....	.....	.....
		Kentville, N.S.		Sample as sold.....	.....	.....
"	15	20222	W. M. Carruthers.	Russia Cement Co., Gloucester, Mass. 'Complete Manure for Corn, Grain and Grass'—		
				Guaranteed..	.....	... .
				Standard sample.....	... .	.....
				Sample as sold..... ...	2·72	3·30
"	15	20223	" ..	" .. 'Complete Manure for Potatoes, Roots and Vegetables'—		
				Guaranteed.....	.....	.....
				Standard sample.....	.. ..	.....
				Sample as sold..... .. .	3·14	3·81
"	15	20224	C. O. Allen.....	Nova Scotia Fertilizer Co., Halifax, N.S. 'Potato Phosphate'—		
				Guaranteed.....	.....	3·71
				Standard sample.....	2·60	3·16
				Sample as sold..... ...	1·23	1·50

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Samples of Fertilizers as sold in 1902.

Results of Analysis.									
Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst's Remarks.
Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
6·48	1·92	7 22	15·62	8·40	7·55	.. ..	.... ..	20215	
6·71	2·89	5·43	15·03	9·60	7·72	7·20	26 96		
6·79	2·62	2·03	11·44	9·41	3·91	20·57	19 97	...	Below guarantee except in available phosphoric acid.
7·19	2 70	7 88	17·77	9·89	2·02	.....	.....	20216	
7·67	2·25	7·03	16·95	9·92	2·64	9·55	22 30		
6·51	1·98	2·65	11·14	8·49	3·04	18·95	19 43	....	Genuine.
.....	.....	.....	24·00	.....	.....	.....	.....	20217	
.....	22·50	3·32	25·82	22·50	.. ..	6·90	35 17		
0·40	11 75	13·08	25·23	12·15	.....	5 02	32 39	.....	Deficient in available phosphoric acid and therefore adulterated.
.....	.....	.....	12·00	6·00	2·00	.. ..	.....	20218	
2·56	3·58	5·76	11·90	6·14	1·80	9·95	15 67		
2 57	5·13	4·06	11·76	7·70	2·05	12·65	16 31	.....	Genuine.
6·00	2·00	2·00	10·00	8·00	2·00	... .	14 67	20219	
7·36	1·53	2·56	11·45	8·89	2·49	14·90	17 18		
6·01	2·88	1·33	10·22	8·89	1 49	12·07	16 38	..	"
5·00	3·00	2·00	10·00	8 00	3 00	... ...	17 99	20220	
5·25	3·20	2·24	10·69	8·45	4·17	14·05	19 77		
5·37	3·68	2·11	11·16	9·05	2·89	18 74	18 67	...	"
.....	.....	.....	17·00	.....	.....	.....	.....	20221	
.....	13·53	4·13	17·66	13·53	.....	0·17	17 77		
.....	12·38	4·49	16·87	12·38	... .	0·40	16·76	. ..	"
Not registered, therefore sold illegally.									
.....	.....	.....	.....	.....	.. ..		.. ....	20222	
.....	.....	.....	.....	.....	.....	.....	.....		
3·78	4·69	2·05	10·52	8·47	9·57	10·17	26 90	.....	Not registered.
Not registered, therefore sold illegally.									
.. ..	.....	.....	.....	.....	.....	.....	.....	20223	
.....	.....	.....	.....	.....	.....	.....	.....		
3·66	4·06	3·89	11 61	7·72	8·92	6·91	26 94	.....	Not registered.
.....	.....	.....	7·86	.. ..	4·70	.....	.....	20224	
4·79	1·30	3·51	9·60	6·09	4·63	8·95	19 33		
2·87	3·44	2·25	8·56	6·31	3·65	14·77	14 68	.... .	Below guarantee in nitrogen and potash, and therefore adulterated.

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
					p. c.	p. c.
1902.		*Quebec.*	*Analyst, Dr. M. Fiset, Quebec.*			
April	3	23307 P. T. Legare	The Nichols Chemical Co., Capelton, Que.	'Reliance'—		
				Guaranteed	.....	2·00
				Standard sample	2·48	3·01
				Sample as sold	2·27	2·76
"	3	23308 "	"	'Superphosphate No. 1'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
				Sample as sold	0·19	0·23
"	3	23309 "	"	'Royal Canadian'—		
				Guaranteed	.....	4·00
				Standard sample	4·01	4·87
				Sample as sold	2·88	3·50
"	3	23310 " ..	"	'The Victor'—		
				Guaranteed	.....	2·00
				Standard sample	2·58	3·13
				Sample as sold	2·47	3·00
"	3	23311 J. B. Renaud & Co.	Provincial Chemical Fertilizer Co., St. John, N.B.	'Victor Guano'—		
				Guaranteed	1·77	2·15
				Standard sample	2·56	2·11
		Ottawa.		Sample as sold	1·65	2·00
"	21	22623 Graham Bros... ..	Standard Fertilizer Co., Smith's Falls, Ont.	'Bone Meal'—		
				Guaranteed	.....	4·00
				Standard sample	4·22	5·13
		Brockville, Ont.		Sample as sold	3·76	4·56
"	22	22624 Brown & Sons	American Agricultural Chemical Co., Boston, Mass.	'Potato Fertilizer'—		
				Guaranteed	2·06	2·50
				Standard sample	1·95	2·36
				Sample as sold	2·31	2·80
"	22	22625 "	"	'B. D. Sea Fowl Guano'—		
				Guaranteed	2·06	2·50
				Standard sample	2·38	3·09
				Sample as sold	2 03	2·46
"	22	22626 " ...	"	'Complete Manure for Potatoes and Vegetables'—		
				Guaranteed	3·29	4·00
				Standard sample	3·60	4·36
				Sample as sold	2·67	3·25
"	22	22627 " ...	"	'New Method Fertilizer'—		
				Guaranteed	1·03	1·25
				Standard sample	1·34	1·63
				Sample as sold	1·05	1·28

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Samples of Fertilizers as sold in 1902 *Continued.*

Results of Analysis.									
Phosphoric Acid.									
Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.	Potash.	Moisture.	Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst's Remarks.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	.....	6·00	2·00	.....	.....	23307	
5·97	1·74	3·96	11·67	7·71	3·44	13·78	19 81		
5·11	2·88	4·32	12 31	7 99	2 45	14 17	19 79		Genuine and up to guarantee.
.....	.....	.....	.....	11·50	.....	.....	.....	23308	
11·83	1·19	3·20	16 22	13·02	0 46	10·85	16 96		
9·27	1·92	4 80	15·99	11·19	Traces.	12·85	15 22		
.....	.....	.....	.....	9·00	5 00	.....	.....	23309	
9·30	0·60	3·20	13·10	9·90	6·64	6 92	29 37		
9·43	2·62	3·20	15 25	12 05	2·66	12 00	26 35		Genuine but below guarantee in ammonia and potash.
.....	.....	.....	.....	7·00	3 00	.....	.....	23310	
8·55	1·30	3·90	13·75	9 85	4 58	11·35	24 86		
6·56	3·36	3·35	13·27	9·92	3·72	14 55	23 68		Genuine and up to guarantee.
.....	3·35	8·17	17·32	9·15	1·55	.....	.....	23311	
6·84	2·82	6·59	16·25	9·66	3·42	9 85	23 02		
4·80	1·79	8·31	17·90	9·59	1·58	13·50	19 98	.....	.....
.....	.....	.....	22·00	.....	.....	.....	.....	22623	
.....	16·32	5·43	21·75	16·32	.....	6·50	33 51		
.....	12·95	10·23	23·18	12·95	.....	6·93	33 50	.....	.....
5·00	3·00	2·00	10 00	8 00	3 00	.....	17 99	22624	
5·76	3·35	1·92	11 03	11·00	3·46	12·85	19 48		
6·65	3·47	2·19	12·31	10·12	4·03	9 88	23 43	.....	.....
6·00	2 00	1·00	9 00	8·00	1·50	.....	16 22	22625	
8·31	0·52	1·40	10·23	8 83	2·16	10 40	18 92		
6·50	2·94	2 39	11·83	9·44	1·83	7·00	18 51	.....	.....
6·00	2·00	1 00	9 00	8 00	7·00	.....	24 95	22626	
9·28	0 00	1·08	10·36	9·28	7 14	10·30	27 60		
8·00	2·55	1·92	12·47	10·55	6 10	9·93	19 40	.....	Genuine but below guarantee in ammonia and potash.
6·00	2 00	2 00	11·00	8 00	2 00	.....	14 67	22627	
6·07	2·28	3 00	11·35	8·35	2 54	15·45	17 58		
7·45	2·15	2·07	11 67	9 60	2·95	7·68	17 55	.....	Genuine and up to guarantee.

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Richmond, P.Q.*	*Analyst, A. L. Tourchot, St. Hyacinthe, P.Q.*		p. c.	p. c.
April	2	23301 D. Taylor.....	Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	'Special'—		
				Guaranteed	.....	3·50
				Standard sample	3·32	4·04
				Sample as sold	3·69	3·75
	2	23302 "	" "	'Superphosphate of Lime'—		
				Guaranteed	.....	.....
				Standard sample	0·11	0·13
				Sample as sold	.....	.....
	2	23304 M. Steele & Co.	Nichols Chemical Co., Capelton, P.Q.	'Victor'—		
				Guaranteed	.....	2·00
				Standard sample	2·58	3·13
				Sample as sold	1·90	2·31
	2	23305 "	" "	'Capelton'—		
				Guaranteed	.....	.....
				Standard sample	0·29	0·36
				Sample as sold	.....	.....
	2	23306 D. Taylor.....	Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	'Standard'—		
				Guaranteed	.....	2·50
				Standard sample	2·67	3·24
				Sample as sold	2·27	2·75
	8	23312 E. Payne, Granby.	American Agricultural Fertilizer Co., Boston, Mass.	'Bradley's Eclipse Phosphate for all crops'—		
				Guaranteed	1·03	1·25
		Knowlton, P.Q.		Standard sample	1·37	1·66
				Sample as sold	1·40	1·70
	9	23313 C. W. Beals.....	" "	'Bradley's Eclipse Phosphate for all crops'—		
				Guaranteed	1·03	1·25
				Standard sample	1·37	1·66
				Sample as sold	1·37	1·66
		Magog, P.Q.				
	10	23314 F. W. Wallace, Mary St.	Bowker Fertilizer Co., Boston, Mass.	'Bowker's Corn Phosphate'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
				Sample as sold	1·44	1·75
	10	23315 "	" "	'Bowker's Potato and Vegetable Phosphate'—		
				Guaranteed	.....	2·00
		Spencerville, Ont.		Standard sample	1·90	2·31
				Sample as sold	1·58	1·92
"	10	22621 A. Millar.....	The Nichols Chemical Co., Capelton, P.Q.	'The Victor'—		
				Guaranteed	.....	2·00
				Standard sample	2·58	3·13
		Ottawa.		Sample as sold	2·58	3·13
"	21	22622 Graham Bros.....	W. A. Freeman Co., Hamilton, Ont.	'Tankage'—		
				Guaranteed	.....	5·00
				Standard sample	5·44	6·61
				Sample as sold	6·30	7·65

Samples of Fertilizers as sold in 1902 —*Continued.*

Results of Analysis.									
Phosphoric Acid.									
Soluble in Water.	Citric soluble.	Insoluble.	Total.	Total Available.	Potash.	Moisture.	Relative value per ton of 2,000 lbs.	No. of Sample.	District Analyst's Remarks.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	10·00	8·00	6·00	.....	.....	23301	
8·12	0·90	1·28	10·30	9·02	7·39	9·20	26·85		
7·93	1·73	1·09	10·75	9·66	5·64	10·01	25·09		Up to guarantee.
.....	.....	.....	16·00	14·00	.....	.....	.....	23302	
12·47	0·49	3·51	16·47	12·96	.....	10·30	16·83		
12·16	2·49	2·24	16·89	14·65	.....	13·65	18·00		"
.....	.....	.....	.....	7·00	3·00	.....	.....	23304	
8·55	1·30	3·90	13·75	9·85	1·58	11·35	24·86		
6·91	3·52	2·94	13·37	10·43	3·09	12·98	20·85		"
.....	.....	.....	.....	8·00	.....	.....	.....	23305	
8·95	1·86	1·48	15·29	10·81	1·00	14·60	15·90		
7·90	1·64	5·05	14·59	9·54	.....	13·58	12·80		"
.....	.....	.....	11·00	9·00	2·00	.....	.....	23306	
9·72	1·16	1·91	12·79	10·88	2·78	8·95	22·84		
8·70	1·98	1·79	12·47	10·68	2·63	11·66	21·37		"
6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	23312	
5·76	2·81	2·87	11·44	8·57	2·32	16·15	16·59		
5·60	2·26	2·69	10·55	7·86	2·53	14·64	16·03		"
6·00	2·00	2·00	10·00	8·00	2·00	.....	14·67	23313	
5·76	2·81	2·87	11·44	8·57	2·32	16·15	16·59		
5·60	2·33	2·18	10·11	7·93	2·55	15·16	15·89		"
Not registered by this name.									
.....	.....	.....	.....	.....	.....	.....	.....	23314	
5·31	2·69	3·32	11·32	8·00	2·32	16·08	16·23		"
.....	.....	.....	11·00	9·00	2·00	.....	.....	23315	
5·25	1·41	4·60	11·26	6·66	2·12	9·60	16·02		
5·40	2·57	3·84	11·81	7·97	2·32	15·91	16·69		"
.....	.....	.....	.....	7·00	3·00	.....	.....	22621	
8·55	1·30	3·90	13·75	9·85	1·58	11·35	24·86		
7·89	1·71	3·52	13·12	9·60	4·60	10·18	23·63		"
.....	.....	.....	12·00	.....	.....	.....	.....	22622	
.....	9·91	2·24	12·15	9·91	Trace.	4·35	.....		
0·13	6·76	4·16	11·05	6·89	.....	6·10	26·88		

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Montreal.*	*Analyst, J. T. Donald, Montreal.*		p. c.	p. c.
Mch. 21	21212	Laing Packing & Provision Co.	Vendors	'Laing Fertilizer'—		
				Guaranteed	4·12	5·00
				Standard sample	4·70	5·69
				Sample as sold	5·48	6·66
" 21	21213	Montreal Union Abattoir Co.	"	'Tankage'—		
				Guaranteed		
				Standard sample		
				Sample as sold	7·86	9·55
" 22	21214	Brodie & Harvie, Bleury street.	Standard Fertilizer Co., Smith's Falls, Ont.	'Special'—		
				Guaranteed		3·50
				Standard sample	3·32	4·04
				Sample as sold	3·02	3·67
" 24	21215	R. J. Latimer, 144 McGill street.	Nichols Chemical Co., Capelton, P.Q.	'Victor'—		
				Guaranteed		2·00
				Standard sample	2·58	3·13
				Sample as sold	2·46	2·99
" 24	21216	" "	" "	'Capelton'—		
				Guaranteed		
				Standard sample	0·29	0·36
				Sample as sold	0·24	0·29
" 24	21217	" "	" "	'Royal Canadian'—		
				Guaranteed		4·00
				Standard sample	4·01	4·87
				Sample as sold	2·32	2·81
" 24	21218	" "	" "	'No. 1'—		
				Guaranteed		
		Hurdman's, P.Q.		Standard sample		
				Sample as sold	0·36	0·43
April 8	21219	Thos. Cogland	Bowker Fertilizer Co., Boston, Mass.	'Vermont Phosphate'—		
				Guaranteed		3·00
				Standard sample	2·70	3·28
				Sample as sold	2·53	3·07
" 8	21220	"	" "	'Potato and Vegetable'		
				Guaranteed		2·00
				Standard sample	1·90	2·31
				Sample as sold	1·59	1·93
" 8	21221	Wm. Anderson	American Agricultural Fertilizer Co., Boston, Mass.	'Eclipse Phosphate'		
				Guaranteed	1·03	1·25
				Standard sample	1·37	1·66
				Sample as sold	1·36	1·65
		Smith's Falls, Ont.	*Analyst, Dr. F. X. Valade, Ottawa.*			
Mar. 13	22601	The Standard Fertilizer Co., Smith's Falls, Ont.	Vendors	'No. 1 Brand'—		
				Guaranteed		2·00
				Standard Sample	1·76	2·14
				Sample as sold	2·17	2·64
" 13	22602	"	"	'Corn and Grass'—		
				Guaranteed		2·00
				Standard sample	2·49	3·02
				Sample as sold	1·96	2·38
13	22603	"	"	'Special'—		
				Guaranteed		3·50
				Standard sample	3·32	4·04
				Sample as sold	3·08	3·74

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Samples of Fertilizers as sold in 1902 *Continued.*

RESULTS OF ANALYSES.

Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	No. of Sample.	District Analyst's Remarks.
Soluble in Water.	Citric soluble.	Insoluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	14·71	.....	.....	.....	.....	21212	
1·00	8·55	3·53	13·08	9·55	.....	5·75	25 42		
.....	13·56	1·93	15·19	13·56	0·04	6·08	30 04		Above guaranteed value.
Not registered for 1902, therefore sold illegally.									
.....	.....	.....	.....	.....	.....	.....	.....	21213	
.....	.....	.....	.....	.....	.....	.....	.....		
Heavy traces.	1·98	0·33	2·31	1·98	0·30	16·81	21 68		Genuine.
.....	.....	.....	10 00	8·00	6·00	.....	.....	21214	
8·12	0·90	1·28	10·30	9·02	7·39	9·20	26 85		
8·37	0·49	1·30	10·16	8·86	6·57	9·02	25 12		Above guaranteed value.
.....	.....	.....	.....	7·00	3 00	.....	.....	21215	
8·55	1·30	3·90	13·75	9·85	4·58	11·35	24 86		Above guarantee in ammonia and under guarantee in available phosphoric acid and potash.
4·88	1·40	3·96	10·24	6·28	2·29	12·60	16 89		
.....	.....	.....	.....	8 00	.....	.....	.....	21216	
8·95	1·86	4·48	15·29	10·81	1·66	14·60	15 90		
4·94	1·43	5·19	11·56	6 37	0·18	12·77	9 83		Below guarantee in available phosphoric acid.
.....	.....	.....	.....	9·00	5·00	.....	.....	21217	
9·30	0·60	3·20	13·10	9·90	6 64	6 92	29 37		Under guarantee in ammonia and available phosphoric acid.
7·17	0·79	3·52	11·48	7·96	4·75	11·64	20 11		
.....	.....	.....	.....	11·50	.....	.....	.....	21218	
11·83	1·19	3·20	16·22	13·02	0·46	10·85	16 96		
7·37	1·17	5·04	13·58	8·54	0 16	13·85	12 67		Below guarantee in available phosphoric acid, and therefore adulterated.
.....	.....	.....	10·00	8 00	4 00	.....	.....	21219	
6·40	0·95	3·33	10·68	7 35	3·49	5·50	19 88		
4·46	4·74	2·06	11 26	9·20	4·32	15·09	21 79		Fully up to guarantee.
.....	.....	.....	11 00	9 00	2·00	.....	.....	21220	
5·25	1·41	4 60	11·26	6·66	2·12	9·60	16 02		Slightly under guarantee in available phosphoric acid and slightly over guarantee in potash.
5·14	2·97	2·81	10·92	8 11	2·17	15·70	16 38		
6·00	2·00	2·00	10·00	8 00	2·00	.....	14 67	21221	
5.76	2·81	2 87	11·44	8·57	2 32	16·15	16 59		
4·96	2·95	3·04	10 95	7 91	2·11	13·62	15 39		Fully up to guarantee.
.....	.....	.....	11·00	9·00	1·00	.....	.....	22601	
7·67	1·68	3·99	13 34	9 35	2·33	9·85	18 92		
8·68	1·20	1·48	11·36	9·88	1·37	13·64	18 83		Genuine.
.....	.....	.....	9·00	7·00	4·00	.....	.....	22602	
7·80	0·83	1·92	10·55	8·63	4 92	8·85	22 00		
6·68	1·04	1·62	9·34	7·72	3·00	13 93	17 50	...	"
.....	.....	.....	10·00	8·00	6·00	.....	.....	22603	
8·12	0·90	1·28	10·30	9·02	7·39	9·20	26 85		
7·20	1·28	1·84	10·32	8·48	5·88	10·42	24 16	.....	"

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Smith's Falls, Ont. Analyst, Dr. F. X. Valade, Ottawa.*			p. c.	p. c.
Mar. 13	22604	The Standard Fertilizer Co., Smith's Falls, Ont.	Vendors	'Standard'—		
				Guaranteed		2·50
				Standard sample	2·67	3·24
				Sample as sold	2·38	2·89
" 13	22605	"	"	'Royal'—		
				Guaranteed		2·00
				Standard sample	1·64	1·98
				Sample as sold	1·68	2·04
" 13	22606	"	"	'Superphosphate'—		
				Guaranteed		
				Standard sample	0·11	0·13
		Spencerville, Ont.		Sample as sold	0·70	0·85
" 27	22617	Mr. Smailie, Farmer.	The American Agricultural Chemical Co., Boston, Mass.	"B. D." Sea Fowl Guano'—		
				Guaranteed	2·06	2·50
				Standard sample	2·38	3·09
				Sample as sold	2·66	3·23
" 27	22618	"	"	'Bradley's Potato Fertilizer'—		
				Guaranteed	2·06	2·50
				Standard sample	1·95	2·36
				Sample as sold	1·96	2·38
27	22619	"	"	'Bradley's Farmers' New Method'—		
				Guaranteed	1·03	1·25
			Analyst, Dr. W. H. Ellis, Toronto.	Standard sample	1·34	1·63
		Belleville, Ont.		Sample as sold	2·38	2·89
Mar. 14	22607	The Belleville Canning Co.	The American Agricultural Chemical Co., Boston, Mass.	'Dissolved Bone and Potash'—		
				Guaranteed		
				Standard sample		
		Toronto.		Sample as sold	1·99	2·42
15	22608	The Steele, Briggs Co., King's St.	Furnished by A. Boyd, Toronto.	'Nitrate of Soda'—		
				Guaranteed		
				Standard sample		
				Sample as sold	16·25	19·73
15	22609	"	Harris & Co., Toronto.	'Bone Meal'—		
				Guaranteed		4·76
				Standard sample	5·02	6·10
				Sample as sold	4·95	6·01
15	22610	W. Rennie, seed merchant.	W. A. Freeman Company, Hamilton, Ont.	'Bone Meal'—		
				Guaranteed		3·00
				Standard sample	5·04	6·12
				Sample as sold	5·32	6·46
" 15	22611	"		'Thomas Phosphate'—		
				Guaranteed		
				Standard sample		
				Sample as sold		

Samples of Fertilizers as sold in 1902 *(Continued.)*

Results of Analyses.

Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst' Remarks.
Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	11·00	9·00	2·00	.....	.....	22601	
9·72	1·16	1·91	12·79	10·88	2·78	8·95	22 84		
8·72	0·86	1·08	10·66	9·58	2·20	11·31	19 75	....	Genuine.
.....	.....	.....	9·00	8·00	3·00	.....	.....	22605	
8·13	1·91	1·92	11 96	10 04	3·95	7·65	20 54		
7·06	0·96	1·14	9·16	8·02	3·20	5·02	17 26	...	"
.....	.....	.....	16 00	14·00	.....	.....	.....	22606	
12·47	0·49	3 51	16·47	12·96	.....	10 30	16 83		
12·80	1·62	1·76	16·18	14·42	0 63	6·67	18 63	. ...	"
6·00	2·00	1·00	9·00	8·00	1·50	.....	16 22	22617	
8·31	0·52	1·40	10·23	8·83	2·16	10·40	18 92		
4·12	0·80	4·30	9·22	4·92	2·63	15·59	16 25	.....	Adulterated, being below guarantee in available phosphoric acid.
5·00	3·00	2 00	10·00	8·00	3·00	.....	17 99	22618	
5·76	3·35	1·92	11 03	9·11	3 46	13 85	19 48		
4·96	2·16	3·72	10·84	7·12	1·04	12·73	18 39	. .	Genuine, though a trifle low in available phosphoric acid.
6·00	2·00	2·00	10·00	8·00	2·00	.....	14 67	22619	
6·07	2·28	3·00	11·35	8·35	2 54	15·45	16 58		
4·88	2·16	3·84	10 88	7·04	4 66	15·85	17 99	....	Genuine, though below guarantee in available phosphoric acid.
8·00	2·00	1·00	11·00	10·00	2 00	.....	.....	22607	
.....	.....	.....	.....	.....	.....	.....	.....		
4·46	6·11	1·60	12·67	11 07	2·32	6·84	20 32		
Not registered.									
... ...	.....	.....	... ..	.....	.....	... ...	.....	22608	
.....	.....	.....	.....	.....	.....	.....	.....		
... ...	.....	.. ...	.. ....	.....	.....	0·26	42 25	.....	Not registered.
.....	.....	.....	20·14	.....	.....	7·16	.....	22609	
0·00	12·23	4 15	16·38	12·23	0·38	0 65	30 05		
3 75	9·55	5·00	18·30	13·30	.....	2·79	31 89	....	Up to standard.
.....	.....	.....	23·00	.....	.....	.....	.....	22610	
.....	11·52	7·80	19·32	11·52	0·11	7·70	32 69		
1·12	13·71	1·37	16·20	14·83	.. ....	3·74	30 56	. ..	Up to standard but below guarantee in phosphoric acid.
.....	.....	.....	17·00	.....	.....	.....	.....	22611	
0·06	13·53	4·13	17·66	13·53	.....	0·17	17 77		
1·79	12·56	1·95	16·30	14·35	.....	0·45	17 34	.....	Up to standard.

TABLE II.—Result of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name of Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Toronto.*	*Analyst, Dr. W. H. Ellis, Toronto.*		p. c.	p. c.
Mar. 15	22612	W. Rennie, seed merchant.	Wm. Faint, Peterboro', Ont.	'Bone Meal'—		
				Guaranteed		
				Standard sample	5·06	6·15
				Sample as sold	3·95	4·80
15	22613	J. A. Simmers, seed merchant, King St.	W. A. Freeman Company, Hamilton, Ont.	'Celery and Early Vegetables'—		
				Guaranteed		6·00
				Standard sample	5·29	6·33
				Sample as sold	3·24	3·94
15	22614	" "	"	'Potato Manure'—		
				Guaranteed		3·00
				Standard sample	2·76	3·35
				Sample as sold	2·83	3·40
15	22615	" "	"	'Lawn Fertilizer'		
				Guaranteed		
				Standard sample		
				Sample as sold	0·92	1·19
15	22616	" "	"	'Sure Growth'—		
				Guaranteed		3·50
		Hamilton, Ont.	*Analyst, F. T. Harrison, London, Ont.*	Standard sample	4·00	4·86
				Sample as sold	4·27	5·22
18	22023	W. A. Freeman Co.	Vendors	'Sure Growth'—		
				Guaranteed		3·50
				Standard sample	4·00	4·86
				Sample as sold	4·22	5·12
18	22024	" "	"	'Bone Meal'—		
				Guaranteed		3·00
				Standard sample	5·04	6·12
				Sample as sold	4·64	5·64
18	22025	Thos. S. Morris, 45 Wellington St		'Thomas' Phosphate'—		
				Guaranteed		
				Standard sample		
		St. Catharines.		Sample as sold		
19	22027	Tetterington & Co.	The American Agricultural Chemical Co., Boston, Mass.	'Guano'—		
				Guaranteed	2·06	2·50
				Standard sample	3·25	3·94
		Ingersoll, Ont.		Sample as sold	2·53	3·07
20	22028	Robertson & McKay.	" "	'Potato Fertilizer'—		
				Guaranteed	2·06	2·50
				Standard sample	1·95	2·36
				Sample as sold	2·67	3·24
20	22029	" "	" "	'New Method'—		
				Guaranteed	1·03	1·25
				Standard sample	1·34	1·63
				Sample as sold	1·62	1·96

Samples of Fertilizers as sold in 1902 *Continued.*

Results of Analyses.

Phosphoric Acid.									
Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.	Potash.	Moisture.	Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst's Remarks.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
No guarantee given.								22612	
.....	9·92	10·88	20·80	9·92	.....	6·65	33 93		
2·43	11·12	9·50	23·05	13 55	.....	4·78	34 13	.....	Not guaranteed.
.....	.....	.....	9·00	.....	6·00	.....	.....	22613	
4·48	1·47	3·33	9·28	5·95	7·15	8·40	28 21		
3·35	5·58	2·97	11·90	8 93	6·55	7·26	25 71	.....	Up to guarantee in phosphoric acid and potash, below guarantee in ammonia.
.....	.....	.....	8·00	.....	5·00	.....	.....	22614	
4·95	3·04	3·67	11·66	7·99	1 54	10·40	21 77		
2·87	15·48	3·45	21·80	18·35	2·49	9·43	30 92	....	Up to standard and guarantee.
Not registered.									
.....	.....	.....	.....	.....	.....	.....	.....	22615	
8·77	2·95	0·98	12·70	11 72	3·35	7·34	19 80	....	Not registered.
.....	.....	.....	8·00	.....	3·00	.....	.....	22616	
5·44	2·38	3·84	11·66	7·82	5 79	9·20	25 98		
5·05	5·40	4·05	14·50	10 45	2 16	5·47	25 74	.....	Up to standard and guarantee.
.....	.....	.....	8·00	.....	3·00	.....	.....	22023	
5·44	2·38	3·84	11·66	7·82	5·79	9·20	25 98		
5·52	0·68	4·80	11·00	6·20	2·60	13 17	19 27	....	Unadulterated.
.....	.....	.....	23·00	.....	.....	.....	.....	22024	
.....	21 52	7·80	19·32	11 52	0·11	7 70	32 69		
.....	8·26	12·02	20·28	8·26	.....	6·47	32 25	..	Adulterated in that it is deficient in phosphoric acid.
.....	.....	.....	17·00	.....	.....	.....	.....	22025	
.....	13·53	4·13	17·66	13·53	.....	0·17	17 77		
.....	13·49	4·10	17·59	13 49	.....	0·20	17 70	.	Unadulterated.
5·00	3·00	2·00	10·00	8·00	1·50	.....	16 41	22027	
6·39	2·18	4·28	12·85	8·57	1 72	13·25	20 96		
6·23	2·15	4·54	12·92	8 38	2 56	8 65	19 97	...	"
5·00	3·00	2·00	10 00	8 00	3·00	.....	17 99	22028	
5·76	3·35	1·92	11 03	9·11	3 46	13·85	19 48		
8·31	0·58	1·98	10·87	8·89	2 62	12·90	20 56	. ...	"
6·00	2·00	2·00	11·00	8·00	2 00	.....	14 67	22029	
6·07	2·28	3·00	11·35	8·35	2 54	15·45	16 58		
4·80	4·09	1·21	10·10	8·89	2 29	10·56	16 92	... ...	"

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Ingersoll, Ont.*	*Analyst, F. T. Harrison, London, Ont.*		p. c.	p. c.
Mar. 20	22030	Ingersoll Packing Co.	Vendors	'Ingersoll Fertilizer'—		
				Guaranteed	.....	9·60
				Standard sample	6·41	7·80
		London, Ont.		Sample as sold	7·81	9·48
22	22031	J. H. McMeechen.	"	'Tankage'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
				Sample as sold	10·28	12·39
22	22032	Darch & Hunter, Seed Merchants.	Michigan Carbon Works.	'Bone Dust'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
		St. John, N.B.	*Analyst, E. B. Kenrick, Winnipeg.*	Sample as sold	1·62	1·96
18	17836	The Provincial Chemical Fertilizer Co.	Vendors	'Bone Meal'—		
				Guaranteed	4·68	5·68
				Standard sample	2·97	3·60
				Sample as sold	4·18	5·07
19	17837	C. H. Peters & Sons, Walker's Wharf.	Bradley Fertilizer Co., Boston.	'Potato Fertilizer'—		
				Guaranteed	2·06	2·50
				Standard sample	1·95	2·36
				Sample as sold	2·35	2·85
		Sussex, N.B.				
20	17838	W. B. McKay & Co.	Bowker Fertilizer Co., Boston.	'Potato and Vegetable'—		
				Guaranteed	.....	2·00
				Standard sample	1·90	2·31
				Sample as sold	1·90	2·31
20	17839	J. A. Humphreys.	Nova Scotia Fertilizer Co., Halifax, N.S.	'Ceres Superphosphate'—		
				Guaranteed	.....	2·00
				Standard sample	1·89	2·30
		St. Andrew's, N.B.		Sample as sold	1·37	1·66
25	17840	G. D. Grimmer	Lowell Fertilizer Co., Lowell, Mass., U.S.A.	'Swift's Lowell Bone Fertilizer'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
		St. Stephen, N.B.		Sample as sold	1·04	1·26
26	17841	F. E. Rose	E. Frank Coe Co., Front St., New York.	'Ammoniated Bone'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
		Woodstock, N.B.		Sample as sold	1·43	1·74
27	17842	Batmain Bros.	New England Fertilizer Co., Boston, Mass.	'Seeding Down Fertilizer'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
		Fredericton, N.B.		Sample as sold	1·23	1·49
29	17843	J. F. Van Buskirk	American Agricultural Fertilizer Co. Boston, Mass.	'Quinnipiac Climax Phosphate'		
				Guaranteed	1·03	1·25
				Standard sample	1·09	1·32
				Sample as sold	1·23	1·49

Samples of Fertilizers as sold in 1902—*Continued.*

Results of Analysis.

Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst's Remarks.
Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
.....	.....	.....	11·20	10·40	0·64	8·10	.....	22030	
Trace...	10·68	4·00	14·68	10·68	0·52	9·23	31 68		
.....	9·09	2 68	11·77	9 09	0·24	11 24	31 67	.....	Unadulterated.
Not registered, therefore sold illegally.									
.. ....	.....	.....	.....	.....	.....	....	.....	22031	
.. ....	.....	.....	.....	.....	.....	.....	.....		
.....	2·18	0 89	3·07	2·18	0·36	6·90	28 44	.....	Not registered.
Not registered, therefore sold illegally.									
....	.....	.. ...	.....	.....	.....	.....	.....	22032	
.. ....	.....	.....	.....	.....	.....	.....	.....		
.....	16·57	13·37	29·94	16·57	.. ...	3 50	35 49	.....	"
.....	.....	.....	24·28	.....	.....	.....	.....	17836	
....	13·57	6·07	19·64	13·57	.....	5·5	28 13		
.....	.....	.....	21·82	.....	.....	7·19	.....	..	Genuine.
5·00	3·00	2.00	10·00	8·00	3·00	.....	17 99	17837	
5·76	3·35	1·92	11·03	9·11	3 46	13·85	19 48		
4·46	3·92	2·53	10·91	8·38	2·99	14·03	19 20	.....	"
.....	.....	... ...	11·00	9·00	2·00	.....	.....	17838	
5·25	1·41	4·60	11·26	6·66	2·12	9·60	16 02		
4·48	4·00	2·24	10 72	8·48	2·68	15·83	17 82		"
.....	.....	... ...	9·20	.....	2·14	.....	.....	17839	
5·11	2·92	3·00	11·03	8·03	2·97	9·85	17 90		
1·91	3·38	4·03	9·32	5·29	2·34	7·42	12 97	...	"
Not registered, therefore sold illegally.									
.....	.....	.....	.... ..	.. ..	.....	.....	.....	17840	
.....	.....	.....	.....	.....	.....	.....	.....		
3·88	3·38	2·06	9·32	7·26	2·96	11·37	14 61	.. ..	Not registered.
Not registered, therefore sold illegally.									
.....	.....	.. ....	.....	.. ..	.....	.....	.....	17841	
.....	.....	.....	.....	.....	.....	.....	.....		
4·17	2·98	1·30	8·45	7·15	2·07	7·82	14 27	.....	"
Not registered, therefore sold illegally.									
.....	... .	.....	.....	.. ..	.....	.....	.....	17842	
.....	.....	.....	.....	.....	.....	.....	.....		
4·90	3·10	2·68	10·68	8·00	2·07	11·85	14 96	....	"
6·00	2·00	2 00	10·00	8·00	2 00	.....	14 67	17843	
5·11	3·85	2·23	11·19	8·96	2·53	13·90	16 32		
5·59	1·65	4·41	11·65	7·24	1·95	9·16	14 85	.....	Genuine.

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Nitrogen. Total; including that of Nitric Acid or Ammonia if present.	Nitrogen. Total; calculated as Ammonia.
1902.		*Victoria, B.C.*	*Analyst, Dr. J. C. Fagan, Victoria, B.C.*		p. c.	p. c.
April	1	21668 Victoria Chemical Co.	Vendors	Mixed Fertilizer 'A'—		
				Guaranteed	4·00	.....
				Standard sample	3·99	4·84
				Sample as sold	3·82	4·65
"	1	21669 " " "	"	Mixed Fertilizer 'B'—		
				Guaranteed	3·50	
				Standard sample	3·85	4·68
				Sample as sold	2·90	3·50
	1	21670 " " "	"	Mixed Fertilizer 'C'—		
				Guaranteed	.....	.....
				Standard sample	0·77	0·93
				Sample as sold	0·56	0·68
"	1	21671 " " "	"	'Superphosphate'—		
				Guaranteed	.....	.....
				Standard sample	0·89	1·08
				Sample as sold	0·75	0·91
	1	21672 W. A. Jackson & Co., Druggists, *Vancouver, B.C.*		'Liquid Fertilizers for Plants'		
				Guaranteed	.....	.....
				Standard sample	.....	.....
				Sample as sold	2·47	2·99
	3	21673 M. J. Henry	Pacific Meat Co., Tacoma, U.S.A.	'Bone Meal'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
				Sample as sold	4·20	5·10
	3	21674 " "	Hy. Cowell, Tacoma, U.S.A., imported from Germany.	'Muriate of Potash'—		
				Guaranteed	.....	.....
				Standard sample	.....	.....
				Sample as sold	.....	.....
	3	21675 " "	Victoria Chemical Co., imported from Chili.	'Nitrate of Soda'—		
				Guaranteed	16·00	.....
				Standard sample	15·62	18·97
				Sample as sold	15·40	18·69

Samples of Fertilizers, as sold in 1902—*Concluded.*

Results of Analyses.									
Phosphoric Acid.									
Soluble in Water.	Citric Soluble.	Insoluble.	Total.	Total Available.	Potash.	Moisture.	Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst's Remarks.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	10·00	.....	7·00	.....	.....	21668	Genuine.
11·20	.....	0·45	11·65	11·20	6·87	9·20	32·41		
9·80	0·84	1·05	11·69	10·64	7·20	14·15	29·73		
.....	.....	.....	9·00	.....	11·00	.....	.....	21669	"
9·40	0·89	Trace.	10·29	10·29	11·90	9·10	35·79		
8·90	0·70	0·49	10·09	9·60	10·90	12·19	30·01		
.....	.....	.....	12·50	.....	11·00	.....	.....	21670	"
12·47	0·96	Trace.	13·43	13·43	11·16	11·80	29·77		
11·90	0·84	0·56	13·30	12·74	11·00	15·21	28·77		
.....	.....	.....	16·00	.....	.....	.....	.....	21671	"
14·20	0·60	0·45	15·25	14·80	.....	10·55	20·43		
17·24	0·70	0·56	18·50	17·94	.....	12·14	23·43		
			Not registered.					21672	Not guaranteed.
.....	.....	.....	.....	.....	.....	.....	.....		
3·65	.....	.....	3·65	3·65	19·88	1·14	31·18		
			Not registered, therefore sold illegally.					21673	"
.....	.....	.....	.....	.....	.....	.....	.....		
.....	16·60	7·40	24·00	16·60	.....	7·40	35·74		
			Not registered, therefore sold illegally.					21674	"
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	56·85	2·13	59·69		
.....	.....	.....	.....	.....	.....	.....	41·60	21675	Genuine.
.....	.....	.....	.....	.....	.....	1·25	40·61		
.....	.....	.....	.....	.....	.....	1·90	40·04		

MEMORANDA ON MANURES.

Since this publication is intended for circulation among our farmers, it has been thought advisable to take advantage of its issue by reprinting some of the notes which have appeared in former bulletins, and adding a few additional particulars from works which have recently appeared, regarding the application of natural manures and artificial fertilizers.

It is nearly fifty years since Stoeckhardt, at that time professor in the agricultural school of Tharandt, Saxony, said that a farmer who bought guano, bonemeal, or other artificial fertilizers, and at the same time neglected to make proper use of the dung of the cattle on his own farm, must be regarded as an agricultural spendthrift. Every intelligent farmer in Canada will in these modern days agree with the old German professor, and maintain that the treasury of the farm is the dungstead, and that leaks and emanations from it of valuable fertilizing constituents must lead to financial embarrassment and possibly ruin.

This statement may be positively made without in the slightest degree detracting from the merits of artificial fertilizers, for when properly selected and applied, their value becomes abundantly evident. The question as to whether their use is remunerative has been frequently discussed, and depends to a large extent on the care employed in their selection. Supposing that the intelligent farmer has considered composition, cost, &c., to the best of his ability, made his selection and applied the fertilizer, he may still be in doubt as regards the result unless he takes steps to make a manure trial with it. As regards the best way of doing this, Hellriegel, in a publication, dated 1897, has related his experience. He recognizes how difficult it is for practical agriculturists, fully occupied with their regular work, and engaged in meeting all the difficulties caused by workmen, weather and market rates, to carry out regularly planned manure experiments. He therefore describes a method which experience in his estimation had justified, and recommends it for the purpose of ascertaining whether any application of lime, marl, dung or fertilizers had really produced the improvement which from the point of view of cost had been expected. This plan is to pass over, at one or several places, properly selected, a few square rods of the field without applying the dung or fertilizer. In this way unmanured plots, which do not require to be measured with great exactitude, but merely paced, and do not need to be harvested separately, are left in the manured field, by means of which any improvement in the latter may be remarked and valued.

This plan exacts that it should be possible to *see* a distinct difference between the unmanured plots and the manured field, not only as regards the height and density of the resulting crop, but also in reference to the fullness of the ears and the development of the grains. In the event of such a distinct difference being invisible the manure is justly discredited as unfit for its intended purpose. It would seem advisable to recommend this plan to farmers who use fertilizers, because some of them may manure the whole field, fail to see any improvement on account of being unable to make comparisons, and perhaps condemn the fertilizer unjustly. The simplicity of the plan above described, and its applicability everywhere and every year would appear to commend it to the practical agriculturist. At the same time it is necessary to remark that there are instances on record of fertilizers having been applied and remaining utterly without effect owing to some defect in the soil. Such defects have often been cured by a previous application of marl or lime, which not only produced good effects themselves, but improved also the action of the fertilizers afterwards applied.

THE CARE OF NITROGEN.

This element is the most valuable of fertilizing constituents, and one which is exceedingly liable to loss.

In many of the fertilizers described in this and former reports their cost is very much increased by the admixture of nitrogenous constituents. This cost farmers might save by properly caring for the stock of nitrogen on their farms and this stock might even be increased by cultivating those crops which have the power of appropriating the

nitrogen of the atmosphere. Nevertheless, the fertilizer manufacturers still seem to be under the necessity of supplying this element in considerable quantity in their goods, and of charging for it. In the case of the mixed fertilizers, this extra charge varies from $8 to $14 per ton, which the farmer must pay if he purchases, and which he can readily save in his own stables, or produce upon his own farm.

Nearly the whole of the nitrogen in the fodder fed to farm stock is to be found in the excreta of the animals, and one half of it is contained in the urine. It is further well known that 95 per cent of the potash contained in the food of cattle and sheep may be recovered by carefully saving the liquid manure only. It has, however, been ascertained that stable yard manure experiences considerable loss of its fertilizing constituents, but more especially of nitrogen, when left to itself in the dung heap. According to the experiments of Wolff this loss amounts to 55 per cent of the nitrogen contained in fresh manure from horned cattle. The later experiments of Heiden and Holdefleiss place it at 23·4 per cent. These results were obtained when ordinary reasonable care is taken of the manure, but give no data for estimating the loss which occurs when, as is very frequently the case in Canada, the manure is treated with the grossest neglect. It is safe to assume that, generally, 50 per cent of the nitrogen contained in the barn-yard manure of this country returns unutilized to the atmosphere, or is otherwise lost by careless treatment. Supposing that an average quantity of 36,000 lbs. is produced in fresh condition annually by each animal, and that it contains 0·4 per cent of nitrogen, it follows that a loss of 72 pounds of nitrogen, worth $8.64, takes place for each head of cattle. This loss can be prevented by daily strewing the stables with 2 lbs. of ground plaster for each animal, which at once prevents any smell of ammonia from arising in the stable. The quantity prescribed means 700 lbs. or a cost of about $2.50 annually for each 1,000 lbs. live weight, but, by adopting this plan, the farmer would to a great extent be relieved from the necessity of purchasing the nitrogen of artificial fertilizers.

In a pamphlet published by Vieweg in 1859 entitled "Ein Pfund Sticksoff kaum einen Groschen," which may be freely translated "a pound of nitrogen for a penny," Dr. Meyer-Altenberg maintained that ground gypsum is the very best preservative of barn-yard manure when applied in the stable, because it secures "certainty and completeness of effect, ease of execution, and the lowest possible cost." He further described the effect of its application on the domain of Beberbeck in Hesse, and other impoverished farms, showing that it is possible to bring such into a fertile condition, without the purchase of manure or fertilizers or feeding stuffs, excepting a little straw for bedding and oats for the horses.

TREATMENT OF STABLE-YARD MANURE.

Dr. Meyer-Altenberg, in the little work above mentioned, takes care to point out that the use of gypsum, without subsequent careful treatment of the dungheaps, does not give the desired effect, and he dwells on the importance of having the manure thoroughly trodden down, and made as compact as possible. This is also shown in Dr. J. König's prize essay 'How can the farmer preserve and increase the stock of nitrogen on his property?' (Berlin, 1887.) In a special chapter of this work the author discusses 'The evolution of free nitrogen during the fermentation and storage of stable manure,' describes the experiments which were made from 1860 to 1885 regarding its treatment and gives finally the results of the discussion from which the following sentences may be translated with advantage :—

1. In the decomposition of nitrogenous substances of every nature a loss, more or less considerable, of free nitrogen takes place.

2. This loss is the greater the more the atmosphere has access to the decomposing mass.

3. Too much moisture is just as hurtful as too little. Stable manure requires such a degree of humidity as permits its components to lie close to each other.

4. The addition of substances which fix ammonia (such as gypsum, kainite and kieserite) prevent or reduce the loss of nitrogen. *These substances are, however, of little*

or no value if care is not taken at the same time to prevent as much as possible the access of air.

12. In storing stable manure in dungsteads the latter must be watertight and roofed in, and the treading down of their contents by the farm animals is to be recommended.

One thing in connection with this question is perfectly certain and that is that the use of gypsum, or ordinary ground land plaster, prevents any loss of nitrogen in the stable, and while the manure is being forwarded to the dungheap. Further, if the work from which the foregoing quotations have been made be carefully studied, and also the experiments and writings of Holdefleiss, Vogel and others, it appears to be quite certain that the use of the same article, or of the gypsum produced in the manufacture of 'acid-phosphate,' completely prevents the loss of ammonia from the liquid part of the manure, and also from the organic nitrogen of the solids, provided the whole has, previous to fermentation, been made thoroughly compact, and atmospheric air almost completely excluded. Where it is found impossible to attend to the latter precautions, the safest way will probably be found to lie in avoiding fermentation altogether, by conveying the fresh manure, after treatment with gypsum, on to the field to be manured and bringing it under the soil as rapidly as possible. The latter practice has been proved to be most advantageous by the experiments which have been carried on for some time past, at the Central Experimental Farm by Director Saunders. (See Reports for 1898.)

Not only has the addition of substances which have the faculty of fixing ammonia been recommended for stable manure, but its improvement to a greater extent has been proposed by the addition of fertilizers. The following quotation is taken from Bulletin No. 45 (for March, 1897) of the Massachusetts Agricultural College, and was written by Dr. C. A. Goessmann, Chemist for that institution :—

'*The practice of adding to the manurial refuse materials of the farm as stable manure, vegetable compost, &c., such single commercial manurial substances as will enrich them in the direction desirable for any particular crop to be raised, does not yet receive that degree of general attention which it deserves*' (The italics are in the original.) An addition of potash in the form of muriate or sulphate of potash, or of phosphoric acid in the form of fine ground South Carolina or Florida soft phosphate, &c., will in many instances not only improve their general fitness as complete manure, but quite frequently permit a material reduction in the amount of barn-yard manure ordinarily considered sufficient to secure satisfactory results.

'Average composition of seventy-five samples of barn-yard manure :—

	Per cent.	Lbs. per ton.
Moisture	67·00	1,340·0
Nitrogen	0·52	10·4
Potassium Oxide	0·56	11·2
Phosphoric Acid	0·39	7·8

The average barn-yard manure contains, it will be noticed from the above statement, a larger percentage of nitrogen, as compared with its potash and phosphoric acid than is generally considered economical. An addition of from thirty to forty pounds of of muriate of potash, and of one hundred pounds of fine ground natural phosphate (soft Florida or South Carolina floats) per ton of barn-yard manure would greatly increase its value as an efficient and economical general fertilizer.'

These are no doubt most excellent suggestions, and there is no reason why these substances should not be introduced into the stable manure in the same manner as in the case of the ground plaster above mentioned. Plain superphosphate and kainite might also be used, some of the constituents in which would be useful in fixing the ammonia, as soon as formed from the organic nitrogen. Should this suggestion be found to have practical value, there is no doubt that our fertilizer manufacturers would be found able to supply our farmers, at a very moderate cost, with a mixture of ground plaster, superphosphate and kainite, in such proportions as experience might show to be most advantageous. No better application can be made of the wood ashes produced in

the farmer's household than by mixing them with the barn-yard manure, and most excellent results are known to have followed this practice.

ACQUISITION OF NITROGEN.

Not only can the farmer save almost the whole of the nitrogen contained in the fodder fed to his cattle, but he can actually increase the stock of it stored away in his fields, agricultural products and manure heaps by a judicious course of crop rotation. For more than a century agricultural chemists discussed the question as to whether free atmospheric nitrogen can be assimilated by plants, but it may now be regarded as perfectly settled in the affirmative, if regard is had only to the plants of the order leguminosæ, such as beans, pease, lentils, vetches, clovers, alfalfa, serradella, &c. Even the great English agriculturists, Sir J. B. Lawes and Sir Henry Gilbert, who had previously been of an opposite opinion, have now admitted that this appropriation of nitrogen has been completely proved. This acknowledgment was made by Sir Henry Gilbert at a great meeting of agricultural chemists held at Halle, in Germany, in September, 1891. Thus, modern research has confirmed not only modern agricultural practice, but also the experience of antiquity, for Prof. W. Strecker has pointed out a passage in Pliny which says: 'Lupines require so little manure that they in fact replace it: vetches make the land more fertile. Corn should be sown where previously lupines or vetches have stood, because they enrich the land.'

It is not, however, to be supposed that this utilization of atmospheric nitrogen by leguminous plants can take place upon very poor soils or upon those destitute of the inorganic constituents which they require. The latter must in such cases be supplied in the shape of potash with some phosphoric acid, as was done with great success by Schultz, of Lupitz, a practical agriculturist in North Germany. In fact, had it not been for his investigations, the controversy above referred to might have continued without results up to the present hour.

Professor Konig, of Munster, gives the following summary of Schultz's experience:—

'Schultz acquired the farm Lupitz in the year 1855; its soil consisted of a poor, cold, diluvial sand; the profit in working it was very small. Lupines yielded indeed as fodder tolerable results, but when used as green manuring for rye and oats, no return was obtained from them. The application of artifical manures produced good crops, but they did not pay; burnt lime showed itself to be too heating. The use of manure was more favourable, especially when fertilizers containing phosphoric acid were used at the same time. But at the best the total result was not satisfactory.'

'Shortly after Schultz acquired Lupitz, the great discovery of potash salts was made, and about 1860 they began to be produced from the mines of Stassfurth. Schultz made up his mind to try them as manure and he obtained the most surprising results. After lupines had shown themselves to be useless as forerunners of grain, they were excluded from the rotation and grown on a separate field without any manuring and alternating with sheep pasture. But the harvest on these became worse and worse until the field in question became quite lupine 'sick.' Schultz made his first trial on this field, manuring it with 300 pounds kainite per morgen (1 Prussian morgen = 0·631 acre); the sickness was at once cured, and for twenty-five years afterwards Schultz has grown lupines on this ground without interruption, always with the application of 300 pounds kainite. Schultz obtained similar good results on the ground which had received the marl, by the application of potash salts. This ground had indeed yielded well with lupines for two years after the application of the marl, but in the third year they sickened here too. When, however, 300 pounds kainite were applied here and ploughed in, the ground was cured, although an application of phosphates had not produced the desired results.

'The favourable influence which the manuring with kainite or potash salts had exerted on lupines induced Schultz to try them on grain, in conjunction with phosphates. But in this case he obtained contradictory results according to the nature of the crops which preceded the grain. For instance, while grain sowed after lupines and manured with potash and phosphates yielded very good and remunerative harvests, these were not

to be obtained if grain was grown after grain or after potatoes. This behaviour of these crops was explained by Schultz in this way: that lupines or deep-rooted plants leave in the soil after harvest a residue of root, in which a considerable amount of nitrogen has accumulated, an amount sufficient to supply the wants of the following grain crops; that, on the other hand, the application of potash and phosphates to grain, after a preceding grain crop, is without effect, for the reason that the latter has consumed the stock of nitrogen. Grain crops always reduce this stock; never increase it. Schultz has given the name 'nitrogen collectors' to the lupines and similar plants, while grains are called 'nitrogen consumers.' His system of rotation is therefore the following:—Sow first nitrogen collectors (lupines, pease, beans, vetches, clover, lucerne, serradella, &c.), or, as they have been called, renovating crops, and give them 300 pounds kainite per morgen, with perhaps an addition 20 pounds phosphoric acid. After harvesting the nitrogen collectors, sow a nitrogen consumer, raising a grain or exhausting crop, giving it also 300 pounds kainite and 20 pounds phosphoric acid. The grain crop is perfectly successful, because the first crop left behind it nitrogen enough to supply the wants of the grain. In this way the keeping of stock, which is expensive on a poor sandy soil, can be reduced and the purchase of nitrogenous fertilizers dispensed with, because the nitrogen collectors are able to stock the soil with that valuable element'.

The foregoing description is taken from Professor König's "Stickstoff Vorrath," published in 1887 (Paul Parey, Berlin). It was in 1884, nearly thirty years after the purchase of his sandy farm, that Schultz, of Lupitz, published the results of his experience, although they did not contain anything very new and although they only confirmed experiences still older than his own. But his case was surprising and his explanation of the cause of his successful farming challenged the attention of scientific agriculturists. The consequence has been the issue of many pamphlets on the subject, and an activity in the region of agricultural experimenting which is not yet ended. Atwater, Wagner, Heiden, Hellriegel, and many others have participated in these investigations, and Professor Wood, of the Storrs Agricultural School in Connecticut, has given the following general conclusions as the result of the work:—

1. "Pease, alfalfa, serradella, lupine, clover in all probability, and apparently leguminous plants in general, are able to acquire large quantities of nitrogen from the air during their period of growth.

2. "There is scarcely room to doubt that the free nitrogen of the air is thus acquired by plants.

3. "That there is a connection between root tubercles and this acquisition of nitrogen is clearly demonstrated. What this connection is, what are the relations of micro-organisms to the root tubercles and the acquisition of nitrogen, and in general how the nitrogen is obtained are questions still to be solved.

4. "The cereals with which experiments have been completed have not manifested this power of acquiring nitrogen, nor do they have such tubercles as are found on the roots of legumes.

5. "In the experiments here reported, the addition of soil infusions did not seem necessary for the production of root tubercles. A plausible supposition is that the micro-organism or their spores were floating in the air and were deposited in the pots in which the plants grew.

6. "As a rule the greater the abundance of root tubercles in these experiments, the larger and more vigourous were the plants and the greater was the gain of nitrogen from the air.

7. "In a number of these experiments, as in similar ones previously reported, there was a loss of nitrogen instead of gain. The loss occurred where there were no root tubercles: it was especially large with oat plants, the largest where they had the most nitrogen at their disposal in the form of nitrates. As the gain of nitrogen by the legumes helps explain why they act as renovating crops, the loss in the case of the oats suggests a possible reason why they should appear to be an exhausting crop.

'Practical inferences:—The ability of legumes to gather nitrogen from the air helps to explain the usefulness of clover, alfalfa, pease, beans, vetches and cow pease as renovating crops, and enforces the importance of these crops to restore fertility to ex-

hausted soils. The judicious use of mineral fertilizers (containg phosphoric acid, potash and lime) will enable the farmer to grow crops of legumes which, after being fed to his stock, will, with proper care to collect and preserve all manure, both liquid and solid, enable him to return a complete fertilizer in the shape of a barn yard manure to his land. A further advantage of growing these crops is that the nitrogenous material, protein, which they contain in such great abundance, is especially valuable for fodder.

From the foregoing it seems that, in the present condition of our knowledge, the conclusion may be drawn that the atmosphere stands ready to furnish the farmer, gratis, with all the organic constituents which his crops require, provided always that he, on his part, will exercise a sufficient amount of skill and intelligence in appropriating and retaining on his farm the fertilizing materials, and especially the nitrogen. If he does this, all that is necessary for him to provide, in order to replace the losses which his farm sustains from the sale of stock or produce, are the inorganic or mineral constituents of these, and especially the phosphoric acid and potash. There is much in all this to remind one of Sprengel and Liebigs teaching of fifty years ago, according to which a plant cannot thrive if its soil does not contain all the substances which are to be found in its ash.

UTILIZATION OF SEWAGE.

The losses in fertilizing material which are sustained, as above mentioned, on account of the neglect or unscientific treatment of barn-yard manure, are very trifling when compared with those which the community suffers in the almost total loss of the nitrogen, phosphoric acid and potash contained in human excreta. The utilization of such always becomes a subject for discussion when the question is raised as to how a cheaper class of manures than the artificial fertilizers can be obtained for use in agriculture.

Where the water carriage system of removing sewage and excrement has been introduced, nothing is to be hoped for in the recovery of their fertilizing constituents. Even in cases where, at large expense, establishments have been erected for the treatment of sewage by precipitation or similar methods, the products have been found to be entirely destitute of agricultural value. The greater part of the fertilizing constituents of sewage are in such a soluble condition, and have been diluted with water to such an extent, as to render their recovery economically impossible. It has been attempted in the neighbourhood of many cities in England and on the continent of Europe to use the sewage for irrigation and as liquid manure, but this method of utilization has been found to be in the highest degree imperfect. At Berlin it has been proved, that of the nitrogen contained in its sewage, at the very most only 13·8 per cent is found in the agricultural products of all the magnificent farms irrigated by it in the neighbourhood of the city. When the use of water for removing house refuse is excluded, and ordure and urine are removed as manure in their natural state, their utilization is possible, and is made a source of revenue in such towns as Stuttgart, Groningen, Greifswald, &c. But the systems of this class which are in use have all their disadvantages, as is proved by the tendency which municipal authorities constantly show to adopt the water carriage system. The greatest disadvantage under which these systems labour is the difficulty caused by the offensiveness to sight and smell of the material with which they have to deal. This has been entirely met by the use of moss litter as an absorbent, deodorizer, and disinfectant.

MOSS MANURE.

The first public mention of the usefulness of moss litter as a deodorizer and absorbent seems to have been made by Dr. Ludwig Happe, in Braunschweig, in December, 1880, since which time its application for the purpose has gradually increased until now, when the system has been introduced into several towns in Germany, and is also practised in Congleton, Cheshire, England. In Canada this method of deodorizing human refuse has been in use for years at Caledonia Springs. It, of course, at once

recalls the dry earth system regarding which great expectations were at one time entertained. The advantages of moss litter over dry earth for the purposes in question are, however, very decided. They consist in the perfect inoffensiveness of the moss litter product, in the fact that one part of moss litter will deodorize and dry at least six parts of mixed excreta, and in the greater agricultural value of the resulting manure. Dry earth (which is required in quantity at least equal to that of the excreta) is valueless from an agricultural point of view, but this is not the case with moss litter, which as its analyses show, often contains as much nitrogen as ordinary barn-yard manure. Numerous analyses have been made of moss litter manure as produced in Germany, and its average contents from seven different towns may here be stated.

	p. cent.	lbs. per ton.		Value per ton.
Nitrogen	0·664	13·28	at 13c.	$1 72
Phosphoric acid	0·350	7·00	5	0 35
Potash	0·285	5·70	5¼	0 30
Water	83·00			$2 37

Numerous trials have been made on various crops with this manure, and very satisfactory results are always reported. In all cases it is stated to excel barn-yard manure even when the latter is used in much greater quantity.

Canada posseses in its bogs and swamps inexhaustible quantities of moss litter, which is frequently found in beds, several feet in thickness lying above the peat. The following tests have been made in the Inland Revenue Laboratory, of moss litter from various localities in the Dominion:—

	Moisture.	Ash.	Nitrogen.
	p. c.	p. c.	p. c.
Moss litter, Berwick, N.S.	14·40	1·16	1·26
Black muck, Berwick, N.S.	13·30	3·68	1·58
Moss from Great Village, N.S.	63·44	3·46	0·63
Sphagnum moss from Shippegan, N.S.	12·45	1·55	0·55
Light coloured moss litter from Lincoln Parish, N.B.	11·55	1·40	1·79
Dark coloured sample from the foregoing locality	10·95	0·80	1·06
Moss litter from Musquash, N.B.	11·50	0·95	0·82
Moss litter from lower layer	12·50	0·90	0·72
Peat from St. Bridget, P.Q.	13·30	2·50	1·48
Peat from St. Hubert, P.Q.	12·35	2·68	1·84
Light coloured moss litter from Caledonia Springs, Ont.	10·00	1·60	2·95
Dark coloured moss litter from the same locality	11·60	2·70	2·23
Peat from the same locality	10·95	3·90	2·94
Surface moss from the Mer Bleu at Eastman's	10·85	2·80	0·71
Surface moss from the Mer Bleu at Baldwin's Farm	7·90	2·66	1·47
Surface moss from the Mer Bleu at Baldwin's Farm 18 inches deep	27·90	1·72	1·64
Peat from Mer Bleu at McFadden's Farm, Navan, wide ditch	22·60	4·40	2·21
Peat from Mer Bleu at McFadden's Farm, Navan, narrow ditch	9·40	6·62	2·80
Peat from near Stratford, Ont.	16·80	9·10	1·91
Hypnum moss from the Ellice bog, Stratford, Ont.	8·75	9·72	2·01
Moss litter from Welland marsh, Ont.	3·85	4·70	1·51
Peat lying underneath the foregoing.	5·30	4·85	1·41
Peat from same locality, 4½ feet deep	3·25	41·25	1·52
Peat from Dobson's bog near Beaverton, Ont.	18·42	9·04	1·89

The manufacture of moss litter has been attempted at Musquash, in New Brunswick, and also in Welland County, Ontario. From the latter locality I was supplied with several bales of the moss litter for experimental purposes, and Dr. Laberge, of Montreal, undertook to superintend the carrying out of an experiment to determine its deodorizing and absorbent qualities. He reported that 100 pounds of moss litter were

sufficient for drying 800 pounds of ordinary excreta from privy pits in Montreal, and rendering it entirely inoffensive. A sample of the product remained for days in my office without attracting notice, and indeed it was quite devoid of odour. Its analysis gave the following results:—

	Per cent.	Pounds per ton.		Value per ton.
Nitrogen	1·31	26·2	at 13c.	$3 41
Phosphoric acid	0·90	18·0	at 5	0 90
Potash	0·14	2·8	at 5¼	1 15
Water	65·47			$4 46

The valuation of ordinary fresh barn-yard manure with 75 per cent of water is about $2 per ton; with 67 per cent water, as in the case of the average given above by Dr. Goessmann, the value is nearly $2.25. Therefore, much better results might be expected agriculturally from a 'moss manure' of the composition just described.

These facts are reported in order to show that Canada possesses in her waste lands abundance of material which might be used in our towns and villages for the production of a very valuable manure, with the simultaneous introduction of very many sanitary advantages. It is not to be expected that cities or towns which are advantageously situated for the water carriage system, or which have already adopted it, will make any changes, but there are many towns and villages in the Dominion where the application of the moss litter system would be very suitable, and the authorities of which, by selling the product or giving it gratis to the farmers of the neighbourhood, might confer a great advantage on agriculture.

REPORT

OF THE

MINISTER OF AGRICULTURE

FOR THE

DOMINION OF CANADA

FOR THE

YEAR ENDED OCTOBER 31

1902

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
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1903

[No. 15—1903]

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REPORT

OF THE

MINISTER OF AGRICULTURE

1902

To His Excellency the Right Honourable Sir GILBERT JOHN ELLIOT, *Earl of Minto, and Viscount Melgund of Melgund, County of Forfar, in the Peerage of the United Kingdom, Baron Minto of Minto, County of Roxburgh, in the Peerage of Great Britain, Baronet of Nova Scotia, Governor General of Canada.*

MAY IT PLEASE YOUR EXCELLENCY—

I have the honour to submit to Your Excellency the annual report of the Department of Agriculture, for the year ended October 31, 1902.

I.—GENERAL REMARKS.

A synopsis of the operations of the Department, which have been efficiently carried out, is laid before Your Excellency.

The legislation affecting the Department during the last session consisted of Chapter 10, 2 Edward VII., intituled 'An Act to Amend the Fruit Marks Act, 1901.'

By Order in Council of the September 14, 1901, under authority of the Act 1 Edward VII, Chapter 27, intituled 'An Act to provide for the marking and inspection of packages containing Fruit for Sale,' the following regulations were made, the same to come into force on the date of their publication in the *Canada Gazette*:—

1. The Minister of Agriculture may make appointments of inspectors and other persons for the enforcement of the Act.

2. Any inspector charged with the enforcement of the Act may detain for the time necessary to complete his inspection any shipment of fruit, in respect of which he has reasonable grounds for believing that the marking of the package or the packing of the fruit constitutes a violation of the Act; such fruit shall at all times be at the risk and charges of the owner thereof; and any inspector detaining fruit shall give the owner, where ascertained, notice that such fruit is being detained, in storage or otherwise, as the case may be.

3. The despatch of a prepaid telegram or letter to the packer whose name is marked on the package shall be considered due notice.

4. No person shall, for himself or on behalf of any other person, pack any fruit for sale, contrary to the provisions of the Act.

5. Any inspector or other person who violates any of the regulations made under the authority of the Act shall for each offence, on summary conviction, be liable to a fine of not less than five dollars and not exceeding fifty dollars, together with the costs of prosecution.

It is with regret that I have to report the death of two officers of my Department during the past year: Mr. William Bain Scarth, Deputy Minister of Agriculture and Deputy Commissioner of Patents, and Dr. Douglas Brymner, LL.D., F.R.S.C., Archivist. The former died on May 15, and the latter on June 19, 1902.

On February 1, last, Mr. John Gunion Rutherford, V.S., was appointed Chief Veterinary Inspector for the Dominion vice Professor Duncan McEachran, F.R.C.V.S., V.S. Edin., D.V.S. McGill, resigned: and on April 29, last, Mr. Arthur G. Hopkins, V.S., M.D.V., was appointed Veterinary Quarantine Officer for Canada in the United Kingdom for the purpose of testing with tuberculin all cattle for shipment to Canada.

By Order in Council under date May 20, 1902, Mr. George Finley O'Halloran was appointed Deputy Minister of Agriculture and Deputy Commissioner of Patents, vice Mr. W. B. Scarth deceased.

A party of Boers who had been confined as prisoners of war reached Canada by the SS. *Lake Champlain* on Thursday, October 2, last, having been sent out to Canada by the Imperial Government for the purpose of enabling them to study agricultural methods of the Dominion, on the understanding that they will lecture on their experiences upon their return to South Africa.

The party consisted of Mr. and Mrs. Jouste, Mr. and Mrs. Lane, and Mr. Rood, and they were accompanied by Captain J. H. Kirkpatrick, an officer in the South African Constabulary, and Mrs. Kirkpatrick. The party was met on their arrival at Quebec by Mr. G. F. O'Halloran, my Deputy.

Every effort was made to ensure their visit to Canada being a success. Mr. W. W. Moore, an officer of the Dairy Branch of my Department, was selected to accompany the party through Canada, with a view to showing how agriculture is carried on in the different provinces as regards mixed farming, fruit farming, dairying, cattle sheep and horse ranching, and also of showing them something of the lumber and other industries.

At my request the Provincial Governments kindly aided in carrying out the aim of the project by co-operating with my Department, and a representative was appointed in each province to accompany the party through it.

At the termination of their visit to Canada the delegates will proceed from Vancouver to Australia, and thence to South Africa.

The Right Honourable the Secretary of State for the Colonies forwarded with circular letter under date December 28, 1901, copy of the Importation of Dogs Order, 1901, and of a memorandum thereon: also, under date March 11, 1902, copy of a letter from the Board of Agriculture inclosing copy of a further notice which has been

issued to the press in Great Britain on the above subject. This correspondence will be found as an appendix hereto. (See Appendix No. 54).

Again, during the last year it has been my duty to provide for the representation of Canada at exhibitions. I have found this organization of exhibition work has been so constantly repeated that it has become almost a permanent branch of the Department. From the experience gained during the last three years it is to me perfectly evident that officers of experience should be retained for this work, their services being utilized between the actual dates of exhibitions in preparing and planning exhibits. I now have a staff of experienced officers on annual salary whose whole time and attention is devoted to this work. I think I may say that the result of this organization has been very beneficial, and that Canada has thereby been enabled to make a more comprehensive and representative display than she otherwise might be able to do, especially in those of her products in which no one individual or firm could be expected to make a representative national display. These are our agricultural, forestry and mineral products, with food products as a natural adjunct to the agricultural exhibit.

The exhibitions in which Canada participated this year were those of Wolverhampton, in the midlands of England, and Cork, in Ireland. At both of these exhibitions we erected a Canadian pavilion, having found from our experience at Paris, where we were placed with other colonies and nations, and at Glasgow where we had part of our exhibits mixed up with those of other countries, and part of it in a pavilion by itself, that a separate special Canadian pavilion is far more effective in drawing attention to the Canadian exhibits and enabling us to make a favourable impression on the visitors. Where space is charged for, as has usually been the case in these exhibitions, it costs hardly any more to erect a special pavilion as we have done than it would to purchase space in the large buildings.

At Wolverhampton the exhibition was in the centre of one of the densest consuming populations of Great Britain, where we were able to show to those people the excellent quality and enormous quantity of our Canadian foods and manufactures.

In Cork, where the exhibition was on a smaller scale, we also wished to show Canadian products and impress the people who are still emigrating in considerable numbers, with the advantages of Canada as a home. This latter object was not lost sight of either at Wolverhampton. Mr. W. D. Scott, now for over three years one of my exhibition commissioners, was in charge of these two exhibitions, and in a practical, effective business way put them through very successfully.

While Mr. Hay, who has charge of the agricultural and general decorations at our exhibitions, was at work at Wolverhampton and Cork, the Immigration Department conceived the idea of a Canadian arch in London in honour of the coronation of His Majesty. I was very glad to lend the services of Mr. Hay, who has had much experience of this kind of decorative work, both at the Experimental Farm and at our exhibitions, and I am glad to know that his services were so successful as to materially aid in making the Canadian arch a good and effective representation of Canada,—'the Granary of the Empire.'

The Wolverhampton and Cork exhibitions are reported to have been successful, and the Canadian exhibits there attracted a great deal of favourable comment and have brought about many inquiries for trade, which will no doubt result to the advantage of the producers of this country.

This year Canada received and accepted an invitation to take part in the great Louisiana Purchase Exhibition at St. Louis, U.S.A., which was announced to take place in 1903. Preparations were commenced for this, which is intended to be the greatest exhibition the world has ever seen. The authorities connected with it propose to spend $30,000,000 in preparations, and it was, therefore, thought necessary that Canada should make a special effort to appear to advantage. To do this care and thought in planning and time to carry out the work for such an undertaking were required. Mr. William Hutchison, who had been our Commissioner last year at Buffalo, was intrusted with the commencing of this work. During the summer the exhibition authorities decided to postpone the exhibition until 1904, but their work of preparation is steadily going on, and we were obliged to make arrangements with them for the position of the Canadian pavilion and the securing of space for Canadian exhibits. For this purpose Mr. Hutchison has been a good deal occupied during the year, but he has also been able to assume the burden of organizing and managing the Canadian exhibit for the exhibition at Osaka, in Japan, to which we had received an invitation that it was deemed best to accept.

This exhibition at Osaka opens on March 1, and Mr. Hutchison with a small staff at his disposal has prepared a thoroughly representative exhibit of such Canadian products as seem likely to suit the market in the Orient. Here again Canada is to have a special pavilion put up for us by the Japanese authorities, on payment by us of the sum of $2,500. As the Japanese Empire imports a great deal of food stuffs, as well as lumber and some other items, from the United States, we are making a special effort to show and prove the satisfactory quality of much of our Canadian products so that Canada may share the advantages of this trade. It is thought that in the near future Japan, whose population is increasing very rapidly, and whose imports of food must increase correspondingly, will be a market in the east open to our western provinces somewhat similar, in a minor degree, to the market which our eastern provinces have in Great Britain.

I have again taken occasion to visit the great agricultural gatherings of the country, beginning last December with the Guelph Fat Stock show. More than ever before has this convention assumed a national character, there being representatives present from almost every province in the Dominion. The plan of gathering there the lecturers and workers in agricultural instruction, for the purpose of exchanging views and getting the best and latest information for use in their work, has more and more developed. My Department, through the Live Stock Commissioner, Mr. Hodson, again managed the lectures and meetings which are a part of this convention.

The contests in what are known as the block tests, in which the animals that have competed in the ring alive are slaughtered and judged on their merits as food, were again a feature of the fair, specially in connection with the bacon carcasses. There is no doubt that this work is contributing largely to the steady advance of our bacon trade. The success of the Guelph fair and its value to our agriculture presses on my attention the importance of similar fairs in other parts of the country; and, working again through the Live Stock Commissioner, I urged the establishment of a Fat Stock Show at Amherst, Nova Scotia, for the benefit of the three Maritime Provinces, and I authorized Mr. Hodson to make such use of the officers of my Department as might be necessary to aid in this fair. The town of Amherst and the people of that neighbourhood put up a good building, and the Local Governments of the Maritime Provinces aided in the enter-

prise. The result was a wonderfully successful meeting for a first effort. The enterprise was so well received that the town of Amherst immediately took steps to put up a larger and better permanent building, and those who were engaged in the organization have made arrangements by which this fair will be a permanent feature of the agricultural year in the Maritime Provinces. I have no doubt it will contribute very materially to improvement in agriculture in that part of Canada. I trust to see others established in the near future in other parts of the country.

I also attended the Eastern Dairymen's Association meeting at Whitby, an unusually large and successful meeting of that organization; the Huntingdon Dairy Association meeting at Howick; the district of Bedford Dairy Association meeting at Cowansville, and the Eastern Ontario Good Roads Association meeting in Ottawa, besides many smaller and more local agricultural meetings in the country.

I must refer to the movement in favour of good roads in Canada as one intimately bound up with agricultural progress. And it is gratifying to know that the farmers are taking up this question in a most practical and business-like way, with results that will help very much to make our rural life more agreeable and easier. Your Excellency and Lady Minto were good enough to attend the meeting at Ottawa, and your presence there will stimulate and encourage those who are working for this object.

During the year my officers have more than ever before taken part in the management and organization of what we may call enlarged institute meetings, in different parts of Canada, co-operating with the Provincial Governments where these have inaugurated such meetings.

I personally arranged for, and was present at four large meetings in the province of Quebec amongst our French farmers: one at St. Hyacinthe on July 22, and three at Louiseville, Roberval and Chicoutimi in the middle of August.

This was my first opportunity of visiting what is called the Lake St. John country. I was much struck with the evident fertility of the soil, the proof of which was everywhere visible in the splendid crops; while the thrift, industry and enterprise of the people who have opened up that region to agriculture is much to be praised. The meetings which were held were largely attended by most intelligent and enthusiastic farmers. The farms which I had an opportunity of inspecting showed that much intelligent labour had been applied to the clearing of the land and erection of buildings. I was especially struck with the excellent crops of wheat, which seems to be most successfully grown. There is a very large dairy product, and the factories which I visited were equal to those in any other part of Canada. There is an active movement to import the best quality of live stock and increase the numbers kept. Poultry and swine raising is being much inquired about, and will no doubt, in the near future, be a most profitable source of income to this region. I was surprised to note the wide area of good land of easy cultivation and great productive capacity. This region has made so much progress in the last 25 years that there seems no reason to doubt it is destined to be one of the most populous and prosperous parts of our country.

I took the opportunity while in Quebec of paying a visit to the Quarantine Station for the St. Lawrence at Grosse Isle. Most of the buildings at this station had been hastily erected many years ago when there was a large number of immigrants detained there. These were no longer suitable for the needs of such a station, and this summer

more improvements than ever have been making for the purpose of properly and adequately providing for the numbers of immigrants who may be at any moment detained there through the discovery of contagious disease on incoming ships. The stream of immigration from the old country having largely increased during the last few years this improvement was necessary : and it was the more called for from the fact that at this time even the steerage passengers on the ships have very superior accommodation to what used to obtain, and therefore expect equally superior accommodation when put on shore at our quarantine stations. Especially were improvements in the sanitary arrangements necessary. Complete plumbing, with baths and closets, all through even the steerage buildings, have now been provided. This was possible only since the water system was completed last year. I venture to say that with the completion of the work undertaken this year the station will be thoroughly adequate to any ordinary demands upon it, and, with the exception of some minor improvements to be made next year, is thoroughly satisfactory.

I am happy to be able again to congratulate the country on a most prosperous agricultural year. Notwithstanding the enormous crop which our North-west produced last year, it has been exceeded in the present season, and I can venture again to prophesy that in the years to come it will constantly increase in a most marvellous manner. The agricultural production of Eastern Canada has been full to overflowing this year. Butter and cheese have been produced and exported in much larger quantities than ever known before, while the prices have been so high that the value of the exports is much the greatest in the history of our country. The pork industry has also been stimulated by the very high prices and, although the increase in quantity is not so very great, the increase in value is most satisfactory. Poultry and egg production have been again much stimulated. The only difficulty in fact in regard to these products is that the buyers cannot find in Canada enough to meet their demands. This may also be said of our hog products. It is indeed a fact that this year in Canada farmers could have sold far more than they had to sell, at prices which were uniformly profitable ; the only difficulty that has appeared in our agriculture in Canada being the lack of labour to produce what we could sell and to develop an increased area of productive fields.

In noting the lamented death of my late Deputy Mr. Scarth, I must refer to the appointment of Mr. George F. O'Halloran as Deputy in my Department, feeling most gratified to obtain the services of a gentleman so well equipped for the work. The Department has so many branches which are not at all agricultural in their nature that I required a Deputy who could deal with these, and therefore selected a trained lawyer : the purely agricultural branches being under such specialists as Professor Saunders, Professor Robertson and Dr. Rutherford.

In connection with the Veterinary Branch some events occurred in the earlier part of the year which impressed more strongly than ever upon me the opinion, which has been gradually growing from my experience, that it was necessary that the head of the Veterinary Branch should reside in Ottawa and devote his whole time and attention to the management of this work. Dr. McEachran, who had been for many years the Chief Veterinary Inspector, found it impossible from the multiplicity of his private concerns to meet this requirement. He therefore resigned the active work of Chief Veterinary Inspector, but I was able to retain his services as Advising Veterinary Officer at the same time that I appointed Dr. J. G. Rutherford, Chief Veterinary Inspector. The

new arrangement is working most satisfactorily, and it is evident that the demands of the branch require the full time and attention of the Chief Officer.

I am happy to be able to say that another year of the working of the 'Fruit Marks Act' has still more shown the utility of this law. Constant reports have come from Great Britain to show that our apples especially, and our fruit generally, are packed more evenly according to the grade marked upon them. Unfortunately this season has not been a good fruit year, in Nova Scotia especially, while even in Ontario and Quebec the quality has not been up to the usual Canadian standard. Even with this difficulty the packing of our fruit has been favourably commented upon in England. We have been enforcing the Act rather more strictly, and paying more attention through the efforts of our Inspectors, to the marketing of fruit in Canada under the Act, with the result that a larger number of prosecutions have been taken out by my officers under the Act notwithstanding the fact that in general the packing of the fruit has been decidedly improved. The invariable success of these prosecutions has shown that the Act can be easily and successfully carried out.

The work of compiling the Census schedules has been carried forward during the year, and the first volume has gone through the press. It deals altogether with population, in the various phases of families, sexes, conjugal conditions, religions, origins nativities and nationalities. In the ten years 1881–1891 the population grew from 4,324,810 to 4,833,239, and in the ten years 1891–1901 from 4,833,239 to 5,371,315, the increase in the former decade being 508,429 and in the latter 538,076. In Manitoba, the North-west Territories and British Columbia the increase in the last decade was 275,330, and the total population of those parts of the Dominion is shown to be 592,808. The land and water area of Canada above tide level is 3,745,574 squares miles, and the largest province is British Columbia, which has an area of 372,630 square miles or nearly one-tenth of the whole. Quebec stands second, with an area of 351,873 square miles, and Ontario third with 260,862 square miles. The smallest province is Prince Edward Island, which has an area of only 2,184 square miles. But in density of population the island ranks first, having 47·28 per square mile. Nova Scotia is second with 21·45, New Brunswick third with 11·83, Ontario fourth with 8·37, Quebec fifth with 4·78, and Manitoba sixth with 3·46 per square mile. In British Columbia and the North-west Territories the population is less than one per square mile and for the whole Dominion it is 1·43, which shows that we possess an enormous field for settlement By origins, 3,063,195 or 57·03 per cent are British, 1,649,371 or 30·71 per cent are French, 310,501 or 5·78 per cent are German, and 348,248 or 6·48 per cent are of various origins. By nativities, 4,671,815 or 86·98 per cent were born in Canada, 405,883 or 7·56 per cent in the British Islands and possessions, and 293,617 or 5.46 per cent in foreign countries, at sea, and not given. The total number of immigrants from foreign countries is 278,788, of whom 153,908 are naturalized citizens and 124,880 are aliens. But as 159,283 of the whole number arrived during the $5\frac{1}{4}$ years preceding the date of the Census it is apparent that the immigrants are merging fast into citizenship. Immigrants born in the United States number 127,899, and of these 87,049 are naturalized. The only people who adhere to their own nationality are the Chinese, as less than four per cent of the 17,043 born in China are Canadians. The rural population of the country is 3,349,516 and the urban is 2,021,799, the latter embracing all incorporated cities, towns and villages. There are 62 cities and towns of over 5,000, whose total population is 1,321,109. In 1891 there were 45 cities and towns of this class, and their total population was 1,021,819.

II.—ARTS AND AGRICULTURE.

BRANCH OF COMMISSIONER OF AGRICULTURE AND DAIRYING.

The general object of the work in the Branch of the Commissioner of Agriculture and Dairying is to render assistance towards the improvement of all agricultural products, including the means and methods of their production, transportation and marketing with particular regard to those which may be grouped under the name of food products.

The export commerce of the country in most of the farm products is increasing at a very rapid rate. The following statement of the value of the exports of some of the farm products of Canada during the years 1896 to 1902, shows the growth in that period and indicates somewhat of the great possibility for further expansion of this trade:

VALUE OF SOME CANADIAN FARM PRODUCTS EXPORTED FROM 1896 TO 1902.

(Years ending June 30.)

	1896.	1897.	1898.	1899.	1900.	1901.	1902.
	$	$	$	$	$	$	$
Wheat	5,771,521	5,544,197	17,313,916	7,784,487	11,995,488	6,871,939	18,688,092
Flour	718,433	1,540,851	5,425,760	3,105,288	2,791,885	4,015,226	3,968,850
Oats	273,861	1,655,130	3,041,578	3,268,388	2,143,179	2,490,521	2,052,559
Oatmeal	364,655	462,949	554,757	396,568	474,991	467,807	344,332
Pease	1,299,491	2,352,891	1,813,792	1,955,598	2,145,471	2,674,712	1,805,718
Cattle	7,082,542	7,159,388	8,723,292	8,522,835	9,080,776	9,064,562	10,663,849
Sheep and lambs	2,151,283	1,002,011	1,272,077	1,540,857	1,894,012	1,625,702	1,483,526
Cheese	13,956,571	14,676,239	17,572,763	16,776,765	19,856,324	20,696,951	19,686,291
Butter	1,052,089	2,089,173	2,046,686	3,700,873	5,122,156	3,295,663	5,660,541
Pork, bacon and hams	4,446,884	5,871,988	8,092,930	10,473,211	12,803,034	11,829,820	12,457,863
*Poultry	18,992	56,792	97,473	139,759	210,822	141,518	238,047
Eggs	807,086	978,479	1,255,304	1,267,063	1,457,902	1,691,640	1,733,242
†Fruits	1,716,278	2,987,839	1,709,360	3,596,415	3,305,662	2,006,235	1,922,304
Totals	39,659,686	46,377,927	68,919,688	62,528,107	73,281,702	66,872,296	80,705,184

* Dressed and undressed.
† Including green, dried, canned and preserved.

The increase in the production of foods from agriculture is greater than is shown in the preceding table. The consumers in Canada have been augmented greatly by the development of mining and allied industries, by the enlargement of lumbering and the establishment of large concerns for the making of wood pulp and paper, by the expansion of commerce and manufactures and the consequent enlargement of population in cities and towns, and by the phenomenal increase in the traffic on railways and steamships. The general prevalence of good times has led also to a more generous consumption of food stuffs in the home markets. Notwithstanding those facts the value of the exports of the products referred to, produced in Canada, has increased from 39 million dollars worth in 1896 to 80 million dollars worth in 1902.

The remarkable increase is due in a great measure to the progress the farmers are making (1) in ability to manage successfully the conditions which surround them, (2) in intelligence as applied to their own tasks and difficulties, and (3) in co-operation among themselves and with the interests and persons having to do with the commerce and transportation of farm products.

In soil and climate—the two physical conditions which determine the sorts of food that can be produced—Canada is unsurpassed in suitability for turning out fine qualities of the main foods of the northern peoples of the world. For instance, cattle and cattle products are better in northern than in southern countries. Luxuriant growth of fodder crops, sweet pastures, abundance of pure water in springs, creeks, streams, rivers and lakes, comparatively cool evenings and nights in summer, are all favourable to the production of meats, cheese and butter of the finest flavours and highest nutritive properties. The cereals grown in our northern regions are better than those grown in southern climes. Our wheat contains more gluten than that grown in countries further south; and the flour made from it also contains a higher percentage of flesh-forming or nourishing parts. These are advantages which afford the farmers of Canada opportunities for still further application of intelligence, practical ability and co-operation.

THE OPERATIONS OF FARMING.

Although the conditions for profitable farming are favourable, the difficulties in the way become greater and more numerous every year. Some of them arise from the partially exhausted condition of the soil in localities; and from the need for maintaining or increasing the fertility in all places. The simple cultivation which prepared a suitable seed-bed out of virgin soil is no longer sufficient. Weeds, the thieves of plant food, insect pests and fungous diseases, are ever present troubles. The greatest difficulties are of four sorts: (1) Those which beset the farmers in the growing of crops; (2) those which arise from the demands of markets for superior qualities of all products; (3) those which come from the change to diversified or mixed farming; and (4) those which result from the world-wide keen competition in the markets to which the surplus of Canadian farm products are sent.

The Department of Agriculture continues to help the farmers in all these matters. Where it has no power to remove difficulties it endeavours to furnish information which can assist the farmers to overcome them with the least expense and the greatest benefit to themselves.

After a farmer has decided upon the acreage of the different crops he will put in, there remains the matter of selecting the seed for each crop to be sown or planted. It is not enough that a variety of seed with a popular name be chosen. In addition to the merits of any particular variety, it is of vital importance to the crop that the seed should be vital, sound, plump, well-matured, free from weeds, and, if practicable, from a crop with a record, in the locality, of desirable market qualities and large yields per acre.

The preparation of a reasonably clean seed bed of fine tilth, by such cultivation as will help to make the plant food in the soil available to the coming crop, and the systematic rotation of crops, are parts of farm practice too often neglected. Not less necessary is it that there should be natural or artificial drainage to make possible the retention of moisture in the soil, with a physical condition permitting the access of air and the maintenance of a temperature in the soil favourable to plant growth.

The feeding of the crops or part of them to live stock is essential to successful mixed farming in Canada; and the better the crop of cereals, fodders and roots, the better is the chance to make the live stock on the farm pay. The feeding of live stock makes provision for using up some inferior grains and other things not saleable, and for turning them into superior qualities of animal products. To do that profitably gives room for the exercise of skill, wide exact knowledge and true economy. Since a large portion of the bulky crops from mixed or diversified farming is fed to live stock, the annual profits, and the chance for increasing those profits, depend upon the quality of the animals fed.

Progessive improvement of live stock has been hindered more or less from want of continued attention year after year to the formation of a definite type of body suited to the main purpose of each breed of every sort of live stock. The climate of Canada and its suitability for growing large crops of wholesome nutritious forage plants, make it possible for this to be a breeding ground for the best types of live stock. To succeed it is evident that educational work must be pushed wisely and energetically. If that be done there does not appear any reason why the breeding of horses, the breeding of beefing types of cattle, the breeding of sheep, and the breeding of poultry for fattening, should not make hereafter as much advance per year as has been made in the development of dairying and of the cheese, butter and bacon trades.

A marked improvement is evident in the stabling of horses, cattle and swine. Numerous buildings are constructed every year, well lighted, comfortable and convenient. Sufficient attention has not yet been paid generally to the ventilation of stables.

On the whole the live stock is fed with greater economy as the relative values of feeding stuffs become better known among farmers. In that respect the practices of the best farmers are readily copied by others.

Another essential to a continuation of good farming is ability to keep up the fertility of the land without purchasing fertilizers to such an extent as to absorb all or most of the profits. The growing of clovers, pease, beans, and other leguminous crops, the feeding of them to live stock and a careful saving of everything on the place that has manurial value, are in the right direction.

The Department directs attention to these fundamental principles which are still apt to be overlooked in farm management, and furnishes information and illustrations of a helpful, educational sort in regard to them.

THE PRODUCTS FROM FARMS.

Whether a farmer sells what may be called primitive raw products, such as grain, hay, roots, or other crops, or feeds these to live stock, and markets them in other forms, reduced in volume but increased in value, as in butter, cheese, cattle, swine, poultry, eggs, horses, sheep or wool, he needs reliable information on the qualities of those for which there is likely to be a good demand and a fair price.

Much information of practical value has been obtained from time to time from those engaged in the commerce of agricultural products, and from those who manufacture what may be called the raw products of the farm. Curers of bacon, exporters of cheese and butter, shippers of live stock, flour millers and others, have greatly assisted the Department by specific information on the qualities of products which are in demand

for the home and export trades. Farmers are becoming more and more alive to the benefits that result from co-operating with such men in those matters.

The employment, by the Department, of inspectors to observe and report upon the condition in which products are loaded upon steamers at Montreal, and other inspectors to watch and report upon the discharge of food products at ports in the United Kingdom; the assistance given at the fat stock shows and in the inauguration of a system of judging by experts at agricultural fairs; the establishment and maintenance of illustration cool curing rooms for cheese; the poultry fattening stations and the investigation into seeds, are all in the direction of helping the farmers towards the improvement of the quality and condition of the products from farms.

Fine food products of a readily perishable character, such as meat, butter, poultry, eggs, and to some extent fruit and cheese, cannot be delivered in distant markets in their best condition without special accommodation for carrying them safely. Any absence of freshness and daintiness of flavour or appearance lessen their value very much. It is evident that the production of such foods, even when carried on in the most skilful and economical manner, cannot be permanently profitable unless means are used for their preservation and protection, so that the consumer may obtain them in an undeteriorated state.

The system of cold storage intended for the protection particularly of butter, meats and tender fruits has made possible large increases in the exports of these products. By the action of the Department a number of ventilated railway cars of special construction were provided for the carriage of cheese and apples; and a beginning was made this year in arranging for the use on the railways of a comparatively large number of refrigerator cars for cheese. Under agreements made with the Department six more steamships in the Atlantic trade were fitted for the circulation of air cooled by refrigerating machinery through the places used for carrying cheese and apples in hot weather.

GENERAL SCOPE OF THE WORK.

The Branch of the Commissioner of Agriculture and Dairying has several divisions which take up and follow in particular detail the general work which has been mentioned. Some of these are as yet only partially organized. They are the 'Seed Division,' the 'Extension of Markets Division,' the 'Cold Storage Division,' the 'Live Stock Division,' the 'Dairy Division,' the 'Poultry Division,' and the 'Fruit Division.' In addition to the work of each division, which unavoidably in many cases overlaps, other undertakings of a general character looking towards the advancement of agriculture have been carried on during the year.

THE SEED DIVISION.

IMPROVEMENT OF CROPS BY SELECTION OF SEED.

The seed grain competition, for which Sir William C. MacDonald of Montreal, donated through Professor Robertson, the sum of $10,000 for prizes, has continued to be stimulating and instructive not only to the boys and girls who have been operating seed grain plots, but to the farmers in the localities where the work was carried on.

Over ninety per cent of the reports and samples from the competitors show that improvement in the quality and productiveness of the grain has resulted from sowing in each of three consecutive years, good plump grains, which have been bred up systematically and progressively by selection of seed from the heads of the most vigorous and productive plants in the seed grain plot of the previous year. Improved seed grain is now being grown and bred up in quantity, in this manner, in practically every agricultural district in Canada. The further organization of means and agencies for advancing that practice would be of great benefit to the farmers.

SEED INVESTIGATION.

It is difficult to judge the actual value of grass, clover and other small seeds from an ordinary examination of their appearance. Few farmers have the time to acquaint themselves with the weed impurities common in such seeds. In consequence, business competition in the seed trade, has been too largely confined to the matter of prices without due attention to quality and cleanness.

From the standpoint of a farmer the real worth of grass and clover seeds is affected most of all by the nature and amount of their impurities. The cost and labour of fighting weeds has become a very important item.

To obtain accurate information regarding the condition of the trade in grass and clover seeds, I authorized the equipment of a modern seed laboratory for testing the purity and vitality of seed. With the assistance of agricultural associations in all the provinces, over five hundred samples containing one-half pound each of timothy, alsike and red clover seeds, offered for sale by seed dealers were forwarded to the seed laboratory for examination. The results from this investigation have brought to light some evils and dangers connected with the seed trade, that are highly injurious to the interests of agriculture.

Evidence of wilful adulteration was found in a few instances; several samples contained from ten to thirty per cent, by weight, of coloured sand. On the whole there has not been serious cause for complaint in the percentage of vitality. It has been made evident that the trade in agricultural seeds is an exceedingly fruitful medium for the dissemination of noxious weeds.

The demand for clover seed for both home and export markets has encouraged their production even on some farms foul with weeds. Much of the best quality of Canadian grown clover seed is exported to countries where it is sold under a guarantee as to purity and vitality and where only the best re-cleaned stocks can find a sale. The inferior qualities with their weed contents have been to far too great an extent reserved for and forced upon our home markets.

The following summary of the results from the analysis of a number of representative samples indicates how little the relative market prices of seeds are determined by their actual value. It shows also how weeds become widely disseminated by impure seed.

ALSIKE.

Bought at	Price per Bushel.	Per Cent of pure Vital Seed	Cost of pure Vital Seed per Bushel.	No. of Weed Seeds per Pound.
	$ cts.		$ cts.	
Sussex, N.B.	12 00	46	26 03	27,540
"	9 00	63	14 30	6,390
Carleton Place, Ont.	7 20	93	7 74	8,879
"	7 20	83	8 62	7,248

RED CLOVER.

Yarmouth, N.S.	9 00	25	36 00	8,775
"	9 00	89	10 11	1,035
Vernon, B.C.	9 60	90	10 66	90
"	7 50	94	7 97	1,989

TIMOTHY.

St. Hyacinthe, P.Q.	3 95	73	5 41	900
"	3 45	96	3 68	1,620
Weymouth, N.S.	4 00	73	5 48	2,520
"	3 90	83	4 69	42,930

It is impossible to estimate the enormous injury inflicted upon farmers because of these abuses in the seed trade. If it were not for the prevalence of noxious weeds in Canada, the net cost of producing crops would be very much decreased.

Undoubtedly the one great cause of the existence of the present condition is ignorance, not only on the part of the farmers but also on the part of the distributing merchants. In order to correct this condition I authorized the preparation and distribution of collections of specimens of weed and also of economic seeds with a view to giving seed merchants and farmers an opportunity to become familiar with them. A bulletin is being issued stating the results of the examination of the samples of seed which were analysed during the present year. By informing farmers of the losses and dangers from using cheap seeds without regard to quality and cleanness, much permanent improvement may be accomplished. This, however, is a slow process and it may be necessary to supplement it by restricting as far as practicable the spread of weed pests through the sale of foul seeds. The results of this, the first year, of the Seed Laboratory make clear the need for wise measures and energetic, persistent efforts to protect Canadian farmers and their fields from the far reaching and long continuing damages which arise from the sale of seed containing noxious impurities.

EXTENSION OF MARKETS DIVISION.

AGRICULTURAL PRODUCTS FOR SOUTH AFRICA.

From December, 1899, the Department acted in the capacity of agent for the purchasing and forwarding to South Africa of agricultural products on account of the Imperial War Office, and up to July 14, 1902, the following quantities were shipped in ninety steamer loads:—

Hay	203,263	tons (of 2,000 lbs.)
Flour	125,815	bags
Oats	294,772	"
Beef	40,776	cases
Jams	11,743	"

An officer of this Department was sent to South Africa in 1900, in connection with some of these shipments. On his return he reported that South Africa offers a splendid market for Canadian products and recommended the establishment of a direct steamship line between Canada and South Africa in order to assist in the development of trade. He found Canadian food products almost unknown in the markets there, although the United States, Australia and New Zealand had a large business in flour, wheat and other cereals, cheese, butter, bacon and hams, potatoes, dried and tinned fruits, canned meats, rolled oats, split peas, beans and tinned vegetables. His report outlined the business procedure followed by New York commission houses. He advised in favour of Canadian exporters adopting a policy of direct representation in South Africa. The report concluded as follows:—'Owing to the destruction by warfare of public works, mines, buildings, etc., there will be a tremendous demand for timber, building material, agricultural implements, machinery and manufactured articles generally. The trade in food stuffs will be a great and growing one and the imports should be heavy for years to come. Canadians will have to be on the alert if they wish to participate in the steamship expansion of the South African market. With a direct steamship service, keen business representatives, enterprising shippers, who will work for future rather than present profits, and a determination to meet the special requirements of the market, there is nothing to hinder the development of a trade worthy of our people and the resources of our country.'

In November, 1901, I sent the following communication to the High Commissioner for Canada in London:—

'As you are well aware, my Department has arranged for the shipment of large quantities of hay, oats and other products from Canada to South Africa on account of the Imperial War Office. I venture to hope that these shipments have given the War Office particularly good value. At the same time they have helped to develop the commerce in agricultural products from Canada. Every care has been exercised in the purchase, inspection and shipment of the products. For the month of December some nine steamers have been chartered to carry hay and oats.

'Considerable attention has been attracted lately to the possibility of developing a general and regular export trade from Canada to the South African colonies. Canada, as you know, is in a good position to supply lumber, timber, other building material and

all sorts of manufactures of wood; also pulp and paper; also wheat or flour, cheese, cured and canned meats, canned fruits; also wagons, agricultural machinery, and many other articles.

'At the present time an obstacle in the way of beginning the trade is the want of regular steamship service between a Canadian port and some port or ports in South Africa.

'It has occurred to me that since it is likely that shipments of some products for the War Office will be continued from Canada to South Africa for a number of months, that in connection therewith, accommodation might be provided equal to that of a regular steamship line for freight from Canada on account of merchants who might want to open up this trade. That beginning might lead to a permanent service being established, and the development of a profitable Imperial trade.

'I have consulted my colleague Sir Richard Cartwright in this matter, and he agrees with me in the opinion that if an arrangement such as the following could be carried out, it would be to the benefit of both South Africa and Canada and thereby to the interests of the Empire as well.

'I beg that you will be so kind as to bring the following inquiries to the attention of the War Office and use your best influence to obtain favourable consideration in the direction indicated:

'1. Whether the War Office would assure to this Department that at least one steamer load of hay or other products from Canada would be taken monthly for a period of say six months or longer.

'2. Whether the War Office would permit this Department to have carried on such steamships from St. John, N.B., to Cape Town or some other port in South Africa such products or merchandise as Canadian shippers might desire to have sent there.

'In case of favourable reply from the War Office the Department would be prepared to offer space to Canadian shippers at a rate based on the cost per cubic foot of space occupied.

'It would be understood that the hay or other supplies authorized by the War Office would be furnished as at present at the lowest wholesale cost by this Department; and that the other merchandise or products carried on these ships from Canada would bear their full share of the cost of chartering the steamers, and that no goods of a sort that would damage or endanger the cargo shipped from the War Office would be taken on board.

'To recapitulate: The two points on which we desire to have the favourable decision of the War Office are:

'1. Assurance that at least one shipment of hay or other products would be taken from Canada every month for a period of six months or longer;

'2. Permission from the War Office to carry on these ships Canadian products and merchandise for commercial firms, they paying the full share of the cost of the steamer in proportion to the space occupied.

'I am sure you will not count it any trouble to give your valued co-operation in this matter.'

Intimation was received from the Imperial War Office through the High Commissioner for Canada granting the assurance and permission which had been applied for. In accordance with that arrangement, general cargo was carried on five steamers. That general cargo included the following articles of Canadian production :-

Axes, axles, barley, baths, bicycles and parts, billiard tables and frames, boots, calcined plaster, canned apples, canned corn, canned goods, canned tomatoes, canned lobsters, chairs, chair stock, chair stuff, cheese (Imperial), codfish, cook stoves, cushions (for roadcarts), desks, doors, fish, flour, furniture, furniture stock, harness, harness racks, iron roofing, lumber, match blocks, mats, metal ceiling, metal sheeting, paint, paper fillers, peas (green), peas (split), pianos, radiators and castings, roadcarts, saddlery, sash, doors and frames, sash lumber, shoes, stoves, boilers, pipes, castings and pots, tomato catsup, and wood mantles.

OFFICERS AT PORTS.

Several officers, in the capacity of inspectors, were appointed to observe and report upon the condition in which Canadian food products were loaded on the steamships at Montreal. During the season of navigation they reported that there had been 250 sailings of steamers carrying perishable products of the following lines : Allan Line, Thomson Line, Elder-Dempster Line, Donaldson Line, the Manchester Liners, the Dominion Line and the Leyland-Ellerman Line.

Officers of the Department have been stationed also at Manchester, Liverpool, Bristol, London and Glasgow in connection with the extension and improvement of trade in Canadian farm products. They have been instructed to observe and examine carefully the manner in which the products are handled in the unloading of the steamships, for the purpose of enabling the Department to take such steps as may be necessary to prevent the damage, particularly to cheese and fruit, which has been complained of by shippers and receivers from want of effective cool ventilation on steamships. The want of care in unloading, in handling on the docks, and in carting to the railways and warehouses, has in the past broken and injured a large percentage of the packages. Representations by these officers of the Department have been communicated to the shippers in Canada and also to the steamship agents. These have contributed to the means which have brought about some improvement during the season.

VARIOUS FOOD PRODUCTS.

Inquiries and examination of Canadian cheese in several of our commercial centres in the United Kingdom had revealed the fact that much of it had been landed in the United Kingdom in a heated condition that was telling against it in the markets. Consumers were less and less willing to purchase anything except cheese of mild flavour and rich body.

An investigation was carried on at cheese factories in Canada in 1899, as to the effect on the quality of cheese of curing them during the summer months in a controlled cool temperature continuously under 65 degrees Fahr. That was continued at one factory in 1900. The information derived from these investigations and from other inquiries made it evident that it was desirable to take further steps to bring about an improvement in the methods of curing cheese in Canada. In consequence it was

decided to establish and to maintain for a period of years, four illustration curing rooms for the curing of cheese at a controlled cool temperature. The results are presented more fully under the report of the Dairy Division. So far they indicate that a great improvement in quality in every respect has been obtained from curing cheese at a temperature continuously under 58 degrees Fahr.

There has been a great development of the Canadian butter trade in the last few years. The number of packages of butter carried in cold storage from the port of Montreal increased from 227,863 in 1900, to 410,893 in 1901, and to 525,735 in 1902. Canadian butter has won a higher place relatively in the markets of the United Kingdom than it occupied before. The special inquiries by cold storage inspectors reveal the need for more careful maintenance of low temperatures at creameries before the butter is shipped, in order that it may be delivered at the point of export without any injury to its quality from heat.

Reports were received that a few lots of Canadian butter had been received in the United Kingdom somewhat spotted with mould on the butter paper and between the butter and the boxes. That occurred on saltless butter. A circular of information was issued to butter-makers informing them of means whereby they could entirely prevent the growth of mould on the butter papers and packages. A weak solution of formalin is effective for the destruction of spores of mould. A good course for the butter maker to follow is to prepare a strong brine of salt, adding one ounce of formalin to one gallon of brine. The butter paper should be soaked in the solution. The inside of all butter packages should also be rinsed with it. The butter paper, while still wet with the brine containing formalin, should be placed inside the butter box, and the butter immediately packed in it. The brine containing the formalin will destroy all spores of mould on the butter paper and on the inside of the box. A brine can be used for a long period if it be boiled once a week. As the formalin evaporates during the boiling process, it will be necessary to add to every gallon of brine, after it has been boiled and cooled, one ounce of formalin.

Canadian brands of bacon, hams and pork are now among the best known in the United Kingdom, and their superior quality is being more generally recognized. On that basis there is a steadily growing demand for them.

It was learned from dealers in eggs that Canadian eggs were growing in favour although the production of eggs in Canada during the year is reported as being somewhat less than formerly.

The Canadian package holding thirty dozens of eggs, with a separate cardboard compartment for each egg is preferred to all others. It has been reported that owing to the excellent reputation won by Canadien eggs, English dealers have in some instances been repacking continental eggs in cases similar to the Canadian egg case. Although these eggs have not been labelled or sold specifically as Canadian eggs, they have been sold as eggs in Canadian cases. While this practice is a compliment to the quality and reputation of Canadian eggs, it is also an injury, as some dealers may conclude that these continental eggs in Canadian cases, although not marked Canadian, are Canadian eggs, or that Canadian eggs are similar to them in size, quality and condition.

When eggs were carried in cold storage on the steamships, the surface was so cold that moisture from the humid and warm air of the United Kingdom was deposited on

the outside of each egg. That brought about a 'mussy' condition and prevented the egg from keeping well. Consequently the importers prefer to have the eggs delivered in a cold condition to the steamship, and then carried in cool, ventilated chambers across the ocean. That leaves them with bright, dry shells when the cases are opened.

COLD STORAGE DIVISION.

Cold storage is intended to preserve commodities and thus avoid direct loss; it is useful in extending the period during which they can be marketed: and it thus gives the owners a wider chance to choose their own time for selling. The best service is for the preservation of commodities on their way to the consumers, and the less time they are on the way, as a rule, the better will be the results.

In the planning and carrying out of a system of cold storage for Canada, various interests had to be taken account of, viz., the producers, the collecting buyers, the carriers or transportation companies, the distributing merchants and the consumers. The cold storage system has helped to prevent losses and deterioration of quality, it has given handlers a chance for more profit and left more wealth in the country. The arrangements were made mainly for cold storage for food products intended for export. Advantages have been provided incidentally for products for home consumption. With what is practically a chain of cold storage available, the superior quality of Canadian products will be further recognized by importing merchants and consumers in the countries to which they go.

COLD STORAGE ON STEAMSHIPS.

The contracts entered into with agents of steamship companies to provide a regular cold storage service for the carriage of butter and other perishable products from Montreal to points in Great Britain, in chambers cooled and kept cool by mechanical refrigerating machinery of the best and most modern sort, terminated at the close of navigation from Montreal in 1901.

From the port of Montreal, in the season of 1902 there were sailings of 37 steamers with cold storage, and most of these made several voyages each. The total capacity of those steamers per voyage to the various ports was as follows:—

	Cubic feet.
Bristol	127,854
London	166,286
Glasgow	90,120
Liverpool	168,652
Manchester	20,000
	572,912

There were also sailings of two steamers to South Africa with cold storage capacity of 67,500 cubic feet.

During the season, 148 self-registering thermometers, called thermographs, were placed on the steamers of the different lines, from time to time, for the purpose of re-

cording the temperatures at which perishable products were carried. Comparatively small quantities of butter, some 1,593 packages, were carried in ordinary storage. Small quantities of cheese, bacon, lard and tender fruits were carried in cold storage during the season.

The following statement gives the number of packages of butter carried in cold storage, from the port of Montreal, during the seasons of navigation since 1898:

	Packages.
1898	209,172
1899	429,734
1900	227,863
1901	410,893
1902	525,735

On the whole the temperatures in the cold storage chambers for butter were not kept as low in 1902 as in 1901. The Department has advised that the temperature for butter should be maintained under 30 degrees Fahr., and as near 20 degrees Fahr., as practicable.

The following table shows the records for the highest and the lowest on the lines named:

TEMPERATURES as recorded in cold storage chambers for butter.

Lines.	Highest average of any voyage.	Lowest average of any voyage.
Allan	56° Fahr.	23° Fahr.
Thomson	36° "	22° "
Elder-Dempster	43° "	23° "
Donaldson	38° "	22° "
Manchester Liners	33° "	25° "

CIRCULATION OF COOLED AIR ON STEAMSHIPS.

The Department, while recognizing that improvements had been made in the handling of cheese and apples for export, was of opinion that still further improvements were necessary. It has appeared desirable to have cheese and apples carried in compartments in steamships through which a current of cooled air could be caused to pass. That would leave them with an attractive appearance on the surface and prevent any material deterioration in the quality of those products while on board the steamships.

Two plans were feasible and both have been applied to some extent. In reasonably cool weather it is sufficient to have forced circulation of the ordinary atmosphere. That can be effected by exhaust fans for the heated air being used in conjunction with a series of ventilators leading the cool air from the outside to the bottom of each compartment where cheese or apples are stowed.

Mainly in response to representations made by the Department in previous years, a large number of steamers in the Atlantic trade have been fitted with fans for the forced circulation of air through the holds and tween-decks.

To effect the cooling in hot weather soon after the cargo has been put aboard, another method was recommended by the Commissioner for the cooling and circulating of air on steamships, particularly for the carriage of cheese, apples and other perishable products. Mechanical refrigerators were to be used for the cooling of air to be afterwards circulated through parts of the steamship by means of fans. Such parts of the steamship were to be insulated to some extent. Thus in the warmest weather, the holds and the tween-decks where cheese and apples were carried could be cooled to a temperature under 60 degrees before the steamer was more than 24 hours on her way down the St. Lawrence or out from any port. An arrangement was entered into with the owners or agents of the Allan Line, Thomson Line, Donaldson Line and Elder-Dempster Line to fit up one or more steamships of their lines. Under that arrangement ten steamships have been fitted up and have carried products.

Reports received from merchants in the United Kingdom who handled cargoes ex these steamships speak most favourably of the condition in which they were delivered and advocate an extension of similar accommodation.

COLD STORAGE ON RAILWAYS.

Arrangements were continued for the running to Montreal of refrigerator cars fully iced from nineteen starting points on the Canadian Pacific Railway; from fifteen starting points on the Grand Trunk Railway; from two starting points on the Quebec Central Railway; from two starting points on the Intercolonial Railway; from six starting points on the Canada Atlantic Railway; from three starting points on the Quebec Southern Railway; and from one starting point on the Quebec and Lake St. John Railway. Six of these ran once a fortnight, the other forty-two ran weekly.

The railway companies provided the refrigerator cars; and every car was iced to receive butter and other products requiring cold storage, at stations between the starting point and destination. Shippers who made use of these refrigerator cars were charged the regular 'less than carload rates', and no extra charge was made to them for the cold storage services.

CARS FOR CHEESE.

To provide further means for protecting cheese from being heated, agreements were entered into with the Canadian Pacific and Grand Trunk railways to build a number of ventilated cars of special construction.

Further arrangements were made with the various railway companies to provide a comparatively large number of refrigerator cars well supplied with ice, to be loaded weekly at various points whence cheese was to be moved to Montreal. The Department undertook to pay the railway companies a sum towards the cost of icing these cars, up to one hundred cars per week during two months.

The following extracts from letters written by representative firms largely engaged in the trade show that the service was appreciated:

From Mr. P. W. McLagan, President of the Montreal Produce Merchants' Association:—'This service has been undoubtedly a step in the right direction. In the cases where the supply of ice was adequate to keep the cars properly cool, the goods

arrived in a very much improved condition. On the whole, the improvement is one in the right direction, and I sincerely hope that it will be made universal.'

From Messrs. A. A. Ayer & Co. : 'We consider the refrigerator car service for the carriage of cheese during the hot weather of this season to have been a decided benefit to the condition and keeping qualities of the cheese.'

From Messrs. Hodgson Brothers : 'We have been more than pleased with the special iced refrigerator car service supplied for cheese this season. We have compared the condition of cheese as it arrived in our warehouses from these iced cars with cheese that have come in ordinary cars, and the difference has been most marked. We sincerely hope your Department will see that the trade is supplied with more of these cars for next season. The difficulty has been that the supply this season has been so limited that it has been hard work to get as many cars as we would like, and I think your Department might treble the number next year with safety. If we are to hold our own with the competition from the other colonies it is of the utmost importance that the trade should be given equal facilities with other colonies as regards shipping.'

From Mr. A. W. Grant :—'There is not the slightest doubt that the iced car is the proper way to carry cheese, as they are altogether different to those which come in ordinary cars.'

From Mr. James Alexander :—'There is no question that the refrigerator car service for cheese this year was of great benefit.'

COLD STORAGE WAREHOUSES.

Cold storage warehouses of sufficient capacity for the trade are provided in most of the cities as private business concerns. For the protection of perishable products intended for export and for the extension of business, it is desirable to have cold storage buildings at other seaboard points. As the volume of trade at first would not likely be sufficient to induce business men to put up such buildings for the accommodation of products intended for export, a grant was offered to those who would provide cold storage buildings at seaports. The grants were to be in the nature of guarantees that the earnings from the cold storage business at these points would yield at least five per cent on the cost of the building and plant.

The rates to be charged were to be satisfactory to the Department of Agriculture, and the grants from the government were not to be called upon, except to make up any deficiency between the net earnings and the sum of five per cent on the cost as mentioned. Advantage was taken of this offer at Quebec only.

An agreement was made with Messrs. B. & M. Rattenbury, the owners of a cold storage building at Charlottetown, Prince Edward Island, to provide cold storage there for the use of the public at reasonable rates.

COLD STORAGE AT CREAMERIES.

To encourage the owners of creameries to provide cold storage accommodation at them to protect the butter in cold storage from the day after it is made, I caused it to be announced that the Government would, subject to ratification by Parliament, grant a bonus of fifty dollars ($50) per creamery for every creamery at which the owner would

provide and keep in use a refrigerator room according to the plans and regulations, during the season of 1897: and further bonuses of twenty-five dollars ($25) per creamery for 1898, and of twenty-five dollars ($25) per creamery for 1899, if and when the refrigerator room was provided and kept in use according to the plans and regulations during these years.

Plans showing the style of construction to be adapted for the insulation of old cold storage rooms and the methods of constructing new cold storage buildings and ice houses were furnished on application.

When the bonus was made available for those years, a great many owners of creameries did not appear to understand the benefits which would result to themselves from providing cold storage; and some did not learn of the offer of the government bonus in 1897 in time to construct the cold storage for use during that summer. To encourage the owners of creameries to provide the cold storage which is so necessary, I intimated that the Government would extend the provisions of the bonus offered in the circular published October 26, 1896.

To the owners or lessees of creameries who did not before obtain the bonus of fifty dollars ($50), the Government would grant a bonus of fifty dollars ($50) per creamery, if and when its owner provides and keeps in use a refrigerator room according to the plans and regulations during the season of 1903, and the further bonuses of twenty-five dollars ($25) each for the seasons of 1904 and 1905, if and when the refrigerator room has been kept in use according to the regulations, during these two seasons.

Thus the owner of a creamery who provides the necessary refrigerator room and keeps it in use according to the regulations during the three years ending 1903 or 1904 or 1905, as the case may be, may receive altogether a bonus of one hundred dollars per creamery.

The owners of over 600 creameries have provided cold storage in accordance with the regulations.

COLD STORAGE INSPECTORS.

Many of the creameries which had provided cold storage rooms were visited by an inspector on behalf of the Department. In the large majority of cases, the cold storage rooms were not being kept as cold as is necessary for the preservation of butter for even a few days. That state of affairs prevents the dairymen from deriving full benefit from the refrigerator car service, and from the cold storage on steamships. Earnest representations have been made to butter-makers and creamery managers, urging them to maintain a temperature continuously under 40° Fahr. A cold storage inspector in Montreal who looked after the arrivals of the refrigerator cars, subsidized by the Department, reported frequently that creamery butter was received at Montreal showing a higher temperature than that of the car in which it was carried. Some shippers persist in delivering their butter to the refrigerator cars and to the steamships, in a relatively warm condition. The cold storage accommodation of the carrying companies is intended to keep cool, but not to make cold, the products carried by them. The putting of warm products from any shipper into a refrigerator car, may cause injury to the other contents. The same is true to a less extent in the case of cold storage compartments on steamships.

A travelling inspector was employed to advise with railway agents and shippers regarding means for securing the greatest benefit from the cold storage system. Occas-

ionally he found lots of butter which had been standing on a platform in the sun for several hours. In some instances doors of refrigerator cars were left open unnecessarily. He found shippers and railway agents ready to do what they could to prevent damage to the quality of the goods, when their attention was directed to those matters. Want of knowledge, want of care, want of thoroughness, absence of a sense of responsibility, can hardly be remedied altogether by a cold storage system.

The cold storage chambers on the steamships were examined regularly. It would appear to be in the interests of the export butter trade, if the steamship agents should decline to receive into cold storage on the steamships, any butter at a temperature higher than 40° Fahr. Neglect to cool down the cold storage chambers before the cargo was put in was noticed in many cases. One steamship line was a chief delinquent in that respect.

The Commissioner recommends that the facts in regard to those matters be posted in the Board of Trade room at the port next season.

LIVE STOCK DIVISION.

When it is remembered that four-fifths of the products of Canadian fields, not including pastures, are consumed by live stock, it will be seen that it is important that the animals fed should be of the best quality. During the past year the efforts of the Live Stock Commissioner have been directed chiefly towards four objects, viz., the development of interprovincial trade in live stock, the extension of the Farmers' Institute system, the improvement of the work of agricultural societies, and the publication of press articles on live stock and kindred subjects.

THE DEVELOPMENT OF INTERPOVINCIAL TRADE.

The reduced freight rates on pure bred stock, which were conceded by the railway companies, have greatly assisted in developing interprovincial trade.

The system of provincial auction sales of pure bred stock, established two years ago, is working out well. Four such cattle sales have been held in Ontario, at which 233 head of shorthorns were sold for an average of over $100 each. The majority of these animals were young bulls and heifers. That average has been considered remunerative to the small breeders, for whose benefit these sales are largely intended. This year's sale at Calgary showed an average of over $95 per head for 220 animals, which is considered satisfactory for ranch-bred cattle. With the assistance of this Department a territorial sheep breeders' association has been formed, and a large and successful sale of pure bred rams held at Medicine Hat, N.W.T. As there are few breeders of pure bred sheep in the North-west territories, the rams were principally imported from Ontario. In connection with the cattle sale at Calgary (started last year) a stallion and cattle show has been inaugurated. Live stock conventions have been held, at which the educational features have been developed by expert live stock lecturers furnished by this Department. The Live Stock Commissioner has given the Department of Agriculture of the North-west Territories assistance in selecting a shipment of 250 pure bred pigs in Ontario which were sold by auction in the Territories, with a view to improving the class

of swine raised there. Similar assistance was given the Prince Edward Island government in purchasing a car load of pure bred stock for sale by auction in that province.

The trade in stocker cattle between the eastern provinces and British Columbia and the North-west Territories, which the Live Stock Commissioner assisted in starting last year, has been developing satisfactorily. As a complement of this trade efforts have been made, with fair success, to find a market in the east for the range-bred horses of British Columbia and the North-west. One car-load of draft horses from British Columbia was sold by auction in Toronto, in September last, at fair prices.

The Live Stock Commissioner this year has given special attention to inducing the farmers of the Maritime provinces to appreciate the value of improved live stock. The Maritime Stock Breeders' Association has been greatly strengthened and brought into closer touch with this Department. It has been incorporated under Dominion charter and is doing a great deal of educational work. A maritime winter fair of a strictly educational nature has been established at Amherst, N.S., which town, with the county of Cumberland, is providing permanent accommodation for the show at a cost of about $13,000.

EXTENSION OF THE FARMERS' INSTITUTE SYSTEM.

Further progress has taken place in the development of farmers' institutes in the various provinces. Early in the present year arrangements were made with the Quebec Department of Agriculture for systematic work covering the larger part of that province. Eight speakers were furnished by this Department and meetings were held at 48 places at which over ten thousand people were in attendance.

In Nova Scotia no arrangement was made with the local authorities for institute work until June of the present year, when a speaker was sent for a month's campaign in that province. Two speakers were also sent to Nova Scotia during October for a series of thirty meetings, devoted especially to fruit and poultry. The meetings have been well attended and the speakers have given satisfaction.

In Prince Edward Island forty-four meetings, during January and February last, were attended by two speakers furnished by this Department, who spoke to audiences totalling over four thousand farmers. Three speakers were furnished for a month's work in July. Several new institutes have been formed as a result and a good deal of enthusiasm created.

During January of this year, three speakers were sent to a series of upwards of thirty meetings in New Brunswick, at which there was an attendance of about two thousand people. Four additional speakers were furnished for 63 meetings in the month of October.

Three speakers were supplied last spring for a series of meetings in the North-west Territories. The Department of Agriculture at Regina has expressed great satisfaction with the work accomplished. These three workers also conducted a series of meetings in British Columbia with the assistance of local speakers. The attendance was large at nearly all the meetings, and the people showed themselves eager for information. Five speakers sent by the Department are now in British Columbia on a five weeks' campaign covering all the agricultural districts.

In connection with this work the Live Stock Commissioner has assisted in providing a list of speakers for the annual conventions of the Nova Scotia Farmers' Association, the New Brunswick Farmers' and Dairymen's Association, and other farmers and dairymen's associations in Quebec.

IMPROVEMENT OF AGRICULTURAL SOCIETIES.

There are throughout Canada a large number of agricultural societies and farmers' clubs, the majority of which have done no work outside of holding an annual show. These associations receive from various sources nearly $1,000,000 per year. As one means toward improvement, an effort was made last year to inaugurate a better system of conducting county and townships fairs. A number of fairs were arranged in a circuit, and expert judges furnished for the live stock classes. These expert judges explained the reasons for their decisions in the ring and gave addresses on the best types of horses, cattle, sheep and swine. This plan proved so eminently satisfactory at the county fairs in the Ottawa district, in the North-west Territories and in British Columbia, that a great extension of the movement has taken place; and this year judges have been sent by the Department to nearly all parts of the Dominion. The Ontario agricultural societies have been placed under the control of a superintendent, who arranged some sixty fairs in convenient circuits, sent expert judges to each of these and assisted in drafting an up-to-date prize list.

The awarding of prizes at a fair is a comparatively unimportant matter as compared with other considerations. What is really desirable is that the fairs should be the means of disseminating information and of fixing correct ideals in the minds of those who are producing food stuffs.

This year the Live Stock Commissioner assisted in arranging and conducting what have been designated by the press 'model fairs' at Whitby and Richmond, Ont. The directors of these fairs made a thorough revision of their prize lists, and added a number of new and valuable features, with the idea, not only of improving their own exhibitions, but of inducing other county and township societies to follow their example. In the horse classes no racing was permitted, but exhibitions of riding and jumping were given. Addresses were given by experts on the requirements of the markets. Prizes were given for the best pen of fat cattle, and the best pen of bacon hogs, suitable for the export trade. Desirable and undesirable types of fowls were shown, with lectures on the fattening of chickens for the English markets, and exhibitions of killing, plucking and packing for export. Another novel feature was the operation of a model kitchen and dining room, with exhibitions of cooking simple dishes, and addresses on domestic economy. Dairy instructors were also present to give practical addresses in regard to the different phases of that branch of farming. Practical demonstrations of the proper packing of fruit for export were given by the Dominion fruit inspectors. Illustration plots showing the best varieties of grasses, clovers, millets, sorghums, corn, fodder and pasture crops, turnips, mangels and sugar beets, were planted on the grounds at Whitby and formed an interesting and instructive exhibit. Good clean amateur sport was also encouraged by offering prizes for the championship of each school section in the county in all-round athletics.

The desirability of interesting the children in the agricultural fair system has not been overlooked. With this in view prizes were offered at several fairs to the teachers

and pupils of a public school section making the best exhibit of (1) cut flowers grown in the school grounds; (2) grain in the straw; (3) clover and grasses; (4) roots, fruits and vegetables; (5) wild flowers and leaves of trees; (6) weeds and weed seeds; (7) beneficial and injurious insects; (8) native woods. This plan has proved effective in inducing the children to begin the fascinating study of Nature, directed towards the elements of general agriculture, economic botany and entomology, &c. Already parents are declaring that their children know more about the wonders of nature than they themselves have learned in a life time.

PRESS ARTICLES.

Carefully prepared, practical articles on live stock and kindred subjects have been sent weekly to over eight hundred newspapers throughout Canada, a large proportion of which have published them regularly. It is believed that more can be done by sending good articles regularly to the small country papers than in almost any other way, for by this means information is placed before many country people who can not otherwise be reached.

DAIRY DIVISION.

COOL CHEESE-CURING ROOMS.

Investigations carried on by officers of my Department during several years have shown that the temperature at which cheese are cured in the ordinary cheese curing room is much too high to secure the best results, and that a very great improvement in the flavour and texture of the cheese is effected when the temperature of the curing room is so controlled that it does not go higher than 60 degrees Fahr. It has also been found that the saving of shrinkage in weight during the curing of the cheese at the lower temperature amounts to over one per cent on the average.

In order to demonstrate and illustrate the advantages of the cool curing of cheese in such a manner as to bring them prominently before the notice of a large number of those interested in the industry, it was decided at the beginning of the season of 1902 to establish four central cool cheese-curing rooms, to which the cheese from surrounding factories could be brought as soon as they were made, and there cured at proper temperatures. These central curing rooms are located at Woodstock and Brockville in Ontario, and Cowansville and St. Hyacinthe in Quebec. During the months of July, August and September, 26,519 boxes of cheese were received from 37 cheese factories.

A number of cheese from all the factories were selected every week, and these were cured at the temperature of an ordinary cheese-curing room. They were afterwards compared by experts with other cheese (of the same day's make and from the same vat) that had been cured in the cool rooms; and notwithstanding the fact that the past summer was remarkable for the absence of extreme heat, there was a very marked difference in quality in favour of the cool cured cheese in every case. Some exporters, who examined the cheese, placed the difference in value at fully one cent per pound.

Two of these curing rooms, those at Woodstock and Cowansville, are equipped with mechanical refrigerating machines, while the other two are cooled by ice, stored in a

separate chamber at one end of the building. The latter plan has proved to be the cheapest and simplest method of controlling the temperature.

A description of these buildings, with full details of operation and the results obtained, will be made the subject of a special bulletin.

The operation of these cool cheese-curing rooms has excited a great deal of interest in the trade, and the Department has received many inquiries for information regarding the improvements of factory buildings and the kind of management, which are necessary to effect the cool curing of cheese in their own establishments.

OFFICIAL REFEREE FOR BUTTER AND CHEESE.

An officer of the Department was again stationed at the port of Montreal to act as official referee for butter and cheese. It was his duty to examine, upon request of either buyer or seller and with the consent of both parties, any lot of cheese or butter over which there was a difference of opinion or dispute as to quality.

He was called upon to examine, during the season, 429 lots of cheese and 147 lots of butter, after they had been declared by the buyers as under 'finest'. Of this number 24 lots of cheese and 9 lots of butter were pronounced by the referee to be 'finest' quality, and his decision was final in all cases.

A report on the quality of each lot examined is sent to a representative of the factory and a copy is given to the buyer. The referee, who is an experienced cheese and butter maker, is often able to point out to the makers of the butter or cheese the actual cause of defects observed, and how such defects may be remedied.

The officer who fills the position of official referee also acts as grader or inspector of butter and cheese intended for shipment to South Africa. A certificate, showing the grade of quality as determined by the inspector, is given to the exporter for each lot of butter or cheese examined.

Inspection is optional on the part of the exporter, but South African receivers usually demand it.

THE NORTH-WEST TERRITORIES CREAMERIES.

The Department of Agriculture again operated sixteen creameries in the North-west Territories.

The extraordinary rainfall during the early part of the season and the harvesting of the heavy grain crop were two causes that operated against the support of the creameries during 1902. The output of the Alberta creameries, however, again shows an increase over previous years. Those in Assiniboia have, on the whole, made less butter than they did in 1901.

Three of the creameries formerly managed were closed by the Department during 1902, owing to the lack of sufficient patronage. The failure of the farmers in these districts to support the creameries does not appear to arise from any lack of confidence in the dairy business, but simply because they are now in a position to go into stock raising and grain growing, and because they prefer the latter means of livelihood. The changes of the past few years have altered the aspect of farming operations in many parts of the North-west.

Five carloads of the butter from the government creameries have been exported to Great Britain, one carload was sold for export to Queensland, Australia, and shipments were also made to China, Japan and to the Yukon. The remainder was disposed of in local and British Columbia markets.

NOVA SCOTIA CREAMERIES.

The Department still operates the dairy station at Nappan, and one creamery at Scotsburn, in Pictou county, and another at Mabou, in Inverness.

These creameries were built and equipped by the farmers themselves, and the usual charge of 3½ cents a pound is made for manufacturing and marketing the butter.

A considerable portion of the butter goes to the West Indian markets, while the remainder finds a ready sale in the local markets of the maritime provinces.

GENERAL DAIRY SERVICE.

The Assistant Dairy Commissioner, whose labours are confined chiefly to the province of Quebec, has attended a large number of public meetings, and given lectures on various dairy topics. He also assists in carrying on the syndicate system of dairying instruction as organized in the province of Quebec, and gives a series of lectures to the students of each course at the provincial dairy school at St. Hyacinthe, Que.

The Dairy Superintendent for the Maritime Provinces took charge of a class of instruction in cheese making at Charlottetown, P.E.I., arranged for by the Provincial Dairymen's Association in March last, and an instructor was provided for the dairy school at Sussex, N.B., during its last term.

The office of Dairy Superintendent for the Maritime Provinces will not be continued after this year. All the provincial governments now employ experts of their own.

The Chief of the Dairy Division and his assistants have attended and addressed a large number of meetings and conventions of dairymen in the several provinces.

A number of bulletins and leaflets have been distributed during the year, giving information upon the production and handling of milk, the manufacture of cheese, improvement in cheese-curing rooms, &c. A large correspondence is conducted with the cheese and butter makers and others interested in dairy work, whereby much information of a more or less technical nature is disseminated.

BRANDING AND REGISTRATION BILL.

Under the Act passed 'to provide for the Registration of Cheese Factories and Creameries, and the Branding of Dairy Products, and to prohibit misrepresentation as to the dates of Manufacture of such Products,' certificates of registration have been issued to 1,269 cheese factories and creameries, and applications are being received occasionally.

EXPORTS OF BUTTER AND CHEESE.

The magnitude and growth of the export trade of Canada in dairy products is shown by the following tables (years ended June 30):—

DOMINION OF CANADA—Exports of Dairy Products Home Production.

BUTTER.

Year.	Quantity.	Value.	To Great Britain.	To United States.	To France.	To Germany.	Other Foreign Countries.	B. N. A. Provinces.	British Indies.
	Lbs.	$	$	$	$	$	$	$	$
1868	10,649,733	1,698,042	534,707	1,015,702	.....	1,496	14,870	95,777	26,986
1880	18,535,362	3,058,069	2,756,064	111,158	.....	.....	24,710	163,290	2,647
1890	1,951,585	340,131	184,105	5,059	.....	.....	29,342	119,989	1,636
1891.....	3,768,101	602,175	440,060	10,054	.....	20,447	24,621	101,649	5,944
1892	5,736,696	1,056,058	877,455	6,038	.....	5,160	27,207	133,770	6,428
1893.....	7,036,013	1,296,814	1,118,614	7,539	.....	1,175	35,042	127,412	7,032
1894.....	5,534,621	1,095,588	936,422	6,048	1,125	.....	25,560	109,263	14,170
1895	3,650,258	697,476	536,797	5,365	.....	267	35,028	108,439	11,580
1896.....	5,889,241	1,052,089	893,053	2,729	.....	9,370	34,299	105,472	7,166
1897.....	11,453,351	2,089,173	1,912,389	6,233	.....	8,513	33,490	115,754	12,794
1898	11,253,787	2,046,686	1,915,550	3,738	.....	17,574	31,619	51,945	27,160
1899	20,139,195	3,700,873	3,526,007	3,984	.....	12,384	41,810	74,813	41,875
1900	25,259,737	5,122,156	4,947,000	5,044	.....	7,210	43,176	66,069	53,657
1901.....	16,335,528	3,295,663	3,142,353	5,839	.....	.....	39,675	44,986	62,810
1902.....	27,855,978	5,660,541	5,459,300	41,149	.....	101	36,109	47,066	71,816

CHEESE.

1868.....	6,141,570	620,543	548,574	68,784	.....	.....	891	1,594	340
1880.....	40,368,678	3,893,366	3,772,769	114,507	.....	.....	170	5,710	210
1890.....	94,260,187	9,372,212	9,349,731	6,425	.....	370	2,154	12,777	755
1891	106,202,140	9,508,800	9,481,373	13,485	.....	.....	1,954	9,104	3,884
1892.....	118,270,052	11,652,412	11,593,690	39,558	2	.....	2,124	12,942	4,091
1893.....	133,946,365	13,407,470	13,360,237	23,578	.....	.....	2,689	18,679	2,297
1894	154,977,480	15,488,191	15,439,198	9,552	.....	173	3,036	21,948	14,284
1895.....	146,004,650	14,253,002	14,220,505	5,058	.....	16	5,463	9,785	12,175
1896	164,689,123	13,956,571	13,924,672	10,359	299	.....	4,861	7,509	8,871
1897.....	164,220,699	14,676,239	14,645,850	4,486	94	24	5,365	11,954	8,457
1898.....	196,703,323	17,572,763	17,522,681	14,604	.....	1,428	6,889	12,784	14,377
1899.....	189,827,839	16,776,765	16,718,418	17,739	.....	.....	11,701	13,293	15,614
1900.....	185,984,430	19,856,324	19,812,670	4,836	.....	.....	8,774	16,651	13,393
1901	195,926,397	20,696,951	20,609,361	37,691	465	12	15,375	16,603	17,534
1902.....	200,946,401	19,686,291	19,620,239	12,038	.....	1,179	14,133	20,100	18,602

IMPORTS OF GREAT BRITAIN.

The following table from the Board of Trade returns of Great Britain for 12 years (ended December 31), shows the total quantities and value of butter and cheese imported into Great Britain :—

BUTTER.			CHEESE.		
Year.	Quantity.	Value.	Year.	Quantity.	Value.
	*Cwt.	£ stg.		*Cwt.	£ stg.
1890.	2,027,718	10,598,848	1890.	2,144,074	4,975,134
1891.	2,135,607	11,591,181	1891.	2,041,317	4,815,369
1892.	2,183,009	11,965,190	1892.	2,232,817	5,416,784
1893.	2,327,474	12,753,593	1893.	2,007,462	5,160,918
1894.	2,574,835	13,456,699	1894.	2,226,145	5,474,940
1895.	2,825,662	14,245,230	1895.	2,133,819	4,675,130
1896.	3,037,718	15,344,364	1896.	2,244,525	4,900,342
1897.	3,217,802	15,916,917	1897.	2,603,178	5,885,521
1898.	3,209,153	15,961,783	1898.	2,339,452	4,970,805
1899.	3,389,851	17,213,516	1899.	2,384,069	5,503,004
1900.	3,378,516	17,450,435	1900.	2,705,878	6,837,883
1901.	3,702,890	19,297,396	1901.	2,586,837	6,227,135

Cwt. : 112 lbs.

POULTRY.

FATTENING OF CHICKENS.

In 1898, I authorized the establishment of two chicken-fattening stations in Canada to illustrate the method of fattening chickens as followed in Great Britain. Since that time the trade in crate-fatted chickens has made substantial development each year.

Illustration shipments of fatted chickens from the fattening stations have each year gone forward with success to Great Britain; commercial firms throughout Canada have exported large shipments of chickens, some of them under the direction of this Department. Reports state that the chickens arrived in fine condition, pleased the trade well in every respect and were sold at good prices. After a careful consideration of the favourable impression which Canadian crate-fatted chickens have made in Great Britain, of the letters from large commission merchants making inquiries for thousands of cases of similar chickens this year, and of the relatively good prices realised, it appears that the exporting of fatted chickens to Great Britain can be profitably developed to an almost unlimited extent.

The style of shipping case, which holds one layer of twelve fowls, used at the illustration stations, has been adopted by exporting firms. Practically all the Canadian chickens exported to Great Britain this year will be sent in uniform cases in which they present the best appearance for market.

This year, in order to learn what increased profits could be realized by farmers fattening their chickens and selling them in Canada, I authorized weekly shipments of fatted chickens to be forwarded to produce merchants in Goderich, Ont., Toronto, Ont., Montreal, Que., and Sydney, C.B. The result of these sales confirmed my expectations that the local demand for fatted chickens was an increasing one, and that the fattening of chickens by the farmers for local consumption could be extended with much profit.

In addition to four complete hatching, rearing and fattening stations, there are in operation this year twelve illustration chicken-fattening stations. At all of these stations chickens are fatted, killed, shaped and packed. These chickens are forwarded to Great Britain or sold in Canada.

HATCHING STATIONS.

In 1901, I authorized the establishment of three complete illustration poultry stations for the artificial hatching, rearing and fattening of chickens. The eggs for these stations were purchased from farmers and hatched by incubators. The chickens were reared in brooders, and when about four months old were placed in the fattening crates. Two thousand chickens were reared at the stations and valuable information was secured regarding their hatching and the nature of the feed required for rapid growth.

This year I increased the number of complete stations to four. Two of these stations are in Ontario and one each in Quebec and New Brunswick. Last spring the eggs for hatching were again purchased from the farmers. Whilst the hatching results were satisfactory, the chickens were not of a uniform type or quality.

In order to improve the utility qualities of the Barred Plymouth Rock and White Wyandotte breeds of poultry, I authorized the construction of model poultry houses at the Homesville, Ont., Bowmanville, Ont., and Bondville, Que., illustration stations, and directed that 100 of the best pullets of these breeds be retained at each of the stations. Next spring the eggs for hatching will be secured from selected pullets that are housed and fed at our stations.

Among the farmers of the maritime provinces there was a demand for well-bred Barred Plymouth Rocks. The requests for chickens came through the men in charge of the chicken fattening stations and also from individual farmers. To encourage the production of the most profitable type of poultry, I authorized the shipment of 300 Plymouth Rock cockerels and pullets from the Bondville, Que., illustration station. The chickens were delivered to the farmers at 50 cents each. I learn that the chickens arrived in good condition and have given satisfaction.

The men in charge of the illustration stations were instructed to visit the agricultural fairs in the vicinity of their stations, and to impart practical information about every branch of the poultry work. This has proven of value.

A bulletin, 'Profitable Poultry Farming', dealing with the work of hatching, rearing, fattening and marketing and the care of poultry, has been published.

FRUIT DIVISION.

The Fruit Marks Act of 1901 was amended by Parliament in 1902. A bulletin, containing the Act as amended, together with a copy of the Order in Council making regulations to secure the efficient enforcement and operation of the Act, and general instructions to inspectors, was distributed widely.

Inspectors for the enforcement of the Act were appointed to cover the main fruit growing districts throughout Canada, as well as the chief points from which fruit is exported or distributed for the home markets.

The encouragement given to those who ship choice fruit, by the Act preventing the sale of inferior grades under false designations, has already led to more business-like methods of grading, packing and marking fruit for home and outside markets.

Meetings with persons engaged in the fruit trade were held by the inspectors in March and April in a number of towns and cities, under the auspices of the retail grocers and fruit sellers' associations. Farmers' institutes were attended and meetings called in halls and orchards, wherever information could be given with most benefit. Orchard meetings have been helpful. Practical work of illustration and instruction has been carried on in pruning, grafting, and in the detection and destruction of insects and fungous pests. Demonstrations in spraying have been given at various points. At these meetings many questions are answered on general orchard practice; and the Fruit Marks Act is discussed and explained. Inspectors have attended the regular conventions of provincial fruit growers' associations of the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island.

The Chief of the Fruit Division has been employed in the United Kingdom during the past season, making inquiries and observations into the fruit trade.

The inspectors visited as far as practicable orchards and shipping stations, making inspections and giving information. As far as possible with the number of inspectors available, the Fruit Marks Act was applied also to basket fruit, including strawberries, peaches, plums, &c. A good effect from this was noticeable in the larger towns and cities. About two thousand inspections have been made during the season, and prosecutions have been ordered in about twenty cases.

Noticeable improvements have been observed in the methods of packing and marking fruit intended for sale. Whereas formerly it was usual to find apple barrels faced with fruit greatly superior to the general contents of the package, it is now the exception rather than the rule to find false packing. In the great majority of cases the fruit has been found correctly marked.

CROPS.

RESULTS OF THE PAST SEASON.

Throughout the whole of Canada, from the Atlantic to the Pacific, nearly all agricultural crops have been highly satisfactory; large yields have been realized and the whole country is sharing with the husbandman the benefits following the bountiful harvest he has gathered.

ONTARIO.

From all parts of Ontario come reports of excellent crops. The yield of hay has been exceptionally good, and it has been well saved. Winter wheat has given the largest returns had in many years, much above the average of the past. The Hessian-fly, which caused considerably injury to the crop of 1901, has been seldom met with during the past year and the winter wheat crop has been almost free from insect injury and but slightly affected by rust.

Spring wheat has also yielded bountifully, the crop being well above the average. Barley, also, of which the acreage has been increased, has given unusually heavy returns.

Oats have given much the best crop on record. The grain yield has been from 20 to 25 per cent above the average of past years and the kernel plump and heavy. The straw, also, is unusually good and the crop has been well saved. The acreage devoted to this important crop is yearly increasing and in Ontario now exceeds the total area occupied by all other cereals.

The pea crop has been badly infested by the pea-weevil, which has in many districts considerably reduced the value of the product. Owing to the cool character of the weather throughout the summer, the crop of Indian corn has fallen somewhat short of its usual tonnage; nevertheless, it has given in most districts a very fair return. The season has been favourable for the growth of field roots: the crops have been unusually large and the weather propitious for gathering them.

In most districts there has also been a large yield of potatoes; but in some localities this crop has suffered much from rot. Where properly cared for and the vines sprayed with Bordeaux mixture in accordance with instructions sent out from the Central Experimental Farm, this disease has made but little headway.

The absence of very hot weather, with favourable conditions of moisture, has resulted in rich pasturage, and the dairy industry has flourished; the output has been large and prices have been well maintained. All branches of the stock industry have prospered, good prices having proved a great stimulus to these divisions of farm work.

The apple crop is good and the fruit is very free from insect pests. Pears and peaches have been abundant and good. Plums, also, have grown well: but in some districts much of the fruit has been destroyed by Plum Rot.

QUEBEC.

In this province farmers are well satisfied with the results of the season. Hay has given an abundant return and the crop has been well saved. Oats, also, have

yielded well and the grain is plump and heavy, while there is also a good weight of straw. The crops of spring wheat and barley have been unusually good. Corn has not matured as well as usual, owing to the cool weather, and the crop is below the average.

Pasturage has been good, a condition very encouraging to the dairy and stock interests. Field roots and potatoes in most localities have given satisfactory returns.

The apple crop has been good. Plums, also, and small fruits have yielded well.

THE MARITIME PROVINCES.

In the Eastern Provinces the season opened late and the weather was cool and wet, which delayed seeding beyond the customary time. Nevertheless, the conditions for grain-growing have been most favourable, and bountiful crops have been harvested. Oats, spring wheat and barley have all given unusually heavy returns and the grain is plump and of excellent quality.

Turnips and other field roots have produced abundant crops, the pastures have been excellent and the cattle are mostly in very good condition. The yield of hay has been fully up to the average and the crop well secured.

The yields of the different sorts of fruit have, on the whole, been good; but the heavy crops of apples which have been gathered for the past two years in the Annapolis valley, Nova Scotia, have been followed by a yield unusually light.

MANITOBA.

Manitoba has had another excellent year, the rainfall has been sufficient and the outcome of the harvest most gratifying. The average yield of wheat is expected to be somewhat higher than last year; the weather during harvesting has been fine, and a very large proportion of the grain which is being marketed is of the highest grade in quality.

Oats and barley have given heavy returns, and the crop of potatoes is above the average. Flax has given a good yield and since this is found to do well on newly broken land in most parts of the North-west country, greater attention is paid to this crop than formerly. The dairy and stock industries are also making satisfactory progress.

THE NORTH-WEST TERRITORIES.

In the territories there has been a great influx of settlers and the area of land under cultivation is rapidly increasing and the output becoming correspondingly greater. Good reports as to the weight of crop and the excellent character of the product are coming in from all quarters. The average returns per acre from wheat and other cereals are expected to equal those of 1901. The conditions of moistnre have been very favourable, and the stock industry has prospered much and a large number of fine animals have been marketed. In those districts where mixed farming is carried on, dairying and the rearing of cattle, swine and poultry have been profitable and the output is increasing rapidly.

Under my instructions the Director of Experimental Farms visited the Canadian North-west during the harvest season and travelled over portions of Manitoba and the

Territories. His reports on the results of the season are highly gratifying. He travelled over some of the more sparsely settled portions of the country and found new settlers coming in everywhere and the vacant lands being quickly taken up. He visited portions of southern Alberta in 1901 and revisited some of these in 1902. The localities seen were found to be rapidly filling up. In the Mormon settlements in particular the growth has been phenomenal. Last year, at the time of the Director's visit, a new town called Raymond was being laid out, and the only object which broke the monotony of the plains was a surveyor's tent. Not an acre of crop was in sight. Within a year a town has sprung up with a population of 600, all comfortably housed. Their crops cover an area of nearly 5,000 acres and grain of all sorts has given very satisfactory yields.

BRITISH COLUMBIA.

In the coast climate of this province hay has proved an exceptionally heavy crop; oats also have given a large return, the quality of the material in both cases being excellent. Wheat and barley are not largely grown, but where they have been sown an abundant crop has been harvested. The yields of field roots and fodder crops have been very satisfactory. Dairying is on the increase, and in some districts much success has attended the growing of hops.

The crop of fruit on the coast has been somewhat under the average. Plums have yielded bountifully, but the plum rot has been very prevalent and destructive to the fruit. In the interior and drier districts fruit trees are giving abundant returns and the product is of fine quality. The crops of grain and of hops in the interior country have also been very satisfactory to the growers.

EXPERIMENTAL FARMS BRANCH.

The experimental farms of the Dominion are rendering excellent service to the farmers of Canada. During the sixteen years which have elapsed since these useful aids to farming were established, the advancement made in all lines of agriculture has been most marked. The valuable and trustworthy information which has been given in the reports and bulletins issued from the farms has helped to lessen or remove the difficulties which stand in the way of successful agriculture, has stimulated increased production and given the farming community confidence in their work. The results of the many important and carefully conducted experiments which have been published each year have placed before the farmer a most valuable accumulation of facts for his guidance. In this way he has been made familiar with the results obtained from practical work in the fields, barns, dairy buildings, orchards and plantations to direct him towards the best methods with the happiest results. Canadian farmers are now well informed along most of the practical lines of farm work on which agricultural prosperity mainly rests.

FACTORS BEARING ON AGRICULTURAL PROSPERITY.

Among the more important of these are:—The maintaining of the fertility of the soil, mainly by the proper care and use of barn-yard manure and the ploughing under of clover, the following of a judicious rotation of crops; the preparation of the

land after the best methods under the different climatic conditions prevailing in Canada; early sowing, the choosing of the best and most productive varieties and the selection of plump and well ripened seed. Demonstrations along all these lines are being given continually by the experimental farms. In addition to the benefits resulting from the example and teachings of the farms showing the most profitable course for the farmer to follow, he is further helped in his efforts to improve the quality and increase the quantity of his products by the annual distribution of the best sorts of grain, which many years of trial have shown to be especially productive.

There is probably no employment engaging man's attention which requires more skill and more general information than farming. Competition in agricultural products is keen throughout the civilized world, and the farmer needs to turn to practical account every advantage within his reach for the improvement of the quality of his products and the lessening of the cost of production, if he is to maintain and strengthen his position. The experimental farms are bureaus of information from which he can draw, and the large correspondence with farmers and the great demand for the publications issued from the farms, show how thoroughly the advantages offered are appreciated.

ASSISTANCE TO THE DAIRY AND STOCK INDUSTRIES.

The object lessons given in the raising of fodder crops and the converting of these into ensilage, to furnish succulent winter food for cattle, have been a great stimulus to the dairy industry, especially in reference to the manufacture of butter during the winter months. The way has been prepared for providing cheap food for the fattening of steers, thus adding to the profits of farming. The experiments which have been conducted in regard to the economical production of butter of the highest quality, the proper care of milk, and the best methods of treatment to secure the most complete separation of the butter-fat, have been helpful to those engaged in dairying. The experience gained by the many experiments made in the feeding of cattle, swine and sheep, and in the testing of those breeds best adapted to produce the highest quality of beef, pork and mutton, has proved a stimulus and a help to the stock industry. The business in eggs and dressed fowls for the table has also been advanced by the publication of results obtained from experiments conducted in the poultry branch.

ASSISTANCE RENDERED TO LEADING EXHIBITIONS.

Very excellent and comprehensive exhibits have been provided by the experimental farms for the exhibitions made during the past year at Wolverhampton and Cork. Collections of all the best varieties of grain grown in the country were shown in glass jars of different forms and sizes. Instructive displays were also made of all the leading sorts in the straw, some being put up in small bunches, properly labelled, and placed under glass, and others so arranged as to display to great advantage the fine long and bright straw so characteristic of the excellent grain grown in the Canadian North-west. A fine collection was brought together of the more important grasses grown in Canada, and an interesting display made of other agricultural products such as pease, beans, Indian corn, flax, millets, buckwheat, hops, &c. Handsome exhibits of honey were also made from the apiary of the Central Experimental Farm at Ottawa.

These were all artistically arranged in suitable trophies by Mr. W. H. Hay, accountant at the Central Experimental Farm, who has shown much skill in this branch

of work. The excellent character of the products thus brought prominently into notice has been a surprise to visitors from all parts of Great Britain, and has done much to advertise the immense agricultural resources of Canada.

One feature which attracted the attention of farmers very much was a collection of samples of grain grown by settlers in different parts of the North-west Territories, with statements from the growers as to the number of acres grown and the yield per acre in each case. These were brought together by the Superintendent of the Experimental Farm at Indian Head, Assa., and were drawn from different parts of an area of country covering more than 180 miles in length. The samples of wheat varied in yield from 40 to 60 bushels per acre, and the oats from 80 to 110 bushels per acre. These large yields and fine samples were the subject of much comment by those interested in agriculture across the sea.

CORONATION ARCH IN LONDON, ENGLAND.

The Dominion Experimental Farms also contributed material for the grand collection of Canadian agricultural products displayed on the coronation arch which was erected in London on the occasion of the crowning of His Majesty King Edward VII. This elegant structure, so well conceived and carried out, received much praise from the press in Great Britain, and was generally conceded to have been one of the most telling efforts ever made to bring Canada prominently before the British public as a great food producing country.

DIVISION OF AGRICULTURE AND LIVE STOCK.

In the agricultural division the work carried on during the past year has been: (*a*) a study of methods of soil improvement, (*b*) experiments to determine the comparative economy of different crops as food producers, both forage or roughage, and concentrates or grain.

The Soil.—The work in soil improvement has been along the lines of cultivation and rotation. The system of shallow cultivation is followed for the most part, and has given excellent results. In comparison with shallow cultivation and a partial fallow or August ploughing, fairly deep ploughing late in the autumn is being tried. No conclusive data are as yet available, indicative of the comparative values of the above methods as soil improvers. A five year rotation is followed.

Crops.—The field crops common to Canada are grown, and a study is being made of their comparative economy as food producers.

In animal husbandry work is being done with dairy cattle, beef cattle, steers, sheep and swine, to determine the comparative economy of different foods as milk and flesh producers, and to determine the most economical rations or food mixtures to use.

Dairy Cattle.—In the case of dairy cattle an experiment to determine the comparative value of purely dairy cattle, Guernseys, as compared with dairy cattle of a slight tendency towards beef as Ayrshires; and beef cattle with milking qualities fairly well developed, that is, dual purpose cattle or dairy shorthorns. A record of the year's work with these herds may be found in the Report of the Experimental Farms for 1902.

In addition, a herd of Canadian cows is being introduced, and small grade herds of each of the above mentioned breeds are being built up and studied.

Steers.—With steers, experiments to determine the most economical age at which to feed off, as well as experiments to ascertain the best methods of housing or stabling the cattle for feeding, are being conducted.

Swine.—In pork production, the work during the year has been a study of cross breds of Large Blacks on Yorkshires, Tamworths, Berkshires: feeding pigs on pastures of different kinds, feeding different food stuffs, and feeding a light versus a heavy ration. In addition to pigs for feeding experiments, a great many pure-bred pigs are bred and sold for breeding purposes to all parts of Canada. The breeds kept are those most suitable for bacon production: Yorkshires, Tamworths, and Berkshires.

Sheep.—Leicesters and Shropshires are bred. The operations during the past year have not been very successful.

DIVISION OF HORTICULTURE.

The unusually severe frosts this year were unfavourable to many things connected with the Horticultural Department. Both large and small fruits suffered considerably. Vegetables were in some cases destroyed and ornamental trees and shrubs were badly hurt, at least temporarily. Notwithstanding the unfavourable spring, however, the fruit crop on the whole was good and many experiments which have been in progress with fruits and vegetables were continued successfully and new experiments begun.

Fruit.—The apple crop was good at the Farm this year, and the fruit was of fine quality. Much information was obtained regarding the large number of varieties under test and many kinds fruited this year which had not done so before. Descriptions are made of these and notes taken on the hardiness and productiveness of the trees.

A successful shipment of autumn apples was made to Glasgow in October. The fruit was sent without cold storage and arrived in almost perfect condition. The apples were packed in bushel boxes in layers with excelsior between.

Considerable attention is being paid to the production of seedling varieties of apples and plums, and to testing seedlings originated by fruit growers in different parts of Canada. The seedling orchard was much increased this year and the young trees are doing well.

For the past five seasons special attention has been given to the cultivation of strawberries. Many varieties have been tried and discarded, while those which succeeded best have been recommended. The crop this year was good and the test a very reliable one. Useful experiments are also being made with other small fruits and with pears, plums, cherries, and grapes. Owing to the cool season the grapes did not ripen well this year.

Vegetables.—Experiments with vegetables are made every year. Amongst the most important this year were those with potatoes, tomatoes, pease and corn. The potato crop was very good, the highest yields in the history of the Farm having been obtained this year. This was largely due to the prevention of blight and rot by the use of Bordeaux mixture, coupled with a good growing season. In a test made with eleven varieties of potatoes the yield was almost doubled by spraying with Bordeaux mixture.

Early tomatoes are the most profitable to the grower, and careful notes have been taken and reports made for the past five years on the earliest varieties of those under

test. This information has proven most valuable to market gardeners, as new varieties are being continually introduced, some of which are earlier than the old sorts. The productiveness of the different varieties has also been determined with tomatoes, as well as with corn and pease.

Forest Belts.—The Forest Belts are becoming a more prominent feature of the Farm as the trees get larger. They extend along its northern and western boundaries. Most of the best varieties of timber trees are being grown, both in mixed plantations and in groups by themselves. The annual measurements were again taken this year of average trees of the different kinds. Tables are published in the Annual Reports giving the time of planting and measurements of the trees. These should prove useful as showing the possible height and diameter a tree may reach in a certain time.

Arboretum and Botanic Garden.—Though not as well known as the other branches of Experimental Farm work, the Arboretum and Botanic Garden is steadily improving in appearance, and the collection getting much larger. There, every tree, shrub, and herbaceous plant that is at all likely to survive the winter is tested and notes are taken on the hardiness and vigour shown. Many things which it was thought would not succeed at Ottawa are doing nicely. The trees, shrubs, and herbaceous plants are well labelled, making it easy to study the different species and varieties. Owing to the favourable season, the trees and shrubs made good growth this year.

DIVISION OF ENTOMOLOGY AND BOTANY.

The work in this division has been energetically prosecuted in the same directions as in past years. The correspondence which increases steadily every year shows the appreciation by farmers and others of the work being done by the officers in practical entomology and botany. Critical studies of the life-histories of many injurious and beneficial insects have been carried on, and the latest developments in remedies for injurious insects have been investigated. Valuable additions have been made to the reference collections of plants and insects, and these collections are now a useful feature of the division. Frequent use is made of them by visitors, correspondents and students.

Continued attention has been given to the testing of useful grasses and many kinds have been grown from foreign countries which it was thought might be useful in Canada and also from seed of native species collected in all parts of the Dominion. There is a constant demand for information concerning fodder plants of all kinds, and it cannot be denied that this is a very important part of agriculture. Appreciating this I instructed the entomologist and botanist to prepare for some of the autumn agricultural exhibitions collections illustrating the most valuable agricultural grasses both in a living state at different stages of development and also in the cured condition of hay. Wherever these were exhibited they created a marked interest, as shown by the constant inquiries made concerning them. In conjunction with this exhibit was a similar educational collection of the best known and most injurious weeds of the farm. The losses from weeds every year in all parts of the Dominion are very great, but the different classes of weeds are few and the methods of dealing with them are comparatively simple when the nature of each is understood. At the exhibitions where these collections were shown an officer of the department was in attendance to give information to all inquirers concerning grasses and weeds, and in this way information was disseminated where it could be of most use.

The services of the Entomologist and Botanist have been much used during the year in addressing meetings on the work of his division in different parts of the Dominion. In June last, at the invitation of the North-west Government, I was pleased to send him to conduct a series of meetings at which the chief subject discussed was 'Noxious Weeds,' and incidentally information was also given on injurious insects and the cultivation of grasses and fodder plants suitable for the district. The region visited was south-western Alberta, a tour being made through the prosperous Mormon settlements. All these meetings were well attended and great interest was shown. At the end of July similar work was done in New Brunswick, and in August in Prince Edward Island. These meetings were also successful and useful, as indicated from the appreciative letters I have received from the places visited.

Among the insects which have demanded special attention during 1902 mention may be made of the following :—

The San José Scale.—The policy of fumigating all nursery stock imported into Canada from countries where the San José Scale is known to exist has been strictly carried out, and I am glad to learn that up to the present time no single instance has been recorded where living scales have been found upon nursery stock which had been treated in the Dominion fumigating houses. The excellent work of the Provincial Government of Ontario, as carried out by their energetic inspector of San José Scale, Mr. Geo. E. Fisher, has resulted in a material increase in our knowledge of methods of controlling this most destructive insect. The treatment which has up to the present time given the best results, is to spray infested trees during the winter with the well known California wash of lime, sulphur and salt, and during the summer with the ordinary kerosene emulsion. We are now in the position to claim that a practical remedy has been found for the San José Scale, which will enable fruit growers who adopt the remedy and practice it consistently to grow good crops on infested trees year after year, and at the same time to rapidly reduce the degree of infestation on their trees.

The Pea Weevil.—An insect which is now causing an immense amount of loss in Canada, much of which can surely be prevented by simple and well known means is the Pea Weevil, usually called by farmers "the Pea Bug." The entomologist has done good work by stirring up a keen interest in this matter and if he can succeed in getting farmers to sow nothing but seed which has been fumigated with bi-sulphide of carbon, so that no living weevils are carried to the fields, and in getting pea growers to harvest early, thresh at once, and then treat their seed, there should be even in a single year an appreciable improvement in the condition of the pea seed trade of Canada. The loss from this insect in the Province of Ontario alone during the past ten years has amounted to about seven million dollars. From fear of the attacks of the pea weevil farmers are now giving up the cultivation of peas in many districts, and looking for substitute crops. The area sown with peas in Ontario was, in 1902, 70,000 acres less than in 1901. This is an unfortunate state of affairs. The pea crop is one of special value and no other crop quite takes its place. It is of special value in connection with the feeding of hogs and for export for the European market. The Grass-pea which has been strongly recommended as a substitute appears to be a rather uncertain cropper in some districts. The Entomologist believes that the relinquishing of the cultivation of a valuable crop because it is attacked by enemies is a wrong principle and is therefore devoting his best energies to induce farmers to adopt the simple remedies which he is advising and which are known to be effective.

The Entomologist reports that on the whole the season of 1902 was characterized by absence of injury to crops by many of the well known pests of the farm and garden.

DIVISION OF CHEMISTRY.

As in past years, the work of the Division of Chemistry of the Dominion Experimental Farms has included investigations in all the more important fields of agriculture—general farming, dairying and stock feeding, poultry fattening and fruit growing.

Soils.—A limited number of virgin—*i.e.*, uncropped, unmanured—soils from newly settled districts of the Dominion have been examined, furnishing data as to natural characteristics and probable suitability for the various farm crops.

As far as time permitted, a preliminary examination has been made of such samples of soils received during the year from farmers. This has usually consisted in the determination of nitrogen, humus and lime, in addition to a test for 'sourness.' Notes also upon the physical texture or tilth—a most important matter—are made. In certain instances a more complete analysis has been made, including an estimation of the available mineral plant food present. This latter is ascertained by the use of the one per cent citric acid solution, a solvent, as shown by Dyer, to be approximately equal in strength to that of the exudations from the rootlets of our more common farm crops.

Enrichment of Soils by Clover.—A series of pot and plot experiments has been commenced to ascertain directly the value of clover in increasing the soil's store of nitrogen and humus. The soil has been made uniform throughout the series and its nitrogen and humus content determined. At the close of each season the clover will be taken up, weighed and returned to its respective pot or plot, as the case may be. A yearly analysis will show the direct fertilizing value of the clover.

The Relation of Cover Crops and Surface Tillage to the Moisture Content of Soils.—To obtain further knowledge on this subject—one of great interest to farmers and orchardists—the investigation begun in 1901 has been continued during the past season. The results published last year receive for the most part corroboration from this season's work. The effect on the soil's moisture content by a permanent sod (two years old) is very well brought out by this series of experiments.

Sugar Beets.—In view of the re-awakened interest in beet sugar manufacture in Canada, the sugar-content and degree of purity of the juice of beets grown in various parts of the Dominion have been determined. Among the beets examined are roots from Prince Edward Island, Ontario, Manitoba, Alberta and Assiniboia. The results, speaking generally, go to show that over large areas in Canada beets of sufficient richness and purity for factory purposes—quite the equal of those grown in the United States and the continent of Europe—can be raised.

Fodders and Feeding Stuffs.—The more important materials of this nature examined during the past year are:—

1. Milling and manufactory by-products, &c., *e.g.*, bran, comparing the nutritive value of that from the North-west with that made in Ontario from eastern wheat; patent calf meals and condiments; gluten meals and gluten feeds, &c.

2. Roots.—The relative nutritive value of the various farm roots, as determined by their percentage of dry matter and sugar, is again under investigation.

3. Ensilage.—In course of analysis there are several mixtures, consisting of clover, corn and sunflowers in varying proportions, as well as an ensilage composed of peas and oats.

4. Corn.—The determination of the feeding value of corn grown in hills as compared with that in drills is again being made.

Flours.—Interesting and valuable information is being obtained from the comparative analyses of flours manufactured in Washington and Oregon and in our own Northwest. This investigation is being made with a view to furnish information that will prove of service in developing the export trade of Canadian flour to China and Japan.

Butter.—In view of the recent enactment in England fixing the moisture content of butter to be accounted genuine at 16 per cent, it was thought desirable by the Commissioner of Agriculture and Dairying to ascertain the percentage of water in Canadian creamery butter as ready for export. At his request we accordingly analysed samples of butter, amounting to 103 in all, collected at creameries and warehouses. The results are exceedingly satisfactory and show that Canadian butter falls well within the limit allowed by the English law. The average per cent of water found in the 103 samples of Canadian butter was 12·33. From a comparison with data obtained from butters made in Europe and sold on the English market, it would appear, indeed, that Canadian creamery butter is much *drier* than that usually offered for sale in England.

The Composition of Honey.—In 1901 a series of experiments was commenced to ascertain the differences of composition, if any, between ripe and unripe honey—that is, from fully capped and uncapped comb. It was shown that the unripe or immature honey contained the more water and possessed a tendency to ferment. Further investigations have been made on this subject during the past season.

Poultry Fattening Experiments.—In conjunction with the poultry division, a large number of feeding tests have been made to ascertain (1) the relative merits of different breeds for fattening; (2) the feeding value of differently compounded rations, employing mixtures of ground oats, ground barley, meat meal, ground clover, &c., with and without skim milk; (3) the economy of using ground as against whole grain; (4) the advantages, if any, of feeding in crates or coops as compared with feeding in pens offering opportunities for limited exercise. The results of these experiments, it is thought, will be of particular interest and value at the present time, when so much attention is being paid to chicken fattening.

Clover as a Fertilizer.—A bulletin with this title has been written conjointly by the Director and the Chemist, embodying the field and laboratory results obtained during the past six years upon the manurial value of clover. It was issued in July, 1902, and has elicited much favourable comment.

Chemistry of Insecticides.—A newly exploited material known as 'Bug Death,' and advertised as a substitute for Paris green, has been analysed and reported on.

Among other investigations relating to insecticides and fungicides may be mentioned the analysis of various brands of cyanide of potassium for sale in Canada—a material now largely used in fumigation for the San José scale. An examination of Bordeaux mixture made with washing soda (commercial carbonate of soda) instead of lime has been made. This preparation has been used with good effect for blight on potatoes in Europe, and may be useful here, especially in places where it is difficult to obtain lime.

Well waters from Farms and Dairies.—Over 100 samples have been examined in the farm laboratories during the past year. This useful and popular work has had the effect of calling attention to a matter of vital importance, namely, the necessity of a pure water supply if health and thrift are to be maintained on the farm, and pure wholesome dairy products obtained.

Toxicological Work.—During the year several cases of suspected poisioning have been examined at the instance of the Chief Veterinary Inspector.

Samples received.—In all, 543 samples have been entered in the laboratory register for examination during the past year. Of these, 432 were received from farmers, and 111 in connection with various investigations undertaken by the Experimental Farms.

POULTRY.

In this department experimental work, commenced some years ago, with the view of ascertaining the breeds of fowls which make the best winter layers and most rapid flesh formers has been continued. Several crosses, with the same object, have also been made with more, or less success. Results so far obtained in this direction, lead to the conclusion that the type of table fowl, best suited to the requirements of the foreign market is not yet a fixed one. Investigation during the past three winters into the cause, or causes of the numerous weak germs in early spring eggs and the subsequent mortality among the chickens hatched from these eggs, has been productive of interest, ing and useful results. Experimental feeding of chickens of various breeds, on rations of different quantities and composition, has been continued with most gratifying success and information has been obtained that cannot fail to be of benefit to the farmers of the country. The rapid development of poultry breeding, as a branch of farm work-opens new and large fields for experimental investigation.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES.

The experiments conducted at the Experimental Farm at Nappan, N.S., during the past year have covered many lines of work useful to the farmers of the maritime provinces. Trials have been made of different sorts of cereals, fodder corn field roots and potatoes with the object of finding out which are best adapted to the climatic conditions which prevail in these provinces. Many samples of those sorts which have been found most promising have been distributed among the farmers of this section of the country for trial.

Experiments have been conducted with natural and artificial fertilizers on many different sorts of crops and additional experience gained in connection with this work. A considerable area of the upland on the farm has been cleared, and a part of it brought under cultivation thus increasing the land available for crop.

The dairy herd has been well maintained and a yearly report is made of the milk obtained from each cow, and the profit resulting therefrom. A sufficient number of steers are purchased each year to consume the coarse fodders produced on the farm. By judicious use of the manure thus obtained, and the frequent ploughing under of clover, supplemented by small quantities of artificial fertilizers, the land is improving in

quality and crop-producing power. Further experiments have been made in the feeding of swine and sheep.

The orchards in charge of the Horticulturist have become well established, are making good progress, and many of the trees have fruited well during the past season. From this source a large number of varieties of fruit have been obtained, the most promising of which have been exhibited with other farm products at the principal fairs held in the maritime provinces. Samples have also been prepared and forwarded to the large exhibitions held during the year in Great Britain.

Many experiments have been conducted with different varieties of small fruits and vegetables the results of which will appear in the Annual Report of the Experimental Farms for 1902. A number of sample hedges have been grown on this farm to ascertain which are best suited to the climate of Nova Scotia. These together with a large assortment of ornamental trees and shrubs, and a considerable collection of perennial and annual flowers serve to make this farm a beautiful and attractive place throughout the growing season.

EXPERIMENTAL FARM FOR MANITOBA.

Further experiments with all the more important agricultural crops have been carried on at the Experimental Farm at Brandon, Man. These have included the testing of all the promising sorts of wheat, oats, barley and pease, also varieties of Indian corn, turnips, mangels, carrots and sugar beets. The trials made with all these different crops are mainly for the purpose of finding out which are the most productive and the earliest to mature so that farmers may be informed as to which are likely to be the most profitable to grow. Further comparative tests have also been made with grasses and other fodder plants, field corn and roots. These experiments, devised for the purpose of learning what sorts are best suited to the climate of Manitoba, receive much attention from visiting farmers who come in large numbers every summer to gather information from the experience gained at the farm.

Comparative trials have been made with different sorts of vegetables, and lists of those found to be valuable in Manitoba, have been published in the annual report. In this way farmers have been advised as to the varieties most suitable for their gardens.

A large quantity of the seeds of the most useful forest trees for this province were collected in the autumn and will be available for distribution later. Many young trees and shrubs have been grown from seeds and cuttings to be sent out to applicants for planting in the spring. These distributions, which are made annually, have greatly promoted a love for trees and shrubs among the farmers of Manitoba.

In the efforts being made to improve the quality of the native plum of Manitoba a large number of seedlings have been grown, and among these there are some promising sorts both for quality and earliness. Further trials have been made with new sorts of small fruits with much success. The orchards of cross bred and seedling apples have been greatly enlarged, the trees are proving quite hardy and their fruiting is anticipated with much interest.

Further experiments have been carried on in the feeding of steers to gain information as to how beef can be most economically produced with the foods generally avail-

ble in Manitoba, similar methods have been followed in the feeding of swine and poultry.

The Brandon Experimental Farm has furnished considerable quantities of excellent grain both in straw and cleaned, of many different sorts, for the larger exhibitions in Great Britain in which Canada has taken part.

Under my instructions a very large number of young forest trees have been produced from seed at Brandon for the forestry branch of the Department of the Interior.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

During the past year the agricultural experiments conducted at Indian Head have covered a wide field. They have included trials of many of the more promising sorts of grain, also fodder plants, field roots and potatoes. From these tests much useful information has been gathered as to the relative productiveness and earliness of the different varieties under trial. Indian Head has become a large centre for grain raising, the crops in the district are among the best produced in the Territories, and the advantage it has secured in this respect, has been partly due to the good influence of the work of the experimental farm located there.

At this farm demonstrations have been made every season for many years past, as to the best methods for the preparation of the soil, the best time for seeding and the best sorts of grain to grow. The results of different methods of treatment have been shown side by side and farmers have been advised to follow that treatment which has produced the best results. The influence of that teaching is clearly seen throughout this locality in the good methods generally practised which are almost invariably followed by good crops. Nearly two million bushels of wheat were shipped from this small town during the past season.

The experiments with grasses have been a great success, a large acreage of Awnless Brome grass and Western Rye grass has been grown, large crops of hay have thus been secured as well as good pasturage for cattle.

Among the cattle at this farm are Shorthorns, Ayrshires and grades, and good bulls are kept for the improvement of stock in the district. Feeding experiments are conducted with steers and swine to determine the cheapest methods of bringing these animals to a satisfactory weight for market.

The Siberian crab apples have again fruited abundantly, but most of the varieties are small; they are, however, of excellent quality for jelly. None of the larger growing cross-bred sorts have yet fruited, but the trees are growing well and seem to be quite as hardy as those which have stood the test of the winters of the past ten or twelve years. These orchards are being much enlarged and many new sorts added to the collection from year to year.

Many packages of young trees and shrubs are sent to farmers annually, and a large quantity of tree seeds similarly distributed with suitable instructions for planting and growing. The results of this work persistently carried out are now manifest in the largely increased number of plantations about farmers' homes. A large number of sample packages of grain, grass seeds and potatoes have also been sent out out for trial during the year to farmers in all parts of the territories. A large number of trees have been grown at this farm also under my instructions to assist the forestry experiments being carried out by the Department of the Interior.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

At the farm established for this province at Agassiz much attention has been given to fruit growing and to the testing of varieties to determine which are the most profitable sorts to grow in that climate. A very large collection has been brought together, numbering over three thousand in all. To make this work thorough, fruit trees have been obtained of many varieties from nearly every country in Europe, from all parts of the United States and Canada, also from Australia and New Zealand. The orchards are making rapid growth and many of the trees are coming into bearing. At the recent exhibition in New Westminster about 350 varieties of apples were exhibited, all grown at the experimental farm at Agassiz, also a large collection of pears and plums. It is doubtful if such a large number of varieties has ever been brought together before in Canada at any single exhibition. As these varieties fruit, their quality is tested and reported on, and after sufficient trial the inferior sorts are discarded. The information thus gained and recorded from year to year must prove very useful to the fruit growers of British Columbia. Apples have not been a heavy crop this season: pears have done fairly well: plums have borne heavily, but the plum rot has been destructive to the crop. Cherries have done fairly well, and small fruits have given abundant yields.

Experiments have been carried on with all the more important farm crops to find out those most productive in that district, and samples of those varieties which prove of the greatest value are distributed among the farmers of that province for test. In this way those sorts best adapted to the country are being rapidly disseminated with good results.

Trials have also been made of different grasses, clovers and other fodder crops, and in the use of fertilizers for farm crops and fruit trees, and much information valuable to the country has been gained.

The cattle kept here, chiefly shorthorns, are doing well. Sheep, pigs and poultry are also under trial.

Plantations have been made of eastern timber trees, also of many ornamental trees and shrubs, and most of these are making good growth. Many varieties of nuts are grown and a number of different sorts have borne fruit. A large assortment of vegetables, including all the leading kinds, have been tried. The results of these branches of work will be found in detail in the Annual Report of the Experimental Farms.

CATTLE TRADE FOR YEAR ENDED SEPTEMBER 30.

IMPORTATION OF LIVE STOCK.

The importation of horses and mules, cattle, sheep and swine into the Dominion reported during the past season was as follows:—

Horses and mules	26,391
Cattle	17,712
Sheep	142,581
Swine	*162

The above were brought in at various points as shown in detail in the reports of the Chief Veterinary Inspector. (See Appendix No. 13).

*In addition to the foregoing number of hogs which were imported free, there were 119,750 lbs. of live hogs imported dutiable, valued at $7,089, the rate of duty on which was 1½cts. per lb. The number of hogs represented by this weight is not stated.

EXPORTATION OF LIVE STOCK TO EUROPE.

The exportation of live stock from Canadian ports for the year ended September 30, 1902, was as follows :—

Horses	3,861
Cattle	166,412
Sheep	107,114
Swine	Nil.

EXPORTATION OF CATTLE TO THE UNITED STATES.

The number of Canadian cattle exported to the United States during the past seven years, was as follows :—

1896	1,646
1897	57,857
1898	88,605
1899	85,240
1900	86,898
1901	46,244
1902	31,743

ARCHIVES.

The work of this branch is being prosecuted systematically, steadily and actively, and the collection of archives is carried on continuously both in London and Paris.

The following is a list of the books received during the past year :—

From London—

Nova Scotia General Correspondence to 1728.
Nova Scotia Journals of Assembly to 1759.
Nova Scotia Journals of Council to 1800.
Despatches to Governors to 1840.
New Brunswick General Correspondence, 1797 to 1801.

From Paris—

Collection de Moreau de St. Merry.
Memoirs, 1540 to 1676.
Etat Civil Louisbourg, 1722 to 1754.

III.—PATENTS OF INVENTION.

The following comparative tables show the transactions of the Patent Branch of the Department of Agriculture, from the calendar year 1892, to the year ending October 31, 1902 :—

Years.	Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignments of Patents.
		Patents.	Certificates.	Total.		
1892	3,176	3,417	415	3,832	242	1,500
*1893	2,614	3,153	292	3,445	229	1,345
1894	3,291	2,756	462	3,218	301	1,445
1895	3,387	3,074	422	3,496	343	1,550
1896	3,728	3,488	413	3,901	306	1,420
1897	4,300	4,013	284	4,297	377	1,551
1898	4,200	3,611	262	3,873	363	1,657
1899	4,305	3,151	412	3,563	311	1,467
1900	4,628	4,522	482	5,004	283	1,914
1901	4,817	4,766	551	5,317	302	2,323
1902	5,301	4,391	510	4,901	317	2,339

* For 10 months only.

Detailed Statement. Patent Office Fees.

Years.	Patents.	Assignments.	Caveats.	Copies.	Subscription to 'Patent Record.'	Notices to Apply for Patent.	Sundries.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1892	71,840 84	2,794 66	1,270 13	793 32	236 52	89 96	195 33	77,216 76
*1893	58,441 81	2,633 71	1,244 70	796 15	285 18	337 81	110 73	63,850 19
1894	73,061 77	3,142 74	1,793 40	764 07	347 21	1,449 80	123 57	80,682 56
1895	78,223 52	3,194 00	1,854 35	761 54	245 98	1,951 30	129 79	86,358 48
1896	85,060 61	3,130 56	1,790 65	898 27	420 60	2,245 79	57 04	93,532 52
1897	93,298 16	3,250 23	2,108 57	969 33	252 53	2,110 89	128 21	102,117 92
1898	91,176 44	3,641 00	1,935 74	706 50	266 44	1,463 10	172 73	99,361 95
1899	98,669 92	3,781 71	1,533 25	1,028 80	198 05	1,912 00	137 83	107,261 56
1900	104,848 96	4,255 40	1,405 00	932 54	552 71	1,742 70	115 15	113,852 46
1901	109,985 59	4,506 07	1,479 25	882 87	592 47	2,484 90	133 22	120,064 37
1902	119,766 43	5,079 20	1,565 35	1,112 59	327 95	1,883 00	162 30	129,896 82

* For 10 months only.

The Patent Office fees received during the year ended October 31, show a surplus of $79,047.84 over the working expenses of the office as per subjoined table.

Receipts.	$ cts.	Expenditure.	$ cts.
Cash received	129,896 82	Salaries	33,728 91
Cash refunded	2,783 11	'Patent Record'	14,336 96
			48,065 87
		Receipts over expenditure	79,047 84
Net cash	127,113 71		127,113 71

The following is a table of the countries of residence of the patentees for the years named:—

Countries.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
Canada	671	685	661	707	740	756	710	601	707	744	654
England	298	206	177	179	215	266	261	205	254	256	239
United States	2,227	2,061	1,731	1,980	2,270	2,666	2,312	2,038	3,216	3,423	3,164
France	26	24	24	21	24	26	39	36	40	50	45
Germany	106	88	108	102	117	126	124	112	157	125	100
Other countries	89	89	55	85	122	173	165	159	148	168	189
Total	3,417	*3,153	2,756	3,074	3,488	4,013	3,611	3,151	4,522	4,766	4,391

*For 10 months only.

The Canadian patentees were distributed among the provinces of the Dominion as follows:—

Provinces.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
Ontario	464	437	404	451	430	464	383	310	396	407	373
Quebec	131	151	162	177	201	178	171	160	164	185	148
New Brunswick	19	23	13	13	12	20	26	7	14	26	14
Nova Scotia	16	29	15	19	32	22	27	18	21	17	26
Prince Edward Island	1	3	2	6	2	2	4	8	1	0	1
Manitoba and the North-west Territories	22	26	38	18	28	36	45	50	42	52	40
British Columbia	18	16	27	23	35	31	54	48	69	57	52
Total	671	*685	661	707	740	756	710	601	707	744	654

*For 10 months only.

Patents issued to residents of Canada, with the ratio of population to each patent granted :—

Provinces.	Patents.	One to every
British Columbia	52	3,436
Ontario	373	5,852
Quebec	148	11,141
Manitoba and North-west Territories	40	11,665
Nova Scotia	26	17,676
New Brunswick	14	23,651
Prince Edward Island	1	103,259
Total	654	

Statement of the number of patents issued under the Act of the session of 1892, 55-56 Vic., chap. 24, on which the fees are paid for periods of six, twelve or eighteen years, at the option of the patentee; and of patents on which certificates of payments of fees were attached after the issue of patents originally granted for periods of five and ten years.

Years.	Periods for which the Fees were paid on first issue.			Patents on which Certificates were attached after issue.			
	6 years.	12 years.	18 years.	6 years.	12 years.	5 years.	10 years.
1892 (six months ended December 31)	2,141	3	35		3	387	25
1893 (ten months ended October 31)	3,098	9	46		3	279	10
1894 (twelve months ended October 31)	2,701	9	46		4	433	25
1895 " "	3,049	5	20			416	6
1896 " "	3,443	11	34	2		401	10
1897 " "	3,981	8	24	15	3	262	4
1898 " "	3,586	3	22	176	9	77	
1899 " "	3,125	3	23	291	13	108	
1900 " "	4,489	4	29	366	21	101	
1901 " "	4,719	8	39	408	31	112	
1902 " "	4,362	2	27	412	39	59	

The preceding tables show that there has been a large and steady increase in the transactions of the Patent Office during the past ten years. The total revenue for the year ending October 31, 1902, was $129,896.82, exceeding all previous years; resulting in an increase of $9,832.45 over the preceding year, and a surplus of $79,047.84 over the expenditure.

The total number of reports issued by the examiners during the year was 6,474.

Out of the total number of patents granted during the year, there were 3,164 issued to inventors resident in the United States, being 72 per centum of the whole issue.

Patentees who are resident in foreign countries, continue to avail themselves of the privilege granted under section 8 of 'The Patent Act,' by giving notice of intention to apply for patents in Canada. The number of these notices registered during the year, was 357, yielding a revenue of $1,914.

Section 37 of 'The Patent Act,' confers on the Commissioner the power of granting to patentees, or holders of patents, extensions of time in which they may import, and within which they must manufacture their inventions in Canada. The number of cases in which satisfactory reasons were shown to justify the granting of the importing privilege during the year, was 1,716, and of the manufacturing privilege, 3,417—the former being an increase of 112, and the latter 1,077, over the preceding year.

The 'Canadian Patent Office Record' continues to be published monthly. It contains a transcript, with drawings, of all claims of patents granted, dates of filing, dates of issue, and length of term for which fees have been paid; also names and residences of patentees, as well as containing a list of registered copyrights, trade marks and designs. This publication is of great and increasing value to all who are interested in patents, trade marks, copyrights and designs. It affords convenient and easy reference to the claims of all patents granted in Canada, and thus enables both inventors and the public, to see exactly what is patented.

This publication is supplied to foreign patent offices, and is also sent without charge to a large number of free libraries in Canada, and in foreign countries, with the object of diffusing in the public interest, the information therein contained. The publication is also furnished to the public at $2 per annum, or 20 cents for single monthly numbers.

This branch of my department is indebted to the British and United States Patent Offices, for their weekly official reports, which are of material assistance to the examiners and other officers in the discharge of their respective duties.

The classification of Canadian patents, and the general index of inventions from June 8, 1824 (the first Canada patent) to December 31, 1901, is fast nearing completion. It is expected that the latter will appear in print before July 1, 1903.

It may be remarked, that the classification of patents has been a very onerous undertaking, embracing as it does, all Canadian patents from the beginning of the patent office down to the present period; but the time and expense involved in the preparation of this compilation, will be amply repaid in its usefulness to the examiners in the discharge of their duties; insuring a more reliable examination and a great saving of time in making the necessary researches.

It must be understood, that the government undertakes on behalf of the inventor, not only to give him a patent, if his invention possesses novelty, but to conduct a painstaking examination, in order to ascertain what the fact may be in that regard; consequently, every facility should be afforded the examiners to enable them to reach that end.

I have again to direct the attention of patentees and their solicitors, to the necessity of remitting partial fees before the expiry of the six and twelve years' terms, otherwise the patents will cease and determine, the Commissioner not being vested with the discretionary power, under any circumstances, to revive them. A revival can only be secured by a private Act of Parliament, the obtaining of which entails considerable expense to the patentee. It may further be added that the Committee on Private Bills usually discourages applications of this kind, on the ground that no one should be denied the right of using or vending an invention which has become the property of the public. Exceptional cases may arise, however, in which the patentee or the holder of the patent may be justly entitled to relief from parliament.

It is in the interest of both the applicants and the office, that great care should be taken by applicants and their attorneys, in the preparation of the papers and drawings which are required by the rules and forms.

With a view of bringing up the work which has unavoidably fallen into arrears in the examiners' division, owing to unforseen circumstances, three new assistant examiners will be added to that staff.

IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT of fees received by the Copyright and Trade Mark Branch from November 1, 1901 to October 31, 1902.

Months.	Trade Marks.	Copyrights.	Designs.	Timber Marks.	Assignments.	Copies.	Total.
1901.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
November	1,264 75	69 00	56 00	4 00	37 00	16 00	1,446 75
December	1,440 50	100 50	105 00	2 00	27 00	13 00	1,688 09
1902.							
January	1,280 15	94 15	70 00	4 00	117 75	2 50	1,568 55
February	1,272 25	75 50	110 00	6 00	22 50	28 00	1,514 25
March	1,338 50	61 50	135 50	2 00	29 00	12 50	1,579 00
April	1,583 65	84 50	48 00		31 15	45 00	1,792 30
May	1,235 26	87 00	51 00		15 50	10 50	1,399 26
June	1,685 88	81 50	35 00	2 00	33 00	35 00	1,872 38
July	1,111 00	101 50	30 00	16 00	18 00	28 50	1,305 00
August	736 00	107 00	70 00	10 00	20 00	11 00	954 00
September	932 00	116 00	81 00	9 00	17 00	6 00	1,161 00
October	1,143 10	105 50	95 00	4 00	57 00	18 00	1,422 60
	15,023 04	1,083 65	886 50	59 00	424 90	226 00	17,703 09

The following table shows a comparative statement of the business of this Branch from 1891 to October 31, 1902, inclusive:

Year.	Letters Received.	Letters Sent.	Copyrights Registered.	Certificates of Copyrights.	Trade Marks Registered.	Certificates of Trade Marks.	Industrial Designs Registered.	Certificates of Industrial Designs.	Timber Marks Registered.	Certificates of Timber Marks.	Assignments Registered.	Fees Received.
												$ cts.
1891	1,651	2,385	541	174	307	307	129	129	11	11	51	9,236 96
1892	1,773	2,300	536	159	294	294	30	30	27	27	66	9,496 29
1893	1,432	2,070	475	126	257	257	41	41	19	19	55	8,913 33
1894	1,882	2,720	546	216	311	311	39	39	20	20	77	9,463 63
1895	2,184	3,279	601	163	374	374	52	52	20	20	70	11,673 26
1896	2,185	3,437	653	212	331	331	68	68	14	14	161	10,579 54
1897	2,606	3,548	756	273	446	446	75	75	13	13	94	14,101 93
1898	2,576	3,453	734	275	423	423	136	136	15	15	114	13,535 17
1899	2,487	2,910	702	237	430	430	112	112	5	5	117	14,161 28
1900	2,679	3,213	893	247	447	447	126	126	22	22	136	14,782 53
1901	2,605	3,211	888	249	521	521	146	146	24	24	183	16,823 26
1902	2,687	3,257	900	196	528	528	164	164	26	26	222	17,703 09

The total number of registrations of copyrights, trade marks, industrial designs and timber marks, including registrations of assignments, was 1893, during the year ended October 31, 1902. This consisted of 900 registrations of copyrights, 528 registrations of trade marks, 164 of industrial designs and 26 of timber marks. There were also issued 196 certificates of copyrights, 53 registrations of interim copyrights, and 12 certificates, 7 registrations of temporary copyrights, and 1 certificate. The total number of assignments of these different rights recorded was 222.

The correspondence of this branch of the department amounted to 2,687 letters received; 3,257 letters sent.

The amount of fees received during the year, as certified by the accountant, amounted to $17,703.09.

V.—PUBLIC HEALTH AND QUARANTINE.

The threatenings of the bubonic plague and of small-pox mentioned in my last annual report have continued throughout this year, and have been supplemented by the threatening of cholera.

The maintenance of strict precautionery measures, ordinary and special, for the sanitary protection of the country has therefore been requisite.

I have been able to make this year a memorable one in the evolution of the protection of the public health by carrying into effect my recognition of three important principles, viz., disinfection at ports of departure, the adoption of electric lighting of my stations, and the division of steerage detention buildings into staterooms. Full details on these points, and the considerations which have led me to them, will be found in the report of the Director-General of Public Health annexed hereto.

The increasing public demand for governmental recognition of the importance of hygiene and preventive medicine is instanced by the fact that I am in receipt of a copy of a resolution, adopted by the Canadian Medical Association at its annual meeting in Montreal last month, urging the consideration by the government of the expediency of creating a separate Department of Public Health, under one of the existing ministers.

The United States Government has this year taken action in this matter by an Act of Congress, making the Marine Hospital Service the Public Health and Marine Hospital Service.

Special precautions.—In consequence of the marked threatening of infectious diseases on both our coasts and on our frontier, circulars of warning and instruction were issued from time to time to the transportation companies and to the Quarantine and Customs officers. The exemption from routine inspection of vessels arriving from New York and ports north thereof—usual in healthy years—has not been permissable this year, owing to the continued presence of small-pox in the New England and neighbouring states. So on the Pacific side vessels from San Francisco and ports north thereof have been inspected on account of the prevalence of small-pox in the north western states south of us, and of plague in San Francisco. Since the subsidence of small-pox on that side in August last, vessels from U. S. ports north of San Francisco (including Puget Sound and Alaskan vessels) have been again temporarily exempted by me from routine inspection. Inspection, however, of all vessels from San Francisco is continued on account of the presence of plague in that city.

Frontier and extra coast inspections for small-pox on threatened parts of the international border and of the seaboard have been maintained more or less throughout this year, as the condition to the south of us seemed to me to require.

Such extra inspections I instituted at the following places: Louisbourg in Cape Breton; in Nova Scotia, Canso, Yarmouth, Weymouth, Digby, Bear River and Clementsport; in New Brunswick, McAdam Junction; in Prince Edward Island, Charlottetown, Georgetown and Summerside; in Ontario, Cornwall, Erieau and Rondeau, Owen

Sound, Thessalon, Bruce Mines, Sault Ste. Marie, Port Arthur, Fort William, Mine Centre and Rainy River; in Manitoba, Sprague, Emerson, Gretna, Morden, Crystal City, Killarney, Boissevain, Deloraine and Waskada; in the North-west Territories, Carnduff, North Portal, Coutts and Macleod; and in British Columbia, Gateway, Tobacco Plains, Rykerts, Rossland with Northport, Grand Forks with Cascade and Carson, Greenwood with Midway and Myer's Creek, Huntingdon and Blaine; also Log Cabin on the White Pass and Yukon Railway for the protection of northern British Columbia and the Yukon Territory.

In addition to the officers holding these posts, Dr. James Patterson of Winnipeg acted for me in the management and suppression of small-pox in the North-west Territories.

The bubonic plague in San Francisco has claimed thirty-one reported victims within the last four months, bringing the total of deaths from that disease in that city to over eighty. This disease has prevailed during the year in China and in India. It has been present in Australia, Brazil, Egypt, Great Britain, the Hawaiian Islands, Japan, Madagascar, Mauritius, the Philippine Islands, Russia, South Africa, Turkey, and the United States.

Cholera has prevailed in Arabia, Borneo, Ceylon, China, Dutch India, Egypt, India, Japan, Korea, Palastine, the Phillippine Islands, Russia, and the Straits Settlements.

Small-pox has prevailed as a pandemic. It continued to threaten us on both Atlantic and Pacific coasts and along our international frontier.

Amongst the events of the year may be cited the fact that in March last I fixed the period of observation and quarantine for smallpox at eighteen days. This exceeds somewhat the usually accepted period, but increases the security. It is also a period which will meet the requirements of inland health organizations.

The diseases which have been brought to my maritime quarantines during the year have been small-pox, yellow fever, enteric fever, scarlet fever, diphtheria, measles, chickenpox and beri-beri.

In not a single instance during the year has any infectious disease been transmitted from one to another in quarantine. Nor did any quarantinable disease gain an entrance through any of my organized maritime quarantine stations.

While not expecting or hoping to keep out by land quarantine a disease with a period of incubation of about two weeks, as small-pox has, and especially a mild type of that disease which does not prevent the patient moving freely about, my frontier inspections have done great good. Actual cases of disease have been kept from entering, the exposed have been protected by vaccination, and the knowledge of the inspection has caused countless travellers from the United States to be vaccinated before leaving for Canada.

In these ways great good has been done with a minimum interference with travel and traffic.

Details of the year's work at my different stations, at the Tracadie Lazaretto, and under the Public Works Health Act, will be found in the reports of my officers annexed hereto.

VI.—STATISTICS.

The Statistical Division of the Department of Agriculture is based upon the Union Act of 1867 which specifically assigns Census and Statistics to the exclusive authority of the Parliament of Canada.

In accordance with this assignment of duties the Dominion Parliament passed Chap. 21 Acts of 42 Victoria.

In the Revised Statutes of Canada, 1886, this Act forms Chaps. 58 and 59. Chap. 60 is the authority for the collection of Criminal Statistics.

Chapter 59 Revised Statutes of Canada provides (1st section) for the collecting, abstracting, tabulating and publishing of vital, agricultural, commercial, criminal and other statistics by the Department of Agriculture.

The fourth section gives the Minister of Agriculture power to arrange with any Lieut.-Governor in Council, or with any provincial organization for the collection and transmission of information collected under provincial systems.

The fifth section says:

'The Minister of Agriculture may, in collecting statistics in the manner provided by this Act, call upon any and all public officers to furnish copies of papers and documents and such information as lie respectively in the power of such officers to furnish, with or without compensation for so doing, as is regulated, from time to time, by the Governor in Council.'

The sixth section provides for the publication of an abstract and record of the various departmental or other public reports and documents.

The seventh section gives power to the Governor in Council to authorize the Minister of Agriculture to cause special statistical investigations as regards subjects, localities or otherwise to be made.

The eighth section empowers the Minister of Agriculture to cause all statistical information obtained to be examined, and any omissions, defects, or inaccuracies discernible therein to be supplemented and corrected as far as possible.

The ninth section is as follows:—

'Everyone who wilfully gives false information or practices any deception in furnishing information provided for by this Act shall, on summary conviction before two justices of the peace, be liable to a penalty not exceeding one hundred dollars.'

By another section of the Act, the Governor in Council is empowered to appoint temporary clerks or employees for an indefinite period.

The evident aim and intention of these several Acts is the establishment of a Bureau of Statistics, which shall form part of the Department of Agriculture, and in which shall be consolidated the general statistics of the country, the officers in charge of which shall have every facility necessary to enable them to obtain the needed statistics from the several departments of the federal government, and of the provincial governments, or by special statistical investigations.

A general collection and issue of Dominion government statistics by the statistical division, as directed by the statute, would establish uniformity, coupled with increased accuracy and large economy in compilation.

The statistical division has collected during the year, material to enable it to provide a system for collecting agricultural statistics throughout the Dominion supplementary to the systems employed in some, but not all of the provinces. If a good plan insuring accuracy and early publication could be adopted in Canada, the value to farmers and business men of this information can hardly be over-estimated. The crop reports of the United States, going over all Europe monthly, are a good advertisement of the agricultural possibilities of the country, while an early knowledge of the actualities gives to growers and dealers an advantage, in connection with output and prices, which is of direct pecuniary value.

The frequency with which applications are made to the statistican for information about the crops of Canada, coming as these applications do both from within the Dominion and from outside countries, suggests the advisability of establishing in the near future a statistical inquiry dealing with crops, prices, cost of transportation and like matter.

A great increase in the number of applications for statistics is one feature of the year's experience.

The greater interest taken in Canada is seen in this increased demand.

Annual publications call for statistics of Canada to a much larger extent than in former years. One instance of this may be given. Whitaker's Almanac, which in former years, contented itself with publishing half a dozen pages about Canada, has arranged with the statistican to publish a special Canadian edition with about five times as much Canadian matter in it.

Other publications in the United States and in Europe have shown their increased interest in Canada in the same way.

HEALTH STATISTICS.

No steps have been taken as yet to provide a better system of collecting vital statistics than that which was abolished in 1891.

In the Provinces of Ontario, Quebec, New Brunswick, British Columbia, Manitoba, and the North-west Territories, the provincial and territorial authorities have placed on the statute books Acts dealing with the collection of vital statistics. Section 4 of chap. 59 Revised Statutes of Canada, already quoted, gives the necessary legislative authority to enable my department to join the provincial authorities in making arrangements for the better collection of different kinds of statistics, without limiting the power of my department to enter upon provincial fields not worked by provincial organizations. By a combination of forces the result would be more satisfactory than by any other system that could be originated by the federal authorities. Instead of clashing statistics there would be statistics having a joint approval.

CRIMINAL STATISTICS.

The special analysis of these statistics which has accompanied in former years the general report of the department will be found, this year as last, in the preliminary pages of the special blue book prepared by the Statistical Branch.

A few salient points may be given.

The number of convictions in 1901, was 10·49 per 10,000 inhabitants as compared with 10·87 per 10,000 in 1900. The Yukon Territory which in 1900 had 35·18 convictions per 10,000 of its people, had in 1900 only 14·69. British Columbia has improved considerably, though still above the general average, being 25·57 per 10,000 of the persons living there. In 1900 the rate was 29·41 per 10,000.

The satisfactory decrease in the proportionate rate of convictions is due to a general decrease, all the provinces showing a decrease, excepting Nova Scotia and Quebec which show a small increase, and the Territories which have a considerable increase.

The population in the cities and towns of Canada according to the Census of Canada of 1901 was 1,413,226. From the criminal statistics collected, it appears that urban crime represents 29·80 persons in every 10,000 of the urban population, and rural crime 2·35 persons in every 10,000 of the rural population.

The proportion of females among the criminals still shows a gratifying decrease as the following table indicates :—

PROPORTION OF FEMALES IN CONVICTIONS FOR INDICTABLE OFFENCES.

1884–1891	8·60 per cent.
1894	7·10 "
1900	5·86 "
1901	5·67 "

The native born Canadians are less given to crime than the foreign born. Our population is 87 per cent native born and the native born criminals form only 72 per cent of the convicted.

With regard to juvenile delinquency the records show an increased proportion.

In 1884-1891 the per cent of criminals under 16 years of both sexes was 13·64 per cent. In 1899 it was 16·38 per cent, while in 1901 it was 18·03 per cent. There has been a reduction in the proportion of female criminals under 16 years of age : so that the increase is altogether due to the increase of "bad boys".

The class of crimes which includes the greatest number of those convicted for indictable offences is "offences against property without violence", in which class 62 per cent of all these criminals are found. The sub-class in which the criminals are found in greatest number is that which includes larceny, larceny from dwelling houses and from the person.

The returns of 1901 support the conclusion of 1900 that "the tendency in Canada is towards a habitually criminal class which means (taken in conjunction with the smaller number of convictions in 1901 compared with 1900 and of practically the same number in 1900 compared with 1899) a smaller body of criminals and a larger number of repetitions of crime by the same person. The individuals are fewer but more of them have more than one crime, even more than two to their individual record".

THE STATISTICAL YEAR BOOK.

This work is published by my department under authority of Chap. 59, Sec. 6, Revised Statutes of Canada.

The demand for the book is greater each year. Notwithstanding that every care is taken to prevent copies going in duplicate to the public, the issue of 1901 was exhausted in a couple of months, and a very great number of requests for the work had to be answered in the negative. Double the present issue and there will not be enough to meet the demand.

The plan of issue is to send first to the members of Parliament and the Government, the members of the several Legislatures and the Executives of the several Provinces, the leading newspapers, Boards of Trade, Banks, Libraries, British Consuls and other representatives in different countries, the Legislative Libraries of other parts of the British Empire. The remainder is held for distribution in Canada according to a permanent list and to meet applications. It is in connection with the permanent list and applications that the supply falls short.

The Year Book for 1901 was printed and distributed at an earlier date than any previous issue. The reason is the earlier issue of the Blue Books of the several Departments of the Federal Government.

The following are the dates of the issues of the Year Book :

1896	issued	Oct. 12, 1897
1897	"	Oct. 4, 1898
1898	"	Oct. 10, 1899
1899	"	Aug. 21, 1900
1900	"	June 22, 1901
1901	"	May 15, 1902

The Provincial Governments, I am pleased to note, have cooperated most heartily in the effort to publish the Year Book at an early date. The municipal authorities have been prompt in supplying the material required and the various commercial and manufacturing firms, from whom information was sought, kindly and most considerately gave their prompt attention to the circulars sent them.

There is a great demand for back numbers to make up full sets. As a result the issues of 1893, 1894, 1895, 1896, 1898 and 1899 in English are exhausted.

The Year Book in French is increasingly demanded. Of late years (1891-98) there remain very few copies, and of 1891, 1893, 1894 and 1895, none at all.

There has been a very considerable demand for other publications of the Statistical Division. The Criminal Statistics have been sought after by writers of other lands as well as by students in Canada. The Handbook on Canada and the pamphlet on Pulp Wood were in demand in the Wolverhampton and Cork Exhibitions, and the Pulp Wood pamphlet continues in demand.

During the year the letters, circulars and statements sent out from the office numbered about 8 000 and those received 9 000.

The whole respectfully submitted,

SYDNEY A. FISHER,

Minister of Agriculture.

APPENDICES

PUBLIC HEALTH.

No. 1.

REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH.

(F. Montizambert, M.D. Edin., F.R.C.S., D.C.L.)

October 31, 1902.

Sir,—I have the honour to submit this, my annual report as Director-General of Public Health to October 31, 1902.

The year has been marked by the continued threatening of bubonic plague, cholera and small-pox.

This has required the maintenance of strict measures, ordinary and special, for the sanitary protection of the country.

It is a memorable year in the evolution of public health administration. It is to be distinguished by action taken on several general principles which I have advocated, which have been recognized as theoretically desirable, but which it has not been heretofore possible or expedient to enforce.

Amongst these I may mention three :—

1. Disinfection at port of departure.—The ideal of quarantine inspection would, of course, include the presence in every passenger shipping port of Europe and the Orient of medical officers responsible to this government for the inspection, vaccination and disinfection of intending immigrants to this country.

This properly carried out would destroy infection before embarking ; would lessen the chance of disease during the voyage ; would lessen the risk to cabin passengers of contracting disease from the steerage ; and might well replace any routine disinfection of healthy vessels—even during epidemics—at quarantine, and so, by limiting quarantine at our ports of arrival to inspection and the treatment of actual infection only, greatly lessen interference with travel and traffic.

This year, for the first time, all the passenger steamship lines from China and Japan to British Columbia and to United States Puget Sound ports, via William Head and Victoria, have been properly dealt with at the ports of departure in the Orient by the routine disinfection there of steerage passengers and Asiatic crews. This has, when properly certified to by accepted officials, obviated the previously existing necessity for routine disinfection of all such healthy vessels, and has reduced quarantine delay of such vessels by our officers on the Pacific coast to the time necessary for careful inspection only, to the manifest advantage of the vessels, those on board, and all the interests involved. In Hong Kong in two instances, this summer, plague cases were discovered amongst the intending passengers.

2. Electric lighting of stations.—Another accepted principle in public health administration may be said to be that at quarantine stations when passengers and seamen are liable to be landed and detained, there should be provided for them approximatively the same conditions as their tickets or engagements secured them on the vessel. Modern vessels are lighted by electricity. Such lights and lamps cannot be landed. The ships no longer carry gangs of lamp trimmers capable of safely handling a station's coal oil lamps when landed with the passengers. The danger of fire from such lamps with ignorant or careless persons is moreover a very serious one. Furthermore electric lighting greatly facilitates disinfection and other public health procedures at night.

This year the Grosse Isle station in the St. Lawrence and the William Head station near Victoria, B. C., have been fully equipped with the electric light. Similar action with regard to at any rate the quarantine stations of Lawlor's Island, Halifax, N. S., and of Partridge Island, St. John, N. B., is very much to be desired, and will, I trust, commend itself to your favourable consideration.

3. Dividing steerage detention buildings.—This has become a necessity in compliance with the general principle already referred to, that accommodation at our stations should approximate that on the vessels. Steamships from Europe now for the most part have even their steerages divided into small compartments, or staterooms. This helps towards comfort, privacy and decency. Action in this matter has this year been taken at the Grosse Isle station in the St. Lawrence by the dividing up of three of the formerly open third class detention buildings into compartments, staterooms, dining-rooms, &c. Similar action is desirable at the other Atlantic quarantine stations.

Observation for Small-pox.—Amongst the events of the year may be cited the fact that in March last the period of quarantine of observation for small-pox was, by your ministerial order, fixed at eighteen days. This somewhat exceeds the fourteen day period, accepted by most other countries as generally sufficient. It meets the requirements of the inland health organizations.

Special Precautions.—In consequence of the marked threatening of plague, cholera and small-pox during the year numerous warning circulars were issued. The exemption from routine inspection of vessels arriving from New York and ports north of it, usual in healthy years, has not been allowed since my last report, owing to the continued presence of smallpox in the eastern group of the United States. Similarly, on the Pacific side, vessels from San Francisco and ports north of it have been inspected on account of small-pox in the Pacific States south of us, and of plague in San Francisco. Since the subsidence of small-pox on that side in August last, vessels from U. S. ports north of San Francisco (including Puget Sound and Alaskan vessels) have been again temporarily exempted from routine inspection. Inspection, however, of all vessels from San Francisco is continued on account of the presence of plague in that city.

Precautions as to funnels on hawsers, guarding of gang planks, &c., to prevent the embarkation of rats at ports of departure or their landing at our ports, have continued to be impressed upon the shipping companies.

On the Pacific side careful inspection of all arriving Asiatics has been carried out throughout the year. This includes the testing of the temperature and the examination of the glandular regions. From the beginning of the quarantine year, Nov. 1, 1901, until in January, 1902, the C.P.R. steamers adopted disinfection before sailing from the Orient, five of their steamers carrying 1,532 orientals arrived. In their case the routine disinfection was carried out at the William Head station, as used to be done not only for these vessels, but for those of the United States and Japanese lines running to Puget Sound ports via Victoria.

Frontier inspection for small-pox on threatened ports of the international border, and extra inspection at some of the ports have been maintained more or less throughout the year, as the conditions to the south of us seemed to require.

Public Health Department.—The progress of hygiene as a branch of the science of medicine has been so rapid and general in the last decade that there is now an ever-rising demand for governmental recognition of its importance. The voice of the Canadian medical profession was heard on this matter at the annual meeting of the Canadian Medical Association, held in Montreal last month, when some 350 delegates were present. The following resolution was carried with applause. Moved by Dr. E. P. Lachapelle, President of the Provincial Board of Health of Quebec, seconded by Dr. J. R. Jones, President of the Provincial Board of Health of Manitoba :—

'Whereas, Public health, with all that is comprised in the term sanitary science, has acquired great prominence in all civilized countries, and

'Whereas, Enormously practical results have been secured to the community at large by the creation of health departments under governmental supervision and control, and

'Whereas, Greater authority and usefulness are given to health regulation suggestions when they emanate from an acknowledged Government Department;

'Therefore, Be it resolved that in the opinion of the Canadian Medical Association, now in session, the time is opportune for the Dominion Government to earnestly consider the expediency of creating a separate department of public health, under one of the existing ministers, so that regulations, suggestions and correspondence on such health matters as fall within the jurisdiction of the Federal Government may be issued with the authority of a Department of Public Health. That copies of this resolution be sent by the General Secretary to the Governor General in Council, and to the Honourable the Minister of Agriculture.'

Amongst the uneducated also, and the half-breeds and foreign settlers in our territories, the issuing of rules and regulations in the name of a department of public health would obviate much of the difficulty now experienced from time to time, as set forth in the annual report published herewith of Dr. James Patterson.

The United States have this year taken action in this matter by an Act of Congress making the Marine Hospital Service the Public Health and Marine Hospital Service.

The service will remain a bureau of the Treasury Department, and the Secretary of the Treasury is instructed to prepare rules for the service and to prescribe uniforms for its officers and employees. His annual report will contain a detailed account of the work performed by the health service.

Public Health Service. Dominion Medical Registration.—The Act rendering this registration a possibility, when all the provinces shall have enacted concurrent legislation, passed the Dominion Parliament during this year. When the holding of a Dominion license shall have thus become a possibility, it will seem very desirable that medical officers to be appointed thereafter to the public health service, be required to hold such licenses. That service could then become a regular one, with promotion within its own ranks. It might then be much more of a training school in sanitary science than it can be now. Moreover, when a vacancy occurred it could be filled by the promotion of an officer of the service from elsewhere. This would do away with the present very real danger in having to fill a vacancy from amongst the local practitioners of the port, none of whom may have had time or opportunity to devote to this specialty. The problems in preventive medicine and in the handling of the shipping interests that confront the quarantine officers, and the vital interests, both of the public health and of the shipping, which are involved, are of far too serious a nature to entrust to untried and inexperienced hands, when this can possibly be avoided.

Inspection Service.—In June last I visited and inspected the quarantine station of Grosse Isle, in the St. Lawrence. Later in that same month I inspected the leper lazaretto at Tracadie, N.B., and thence proceeded to the various ports and places connected with our work on the Atlantic coast, viz.: Chatham, McAdam Junction and St. John, New Brunswick; in Nova Scotia, Digby, Bear River and Clementsport, Weymouth, Yarmouth, Halifax, Canso and Pictou; in Cape Breton, Sydney and Louisbourg; and in Prince Edward Island, Charlottetown.

Returning to Ottawa on July 18, I started again west, proceeding along the frontier ports of New Ontario, Manitoba, the Territories and British Columbia, as far as Midway, B.C. Returning from there as far as Grand Forks, I went down by the newly opened road to Spokane and thence to Seattle, and so by Huntingdon and Blaine to Vancouver and Victoria.

Finding from all my inquiries along the frontier and in the State of Washington and other contiguous states that small-pox had almost died out—for the time, at any rate—I was enabled, with the cordial assent of the health authorities of British Columbia, the Territories and Manitoba, to recommend the suspension of most of the frontier inspections, and of the inspection of Puget Sound ferry and other boats and vessels returning from Alaska. This recommendation you put into force.

It, of course, remains to be seen whether or no a fresh exacerbation of the epidemic will take place with the colder weather and closed houses, requiring the resumption in full or in part of these precautionary measures.

Congresses and Meetings.—The annual meeting of the Canadian Medical Association took place in Montreal last month, under the presidency of Dr. Shepherd. It was very largely attended. The meeting of the American Public Health Association does not take place this year until December. It is called to meet in December, when the southern quarantine and public health officials will have more chance to be able to attend.

Bubonic Plague.—In San Francisco this disease continues to exist. There has not been—as yet, at any rate—any great ontbreak, but cases have been occurring with a persistence that is full of import. At the date of my last report, a year ago, there had been officially reported since the first reported case in March, 1900, forty-five cases and forty-one deaths. The total number of reported cases now exceeds eighty. There were five in July last, ten in August, nine in September and seven this month, thirty-one cases in the last four months. All of these cases ended fatally.

In view of this condition of things, careful inspection has been made throughout the year of all vessels from San Francisco arriving at British Columbian ports.

At the conference of State and Provincial Boards of Health of North America, held at New Haven, Conn., on the 28th and 29th instant, Professor F. C. Robinson, of Brunswick, Me., presented the following resolutions, in behalf of the State Board of Health of Maine, expressing the opinion of the conference as to the conduct of the health authorities of San Francisco in dealing with the plague question :—

'Whereas, Thirty cases of plague have occurred since July 13, 1902, no information as to their origin or exact location having been furnished, no effective steps having been taken to restrict the spread of the disease, the City Board of Health of San Francisco being helpless, and the *mala fides* of the State Board of Health of California having been fully established by the history, supported by documentary evidence in the possession of this conference ; therefore, be it

'Resolved, That the conference of State and Provincial Boards of Health of North America views with abhorrence the irretrievable disgrace of the present State Board of Health of California, and pronounces the plague situation in California a matter of grave national concern ; and be it further

'Resolved, That the national conference of State and Provincial Boards of Health of North America does hereby advise the various State boards of health of the United States to consider the propriety of calling upon the Surgeon-General of the United States Public Health and Marine Hospital service to arrange at the earliest possible date a joint conference for the purpose of eradicating the plague from the United States.'

The resolutions were unanimously adopted.

At the date of my last report, a year ago, this disease was reported present in Liverpool, and in Glasgow. On November 14 the Health Committee of Liverpool declared that city to be free from the bubonic plague. Almost simultaneously with its outbreak in Liverpool, plague made its appearance in Glasgow. It was officially announced on October 31 that four cases of bubonic plague had occurred amongst the servants in the Central Station Hotel. The first illness occurred on Saturday, October 19 ; the second on the following day ; and a third on Monday, October 21. The cases were reported to the Sanitary Department on October 23, when the patients were conveyed to Belvidere Fever Hospital. The clinical symptoms suggested plague, and a bacteriological investigation was at once undertaken and fully confirmed the suspicions of the medical officer, Dr. Chalmers. A fourth case was removed to Belvidere on October 31, also from the Central Hotel, and a fifth case occurred on November 1, this patient being a barmaid in the service of the Caledonian Railway at Airdrie Station, who returned to the city every evening and slept in the Central Hotel. One of the patients died. All the patients were employed or resided in the basement of the hotel, and it is regarded as probable that rats got into the building, and that the illness has been so contracted.

No fresh cases were reported from Glasgow after November 1.

Plague has prevailed during the year in China and in India. It has occurred in Australia, Brazil, Egypt, the Hawaiian Islands, Japan, Madagascar, Mauritius, Great Britain, the Philippine Islands, Russia, South Africa, the United States, and Turkey. And was brought to shipping ports in Great Britain, France, Spain, and the United States.

In Cape Colony the outbreak of plague which began on the 2nd February, 1901, seemed to have come to an end in August of this year. But a more recent official report reads as follows :—

'One case of plague was discovered at Port Elizabeth on the 23rd September, the patient, a European male adult, dying on the 25th September. The last preceding case occurred on the 8th of July, 1902.

'No other cases of plague have been discovered or are under treatment in the colony during the week ended Saturday, the 27th September, 1902.

'Plague rats have during the week been found in a number of places in Port Elizabeth, the last being discovered on the 26th September.'

The total number of cases of this disease in Cape Colony to the 16th August last is officially reported as 907 : the deaths, 438 ; percentage of deaths to cases, 48·3. The disease prevailed with greatest violence in the Cape Peninsula, 745 out of the whole 907 cases occurring there. The other places in which plague chiefly prevailed in Cape Colony were Port Elizabeth 135 cases, Mossel Bay 13 cases, and in all other places 14 cases. Of the total 907, 228 were Europeans, 465 were coloured persons, and 214 natives.

In India the ravages of plague have continued throughout the year. In the Bombay districts, in Bengal, in the North-west Provinces, and in the Punjab, the deaths ran up to over twenty thousand per week. In the Punjab alone this spring the deaths from plague were averaging 70,000 monthly.

In Egypt plague has been present, most of the cases occurring at Alexandria.

In Hong Kong the usual seasonal outbreak which has made its appearance each year for some years past was not wanting this year. 431 deaths were reported from May 10 to September 30. A smaller outbreak than usual.

In Australia the deaths from plague included that of Dr. Wray, the health officer of Brisbane. In Sydney, New South Wales, plague was introduced November 14, 1901, and from that date to April 22, 1902, there were one hundred and four cases.

In Japan, plague has occasionally made its appearance at Kobe and Yokohama. In Formosa it has prevailed extensively.

In Russia the plague continues to occur in the city of Odessa. The Russian authorities are taking extraordinary precautions and extreme measures to limit and eradicate the disease.

In Honolulu plague made its appearance in December last. Four deaths occurred from the 11th to the 14th inclusive. A floating sulphur plant was at once established for the purpose of fumigating wharfs and vessels. The outgoing restrictions were removed on April 2.

Since my last annual report, the report of the Indian Plague Commission has been received. The Local Government Board of London has just issued an important volume, giving the results of an investigation of the bubonic plague in all parts of the world during the three years, 1899–1901.

Both reports refer to the question whether plague manifests itself at the outset of epidemics in atypical clinical forms.

This question, the commissioners observe, is both of theoretical interest and of practical importance. In certain instances there have been observed prodromal epidemics of 'mumps,' and it is possible that these may have been due to an attack by attenuated plague bacilli on the mucous membrane of the mouth, causing local buboes. There is a suspicion that one plague epidemic was set on foot by a group of Parsees who had suffered from coryza with high temperature, though laboratory investigation failed to detect the bacillus. Pestis minor has also been suspected of initiating epidemics, but only one definite case came before the commission. Increased mortality from respiratory diseases has been repeatedly noted as a preliminary to plague outbreaks both in ancient

and modern times. The plague at Avignon in the year 1348 was an example. Before the third epidemic at Poona, the deaths from respiratory diseases, which in the three last months of 1898 had averaged 99 cases, rose to 172 in January, 1899, immediately before the plague epidemic began. In other places the disease has shown itself in septicaemic form, and this has been observed in epidemic centres like Kumann and Garhwal. The commissioners think that where an outbreak is set up directly from a pre-existing case the type developed will be that of the case, but where there is a break in continuity, the bacillus may be attenuated during its absence from the living body, and such attenuation may account for the mildness of the disease in places like Oporto and Glasgow.

The report of the Local Government Board states that a curious feature of the disease is its mimicry of other affections when it first invades a new region. The plague when it first appeared in a new field often presented curious resemblances to some commonplace current malady, such as influenza, typhoid fever, or malaria. Repeated mistakes were made in the diagnoses at the beginning of the outbreaks not only where the plague was not looked for, but in countries where the officials and practitioners were alert in watching for it, and believed that they were prepared to detect its appearance.

Under the heading of Sea Traffic the commissioners report that the only way in which plague seems likely to be conveyed to any European or distant country from India is by sea traffic from its numerous ports. Medical inspection of outward bound vessels was begun at Bombay and Karachi early in 1897, no vessel being allowed to leave until all on board had been medically examined, and any plague patients removed.

Similar regulations were extended to other ports. Later on, in accordance with the views of the Venice Convention, medical examination of crews and passengers was made before embarkation, but the details varied in accordance with the prevalence or non-prevalence of the disease in the port. Clothing and bedding of crews and deck passengers from infected areas are disinfected on shore before vessels leave Bombay, Karachi, and Calcutta. Major Crimmin reports the method of examination at Bombay, thus: —

'I will divide vessels into two classes, first, those bound for Indian ports, and, second, those bound for ports out of India. The crews and passengers bound for Indian ports may be examined on board according to the present regulations, but the majority of them are examined on shore. For instance, in the case of the Shepherd Company, who run 35 coasting passenger ships in the week, all the crew and passengers are examined in sheds on shore before they go on board. If a ship is bound for a port out of India, the crew are brought on shore from such vessels for examination in accordance with the Venice Convention. The passengers for such vessels are also examined on shore before they go on board. When there are large numbers of native passengers they are fallen into a line in batches of 100 or 200, according to the size of the examination shed. They open their body clothing, and a medical officer feels each man's chest with both hands, which enables him to detect any increase of temperature. The superficial glands in the neck, armpits, and groins, are then examined. The tongue and eyes are looked at. If he is found to be suffering from a rise of temperature or marked enlargement or tenderness of any of the glands, he is sent to a place set apart for such cases, to undergo a more rigorous examination. His temperature is taken with a Hicks 1½ minute thermometer in the armpit, and if he is found suffering from a marked rise of temperature, or enlarged tender glands, he is rejected. The crew are examined in precisely the same way as passengers. . . . If ships are bound for ports out of India the crew are invariably examined on shore to meet the letter of the Venice Convention. In the case of vessels which are in dock, and which do not want to go to the inconvenience of bringing their crew on shore after they go into the stream, such crews are examined on shore the day before the vessel sails. We again examine such crews on the day of sailing and as near as possible to the time of departure, after which no loading of cargo or communication with the shore is allowed. We carry out this second examination for two reasons. First, for our own reputation, and to do the best we possibly can to keep plague off ships; and, secondly, to meet the wording of the Official

Bill of Health, which states that the vessel, with so many crew, and so many passengers, is at the time of sailing free from plague and certain other infectious diseases . . . At the examinations for plague, if we find any person suffering from a marked rise of temperature, they are detained until such time as the temperature goes down to normal, or until we are certain that the fever from which they are suffering is not that due to plague. We go so far as to take out natives with chronic enlargement of the glands of the groin, more especially on ships bound for foreign ports. We do this in the interests of the ship, and often at the request of the captain. Because if such a person with enlarged glands was unfortunate enough to be suffering from fever on his arrival at a foreign port from Bombay, it is possible that the health officer would class him as a plague case, or return him as a suspicious case.'

When the medical examination is complete passengers are passed down a gangway to the ship in dock, and the vessel is then moved off the dock wall until she can be taken out. If the vessel is in the stream the passengers are conveyed direct, and she goes to sea at once. The vessel herself is also overhauled and sanitary requirements insisted on. The disinfection of baggage appears also to be well carried out. Facts show that the measures taken have been most effective.

With regard to measures to prevent the spread of plague from one part of India to another by railway :

Such measures were undertaken on an elaborate scale, and on certain occasions included even a system of detention camps, or the stoppage of all booking of passengers from infected places. As a rule, however, medical examination of passengers, including temperature observations, were regarded as sufficient, and Sir Andrew Wingate thought that this gave even better results than detention camps. He held that the work was valuable, not only for the cases actually ascertained, but also as a means of preventing sick people from attempting to leave infected areas. The commissioners, on the other hand, have had regard to the great expense involved, and the inconvenience to the public, and also the large staff required to carry out the work—a staff which they think might have been better employed in other plague measures. Their conclusions are as follows :—

1. 'That, while the spread of plague has taken place in a very large number of cases along the railway line, the number of cases of plague detected among travellers, under the different systems adopted, has not been large :

2. 'That any system of land quarantine imposed with the object of detaining all passengers from infected areas, either at a point where the infected and uninfected areas join, or at differing places within the uninfected area, results in great hardship to the travelling public, and has not been found in practice to prevent the spread of plague ;

3. 'That in the special instance of Sibi, the objections to such a system are, owing to the fact that the traffic inwards is concentrated and easily controlled, not so great as elsewhere, while it is very important to take every precaution to prevent plague passing over the north-west frontier of India ;

4. 'That any system of medical examination on railways which falls short of keeping travellers under detention for the ordinary period of incubation must be defective as a measure for stopping all infected persons ;

5. 'That, considering the small results attained by medical examination on railways, it is not necessary or expedient to maintain so many places for examination as hitherto : two of us, Dr. Wright and Dr. Ruffer, are of opinion that it would be well altogether to abandon medical examination on railways, except on the confines of important unaffected areas which communicate with an infected area by only one line of railway ;

6. 'That it appears to be unnecessary to medically examine people travelling between places within an affected area ;

7. 'That it may be a wise precaution, in cases where large concourses of people from infected areas are expected to go to a place for a religious festival or similar gathering, to prohibit their travelling :

8. 'That the disinfection of the personal effects of travellers by railway should not be attempted because—

(*a*) disinfection, if carried out at all, should be thorough, and would then cause an amount of delay and inconvenience which will not be justified by the results; and

(*b*) people when themselves travelling can evade the disinfection of their personal effects by despatching them by goods train. The disinfection of articles sent by goods train would be an impossible task.'

In relation to these land restrictions it is observed that old methods of treating epidemic diseases, such as quarantine, cordons, and segregation, are being gradually given up in favour of notification, isolation, disinfection, and inoculation. The commissioners hold that, 'If every case of plague could be isolated at once, and if the personal effects, clothes, and house of a patient were disinfected, and further, if all plague-infected rats were removed and burnt, and the houses in which these had been found were disinfected, and, finally, if the healthy persons who are exposed to infection would be inoculated, the ravages of plague would be minimized.'

Agencies by which plague is disseminated.—On this point in the report of the commissioners, village experience is relied on, as in large cities the introduction of the disease has not been successfully elucidated, whether in China, Egypt, Spain, Australia, Glasgow, or the large towns of India. Concerning villages, the subject is dealt with under the headings of Human Communication, Infection by Rats, Infection by Clothing, and Infection by Merchandise. In many cases the first-mentioned cause was in operation, and numerous instances are given. As regards rats, the proof is much more difficult. Examples, however, have occurred in which plague-infected rats travelled out from a village and were found dead, in one case amongst heaps of corn a mile and a half away, with the result that six people camped around were infected. No evidence was obtained of general migration of rats following an outbreak of plague among them, but rather that they died where they were attacked. The commission believe that in the great majority of instances infection was conveyed into uninfected places by human communication, and in view of this belief they require considerable evidence before they accept rats as the likeliest agency. Following this line, they say: 'Even after the exclusion of all those cases where the possibility of the introduction of the infection by infected articles or by direct human communication does not appear to have been duly considered, there appears to us to be a residuum of cases in which there is sufficient evidence to make it probable that rats have carried the infection of plague from one village to another situated at no great distance from it.' As to clothing, two stewards who arrived in London in September, 1896, contracted the disease from clothes which they had brought from Bombay, and kept in boxes until reaching England. No quite conclusive cases of spread from village to village by clothing were, however, brought before the commission, the difficulty always being to exclude other possible sources of infection. As concerns merchandise, village opinion frequently attributed the spread of the disease to grain, but the commissioners seem rather struck by the want of evidence of the agency of merchandise in carrying the disease from large towns; and it is pointed out that, in Bombay, the only likely articles are gunny bags, which are brought into Bombay with grain, and then returned to the country for refilling. One instance is given in which these gunny bags were open to suspicion, but even here there were other possibilities.

In concluding this part of the subject, the finding arrived at is that the chief agency for spreading the disease to uninfected places consists of travellers. The lines of human communication are followed by the infection, especially lines of steamships and railways. Even then the spread is slow, partly due to preventive measures, but partly also to the low degree of infectivity of plague, as if each town only became infected from a town near at hand sending it many incubating cases. In Armadabad there were in October, 1896, ten imported cases and two indigenous. In the next three months there were 62 other imported cases detected at the railway station or in the town, but no secondary infection resulted. In the next four months 27 fresh importa-

tions were responsible for only 26 cases occurring in the town, and then the importations became fewer and the indigenous cases died out. Various other examples are given.

The commissioners are of opinion that though some animals, such as squirrels, monkeys, mice and cats, may be attacked by plague, they need not be regarded as likely disseminating agents, while dogs, jackals and birds are insusceptible. No other agencies, indeed, than man and rats are considered of importance, and the question as to the comparative influence of these two agencies is discussed in detail. The result is summarized in the following conclusions :—

1. 'In some places, where severe epidemics have occurred among men, rats have not been affected at all, and in many places where there have been plague epidemics among men the disease has not appeared among rats in epidemic form.

2. 'Occasionally where there has been considerable mortality among rats there has been an absence of plague among men.

3. 'Even when there has been the largest amount of plague among rats, the risk to the persons who came in contact with these infected rats appears not to have approached that undergone by persons inhabiting houses in which there have been plague patients, or persons coming into contact with pneumonic plague. There are however, cases, such, for instance, as the case of Mahlgahla and the case of Chak Kalal, where a very considerable number of plague cases in a village has been directly attributable to the dissemination of infection consequent on an epidemic of plague among rats.

4. 'Since the number of plague bacilli escaping from the infected human organism must be presumed to be greater than the number which escape from a plague-infected rat, *a priori* it would seem clear that a single infected man must constitute a greater danger than a single infected rat; but, on the other hand, seeing that the excreta of rats may be deposited anywhere throughout a house, and that the number of rats which are affected may many times exceed the number of men who are affected, a severe epidemic among rats must, we think, tend considerably to the spread of infection.

5. 'The chief importance of rats in the epidemiology of plague seems to us to arise in connection with the first outbreak of the disease in an infected place, for we have seen that in many instances rats become infected before men, and they scatter plague broadcast over an uninfected place.

6. 'When plague is once established in a place we have no doubt that human agency is a more important factor in spreading the disease than the agency of rats.'

Mode of Communication.—With regard to this question the commissioners, after dealing fully with the bacteriology, incubation period, and clinical features, pass to the infectivity of the disease. They have come to the conclusion that the risk of direct infection from patients is slight. Primary pneumonic plague, however, constitutes an exception to the general rule, and this type of the disease is highly infective. The same may be said as to those exceptional cases of plague in which specific rashes of a bullous or pustular nature appear on the skin. In the ordinary bubonic plague, which is by far the most common form of the disease, the infected material is not thrown off from the skin, or to any considerable extent from the lungs, but appears only in the excretions, and this only in the last stages of the disease. What holds good with regard to the escape of infective material from the human patient applies also to plague-stricken rats. Houses in which human beings or rats have died of plague, and clothes and other effects which have been soiled by the excretions, are infective. All these when once contaminated may remain infective for very considerable periods. The danger which accrues to those who live in infected houses would appear to be much greater than that which accrues to those who merely come in contact with plague patients. The full measure of the infectivity of plague has not, the commissioners think, been fully disclosed in India, inasmuch as in the overwhelming majority of cases measures have been taken either to extinguish the infection in contaminated houses, or to remove the people from them.

Rats and the Plague.—The Sydney, N.S.W., correspondent of the *British Medical Journal* states that an important paper on the diffusion of plague has been issued by the Board of Health, Sydney, in the form of a report by the president, on the case of the troopship *Antillian*, which arrived at Sydney from Cape Town infected with plague on March 2, 1901.

The vessel left Cape Town, S.A., on February 1, 1901, with a clean bill of health issued at that port. She did not touch at any port until arrival at Albany, West Australia, on February 22, and no case of sickness had occurred on board. After leaving Albany fifteen dead rats were found during the process of cleansing the holds under the supervision of the mate and the boatswain. One of the deck hands who was employed in this work fell ill on February 27. On arrival at Sydney on March 2 a diagnosis of plague was made by the City Health Officer, Dr. W. G. Armstrong: the patient died the next day. On March 2 and 4 some more dead rats were found on board, and on examination these were found to be infected with plague. Another case occurred on March 12, in the person of the storekeeper who had supervised the removal of the ship's stores to a lighter, during which process ten more dead rats were found in the store-room.

A fact of important significance is brought out by this case: namely, plague communicated to the rats which infested a vessel of 3,686 tons, to the number of about 100, continued among them for twenty-nine days, and yet at the end of that time had killed but a minority of them, although food was easily accessible to them only in one circumscribed part of the ship. From this it may be inferred that length of voyage, within the limits common with steamships at the present day, does not avoid the risk of infection run by clean ports which are in communication by sea with infected ports.

Another fact of even greater importance is revealed by it: it is that a ship may become infected at a port which lay under no suspicion of plague at the time she took her departure from it. Under certain circumstances, which fortunately did not obtain in the present instance, communication of such a ship with any clean port at which she arrived would necessarily be unrestricted. There is every reason to believe that the epidemic at Sydney in 1900 originated in this very way, free communication with a foreign port having continued after it had become infected, either from want of knowledge on the spot that plague was present, or from undue delay in notifying its presence in accordance with international conventions. From this it is apparent that measures aimed at restricting the export of plague rats cannot be effectual unless they are universally and constantly taken; they must be directed to preventing interchange of rats without reference to the presence or supposed absence of the disease among them; and they must be taken at all times and as a matter of routine, because, if their application be deferred until the presence of plague has been ascertained, they will often (or, in all probability, usually) be taken too late.

The most important point in the prevention of importation by sea is one which was sufficiently well established by the experience gained here during the recent epidemic, namely, that ships can be kept free from rats by the judicious use of sulphur fumes, applied at suitable intervals. This need entail neither great trouble nor expense worth mention, nor important interference with the course of trade. Much would be done to prevent interchange between ship and shore rats if the slight precautions in mooring vessels prescribed by the regulations of the Board of Health were universally taken.

A communication from Gamaleia based on the examination of 23,131 rats, announces that the sewer rat is seldom found on ships. Out of nearly 10,000 rats found in the centre of Odessa about 95 per cent were the sewer rat—*mus decumanus*—while 96 per cent of 1,178 rats found on vessels were of the species *mus rattus*, or the domestic rat. He also found that the three principal varieties of the latter, the black, the red and the Alexandrine rat, do not live together but inhabit different vessels. The black rats were found mostly on ships from England and the Black Sea ports, while the Alexandrines were found on Turkish and Egyptian vessels, and the red species on ships from the Orient. He found that the plague among the town, or sewer rats, was strictly localized in three foci. One was the restaurant where the first patients with the plague were discovered. This focus was exterminated by the destruction of

the supplies of rice, cabbages, &c., in the cellar. The second focus was a freight platform, and this focus also was exterminated after the destruction of a few bags of spoiled rice on it. The third focus is a large freight warehouse; as so many goods are stored there, it has proved impossible to destroy them all; consequently this focus still exists. The determination of these limited foci suggests that possibly the plague is not transmitted directly from one sewer rat to the other, but indirectly by the mediation of infected rice or other foodstuff. Proust commented on this communication that possibly the immunity enjoyed by Europe in respect to the plague may be due to the predominance of the sewer rat, which seems to be less susceptible to the natural plague than the other species.

According to the *Journal of the American Medical Association*, Galli-Valerio takes up the statement of Simond that the transmission of plague is largely due to infected fleas from rats and has investigated the subject thoroughly, studying the different species of fleas found on rats and their tendency to bite man. It appears that one species, the *P. serraticeps*, which has been gathered off rats, may bite man, but this must be very rare as only one observer has ever obtained it from the rat. He applies to the theory, however, evidence that he has gained from other sources, such as the facts that neither by the German Commission nor by Mr. Schotelius in India, nor during the epidemics at Oporto, Glasgow or Naples, has evidence to prove the transmission of plague to man by fleas been found. He says also the facility with which it is possible to arrest an epidemic of plague where hygienic conditions are good and isolation properly carried out speaks against this theory. If Simond's hypothesis were correct, one might almost fold one's arms in consequence of the difficulty of preventing the diffusion of infected fleas. It requires to be demonstrated, not only that fleas pass from rats and mice to man, but from rat to rat. The question can only be solved by conveying to the body of human beings rats and mice fleas that have lived on plague rats. If the experiment is considered necessary he places himself at the disposal of the committee to undergo it.

The Danysz bacillus for the extermination of rats.—Only irregular results seem to have been obtained by those who have experimented with cultures of this bacillus during the year. In some cases, death promptly followed, but in many others the animals remained sound. It is certain that the continued transmission of the bacillus from rat to rat causes its virulence for these animals to be greatly attenuated, so that very soon it entirely loses its pathogenic properties for them. It cannot, therefore, be recommended, as now prepared, as a reliable agent for their destruction. It is probable, however, that by feeding rats on large amounts of fresh agar cultures a reduction in their number may be obtained in regions where they greatly abound.

Wiener announces that the virulence of the Danysz bacillus can be enhanced by cultivating it in raw eggs. It is then capable of inducing extensive epizootics among rats. He injects eight or ten drops of a 1 per cent solution of soda into a freshly laid egg and then introduces a loopful of the bacillus culture. The contents of the egg become transformed in the course of eight days to a highly virulent, practically pure culture, killing rats in five to seven days. Other rats fed with the intestines of the dead ones, succumbed even more rapidly. It was impossible to induce infection of fowls and rabbits even with these highly virulent cultures.

Since the destruction of rats is of prime importance in those countries where plague is prevalent, further work along this line is greatly to be desired. In this manner the most favourable conditions for the employment of this organism may be ascertained.

Curative Plague Serum.—It is well known that the great expectations hoped for from Yersin's serum have not been realized. The slight curative effect of this serum has been acknowledged also by French authors, and it has been recommended that the serum no longer be subcutaneously but intravenously employed. Lately, however, a more potent serum has been prepared in the Pasteur Institute, which has been used in treating plague patients in South America, Oporto, Alexandria and Cape Town, without, however, any marked results. In India, since the failure of the first and second

French serum, prepared in Pasteur's Institute, that of Lustig has been used. Reports from the medical authorities at Bombay showed that the serum possesses a marked curative action in the lighter cases of plague. In severe cases no serum as yet has succeeded. Indeed, injections of as much as 3 litres of serum have failed to save the patients.

The Indian Plague Commissioners examined in all two samples of Yersin's serum and two of Lustig's. Yersin's serum, which they obtained from the Pasteur Institute in Paris, had been derived from horses inoculated first with dead and finally with living plague cultures, and had been heated to 60° C. before being sent out. Lustig's serum was prepared for them in Bombay by Dr. Galeotti. The horses which furnished it had been inoculated with a solution of nucleo-albuminous substance obtained by growing mass cultures of *B. pestis* on agar, scraping them off, dissolving them in 1 per cent potassium hydrate, and collecting the precipitate which formed on subsequent acidification.

The commissioners first endeavoured to find experimentally whether the serums contained any specific antibacterial substances. On this point their results were negative. On adding the serum to fresh plague cultures and introducing the mixture into the peritoneal cavity of normal guinea-pigs, 'we saw nothing which reminded us, even in the remotest degree, of the striking results which were obtained when cholera bacteria were introduced into the peritoneal cavity in association with the serum which contains the corresponding specific antibacterial substances.' Again, plague bacteria seemed to find both Yersin's and Lustig's serums excellent culture media. With guinea-pigs inoculated with $\frac{1}{12}$ agar tube of *B. pestis*, it was found that the simultaneous injection of serum in the opposite side of the body in doses of as much as 2 c.cm. in no case prevented death. Yersin's serum, however, appeared sometimes to prolong life a few days; Lustig's accelerated death. The commissioners then endeavoured to see if the serum contained toxic substances in sufficient quantity to produce a fatal result in normal guinea-pigs. Their experiments showed that when guinea-pigs were injected with as much as 30 c.cm. of Yersin's or Lustig's serum they in every case survived.

As Yersin's serum appeared innocuous in every respect they determined to administer it to hospital patients. They did not feel justified in putting Lustig's to a similar use owing to its disastrous effect on plague-infected guinea-pigs. At the South Camp Hospital, Bangalore, they treated 49 cases, administering the serum to every plague patient admitted who was neither convalescent nor absolutely in *articulo mortis*. The case-mortality of the adjoining North Camp Hospital served as a control. In Bombay, also, they treated 28 cases in the Modi Khana Hospital, selecting every second patient admitted and using the intermediate cases as controls. Both at Bangalore and Bombay the advantages of serum treatment were only slight. The case-mortality showed a diminution of not more than 4 to 5 per cent. Life was not prolonged nor convalescence accelerated, nor was there any well-marked alleviation of symptoms.

The commissioners conclude that Yersin's serum, as received from Paris, 'contains therapeutically useful substances in greater or smaller quantity,' but that some samples at all events, are too weak to be of much benefit to plague patients. Speaking of the more favourable experiences recorded by some other observers, they are prepared to admit that 'a certain amount of advantage in all probability accrued to the patients, both in the case of those injected with Yersin's serum, and of those injected with Lustig's serum.' Notwithstanding the disappointing results hitherto obtained, they hold that serum-therapy is 'the only method which holds forth a prospect of ultimate success' in the treatment of plague. They recommend further study, in the case of animals furnishing the serum, of 'the blood changes which are associated with the incorporation of the plague toxins, and with the elaboration of antidotal and bactericidal substances,' and, in the case of human plague subjects, of the blood changes brought about by the administration of the serum. They also advise that therapeutic serums should be prepared in India by Yersin's method, and urge that all serums, with a view to excluding deleterious samples 'should, before they are brought into therapeutic application on man, be exhaustively tested upon animals.'

Haffkine's preventive plague fluid.—The literature of the year on this subject continues to refute the objection raised by Calmette that a person in the period of incuba-

tion for a slight attack of plague would find the disease considerably aggravated if he submitted during this period to a preventive inoculation of Haffkine's fluid; and his assertion that under such circumstances the case would almost certainly end fatally.

On the contrary, more extensive experience, figures and facts teach us that even if you do inoculate a person suffering from plague with Professor Haffkine's prophylactic, you do no harm, and if that person is in the incubating stage, then you do considerable good. Practically it means this: If a case of plague occurs in a household all the members of that household should be inoculated, even if we think some may be and possibly are incubating plague.

The conclusion of the Indian plague commissioners on this subject are summarized as follows:

1. Inoculation sensibly diminishes the incidence of plague attacks, but the protection is not absolute. 2. It diminishes the death rate among the inoculated population: both the rate of attack and the fatality of attacks is diminished. In neither of these two cases can a numerical expression be given for the measure of protection against attack, or the diminution of the death rate. 3. Inoculation does not appear to confer any great degree of protection within the first few days after the inoculation has been performed. 4. It confers a protection which certainly lasts for some considerable number of weeks, and possibly even for some months, but the maximum duration of the protection cannot yet be determined. 5. The varying strength of the vaccine employed has apparently had a great effect upon the results obtained, but the best results of inoculation will only be obtained after an accurate method of standardization has been devised.

Asiatic Cholera.—This disease has been present during the year in Arabia, Borneo, Ceylon, China, Dutch India, Egypt, India, Japan, Korea, Palestine, Russia, Philippine Islands, and the Straits Settlements. In China the places affected included the ports of Canton, Hong Kong and Shanghai.

In Arabia the disease began in March last. A report from Constantinople under date of the 27th of that month from S. C. Zavitziano, U. S. Sanitary Commissioner to the Surgeon-General U. S. Public Health Service, states that according to the official sanitary news the number of deaths from cholera in the Hedjaz is 1,129, of which 381 have occurred at Medina, 788 at the holy city of Mecca, 1 at Rebuk, and 38 at Djiddah. Rebuk is a station, a little spot where there is a spring and where the caravans going from Mecca to Medina stop and take the necessary water. It is there that the first case of cholera was registered, and of which the sanitary board was informed.

The great danger was when the pilgrims turned back to their countries, but the necessary steps and the necessary quarantines were ordered in order to prevent the spread of the epidemic. All the attention was given to the pilgrims coming to the countries northward of the Suez Canal—that is to say, for the pilgrims coming to Turkey and to Russia, the latter pilgrims being obliged to pass through the Bosphorus.

With regard to the origin of this outbreak the report states the first cholera cases which have been observed were on pilgrims coming from Russia, the Cossacks as well as among the takrouris, or workmen, and a soldier. On the contrary, among the Javanese, who remained in Mecca, no one presented any cholera symptoms; on the contrary, those among the Javanese who followed the caravans of Cossacks, stopped with the latter at Rebuk, where they took and drank water, fell ill with cholera symptoms, and that after the Cossacks and some pilgrims from Bukhara presented the same symptoms of cholera.

The deaths at Mecca from this disease only amounted to 31 for the 20th and 21st March together. On March 22nd the figures rose to 220, and on the 23rd to 247. The Haj was more numerously attended than usual this year. This was largely due to the fact that Russia this year, after several years of prohibition, permitted her subjects to undertake the pilgrimage. It is thought that the total number of pilgrims of all nationalities amounted this year to some 250,000. The dispersal of this large number of persons to all parts of the Moslem world of necessity offered considerable risk of the spread of cholera.

In Egypt the cholera epidemic continues to subside both in respect of numbers and virulence. As a correspondent of the *British Medical Journal* says:—'The latter is a particularly hopeful sign, as it is a well-known fact that an epidemic is far more fatal in character at its onset than when nearing its close. It is satisfactory to be able to record that the number of Europeans attacked has been very small—fewer than 300 out of the first 35,000 and odd cases. Those who fell victims were chiefly of the servant class, and were attacked, in the main, owing to their own incurable carelessness. One English officer died at Alexandria, at the Mustapha Barracks: in this case infection was definitely traced to a house servant living in a badly infected quarter near Ramleh.

'The Sanitary Board has conducted a most careful investigation into the cause of the original outbreak at Moucha The following history has been obtained; it depends, of course, entirely upon native evidence, and the Arab is always anxious to anticipate, if possible, the wishes of his interlocutor, but still there appears to be no reason to believe it substantially inaccurate. Seventeen pilgrims left Moucha for Mecca, and all returned. While at Tor, on the Gulf of Suez, it is stated that one of their number was ill with diarrhœa and vomiting, but was never seen by the native doctor of their section, as he was hidden within the tent, into which the doctor never entered. The other pilgrims say that they stood at the door of the tent, and stated they were all well. The sick man was nursed by a woman who went from Moucha with them. On their return to that village this woman's child died of diarrhœa, and this was followed by a number of deaths in the omdeh's (mayor's) family, one of the members of which had been among the pilgrims. The deaths in this family and its connections, due to severe diarrhœa, were going on throughout June, but were kept quiet. Meanwhile the return pilgrims frequented the mosque in the centre of the village, a mosque of which, as we stated in a previous note, the latrines are in the immediate vicinity of the village well. It is from this well that the earliest cases of the epidemic, which were first notified on July 14, are known to have taken their water. Such is the statement elicited by the Sanitary Department.'

'The latest reports were that Cairo was free from all but imported cases. The problems to be solved in Alexandria were of far greater complexity and were overcome with much more difficulty. Alexandria is of no nationality: almost all the peoples of the earth find representatives there, each with its own consul and, of course, consular court. Each consul, had, of course, a different remedy for the outbreak, and each race hospital its own system of notification and removal of cases.'

Since however Dr. Graham was sent from Cairo by the Sanitary Department, the improvements he has inaugurated in the purification of the water supply, and the disinfection of the people who had come into contact with cholera cases, have led to a rapid abatement.

On Sept. 15, 1,557 towns, villages and ezbehs throughout Lower and Upper Egypt were affected with cholera. From July 15 to Oct. 10 there were officially reported for all Egypt 38,083 cases of cholera, and 32,377 deaths. But from October 25 until to-day only 225 cases and 212 deaths have occurred in all Egypt.

In Jerusalem cholera is present, 494 deaths from that disease have taken place there this week.

In the Philippines it is estimated that 75,000 cases with nearly 60,000 deaths have occurred since the beginning of the epidemic at the end of March. In some of the towns 10 per cent of the native population have died. Although some of the provinces are still suffering severely, the epidemic is gradually subsiding. A cable report from Gov. Taft, received at Washington, October 30, says that the cholera has practically disappeared from the Island of Luzon, and that in Manila there have been an average of only two cases a day during the last ten days. In all, twenty provinces are now practically free from the cholera. Only five provinces are now seriously affected—the provinces of Iloilo, Occidental Negros, Capiz, Samar and Misamis. The mortality, which in the beginning reached 90 per cent, has been greatly reduced, and is now generally below 50 per cent. Cebu has already been declared a clean port, and Manila will be so declared on November 1.

The U. S. Army Transport *Sherman* from Manila to San Francisco went into Merivales for quarantine for five days. Between Merivales and Nagasaki cholera developed amongst the passengers. There were thirteen cases, nine of which proved fatal. The vessel remained in quarantine at Nagasaki for five days. There were no new cases on her after leaving Nagasaki.

In Japan the latest advices show that there have been 7,360 cases and 3,060 deaths from cholera.

Among the important cities in which the disease has been present are Osaka, Okayama, Kyoto, Moji, Nagasaki and Kobe, and Hakodate: the last four named are shipping ports; and Okayama is situated about 72 miles from Kobe, and from the prefecture of Okayama much matting and straw braid are exported.

In China the provinces of Human and Shansi are most affected. The disease is epidemic at Nanking, which reports 40,000 deaths, at Shoo-Yanghsien, with 3,000 cases a day, and a number of other cities. In Hong Kong, since the beginning of the outbreak, there have been 459 cases and 396 deaths.

Yellow Fever.—Much of the observation and of the literature of the year in connection with this disease have been directed to the part played in its dissemination by the mosquito *Stegomyia fasciata*, acting as an intermediate host for the yellow-fever parasite.

In Havana war upon the mosquito has continued to be waged on the lines laid down by Ross, Finlay, Reed, Carroll and Agramonte, as referred to in my last annual report. And the campaign so waged has been most successful. Major Gorgas, M.D., U. S. Army, thus reports in part:

'Our scheme so far as mosquitoes were concerned, was, in the first place, to destroy all the Stegomyia mosquitoes we possibly could, so as to leave as few as possible to transmit the yellow fever from patient to patient. In the next place, to prevent as much as possible those that escaped from biting yellow-fever patients, and thus transmitting the disease. And in the third place, when mosquitoes had escaped our first two lines of defence, to have a third line and endeavour to kill all that had become infected.

'With the idea of destroying all the mosquitoes possible, we formed a brigade, naming it the Stegomyia brigade, which worked within the houses. The Stegomyia mosquito breeds principally in the yards of the more thickly settled portions of the city, in all fresh-water collections, such as rain-water barrels. The water supply of Havana is very hard, and nearly every house in the city has a barrel of rain-water for domestic purposes.

'Early in the season the mayor issued an ordinance requiring every collection of water in the city to be kept mosquito-proof. After one or two inspections this was enforced by fines. Wherever a collection of water was found not protected as required, the owner was fined.

'The Stegomyia brigade is divided into seven sections; each section has a portion of the city assigned to it. The section consists of an inspector and two labourers, who accompany him in his inspections. Every house in his district is visited by this inspector. The inspectors report upon the condition of the water collections as to larvæ, and the manner of their protection. On this report the department acts as to fining the tenant or owner, according as the responsibility rests.

'The oilers pour crude kerosene oil into all the drains, privies, cess-pools, &c., that cannot be otherwise protected. If the families are poor, the department covers their water barrel and puts a spigot in the bottom. Havana has no general sewerage system, but each house has a cess-pool. Sometimes a cess-pool will have an outlet into some neighbouring drain, or it may not have any outlet at all. All these cess-pools and the drains leading thereto are favourite breeding-places for the common *Culex pungens*, and to a very slight extent for the Stegomyia. The only way of managing these is by oiling.'

To prevent the mosquito from becoming infected we have screened, at public expense, every yellow-fever case as it has occurred, having the family designate the room or rooms they want to occupy, and at once putting up wire screens at the doors and windows, and stationing a guard at the door to see that proper precautions are observed to keep the door closed.

With the object of destroying the infected Stegomyia we organized three fumigating brigades of thirteen men each, under the direction of a chief. These at once went to the houses, and as soon as the patients were screened, went to work killing mosquitoes. The screening was generally completed within two hours after the case was reported. Each room in the house outside of those occupied by the patient was closed; the cracks were carefully pasted, and pyrethrum powder was burned at the rate of one pound to every 1,000 cubic feet of air space. At the end of three hours the room was opened, and the mosquitoes were swept up and destroyed. The whole house was gone over in this way, and on the possibility of some of the mosquitoes having escaped, the houses adjoining the infected house were treated in the same way. On an average, 150 pounds of pyrethrum was used to a disinfection.

As soon as the patient had recovered or died, the rooms occupied by him were gone over in the same way and the infected mosquitoes were killed before the screens were taken down.

Pyrethrum is not the best insecticide, but it was used because it was least objectionable to the people being fumigated. Sulphur is very much better, but it injures so many fabrics that we never use it in rooms where any injury can be done. From the stupor caused by the pyrethrum powder a certain number of mosquitoes will revive when exposed to the fresh air, and for this reason, after the fumigation the mosquitoes have to be carefully collected and destroyed in some other way.

The habits of the Stegomyia have greatly assisted us: they seem, as a general rule, not to leave the neighbourhood of their birth-place, and for this reason we were able last summer to get all the infected mosquitoes around each focus as it developed by killing the mosquitoes in the way described.

Writing in July last, Dr. Gorgas says: 'In Havana since September 28, 1901, there has not been a single case. The maximum for the same period, according to the table, is 1,385 in 1896–97; the minimum, 122, in 1899–1900; average, 467. These results, it seems to me, are due entirely to the mosquito work.'

In Brazil the position and belief with regard to the mosquito in yellow fever is stated in a letter from H. S. Allyn, M.D., to the 'Medical Record' under date of Aug. 27 last. He writes from Rio de Janeiro and says: 'Until the present time the sanitary authorities of Rio de Janeiro have not made the war on the mosquito one of their methods of combatting yellow fever, and it is only recently that the leading physicians here have accepted the "Havana doctrine," and even now some of the most eminent ones, while accepting the mosquito as *an* agent, do not believe it to be the *only* agent in the spread of yellow fever; and they rigorously defend the idea that the disease is propagated by fomites.'

In Brazil the lawyers argue their cases and fight their legal battles through the daily papers, and the doctors employ the same means to announce their discoveries and teach their doctrines. In yesterday's 'Journal of Commerce,' the oldest and largest daily in Rio, Dr. Nuno de Andrade, for many years natural director of hygiene, and one of Rio's most celebrated physicians, has a long article with the title, 'The Prophylaxis of Yellow Fever,' and as his views may be of interest to the readers of the 'Medical Record,' I will send you a translation of some extracts from it.

He opens with the following just remark: 'The discovery of the transmissibility of yellow fever by *Culex fasciatus*, or *Stegomyia fasciata*, introduces a new element into the prophylaxis of this pestilential disease, and helps to the comprehension of long-known and well-proven facts, which until now were unexplainable.' As one of these heretofore unexplained facts, he relates a personal experience of his in 1883. Contrary to the then generally accepted opinion, that yellow fever was brought into the city from the shipping in the harbour, he acted upon the hypothesis that the shipping was infected from the lands, and to protect the vessels ordered them to anchor not less than 300 metres from the shore, and forbade them to touch the dock. At the time there were no cases either in the city or among the ships, but in the latter half of December cases began to appear in the city, and in the following months the disease became epidemic, but not until April of 1884 did the first case appear in the shipping, and this one was evidently carried from the land. By continuing this course in the following years, the epidemics

of yellow fever were completely extinguished in a harbour where, in former years, they were so terrible that ships without number had their crews decimated. He then adds: 'To-day more is known than in 1883. The Havana doctrine, confirmed by the studies of Reed, Carroll, Agramonte, and others, and inspired by the persevering observations of Finlay, revealed the agency of the *Stegomyia fasciata* in the transmission of yellow fever; and, as the natural history of mosquitoes teaches us that they are poor travellers, it can be stated positively that the immunity of these vessels, separated from the shore, was due to the distance which the mosquitoes could not traverse.'

Continuing, he says: 'Another fact of great significance speaks equally in support of the Havana doctrine, and, perhaps, with greater brilliancy, than the former. For fifteen years I have witnessed the immunity of thousands of non-immune persons, who during formidable epidemics, have descended daily to Rio from Petropolis, returning at 4 or 5 p.m. Among these I do not know of a single person taking the fever, when the night was not passed here, but, on the other hand, I know many who took it when they imprudently stayed here over night. Now the *Stegomyia* hides itself during the day and begins to fly at dusk. This circumstance explains the well-known immunity of those who ascend to Petropolis. So, too, there are many cases in which yellow-fever patients have been carried to Petropolis, but I do not know a single one who became a *focus* for the spread of the disease. The altitude of Petropolis is not a serious obstacle to the propagation of yellow fever; but the *mosquito-vector*, which sucks the blood of the sick and injects it into the well, *does not exist there*.' (Italics his.)

Petropolis is a mountain city, 2,700 feet above sea-level, about thirty miles north of Rio, and has about 25,000 inhabitants. It is reached by an hour's trip across the bay, and an equal time by rail, the last half of which is up an inclined plane. It is the summer home of the President and many Rio families, and the permanent home of all the foreign legations, and whenever their members have observed the precaution of not passing a night in Rio, they have always escaped; but this week the Chilian fleet has just left Rio with the remains of four ministers and secretaries of that country, who, during the last few years did not observe this well-known law, and died from yellow fever. I am at present living in Petropolis, and I can, from personal observation, confirm Dr. Nuno's statement in regard to the immunity of those who go and come from Rio daily. One remarkable fact in the connection is that one taking the fever in Rio and going to Petropolis, even if the disease does not develop for a day or so, nearly always dies.

But to return to Dr. Nuno's article. He describes the experiments made in Havana, both those to prove the agency of the mosquito in the propagation of the disease and those to prove the innocuousness of families. Of the first he says: 'These experiments are decisive and prove that the *stegomyia* inoculates yellow fever.' He does not, however, accept as final the conclusions of the Americans in the second class, saying, 'They conclude that such objects do not transmit the disease, and *deny the least value to their disinfection*. This statement, however, is not conclusive, because the experiments were not well made. What can be inferred is, that the clothing, bedding, &c., do not transmit the disease *directly* [by direct contact translator], but do not prove that they do not *transport the germ*.'

He outlines his future policy as follows: 'Use all the present methods, and to them add those which have to do with the extermination of Stegomyia.' 'Addition and not substitution.'

Dr. Edmond Souchon, of New Orleans, President of the Louisiana State Board of Health, holds, however, that the actual exemption of Havana from yellow fever is truly due to the quarantine work that prevented the introduction of new infection. In a letter to the *Medical Record*, published on the 25th instant, Dr. Souchon says:

'No one admires more than I do the great efforts and the splendid results obtained by Dr. Gorgas in the sanitation of Havana, but as a seeker of truth for truth's sake, and regardless of its consequences, it has occurred to me that although the destruction of the mosquito may have prevented the spread of yellow fever in Havana, the real cause of the *present exemption* of Havana and of the island from yellow fever is due truly to the efficient quarantine work of the United States Public Health and

Marine Hospital Service officers. They kept out the fever and therefore prevented the spread of it by mosquitoes or any other cause. The past history of New Orleans bears out this view. Up to the time of the incipiency of scientific quarantine, from 1879 to 1884, there was yellow fever in New Orleans every year, more or less, because the quarantine methods employed up to that time permitted the constant introduction of cases by vessels without ever giving the city a chance of exhausting one infection before another infection occurred. Since the inauguration of thorough disinfection of vessels, especially since 1884, under the vigorous championship of our Dr. Joseph Holt, the city has been practically free from yellow fever until the infection of 1897, through the Mississippi coast. It took three years for this infection to exhaust itself, and New Orleans is again free from yellow fever. All that was accomplished without any precautions whatever having been taken against mosquitoes.

'Now it is my firm belief that the same thing has taken place in Havana, through the agency of a perfect quarantine, which has prevented the annual infection of the city and gave the infection a chance to exhaust itself. This view is corroborated by the fact that at the ports of Mantanzas, Nuevitas, Cienfuegos and Santiago, where the officers of the United States Public Health and Marine Hospital Service kept up a rigid quarantine since the occupation of the island, no yellow fever has developed *this year* any more than in Havana, and yet no *serious* crusade was undertaken at these places against the mosquito.

'I reassert here my thorough belief in the transmission of yellow fever by mosquitoes, as demonstrated by the memorable labours of Dr. Walter Reed, his co-workers and followers, but I believe from practical facts before me that there is some other means of transmission.

'I do not wish to be understood that I believe the work of eliminating mosquitoes useless, because I do believe that it *hastened the exhausting of the infection*, but I do believe that Havana would have become free of yellow fever anyhow, and that the *actual exemption* is truly due to the quarantine work that prevented the introduction of new infection.

'I do not believe that it would be safe to do away with all quarantine restrictions and rely solely upon the destruction of mosquitoes in a port to prevent that port from becoming infected. There have been mosquitoes in Havana this summer. I know from private information received, and if no cases of yellow fever occurred it is because the efficient quarantine has kept yellow fever out.'

At the conference of State and Provincial Boards of Health of North America, held at New Haven, Conn., on the 28th and 29th instant, Major W. C. Gorgas presented the following resolution as the report of the committee on yellow fever resolutions, signed by Drs. Gorgas, Ross and Glennan :

'Resolved, That in view of the establishment of the fact that yellow fever is only transmitted by the mosquito, this conference is of the opinion that there is no longer necessity for the disinfection in yellow fever cases of clothing, bedding, fabrics, or effects of any kind, but simply to take measures looking to the control of the sick and the extermination of infected mosquitoes. In cases where non-immunes have been exposed to infection, they should be observed during the period of incubation.'

Dr. J. S. Stephens, Natchitoches, La., representing Dr. Arthur Nolte, of the Louisiana State Board of Health, submitted a minority report to the effect that the mosquito was not the only mode of transmission of yellow fever, he and his confrères believing that fomites carry the disease. The experience in the past had been extensive in that regard. Believing, therefore, that both the mosquitoes and fomites were modes of transmission of the disease, in Louisiana, the same quarantine was maintained to-day that was carried out years ago, with slight modification.

After a spirited discussion, participated in by several members of the conference, Dr. John S. Fulton, Baltimore, moved that both the majority and minority reports be spread on the proceedings, but that the conference not commit itself to any expression concerning the practical measures to be used in restricting yellow fever. This motion was adopted.'

Four cases of yellow fever came to your St. John, N.B., quarantine station during the year.

Small-pox.—This disease has prevailed extensively throughout the year, appearing in Argentine, Austria-Hungary, Barbados, Belgium, Brazil, Canada, Ceylon, China, Columbia, Dutch West Indies, Ecuador, Egypt, England, France, Gibraltar, Greece, India, Ireland, Italy, Japan, Malta, Mexico, Netherlands, Philippine Islands, Porto Rico, Russia, Scotland, Spain, Straits Settlements, Switzerland, Turkey, the United States, Uruguay and Venezuela.

During the year the widespread epidemic of this disease in the United States has continued, some 36,000 cases being reported for the first six months of 1902, and some 11,000 from July 1 to 24 instant. In London the disease prevailed extensively also, costing the community about 1,500 lives, and causing serious suffering to some 7,500 other persons, in addition to the pecuniary loss occasioned by the scare.

The ground had been prepared, and only the seed was needed to cause quick germination and a fruitful crop. The neglect of vaccination in the United States, and the abolition of compulsory vaccination in Great Britain, supplied the conditions necessary to the origin and spread of small-pox. In both countries the long freedom from extended epidemics had served to give the people an unwarranted confidence, and to lull them into a false security, and vaccination had come to be regarded as superfluous.

Small-pox has continued to threaten us throughout the year, on the Atlantic and Pacific seaboards and from the neighbouring republic along our frontier. Its continued presence in the United States has necessitated the maintenance of frontier medical inspectors and guards at those of your unorganized inland quarantines where the threatening seemed the most serious from time to time. In addition to this there have been repeated outbreaks of the disease in different parts of the North-west Territories, the sanitary administration of which territories has come under your jurisdiction in this matter. Dr. James Patterson has continued in local charge, and it is in great part due to his well considered precautions, and prompt and energetic measures that the various outbreaks have been limited and controlled.

Small-pox has been brought to the following amongst your organized maritime quarantines; Charlottetown, P.E.I., four cases were brought by three vessels; at Halifax, N.S., five cases by two vessels; Sydney, C.B., one case from one vessel, St. John, N.B., six cases from three vessels; Grosse Isle, Que., three cases from three vessels; William Head, B.C., four cases from three vessels.

These cases, the vessels bringing them, and the persons and effects in such vessels were promptly and intelligently treated with the appliances with which your stations were equipped.

In not a single instance during the year has any infectious disease been transmitted from one to another in quarantine. Nor did any quarantinable disease gain an entrance in the country through any one of your organized maritime quarantine stations.

Government control of vaccines, &c.—In connection with the recommendation submitted in my last annual report that a laboratory be created for the preparation of national vaccine and therapeutic sera as in Germany and Switzerland, it is of interest to note that in Great Britain at the annual meeting of the Hospital Saturday Fund (an institution which collects money for the metropolitan hospitals on a certain Saturday every year, and last year collected $100,000) Dr. T. D. Acland made an important statement based on his seven years' experience as medical officer to the Royal Commission on Vaccination. More than 6,500,000 vaccinations were brought under the notice of the commission and in these serious injury occurred in one case in 14,159 primary vaccinations. But more than half of these were due to preventable causes, namely, the various kinds of inflammation. Having given facts and statistics to show the protective power of vaccination against small-pox, he advocated arrangements by the government for an adequate supply of lymph of the best quality. A motion was carried that 'the government should establish a laboratory fitted in the most perfect manner, adequate to supply all practitioners throughout the United Kingdom with vaccine lymph; and that they should inspect all establishments for the preparation of lymph in this country and regulate the sale of all that is imported,' and in the United States Senator Spooner recently introduced a bill into Congress to regulate the sale of vaccines and therapeutic sera in the Dis-

trict of Columbia, and to regulate the interstate traffic in the same, the intention of which is to place the manufacture and sale of all such agents under the direct control of the National Government as represented by the officers of the Public Health and Marine Hospital Service. The following is a summary of the bill as published in the *Times* :—

'It penalizes by fine or imprisonment, or both, in the discretion of the court, the taking from one state to another, or the sale, barter, or exchange of any virus, therapeutic serum, toxin, antitoxin, or analogous product for use in the treatment of diseases in human beings, unless the same is produced at an establishment operating under license from the Treasury Department. Every package of such organic preparation which may be legally taken from one state or territory to another for sale or use shall bear the name, address, and license number of its maker, and the date at which it may be expected to lose its therapeutic value. Establishments working under license from the Treasury Department are to be at all reasonable times open to inspection by its authorized representatives or agents. The action of the Secretary in granting or revoking licenses for the domestic production of such preparations shall be taken on the recommendation of the Supervising Surgeon-General of the Marine Hospital and Public Health Service, and none of foreign production shall be received into the country unless the foreign producers shall permit the same inspection of their establishments as is provided in the case of licensed manufacturers in this country.'

Beri-beri.—The question of the causation of this peripheral neuritis has been the subject of some further discussion this year. In the reports of sick for January and February, 1902, recently received at the Surgeon-General's office, Washington, D.C., from the prison and beri-beri hospital at Lingayen, Pangasinan, P. I., Captain Harry A. Littlefield, asst.-surgeon, U. S. Vols., has the following interesting note on the causation of beri-beri : Since the establishment of this prison until February 1 of this year, the native prisoners have been supplied with Chinese white rice. During this time beri-beri has been markedly endemic in the prison. The records of this office show that the number of deaths have averaged five monthly, while the number of new cases monthly averaged twenty. When prisoners reported sick with beri-beri they were removed from the prison to a building about one-half mile from the prison, the upper story of the building being used for a hospital. The difference between conditions existing at the beri-beri hospital and the prison being only the higher elevation of the former; the diet supply was the same at both places. Many of the cases at the beri-beri hospital continued to grow worse and died. The majority of those who did recover, did so after a very long illness and many of them suffered from numerous relapses. During the month of January there were thirty-five cases in the beri-beri hospital and as many who were slightly affected in the prison. The sanitary conditions were excellent. In the civil prison, not more than one-quarter of a mile distant, there were confined a large number of natives, the sanitary conditions not as satisfactory as those of the military prison, they were more crowded, in poorer buildings and not in the open air any more than the natives confined in the military prison. In this civil prison there were no beri-beri cases, the only difference existing in favour of the civil prison being that the ration was purchased in the open market. At the beginning of February of this year, upon recommendation of the prison surgeon, the use of the Chinese white rice supplied by the commissary was discontinued and native rice from the open market purchased in its place. Since that time no new cases of beri-beri have developed and no death has occurred. Of the 29 cases remaining in hospital on the last of January, 16 have been returned to duty : 8 released, greatly improved : 5 remaining, greatly improved and still improving. The mild cases in the prison have all recovered. This marked change occurred in the space of one month, the only apparent difference existing during this period and in the previous times being that of the rice supply. From these facts it would seem that the cause of beri-beri in this prison has been brought about by the use of the Chinese rice, white variety.

Manson writes : —'There are two theories of its causation : The dietetic which has been advocated by many writers, who generally attribute the disease to prolonged and uniform rice diet. The facts that support this are largely from Japanese experience, but epidemics elsewhere show exceptions. It has occurred in other countries with elaborate

diet, where there is no lack of nitrogenous food. In the prisoners of the Dutch colony of Java, there seems to be some evidence that it follows the use of decorticated rather than non-decorticated rice. Another theory which Manson thinks more plausible is the germ theory, which is quite compatible with Japanese experience, and that the disorder has its origin in the toxin elaborated by a germ in the blood or tissues. In his opinion, the best supported theory by facts is that the disease is purely an intoxication produced by toxins elaborated by germs whose nidus is located outside the human body, and he parallels it with alcoholism. The cause can be transplanted from place to place and therefore can not be of climatic or meterological nature, and when so transplanted can multiply. This has been shown by numerous facts, by the transportation of Japanese to different localities where they have carried the disease with them, and it is not unknown on ships in the London docks. We can not, however, say what the toxin is, but its persistency in certain buildings and ships is certainly remarkable. The analogy with alcoholism is used by him largely in his reasoning. In conclusion, he enumerates several points that investigators in the etiology of beri-beri must be careful to attend to: '1. The diagnosis; they must avoid mistaking other forms of peripheral neuritis for that of beri-beri. 2. They must bear in mind the possibility that the disease may not have been contracted at the place in which it is declared. 3. That the toxin which produces an outbreak of beri-beri may have been imported as such and not manufactured, so to speak, locally. 4. They must carefully differentiate between predisposing or favouring conditions, such as overcrowding, heat and moisture, bad food, &c., and the actual direct cause. 5. Finally, they must recognize that the actual cause must correspond in its geographical distribution with the geographical distribution of the disease.'

Sambon writes *(London School of Tropical Medicine)*:—'Certainly, I do not think that rice causes beri-beri because of its deficiency in mineral and nitrogenous matters, but I am quite prepared to admit that it may be related to beri-beri in the same way as we now believe pellagra to be related to maize, or, in other words, that rice may become a vehicle of the beri-beri infection. Rice is used as a staple food over a far wider area than that in which beri-beri prevails, but the cause of the disease is not the rice itself, but perhaps some micro-organism which, in certain places and under certain conditions, may be associated with rice and possibly with other grain.

'Within the endemic centres of beri-beri it has been frequently noticed that the disease is most common in communities supplied with rice of inferior quality, or with rice which has been carelessly prepared and badly stored. Paddy keeps sound for years but the grain deprived of its pericarp is soon damaged by vegetable parasites. Dr. C. Eijkman, from statistics applying to 280,000 prisoners, showed that in the prisoners of Java the proportion of beri-beri cases is 1 to 39 in convicts fed on decorticated rice (white rice), whilst it is 1 to 10,000 in convicts who consume the grain half peeled, that is to say, deprived of pericarp but still inclosed in its perisperm (red rice).

'Besides fungi, there are numerous insects and mites that live on stored rice, and the granaries are constantly visited by mice and rats. Most interesting associations have been established between all these plants and animals that gather on rice. For instance, *Pinius latro* is a small beetle that feeds on rice in winter, its larva inhabits the excrements of rats. If rats were liable to beri-beri, as Lacerda suspected, the specific microbe might be conveyed in their excreta. I mention these facts merely to show how complex might be the connection between rice and beri-beri.'

'Dr. W. A. Wheeler, Civil Surgeon in charge of the Boer Camp in St. Helena, has described his experiences of the epidemic of this disease which occurred among the Boers there. The facts, as he believes, fully agree with Dr. Manson's theory as to the production of the disease by place infection.

'At first only a few isolated cases of beri-beri occurred in the camp at Dead Wood Plain, but at the time of his arrival there in May, 1902, the disease had become epidemic, and a new isolation camp was established, of which he had command, and in which he had on an average 75 cases to treat.'

'In regard to etiology, Dr. Wheeler believes that all the causes ordinarily ascribed might be eliminated. As far as alcholism was concerned, the Boers were well known to be a temperate race, and as prisoners of war they had no possible means of obtaining

alcoholic drinks, and every man returning to camp after leave of absence was strictly searched. Rice was at no time issued as part of the rations. Arsenic was carefully tested for in the drinking water with a negative result, and if any had been present in tinned foods the home troops would have suffered equally, as the rations for soldiers and Boers were identical. Malaria was ordinarily unknown in St. Helena, and although it was common in some parts of South Africa, yet careful questioning of each patient in no case elicited a history of this disease.'

'On the other hand, the conditions existing among the Boers would lend great countenance to the theory of place infection, resulting in the development of a toxin outside the body. The Boers had been confined to one camp of 3,000 men for over two years. The greatest care was taken as regards drainage, latrines, removal of night soil, &c.: but, even so, the ground could not possibly have escaped being fouled during this long time. Again, the large majority of those attacked were old men (50 to 70), men who in their own country had been accustomed to a free active life, but who now, as prisoners, moped, took no exercise, ate and slept too much, and stayed mostly day and night in small huts with every aperture closed. They never washed their bodies and never changed their clothes. Conditions such as these, in conjunction with fouled ground, would naturally bring about a state of affairs favourable to the production of a toxin. The mosquito could be eliminated in this case, for the camp was at an elevation of 2,000 ft., and a strong sea breeze was constantly blowing. Dr. Wheeler had never seen a mosquito there, but vermin of other kinds were there in plenty.

'The theory of place infection was also strongly borne out by the fact that, on moving the invalids to a site hitherto unoccupied, a most rapid and marvellous improvement took place. The earlier cases had been sent to Jamestown Station Hospital (at sea level), and a fair number of these died: but, after the establishment of the isolation camp at Dead Wood Plain, there was not a single death: every man recovered completely, some in a week or so, others more slowly.

The treatment consisted solely in this change of location and in giving extra diet—1 tin of milk, 2 oz. of oatmeal, and 3 oz. of whisky to each man.

'As regards the ordinary diet, it was at no time deficient, and was identical with that of the home troops (encamped on the same ground)—namely, fresh meat four days a week, tinned meat two days, vegetables and potatoes on alternate days, bread, sugar and coffee. It is true the vegetables were compressed, and the potatoes were often not too good.

'During a residence of six years in tea districts in India I have naturally seen a large number of cases of the disease known there as beri-beri, and of malaria in all its forms. I have also as a visitor seen the form of beri-beri common in Singapore: but this epidemic in St. Helena has exhibited features very different from those in the other countries. The acuteness of the cases, the rapid recovery on removal to fresh ground, the absence of all factors hitherto considered causative, with the notable exception of that of fouled ground and personal uncleanliness, is most remarkable.'

Cases of beri-beri were brought to the port of Sydney, C. B., during the year, and to the port of Victoria, B.C.

Scarlet Fever Serum.—*The British Medical Journal* of the 4th inst. speaks thus of a new serum for scarlet fever:—

'At the Congress of Naturalists and Physicians, recently held at Carlsbad, it was announced that Dr. Paul Moser, Assistant Physician to St. Anne's Hospital for children in Vienna, had discovered a curative serum for scarlet fever. The serum is obtained by injecting horses with the products of cultures of streptococci which Dr. Moser has found in the blood of 63 out of 99 children who had died from the disease. It has been produced in quantity in the Serotherapeutic Institute of the Rudolph Hospital in Vienna, under the superintendence of Dr. Paltauf, Professor of Pathology in the University of Vienna. It has been used clinically since November, 1900, in about 84 cases, with the result that the mortality among 400 cases of the disease in St. Anne's Hospital has been reduced by one-half. Only the more severe of the cases in the hospital were treated

with the serum on account of the difficulty in obtaining a sufficient supply. All the children who were treated within three days of infection recovered. Their general condition underwent a striking and rapid improvement, and the pyrexia in many cases quickly abated. So far the serum has not been produced in a concentrated form, so that a comparatively large quantity has been injected into each patient. In some cases erythematous eruptions developed, but they soon disappeared. Professor Paltauf and Professor Escherich, Director of the St. Anne's Children's Hospital, testify to the good results obtained with it, both in the case of children and adults, and orders have been given by the Austrian Minister of the Interior for the serum to be prepared in large quantities for distribution to all the Vienna hospitals, and the Congress was informed that the government would vote a considerable sum for the purpose. An antistreptococcus serum has previously been employed in severe cases of scarlet fever, notably by Professor Baginsky, of Berlin, but without any really satisfactory results. We have not as yet had an opportunity of seeing the full text of Dr. Moser's paper, which will be worthy of careful study.'

Enteric Fever.—In an article on the value of anti-enteric fever inoculations, under date the 20th ultimo, the *Medical Record* says:—'Surgeon-Major Wright of the Army Medical School at Netley has recently made an exhaustive report on the results of anti-typhoid inoculations in South Africa. The medical officers urged at the beginning of the war that the opportunity be given to make extensive tests of the efficacy of the typhoid serum, but Lord Wolseley for a long time refused to permit inoculations, and it was only at the urgent solicitation of Lord Lister that he finally gave a grudging consent.

'Professor Wright says the success of the inoculations was unmistakable, for both the morbidity and the mortality were much less among the inoculated than among those who had refused to submit to the experiment. In proof of this claim he adduces the statistics of the garrison at Ladysmith. According to the summary of the report cabled to *The Sun*, of the 12,234 composing the garrison there, all of whom were exposed equally to typhoid infection, 1,705 submitted themselves to inoculation. In the period from November 2, 1899, until February 2, 1900, there were 1,489 cases of typhoid among those who had not been inoculated, and only thirty-five among those who had been inoculated, instead of about 250, which would have been their due proportion. There were eight deaths among those who had been inoculated to 329 among those who had not been inoculated. The death rates of the two groups were respectively ·047 and ·312. As a result of the diminished mortality, superadded to the diminution of incidence of the fever, is claimed that the reduction of mortality from typhoid amounted to a fourfold reduction.

'These statistics are, doubtless, comforting and cause the hope that the mortality from this scourge of armies may be reduced, but it must be remembered that the experiments cited were made upon soldiers in garrison and not on the march. Men who are marching under a burning sun in a hot and dry country will drink any water they see, no matter how polluted it seems to be or is, and not even military discipline will make them cherish their thirst for the twenty or thirty minutes needed to boil the water so as to make it safe. And again, even in garrison, the men who had enough faith in medical science to submit to a protective inoculation would also be much less disposed to disobey the sanitary injunctions laid upon them than would the careless or sceptical uninoculated.'

'Still the statistics that have thus far been presented go far to sustain belief in the efficacy of protective inoculation against typhoid fever as practised by the English military surgeons and they more than justify continuance of the practice.

'*Eberth's bacilli in typhoid expectorations*—L. Jehle reports (*Wein. Klin. Wochenschr.*, February 27, 1902, No. 9, p. 232) the results of his researches upon the presence of typhoid bacilli in the expectoration of patients, as well as in the bronchial secretions found on examination after death. The expectorations and bronchial secretions were examined under the microscope, then cultivated, and the diagnosis was completed by using the serum reaction.

In 15 cases in which the bacilli were looked for in the expectorations, the result was positive 9 times. In all these cases typhoid was complicated by bronchitis or broncho-pneumonia. The typhoid bacilli existed in pure culture in 2 cases, in 4 cases they existed very numerously, in 2 cases they were associated with the influenza bacilli, and in 1 case with diplococci and streptococci.

The results of the examination of the bronchial mucous were as follows : In 5 cases in which there existed hæmorrhagic infiltration of the lungs the typhoid bacilli were found 4 times. In 6 cases with simply a congested condition of the lung tissue the presence of typhoid bacilli was proved 4 times. The typhoid bacilli were also present in 3 other cases which were clinically abnormal.

The author concludes from these facts that, if Eberth's bacilli are found in the expectorations and bronchial secretions in cases of pneumonia or broncho-pneumonia, their presence implies that the person is suffering from typhoid fever. They are present also, but not so constantly, in the expectoration of typhoid patients afflicted with simple bronchitis.

Leprosy :—At the Royal Medical and Chirurgical Society Mr. Jonathan Hutchinson made a communication on this subject based on the experiences gained in his recent tour in South Africa. Among other conclusions Mr. Hutchinson has arrived at the following :—

'1. Leprosy was almost, if not absolutely unknown in South Africa before the Dutch occupation of the Cape, and their introduction of Malays from Java to establish a fish factory at Cape Town.

'2. Salt fish and rice was the staple food of the Dutch farmers and their Hottentot slaves at the time leprosy was first observed, in 1756. The disease first spread around Cape Town, then over South Africa.

'3. Leprosy prevails slightly in towns (unlike highly infectious maladies) but affects chiefly agricultural labourers. Though widely spread the disease is unequally distributed dotted about among the mining and agricultural population of Cape Colony, who use very largely badly cured salt fish.

'4. In the Kaffir kraals of Natal, the disease is communicated from person to person by eating food from a leper's hands contaminated by food containing the bacillus.

The disease is not contagious in the ordinary sense of the term, but only in this special manner, which Mr. Hutchinson proposes to call 'commensal communication." He thinks that the two hypotheses of fish production and commensal communication together explain the difficulties hitherto felt in regard to leprosy, such as its not spreading in civilized communities, its irregularity and uncertainty even among the most careless, the frequency with which young children suffered, the universal, but varying disproportion of the sexes, and the scattered distribution without, as in South Africa, any foci of great prevalence. The facts in favour of the view that the bacillus is received through the stomach are very strong. The first symptoms are those of a blood disease, There is never a primary sore or other indication of local infection. The earliest phenomena, whether of the skin or nervous system, are, as a rule, bilateral and imply blood communication. It is impossible to believe in communication by the breath, for attendants in leper houses and others in constant and close communication with lepers never take the disease. Similarly, contagion through the skin is incredible. Husband and wife rarely suffer together : many inoculation experiments have failed. Such contamination of food as described could only occur under conditions of extreme carelessness in feeding. Hence among the cleanly communities of Europe and America, the disease was not communicated.

The measures suggested for the prevention of the disease are first (and by far the most important) the legislative control of the fish-curing establishments : secondly, the diffusion of information as to danger of communication ; and thirdly, the establishment of small isolation homes into which lepers should be induced to go during the stage involving risk. Thus Mr. Hutchinson, as the result of his investigations, reaffirms the 'fish-hypothesis' of the origin of leprosy—a doctrine which he has strenuously and persistently maintained for many years in the face of almost universal opposition of all the

other authorities. He has also, against the general view, insisted that leprosy is not in the ordinary sense a contagious disease, pointing out that although a number of lepers live in England and mix freely with the population, no case of contagion has ever been observed. The peculiar method of contagion from lepers through food is a new hypothesis, but it in no way invalidates (on the contrary, it confirms) Mr. Hutchinson's view of the non-contagiousness of leprosy in civilized life.

Ernest F. Neve stated that it has been shown that thousands of people have eaten fish in various forms without developing leprosy, which is rarest in the districts of greatest fish consumption. The question of the spread of leprosy is one of great importance in those countries in which the disease is endemic. If acceptance of the fish hypothesis leads us to deal with the matter by aiming alone at the inhibition of unwholesome fish food, then it appears a mischievous theory. If the disease is to be stamped out the most important measures to be taken are: first, to separate healthy children from their leprous parents as soon as possible; to withdraw lepers from the general community as completely as possible; to use such proper sanitary precautions as shall prevent possible infection or contagion; such, for instance as disinfecting dirty clothing by heat before washing, forbidding expectoration on floors or ground, exercising careful supervision over the free ventilation, exposure to sunlight and general cleanliness of the buildings, inside and out, and of their surroundins, and of the disposal of dangerous refuse. It is important to regulate the contact of healthy attendants with lepers, bearing in mind the dangers from their clothing and discharges. The disease should be treated as no less infectious than tuberculosis, to which it presents not a few points of resemblance.

Here is what Dr. Roberto Aguero, the physician in charge of the lazaretto Cano de Loro, Bolivar, near Carthagena and Commissioner on Leprosy of the Minister of State, United States of Colombia, has to say on the subject of contagion of leprosy. There are 3,000 lepers in Dr. Aguero's country:—

'If leprosy is a disease of infectious nature, there is no doubt that it is contagious, and this is the opinion which I profess, as an expression of conviction derived from observation, from study, and from the careful investigation of the personal leprous antecedents. My opinion is that leprosy is contagious, but not in the same degree as diseases of such active virulence as the eruptive fevers, typhoid fever, cholera, tuberculosis; and I believe that for the contagion to take place there is necessary a contact which facilitates the entrance into the healthy organism of Hansen's bacillus, or its toxins—be it through the mucous passage, or through erosions of the skin, which offer an easy access to the infection. In the first instance it takes place directly from the sick to the well, by the intimacy of life, by prolonged contacts, by the community of domestic utensils, without proper precautions of asepsis, or by the constant intercourse between sick and well.

'When a healthy individual for a long period holds intercourse with a diseased one, an occasion for infection readily presents itself either because the healthy person makes use of the bowl, of the spoon, or any other utensil used by the diseased person, or because he puts his lacerated skin into contact with that of the diseased one, or some of his secretions, offering thus the occasion for the infectious principle to effect an entrance. Hence the case, a very frequent one, of individuals who have lived many years with lepers, and have remained immune, while there exists also the opposite—one single contact, for a short moment, has been sufficient for the infection to take place, and the contagion to become manifest. I want to say this, that the moment is a single one, and that when it presents itself a natural law is necessarily accomplished, just as a grain sprouts when it is placed under conditions required by the biological laws of its evolution.'

The report of a commission of surgeons of the Marine Hospital Service, appointed to investigate the origin and prevalence of leprosy in the United States, has recently been transmitted to Congress. The report shows 278 cases of leprosy in the United States, distributed by states as follows: Alabama, 1; California, 24; Florida, 24; Georgia, 1; Illinois, 5; Iowa, 1; Louisiana, 155; Maryland, 1; Massachusetts, 2; Minnesota, 20; Mississippi, 5; Missouri, 5; Montana, 1; Nevada, 1; New York, 7;

North Dakota, 16; Oregon, 1; Pennsylvania, 1; South Dakota, 1; Texas, 3; Wisconsin, 3.

Of the total number, 176 are males and 102 are females; 145 American born, 120 foreign born, and the remainder of undetermined nativity. It was stated to the commission that 186 of the cases were contracted in the United States, but the opinion is expressed by the commission that this number is too large, and that some of these cases were brought from abroad.

The following are the salient features of a bill to control the spread of leprosy, introduced in the United States Legislature by Senator Platt, of New York, this year:—

'The appointment of a leprosy commission, to reside at New York or San Francisco, to get a yearly salary of $5,000.

'The setting aside of a mile square for a national leper home, the site to be chosen by a leprosy board.'

'The appropriation of $50,000 to erect suitable buildings for the habitation of lepers in the United States, not including Hawaii, Porto Rico, Cuba or the Philippines.

'The transportation of lepers who are unable to care for themselves to the National Leper Home.

'The injunction of steamship companies or individual vessels or railroads to bring to the United States any leper, or to accept any immigrant from any of the countries known to be leprous without a special certificate.

'The strict supervision for seven years of immigrants of leprous families, though they themselves be free of the disease.

'The deportation of any leper, who, despite all precautions, manages to enter the United States. No discrimination to be made in behalf of Americans who contract the disease in a foreign country.

'The Public Health and Marine Hospital Service of the Treasury Department to have full charge of the National Leper Home.

'This bill should have the effect of checking the spread of leprosy in that country. With regard to the contagiousness of leprosy opinions differ; some believe that it is contagious in a high degree, while others hold that the disease can only be communicated under certain conditions.

'However, in the case of a malady so loathsome as leprosy, it is better to err on the side of caution than by any laxness to run even a risk of disseminating its genus.

'Strict segregation is generally believed to be the only effectual way of restricting the scope of leprosy, so that an appropriation of $50,000 for this purpose would be money well spent.'

'The contagion is not common and general as in small pox, scarlatina, measles, &c., because those diseases need no initial local lesions; the whole organism is their theatre, and they find it prepared; for this reason the individuals who escape them are rare. In leprosy the local lesion is indispensable, and as it is only rarely produced in the required condition, contagion is rare, is the exception; and exceptional though it is, it inspires more horror than that of any other disease.'

Tuberculosis.— Referring to what I had the honour to submit in my last annual report as to the considerations which have prevented my recommending that tuberculosis be included amongst the quarantinable diseases, I may now quote the resolutions passed by the New York Academy of Medicine in February last, in protest against the orders of the United States Government for the exclusion of tuberculous aliens:—

Whereas, the Treasury Department of the United States, upon recommendation of the Surgeon-General of the Marine-Hospital Service, has recently decided to classify pulmonary tuberculosis with dangerous contagious diseases, be it

'Resolved, That the New York Academy of Medicine deeply deplores this decision, which is not based either on clinical experience or on scientific experiments.

'Resolved, That the Academy considers the exclusion of non-pauper tuberculous immigrants and consumptive aliens visiting our shores unwise, inhumane, and contrary to the dictates of justice.

'Be it further resolved, That, while the Academy is convinced of the communicability of tuberculosis and urges all possible precaution against the spread of the disease occasioned by sputum and tuberculous food, the Academy is opposed to all measures by which needless hardship is imposed upon the consumptive individual, his family and his physician.'

A despatch to *The Sun* states that Professor Brouardel, who returned to Paris last week from attendance at the International Congress on Tuberculosis in Berlin, says that Koch no longer denies the possibility of the communication of bovine tuberculosis to human beings. Koch also admitted, he says, that milk infected with the disease might be injurious. Some time ago Professor Koch began to recede from the position taken at the London Congress, and resigned the claim of being the only discoverer and originator of the theory of the plurality of tuberculosis. To a reporter of the Paris *Figaro* he said: 'The opinion which I defended at the congress in London I still adhere to. I would like to call attention to the fact, however, that I limited myself to the expression of a theory which had previously been advanced by American men of science. The public has voluntarily accorded me the privilege of parentage. But let us get down to facts: I never said that infection was impossible; all I contended was, that it could hardly have serious consequences.'

The array of well-known authorities who hold that bovine consumption can be communicated to man, and that the ingestion of milk from cows with tuberculous udders may convey tuberculosis to those who drink it, should be sufficient to warn the public that there is danger from this source, which needs to be carefully guarded against.

In a work on tuberculosis just published in Berlin Professor Behring details the results of six years' investigations at Marburg, where he was assisted by Drs. Ruppel and Boemer.

Professor Behring affirms that tuberculosis in man and cattle is propagated by identical bacilli, and that the seeming differences between the human and the cattle bacilli result from the capacity of the bacilli to accommodate themselves to the organism in which they live. The writer explains the process by which he reaches the conclusion that, chemically and physiologically, the tubercule bacilli in man and cattle are of the same species.

Professor Behring says he has successfully infected cattle with virus from human beings, producing thereby fatal animal tuberculosis. He also says he has discovered a method to render cattle immune against tuberculosis, which is done by vaccinating the cattle when they are young. This he declares to be his greatest discovery, and says the method is in use on farms at Marburg. He alluded to his method of inoculating cattle in his speech at Stockholm, when he was awarded one of the Nobel prizes.

Railway and Steamboat Sanitation.—Very much has been written and urged for years by sanitarians to endeavour to improve the hygienic conditions of travel. This year some progress may be observed. The *Journal* says:—

According to a Berlin despatch, the Prussian state railway authorities are taking special precaution against the spread of contagion by public conveyances under their charge. They even propose to go so far as to have a physician accompany through trains and the station masters are to furnish him with detailed reports of typhoid cases, &c., occurring in their town or any suspicions of such. Sterilized water tanks are to be put up and conspicuously labelled and fresh boiled water supplied. All precautions against infection are to be employed about the stations, which will be practically quarantine stations. All this is said to be on account of the spread of typhoid, but it is to be presumed other infections will not be disregarded. Any person who travels and who has even an ordinary eye to sanitary defects can see many opportunities for mischief in railway carriages, and it is said that aside from the spitting nuisance, matters are worse in European travel than in this country. One probable good effect of the public scare as to tuberculosis, &c., which has not yet reached its climax, will be to improve matters, and it is even possible that the expectorating nuisance may be put down. The important point is that the right thing be done; it is too much to expect that only this will be

attended to: there will undoubtedly be many mistakes. If we can feel that decent disinfection, comparative cleanliness and just, reasonable and practicable precautions against infectious disease are the rule, and spitting is suppressed, we can trust to our vital resistance for the rest of our travel with comparative comfort.

A propos to the above it may be added that the Russian bureau of railways has also published rules in regard to travellers, requiring all cases of infectious disease on railroad trains to be at once removed and put in charge of the police at the nearest station where medical care can be given. Any car in which a case of small-pox, scarlet fever, diphtheria, typhoid or dysentery has occurred must be detached and disinfected. In case of other infectious disorders the question of disinfection, &c., is left to the judgment of the medical official.

The *Journal* in its editorial remarks on this subject says:—

'The railroad car, which is inhabited for hours or days by numbers of individuals, and going from one place to another at longer or shorter distances, may readily be a means of spreading infectious diseases from one person to others and from one locality to more or less remote ones. In the ordinary sleeping car, which is supposed to furnish the traveller with every possible comfort, many conditions could not be better for collecting and harbouring infectious germs if they had been planned expressly for the purpose. The upholstery which might be of leather, is usually plush, and the woodwork is often made to furnish as many places for the collection of dust as possible.

'From a hygienic point of view, the upholstery and hangings should be as limited as possible, and of such a nature as can be readily renovated: the woodwork should be smooth and without decorations or sharp angles for the collection of dust: provision should be made for ventilation without the necessity of a cloud of smoke and dust being blown through the car: and the dust which collects should either be allowed to remain undisturbed until the car is empty of passengers, or removed with a moist cloth, instead of being periodically distributed through the car by the ubiquitous duster of the porter. Cuspidors containing on antiseptic solution should be provided. At the end of each trip, the car should be carefully cleaned and disinfected by men who understand the practical use of disinfectants. Drinking utensils should be included in the general disinfection as should also toilet articles for common use, such as hair combs, brushes, &c. Closets should be carefully cleansed and washed with reliable antiseptic solutions. Each railroad should have an official who is a practical hygienist, who would be responsible for the suggestion and execution of all such details as would naturally occur to such a person.

'So long as railroad companies vie with each other in making their cars as luxurious and as gaudy as possible, without regard to after-effects on their patrons, just so long will railroad travel be accompanied with danger from infectious diseases.'

Sterilization of green vegetables, &c.—The attention of the United States Government has been officially drawn to this subject by Dr. Edgar Passel, Assistant Surgeon United States Public Health and Marine Hospital Service. He says the news reports to the effect that the recent outbreak of the Asiatic cholera at Manila was due to an importation of germs on fresh vegetables brought from Hong Kong has given rise to a discussion in Italian medical journals as to the appropriate methods for the sterilization of crude greens. The subject is of especial interest in Italy, where salads form one of the staples of diet. In times of epidemics the question has a bearing on maritime hygiene. Large quantities of salad plants, lettuce, congeners of the cabbage, fennel, and other greens, are usually carried on board ship by emigrants leaving Italy. During the cholera epidemic in 1893, all such articles were prohibited and their exclusion was made a condition to granting the United States consular bill of health. Heat is, of course, inapplicable to the sterilization of fresh food stuffs, inasmuch as their virtues as articles of diet depend largely on their being eaten raw. Popular opinion naturally tends to the view that any hygienic measures applied to salad vegetables should be on the principle of asepsis rather than antisepsis. While the palatability of fresh greens might not be affected by suitable chemical treatment, it is easily understood that the impression produced by the antisepticizing would not be conducive to good cheer. Yet one experimenter, G. Ceresole, writing in the *Policlinico*, recommends the use of tar-

taric acid. He states that a sample of salad infected experimentally with a culture of the cholera spirillum was sterilized in five minutes by a 2 per cent watery solution of tartaric acid. To avert danger from the consumption of crude greens it is sufficient to immerse them for half an hour in a 3 per cent solution of tartaric acid. It is asserted that salads so treated and afterwards washed with water are absolutely nontoxic and that their gastronomic qualities are unaffected by the process. It is recorded that the bacilli of pest and of diphtheria are killed in five minutes by a 5 per cent solution of tartaric acid.

The recent studies of Wurtz and Bourges are in point. In these inquiries it was demonstrated that the use of washings of cesspools for manuring truck gardens is perilous to health. Pathogenic organisms thus deposited on vegetables are capable of retaining their virulence for long periods. In France, an official inquiry has been made into this matter and a hygienic commission has confirmed the conclusions of Wurtz and Bourges. The commission was composed of Bronardel, Roux, Wurtz, and Ogier.

The Quarantine Stations, &c., Grosse Isle, Que.—At this station and at its sub-station of Rimouski 419 vessels have been inspected during the year—388 at Grosse Isle and 31 at Rimouski. 53,379 persons were inspected.

Nineteen vessels arrived with infectious disease.

The admissions to hospital were 264. They included cases of small-pox, chicken pox, measles, scarlet fever and enteric fever.

The deaths were ten: one from phthisis, three from measles, and six from scarlet fever.

The installation of the electric light and the modifying of the third class detention buildings, by their division into compartments or staterooms, with water and drainage, are important improvements at this station during the year.

The chief requirements for the completion of the station are a deep water wharf, a second steamboat, and a small steam disinfector for hospital clothing, with bath room and dressing rooms for personal disinfection.

The question of rebuilding the old wooden detention sheds, which date from 1832 and 1847, will soon have to be met.

Halifax, N.S.—Vessels inspected 482. 59,172 persons inspected. Cases treated in hospital 56, being 12 of small-pox, 40 of measles, 3 of scarlet fever, and 1 of diphtheria. Two deaths occurred, one from scarlet fever and one from acute pneumonic phthisis. The erection of a bacteriological laboratory, the addition of an ambulance, and improvements to the wharfs, tanks, water supply, plumbing and to the roads, are amongst the works of the year. Telephonic communication has also been permanently established, replacing the temporary connection heretofore most courteously allowed us from time to time by the military authorities.

Amongst things required for the station are a house for a resident medical officer, the electric light, and the division into staterooms of the third class sheds. The laboratory requires equipment. A small steam disinfector is also required for sterilizing soiled hospital bedding and clothing, with a bath room and dressing rooms for personal disinfection.

The steamer *Argus* will soon require to be replaced by a better boat, with proper accommodation for landing the sick.

St. John, N.B.—Vessels inspected, 1,053; persons inspected, 40,990; vaccinations, 3,228. Admissions to hospital 32, being 1 case of enteric fever, 8 of measles, 6 of small-pox, 4 of yellow fever, 2 of German measles, and 2 of cerebro-spinal meningitis. There were two deaths in hospital, one from small-pox and one from measles. The great requirements of this station are a fresh water supply, a wharf and electric lighting.

The work of the station has been greatly increased this year by the inspection of many vessels arriving from contiguous ports in the United States. This is well shown by the number of inspections, being 1,053 as compared to 272 last year.

Sydney, C.B.—Vessels inspected, 214. The diseases at this port during the year were small-pox on a coastwise vessel and beri-beri on a vessel from the south-east coast of Africa.

A steam disinfector has this year been installed at this station, with a commodious shelter building over it.

Charlottetown, P.E.I.—Vessels inspected, 144. This includes arrivals from other provinces, whilst small-pox was most threatening, but does not include the daily steamer from Pictou, although that vessel was regularly inspected during that time, before communication with the shore was permitted.

Four cases of small-pox were admitted to hospital, of whom one died.

Chatham, N.B.—Vessels inspected, 90. No infectious disease found during the year.

William Head, B.C.—Vessels inspected, 442. Admissions to hospital were for small-pox, chicken-pox, measles and beri-beri.

Three steamers were quarantined for small-pox during the year. Of these one was the *Rosalie*, one of the daily boats from Seattle. The routine work of disinfecting healthy vessels from plague infected countries is now replaced, as far as China and Japan are concerned, by disinfection at the port of departure.

During the year houses have been built for the medical assistant and for the engineer. A cottage hospital for plague or small-pox patients, and a building as a bacteriological laboratory have been erected; also a boat-house, a storehouse, a rice kitchen and an icehouse. A second steam disinfecting cylinder of latest design has been supplied. The boiler-house has been enlarged to make room for the extra boiler required and for the dynamo for the electric lighting, which is being installed.

Amongst the most essential and pressing requirements of the station may be mentioned a new sulphur dioxide blast furnace. The present one is the first I designed for the St. Lawrence service, and it was sent to Victoria. At that time—now a good many years ago—the disinfecting work was much lighter on the Pacific coast than it is now. The furnace and its appliances are worn out and burnt out. It is very urgent that a new and up-to-date sulphur furnace be provided. Formaldehyde and ammonia retorts are also required as attachments to the new cylinder; electric thermometers and tele-thermometers also. An approach to the disinfecting building along the shore is indispensable to obviate the risk of the reinfection of the disinfected caused by their having to pass back amongst those waiting for disinfection. A connecting piece at eastern end of wharf to cut across the angle would also greatly facilitate the work. Different roadways to and from the disinfecting building are of the essence of preventive medicine. Whilst at Victoria I visited, on the invitation of Dr. M. H. Foster, of the United States Public Health Service, the quarantine station at Port Townsend, Wash. Dr. Watt accompanied me, and we were most courteously and kindly received.

Victoria, B.C.—Vessels inspected, 866. These inspections were principally of vessels from neighbouring ports. The danger from small-pox having much diminished, these inspections were again suspended from August 31. In June a case of measles and in December a case of smallpox were found on the daily steamer from Puget Sound ports. They were sent to the quarantine station at William Head.

Vancouver, B.C.—Vessels inspected, 429. Principally from ports north of San Francisco prior to the exemption from inspection being renewed at the end of August. No infectious disease.

Temporary frontier and coast inspection.—In addition to these regular stations you have this year given the country the additional protection of extra inspecting officers at the following points, where peculiar threatening of small-pox, or the reported lack of effective health organization to the south of them, seemed to make the importation of small-pox most to be feared. Such extra inspections were carried out for greater or lesser periods at the following places: In Cape Breton, Louisburg; in Nova Scotia, Canso, Yarmouth, Weymouth, Bear River and Clementsport, and Digby; in New

Brunswick, McAdam Junction; in Prince Edward Island, Georgetown and Summerside; in Ontario, Cornwall, Ericau and Rondeau, Owen Sound, Thessalon, Bruce Mines, Sault Ste. Marie, Port Arthur, Fort William, Mine Centre and Rainy River; in Manitoba, Sprague, Emerson, Gretna, Morden, Crystal City, Killarney, Boissevain, Deloraine and Waskada; in the North west Territories, Carnduff, North Portal, Coutts, and Macleod; and in British Columbia, Gateway in the Tobacco Plains, Rykerts, Rossland with Northport, Grand Forks with Cascade and Carson, Greenwood with Midway and Myers' Creek, Huntingdon and Blaine; also Log Cabin on the White Pass and Yukon Railway for the protection of northern British Columbia and the Yukon Territory.

The North-west Territories. At this date last year when I submitted my last annual report, those Territories were all practically free from small-pox. During the early winter it was carried in from Manitoba to the railway construction camps in the Erwood and Prince Albert districts. There were in the Prince Albert district 230 cases, in the Lebret district 115 cases, in the Vegreville district 56 cases, and in the Wolseley district 30 cases. The large number of cases in these four districts, a total of 431, was due to the concealment of the disease by those affected until the infection was widespread. In the 28 other outbreaks of the disease occurring during the year, where prompt notification was given, the disease was in all instances confined to the one or two families first affected, the cases in the whole of these 28 outbreaks only reaching a total of 133 cases.

Of the whole 564 cases, fully 500 were half-breeds. The appearance of cases at points scattered all over the Territories is largely due to the unsettled, wandering habits of these people.

Dr. James Patterson, your very efficient public health officer in the North-west Territories, in his annual report for the year, gives a just and fitting recognition of the inestimable value the North-west Mounted Police have been in establishing and maintaining quarantine, and in the purchasing and distribution of supplies.

The Yukon Territory.—There were two cases of small-pox in this territory this year. They were steamboat hands, and presumably infected from Seattle. They were quarantined on Dog Island in the Yukon River below Dawson, and the disease did not spread.

Leper Lazaretto, Tracadie, N.B.—There are now at this institution nineteen patients, twelve male and seven female, one more than at this time last year.

The most pressing requirements of this institution seem to me to be:

1st. A small steam disinfector in which bedding, clothing, &c., can be sterilized and rendered safe before being handled and washed. The religious ladies nurse and care for the lepers in this institution with a self-sacrificing devotion beyond all praise. Nothing, therefore, should be left undone that can be devised to in any way lessen the risk of infection to which they so heroically expose themselves.

2nd. A stone or brick cinder and ash pit as a precaution against fire.

3rd. Alike for comfort and as an assurance against fire, gas or the electric light would be an improvement on the present system of lighting this institution by coal oil lamps.

Public Works Health Act.—Your inspector, Mr. C. A. L. Fisher, reports considerable improvement in the medical supervision of the public works visited by him, showing its results alike in the hospital accommodation provided, the sleeping quarters for the men and the medicines supplied, all of which compare favourably with his observations of the previous year.

I have the honour to be, sir,
Your obedient servant,

F. MONTIZAMBERT, M.D. Ed., F.R.C.S.E., D.C.L.,
Director-General of Public Health.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 2.

(G. E. Martineau, M.D.)

Office of the Medical Superintendent,
Grosse Isle, Quebec, Oct. 31, 1902.

Sir,—I have the honour to submit my annual report of the St. Lawrence Quarantine Service to October 31, 1902.

There were 388 vessels inspected at this station during the quarantine year, being a decrease of nineteen as compared with last year. Of these twenty-seven were sailing vessels.

The total number of persons examined was 53,379, being an increase of 13,108 over last year. These were divided amongst the different classes as follows:—First cabin, 2,604; intermediate, 5,180; steerage passengers, 25,974; crews, 17,341; cattlemen, 2,109; stowaways, 171.

Infectious disease was reported or discovered in the following vessels, named in the order of their arrival:—SS. *Tunisian*, *Lake Simcoe*, *Parisian*, *La Canadienne*, *Montfort*, *Ionian*, *Jacona*, *Lake Megantic*, *Dominion*, *Numidian*, *Mongolian*, *Lake Manitoba*, *Lake Champlain*, *Lake Ontario*, *Verbena*, *Kastalia*, Barque *Cambria*, *Tiger* and *Iberian*.

The diseases as reported or found were small-pox, scarlet fever, chicken-pox, measles, enteric fever and mumps.

Only one instance occurred of a person refusing vaccination, although on three other different occasions parties refused to be vaccinated by the ship's surgeons, but consented to allow the quarantine officer to do so.

The case refusing vaccination was a passenger on board ss. *Dominion*, arriving May 11, 1902. He was landed for the usual period of observation.

Small-pox. The government ss. *La Canadienne*, Commander Wakeham, left Quebec on May 3, but two days after her departure one case of small-pox having been discovered amongst one of the crew, she then came back and arrived at the station on May 6 with 34 persons on board. We presume that the disease had been contracted before sailing at Quebec or St. Michel de Bellechasse.

The instructions from the department being to deal with *La Canadienne* like any other vessels coming from outside ports and bringing small-pox, we removed the patient to the small-pox hospital at the station and we disinfected thoroughly the vessel with steam, sulphur, formaldehyde and bichloride of mercury. All persons were vaccinated, bathed and had their effects disinfected by the usual process. No other cases having occurred they were released on the 21st of May, after a detention of fifteen days for observation. The patient having fully recovered, was discharged from the hospital at quarantine and left the station on June 28.

SS. *Ionian*, Captain Brown, sailed from Liverpool on May 13, with 86 cabin, 153 intermediate, 597 steerage passengers and 189 crew, arrived at the station on May 24 with one case of small-pox amongst the steerage passengers.

That case had been discovered and isolated during the forenoon of the 23rd (the day previous to the arrival of the vessel at the station). He was removed to the small-pox hospital at this station.

In order to cause the least possible delay, we asked the captain to have his steamer anchored near the station, but the pilot was not willing to take that responsibility, therefore the vessel was left in the offing, a distance of one mile from the station, and we had to go out to her with our boats to land the passengers and their baggage, which was very inconvenient and occasioned a greater delay, and on the 26th a strong easterly gale prevented us from boarding the vessel.

Acting under instructions from the department, only the steerage passengers were landed (597 in number), with 31 steerage stewards and cooks, and the vessel proceeded with all others on May 27, after having had her hospital and steerage compartments thoroughly disinfected.

Those detained having completed the period of eighteen days for observation, and no cases having occurred amongst them, were released and left the station on June 10.

The patient was discharged from the hospital and left the station on July 5.

SS. *Dominion*, Captain Jones, sailed from Liverpool June 5, and arrived at the station on the 14th of the same month with 42 cabin, 96 intermediate, 718 steerage passengers, 4 cattlemen and 137 crew.

On her arrival, one suspicious case having been reported by the surgeon on board, we found after careful inspection that it was small-pox; he was immediately removed from the steamer to the small-pox hospital at the station.

That case having been promptly and satisfactorily isolated; we landed, after instructions from the department, only those being in the same compartment occupied by the sick, we disinfected carefully the hospital and the forward steerage compartment and the vessel proceeded on the 15th, leaving at the station 352 passengers and 15 members of the crew for observation. All these people were released and left the station on July 1, with the exception of the patient who was discharged from the hospital and left on July 22.

This year has been a very busy one at this station, specially at the hospital, where we had up to 106 persons at the same time suffering from different diseases.

The total number of admissions at the hospital was 264.

The deaths numbered ten: one from phthisis, three from measles, and six from scarlet fever.

In accordance with the instructions from the department, we have made careful inspection of vessels coming from South American ports, on account of the existence of yellow fever at that place. Special care has also been exercised in the inspection of vessels arriving at the station without having a clean bill of health.

Quarantine Staff.—Dr. A. Lapointe continued, during the season, the inspection of the weekly mail steamers at the Rimouski sub-station.

I visited this advance port, and coming up from thence on the mail steamer, made a detailed inspection between Rimouski and Grosse Isle.

The staff had also to be increased since the installation of the electric light at this station.

Requirements and Improvements.—During the detention of the ss *Ionian's* passengers, many complaints having been made about the accommodation for the steerage passengers, I am happy to say here, that necessary steps were immediately taken to have the necessary improvements carried out: the water and closets were put into the buildings, the sheds were divided into compartments, and a good system of drainage was introduced.

I may perhaps be permitted to add, there are still many works and repairs to do, the list of which is in the hands of the Public Works Department, and I beg to hope that they will be granted and carried out during the next year.

Reserve Inspecting Steamer.—The great deficiency continues to be that of a strong and suitable boat, as a reserve supply, disinfecting, and mail steamer and for the forwarding of the convalescents when discharged from the hospital at quarantine.

Deep Water Wharf.—Another deficiency is that of a deep water wharf to which infected vessels could be brought to land their passengers and effects, and alongside of which our boats could be sheltered in rough weather and seas.

I can only repeat, as I have always done upon every possible occasion, that those two above requirements are essential, all-important, and ever-pressing needs of the St. Lawrence quarantine service.

Steam Laundrying Disinfecting Apparatus.—One of the most important wants for the hospital is that of a steam laundrying-disinfecting apparatus, so as to sterilize the contaminated linen, clothes, bedding, &c.

New Buildings.—Two new buildings ought also to be erected, one to be divided so as to be used for quarters for the employees. In the previous years many of our men, being unmarried, were boarding with the other employees, and we had therefore enough buildings; but now, all the employees being married people and the staff having increased we are short of lodgment.

The other one, which should be placed in the upper part of the island, could be divided so as to give an office, a surgery, a waiting room and a room to vaccinate passengers, and on the second floor we could have four rooms in which to put the passengers suffering from diseases other than the contagious ones.

I will close my report by urging upon the importance and necessity of these different requirements that I consider essential and in the interest of the station as well as of all those concerned.

All of which is respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

G. E. MARTINEAU, M.D.,

Medical Superintendent, St. Lawrence Quarantine Service.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 3.

(N. E. Mackay, M.D.)

Halifax, N.S., October 31, 1902.

Sir,—I have the honour to submit my annual report of the quarantine station at Halifax, N.S., for the year ending October 31, 1902.

During the year just ended we inspected 482 vessels, an excess of 171 over the previous year. This increase is largely due to the withdrawal of exemption from inspection of vessels from New York and ports north of it. In the same period we examined 11,302 cabin passengers; 2,984 intermediate; 27,585 steerage and 17,301 crew, a total of 59,172 souls—an excess of 28,734 over last year's list.

In the year just ended we had more work at this station than in any previous year in its history. Nearly every boat which arrived with immigrants from Liverpool in the spring of the year, had either measles or scarlet fever among the steerage passengers; and every one of the Hamburg-American steamers which came here in April, May and June had infectious disease, especially measles, among the immigrants, but those of later date were free from disease.

During the year we treated 12 cases of small-pox, 40 cases of measles, 3 cases of scarlet fever, and one case of diphtheria. One of these, an officer suffering from scarlet fever, we treated in the infectious hospital in the city. Two deaths occurred at the station—one from scarlet fever and one from acute pneumonic phthisis.

The graver quarantinable disease, small-pox, was found on the steamer *Dahome* from London on January 1, 1902. One of the stewards had the disease. There were 5 first-class passengers on board and she had a crew of 46. The patient was isolated as soon as the disease was discovered and every possible precaution was used to prevent it spreading among the passengers and crew. Every person on board was vaccinated

immediately on arrival of the ship. The vessel with all on board was sent to Lawlor's Island for the regular quarantine period of observation. None on board developed the disease.

The owners having provided a new crew, the vessel was released as soon as she was thoroughly disinfected. Disinfection was made with mercuric chloride, sulphur and formaldehyde. The clothes worn by the patient while sick were destroyed. No one contracted the disease from the vessel after she had been disinfected and released, Mr. Kisser's report to the U.S. Treasury Department to the contrary notwithstanding.

The captain and surgeon of the *Dahome* on being bathed and their clothes and effects disinfected were released; they having made a declaration to the effect that they had had small-pox before.

When I made my annual report on October 31, 1901, there were seven small-pox patients from the Gloucester schooners *Thalia*, *Essex* and *Goodwin* at the station, unfit to be discharged; they all recovered and were released on December 9, 1901, and so far as I know no one contracted the disease from them after they were discharged.

In May and June of this year four cases of small-pox were treated at the station; they belonged to the fishing schooner *Jennie Myrtle*, from Lunenburg, and were under the control and at the expense of the Department of Marine. The four recovered. The vessel had a crew of 16. To show the efficacy of vaccination as a preventive of small-pox, I may say that of the 8 who had been successfully vaccinated in the fall of 1901, none of them contracted the disease, but of the 8 who had not been vaccinated since childhood 4 developed it.

Minor quarantinable diseases were found on the following vessels:—*Lake Superior* from Liverpool, November 29, 1901, 7 cases of measles—6 convalescent and one nearly so; *Garth Castle* from Liverpool, December 14, 1901, 1 case of scarlet fever; *Musician*, from Liverpool, February 24, one case of scarlet fever among the first-class passengers; *Corinthian*, from Liverpool, January 18, 1 case of mumps; *Ionian*, from Liverpool, March 6, 1 case of laryngeal diphtheria; *Tunisian*, from Liverpool, March 29, 2 cases of measles and 3 of scarlet fever; *Bulgaria*, from Hamburg, April 30, 14 cases of measles, 2 died of diphtheria on the passage; *Assyria*, from Hamburg, May 13, 6 cases of measles and one of acute pneumonic phthisis; *Arcadia*, from Hamburg, May 27, 1 case of measles—one died of heart disease on the passage; *Armenia*, from Hamburg, June 13, 2 cases of measles and 1 of chicken-pox; *Bulgaria*, from Hamburg, June 19, 6 cases of measles.

The diphtheria case ex *Ionian*, March 6, had to be intubated and a special nurse was employed to attend the child. The patient I am pleased to state recovered.

Diseases other than quarantinable, occurred on the following vessels:—ss. *Dahome* from London, November 2, fractured ribs; *Numidian*, from Liverpool, November 25, pneumonia; ss. *Pisca* from Hamburg, December 31, pneumonia; *Nicker*, from Bremen February 26, pneumonia; *Armenia*, from Hamburg, June 15, 3 cases of pneumonia; *Cestrian*, from Durban, South Africa, July 29, 7 cases of sickness (pneumonia, typhoid fever and injuries); Troopship *Armenia*, from Southampton, September 28, 1 death from acute congestion of the lung.

The quarantine officer at St. John, N.B., was notified by telegram of the existence of infectious diseases on board of all vessels calling here, making that port their destination, save one. This was the ss. *Lake Superior* from Liverpool, November 29, 1901. There were 7 convalescent cases of measles among the immigrants when the vessel arrived in this port, and if 18 or 20 cases were discovered on board when the ship arrived in St. John, they must have developed after she left here, at that time our station was in quarantine for small-pox.

The following improvements have been made at the station during the past year. The large wharf was replanked and the one at eastern passage repaired; hydrants have been placed on the water service near the different buildings; a surface well was constructed at the hospital and a bacteriological laboratory has been erected and an up-to-date ambulance provided. The water tank, which was at first poorly constructed and leaking, was repaired. It is to be hoped the tank will now hold water. The plumbing work which was badly planned to stand our winter weather is now being reconstructed, which when finished will, I trust, give satisfaction. The heating apparatus in the bath-

houses had to be removed and are being replaced by cast iron upright radiators. It is to be hoped they will withstand the damp atmosphere better than the iron pipes originally placed there. The road from the wharf to the different buildings has been improved considerably, but it needs to be gravelled well. Telephonic communication has been established between the island and the city, by way of eastern passage and Dartmouth. This was much needed and it works very satisfactorily. The frame-work under the mercuric chloride tank was removed and boarded in and the whole structure painted—a great improvement. The roofs of the first class building, the third class detention building, the hospital, and the steward's residence will need re-shingling next summer. The third class detention buildings should be partitioned off into rooms for the better accommodation of passengers. The question of heating these buildings with hot water may have to be considered in the near future.

Decent partitions should be placed in the two small hospitals, and the ceiling painted, and so make them fit for the accommodation of suspects and for the better isolation and treatment of minor (for that matter major) quarantinable diseases. In the year just closed we had three different kinds of infective diseases at the station at one time, viz., diphtheria, scarlet fever and measles. The small hospitals would be admirable for keeping these diseases isolated.

The *Argus* is not well adapted for the work of this station which is growing yearly in importance. The boat is too small for our work. As most of our work is done in the fall, winter and spring, we need a larger steamer with better accommodations. At present we have no means of sheltering the sick from the cold and wet when taking them to or from the station, a distance of 4 or 5 miles. Then again there is a leak in the cabin bunks which we cannot stop, in consequence of which they are unfit for our men to sleep in.

The bacteriological laboratory should be equipped.

Adverse criticism of our accommodation at Lawlor's Island appeared in some of our city papers on the occasion of the arrival of the *Dahome*, from London, in January, with small-pox. No person likes to be detained in mid-winter at quarantine for 21 days, especially for small-pox. We all recognize this: first class passengers are always ready to pick at anything and everything in hopes thereby of getting rid of the confinement. Quarantine officers expect to meet with a good deal of opposition to the enforcement of the law under those circumstances, but usually in a few days all serious opposition to detention ceases. In this instance there was no just cause for complaint, for by the time we had finished the disinfection of the ship and the infected effects, and were ready to land the passengers and crew, the buildings were quite comfortable.

The signalling of incoming vessels by the signal station continues to be very unsatisfactory.

Violations of the regulations are of frequent occurrence, especially among schooners coming from New York and ports north of it: small city agents do not seem to discourage infringement of the law. Runners for city dealers are thorough nuisances in this regard, and they should be forbidden, by regulation, to board any vessel subject to quarantine inspection till free *pratique* has been granted.

Dr. Jones, who had been absent on leave in South Africa since January 22, with the Field Hospital, returned and resumed work on September 1.

I have the honour to be, sir,

Your obedient servant,

N. E. MACKAY, M.D., M.R.C.S.,

Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 4.

(J. E. March, M.D.)

St. John, N.B., October 31, 1902.

Sir,—I have the honour to submit my report for the quarantine year ending October 31, 1902.

The following summary of the inspections shows what was done in this department each month, also the number of vaccinations performed and the totals for the year:

Month.	Vessels Inspected.	Passengers.	Crew.	Vaccinations.
1901				
November	77	500	1,020	600
December	96	311	1,251	632
1902.				
January	47	970	900	188
February	37	1,554	1,048	369
March	45	2,662	1,340	307
April	78	1,848	1,425	270
May	109	447	1,573	102
June	120	1,194	1,797	176
July	117	4,625	2,593	76
August	141	3,912	2,931	90
September	80	2,034	2,428	63
October	106	904	1,620	55
Totals	1,053	20,961	20,029	3,228

Number of vessels inspected in previous year, 272.

Quarantinable diseases were reported by or discovered upon ten vessels, as follows:

November 20, 1901, ss. *Concordia*, typhoid fever.

" 22, 1901, ss. *Lake Ontario*, scarletina and measles.

December 4, 1901, ss. *Lake Superior*, measles.

" 13, 1901, ship *Creedmoor*, small-pox.

January 13, 1902, ss. *Lake Superior*, measles.

February 2, 1902, ss. *Alcides*, small-pox.

March 9, 1902, ss. *Lake Michigan*, small-pox.

" 30, 1902, ss. *Lake Superior*, measles and scarletina.

April 12, 1902, ss. *Lake Ontario*, meningitis, scarletina and measles.

August 5, 1902, barque *Birnam Wood*, yellow fever.

One case of typhoid fever, nine cases of scarletina, eight of rubeola, six of small-pox, four of yellow fever, two of German measles, and two of cerebro-spinal meningitis—a total of 32—were admitted to and treated in the hospital for an aggregate of 661 days.

Because of exposure to grave quarantinable diseases, particularly small-pox, 226 persons were removed to quarantine of observation at the station. The aggregate of the days of detention was 2,836, an average of 12½ days (about).

In not a single instance during the year was any contagious disease transmitted from one to another in quarantine, nor did any quarantinable disease gain an entrance into the country through this station.

Seven steamships were submitted to partial, and one steamship, one ship and one barque to complete disinfection.

The hospital with its contents was completely disinfected three times during the year. Seven hundred baths were given. Hundreds of packages and thousands of pieces of wearing apparel were disinfected both inward and outward at the station. The disinfections were performed without accident or injury to any article or fabric, and no claim was made for damages.

There were two deaths in hospital; one on 26th March, from small-pox, and one on 15th April, from a complicated case of measles in an infant.

A water supply has not been provided for us during the year. Undoubtedly the greatest task which the staff here had to perform last winter was that of keeping the hospital and detention building supplied with water. To make this at all possible fifteen hundred feet of iron pipe were strung over the uneven surface of the island from the storage tank in building D to the supply tanks in buildings A (hospital), and B (detention building for crew). The tank in A had to be filled two or three times, and that in B from three to five times in each twenty-four hours during the period these buildings were in use. It was found to be impossible to drain this long pipe so that it would not freeze. Each time it was used a thousand feet of it from the top of the hill to building A had to be disconnected at every second or third joint, and the sections emptied separately. In the cold weather if this was delayed for even a few minutes after the pump was stopped the whole line would freeze. Then it had to be taken apart at each joint, the sections carried to the boiler room in building D, thawed there, tested for breaks, carried back again and relaid.

This went on day after day and night after night. Even then the supply was intermittent and insufficient. I stated these facts in the early summer and asked that this pipe line be put under ground and below frost.

Assurances were received from the officers of the Department of Public Works, but nothing was done. The Minister of Public Works visited the station in August. I called his attention to the matter He stated that the work would be finished before the beginning of the winter business. We are now within two weeks of that time and although a survey was made, tenders for the work have not, so far as I am aware, been called for. This means that we must again face the distressful conditions of last winter.

If so, we can accommodate no more during the cold weather than last year, when, with sixty-four in quarantine of observation and four in hospital, our facilities for supplying water to the buildings were taxed to the limit.

The capacity of our building is about six hundred. In other words we will be able to work up to one ninth of our capacity.

With the pipe line underground we could care for four hundred, the *Neptune* being able to bring here about four thousand gallons of water each tide.

On two occasions during the year there was delay, on account of storms, in the removal of the crews from steamships infected with small-pox, to the station. In one case the delay amounted to almost three days.

This is a serious matter to the men who are sick, to the men who have been exposed to contagion, and to the owners of the delayed ship. As we have undertaken to care for these cases, I think it will be admitted that facilities for doing so with reasonable expedition should be provided at all first-class stations, and particularly so as there are but few of them to be equipped. So far as providing a wharf at the station is concerned —prime necessity as it is—the situation seems to be complicated and the inception of the work unfortunately delayed by the position assumed by the engineers of the Public Works Department. For many years they have reported the desirability of closing what is known as the west channel by extending Negrotown Point breakwater to Partridge Island, and whenever the necessity for providing a wharf for quarantine purposes is brought to their attention the statement is made by them that the work could be better performed in connection with the greater one of extending the breakwater. And this statement is doubtless true, for, under the lee of the extended breakwater a very much lighter and more inexpensive structure would answer our purposes than though it had to be built to withstand the heavy seas that sweep the west channel

during storms, but it is nevertheless my plain duty to state to you that further delay in providing quarantine wharf accommodation is inimical to the efficiency of the service and is likely to result in claims for damage sustained by infected vessels that have been compelled to remain at anchor in quarantine awaiting a suitable time for the transfer of the sick to the station and for disinfection. The channel in this harbour, within quarantine limits, is narrow, and in order to hold in it during a gale a ship must pay out so much chain that she is almost bound to take the ground, on one side or the other at low water. This has already occurred, as I have reported elsewhere, and that no claim for damage was set up was only a matter of good fortune. Although it would vastly improve the harbour and greatly simplify, and lessen the cost of the inspection work of your officer here, I must leave the closing of the west channel to those whose duty it is to deal with it. It is my duty, however, to continue to point to the fact that we greatly need a quarantine wharf, and cannot well do without it.

Twice during the year I have been called upon by the Director-General of Public Health to report upon the small-pox situation in the eastern United States and to express my opinion as to whether or not it was desirable or safe to discontinue the inspection of coastwise vessels from ports north of New York.

On both occasions I have advised against the discontinuance of this inspection. The failure of the health authorities of Boston and other towns in Massachusetts to eradicate small-pox during the past summer is pronounced and, I think, notable.

These towns are still a source of danger to the maritime provinces and there should be no relaxation of effort on the part of quarantine officers to prevent the introduction of the dread disease.

I quote the following from the editorial column of the St. John *Globe* of this date: -

'In a number of the towns of Massachusetts in the vicinity of Boston there are many cases—a very large number of cases of small-pox—reported, and the outlook at present is that a long time will elapse before the disease is thoroughly eradicated. The conditions suggest that special care should be taken in regard to people coming into St. John from Massachusetts by the health department here, for it is quite easy here under existing circumstances to have this disease again introduced here.'

This seems to me to be a fair statement of the situation and its requirements.

That not a single case of smallpox has occurred during the year on any of the many coasting vessels trading between St. John and Boston can only be attributed to the efficient vaccination to which the crews of these vessels have been subjected here.

I wish to express my appreciation of, and thanks for, the wise and liberal provision which has been made to meet the largely increased expenditure at this station on maintenance and current account. These items have been much larger during the year than ever before. I hope that you will be able to feel, as I do, that the results of the year's work have justified the expense.

I have the honour to be, sir,

Your obedient servant,

J. E. MARCH, M.D.,
Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 5.

(H. RINDRESS, M.D.)

NORTH SYDNEY, October 31, 1902.

SIR,—I have the honour to submit my report for the year ended October 31, 1902.

That this station is rapidly growing in importance can be seen from the fact that 214 vessels were inspected here during the present year, an increase of 95 over last year, and the largest number in the history of the port. Of the total number of vessels inspected there were 156 steamboats and 58 sailing vessels, 133 were cis-Atlantic and 81 trans-Atlantic. The cis-Atlantic arrivals here are from the northern and southern States, Mexico, West Indies and South America; the trans-Atlantic arrivals are from the United Kingdom, France, Germany, Spain, India and Italy. I am glad to say that no quarantinable, contagious or infectious disease has reached here from foreign ports during the year, but the schooner *Arthur Binney*, of Boston, arrived here from Liverpool, Nova Scotia, May 30, reported sickness on board, which on investigation proved to be a case of small-pox. The disease was no doubt contracted in Boston, but the vessel having entered and cleared from a Canadian port did not come under our quarantine regulations, and the patient therefore was cared for by the Local Health Board, who, however, owing to a lack of necessary equipment were unable to deal promptly with the matter, thus increasing the liability of spreading the disease. The local authorities, without the permission of the department, as a last resort took possession of the Quarantine Hospital and treated the patient there. He recovered, and no new cases developed. It is very unfortunate that provision is not made so that any contagious disease that might develop on coastwise vessels would receive the same prompt attention and care that is insured to foreign vessels.

The ship *Almedia* from Beira, on the south-east coast of Africa, arrived here on June 11 with nine cases of beri-beri on board. One of the patients was confined to his bed and was suffering severely from the disease, while the others had a milder type and seemed to be convalescing. The disease not being quarantinable and the patients preferring to remain on ship-board, they were not removed to the hospital.

A disinfecting building has been built this year at Point Edward and a steam disinfecting plant installed. The disinfector will be ready for use as soon as some small repairs are made.

The tug boat *Zaidee* used in the service has given good satisfaction.

I have the honour to be, sir,

Your obedient servant,

HORACE RINDRESS.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 6.

(P. Conroy, M.D.)

Charlottetown, P.E.I., October 31, 1902.

Sir,—I have the honour to submit my report for the quarantine year ending this date.

On November 7, 1901, I received an order from the Director-General of Public Health, directing me to inspect all vessels arriving at this port from any port outside of this province, and to receive their infectious sick. This inspection was deemed necessary on account of the prevalence of small-pox in the neighbouring provinces.

The order implied that the duty of protecting this province against contagious disease coming to this port from any port in Canada outside of Prince Edward Island, belonged to the Dominion Government. Every vessel arriving here, including the daily steamer from Pictou, was accordingly inspected and their crews and passengers vaccinated when such was required.

On November 20, 1901, the schooner *Monitor*, from Boston, via Halifax, Georgetown and Pictou, arrived at this port with a member of the crew suffering from small-pox in an advanced stage. The patient was placed in the hospital, where he died four days after his admission. The vessel was sent to quarantine for 21 days and the crew vaccinated. No other case of the disease developed on the vessel or on shore. Dr. Warburton attended to all inspections during the period of my isolation. When released I resumed the work of inspecting and continued it until the close of navigation on January 5, 1902. The order requiring the inspection of Canadian vessels was not enforced during the past season. On December 8, 1901, a case of small-pox from the schooner *Robin Hood*, which vessel had made customs entry at Georgetown some days before the patient developed the disease, was admitted to the hospital. The consent of the department was given to the admission of this patient on the condition that all the expense connected with the case would be borne by the local Board of Health. The hospital was formally handed over to the civic authorities for the accommodation of local cases of small-pox. Many articles of furniture and bedding destroyed by local authority have not yet been replaced.

On September 14, 1902, the schooner *Citizen*, from Lisbon, arrived at this port having two cases of small-pox among the crew. One case was in the stage of desquamation and the other in the stage of irruption. Both cases were of the confluent kind, and were very severe forms of the disease. Both recovered in due time, the last man being discharged from the hospital on October 20 instant.

The hospital has since been thoroughly disinfected and the bedding boiled in a strong bichloride solution. Some articles of bedding were destroyed.

The total number of vessels inspected was 72, not including the daily steamer from Pictou.

I have the honour to be, sir,

Your obedient servant,

P. CONROY,

Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 7.

(J. Macdonald, M.D.)

Chatham, N.B., October 31, 1902.

Sir, —I have the honour to submit my report for the year ended October 31, 1902. No disease of a contagious character was found on any of the vessels that arrived at the station during the past year. Ninety vessels were inspected since November 1, 1901.

Besides the above number about twenty steamboats arrived, which had touched at other points in Canada and were not subject to quarantine regulations at this port.

I have the honour to be, sir,

Your obedient servant,

J. MACDONALD, M.D.,
Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 8.

REPORT ON WILLIAM HEAD QUARANTINE STATION.

(A. T. Watt, M.D.)

Victoria, B.C., October 31, 1902.

Sir, I have the honour to submit this my report for the year ending October 31, 1902.

During this year, as in preceding ones, it has been necessary to observe extra precautions on account of the presence of plague in the ports from which the majority of vessels for British Columbia ports sail. This year, in addition, it has been necessary to inquire strictly into circumstances of vessels from Asiatic ports, as cholera has been more or less prevalent in the various ports of the Philippines, China and Japan. In San Francisco upwards of 35 cases of plague have been officially reported during the past twelve months, and in Honolulu cases have occurred almost every month. But only a few plague cases have been reported from Australia, and the same for Japan. The cases in Hong Kong have been some 400, which number is about one-third of the number reported for the previous year. The weather conditions in Hong Kong and neighbourhood seem to have been unfavourable to the spread of plague last summer and there has been less of the disease everywhere in China than has been the case for a number of years back. But the prevailing dry weather with the consequent shortage and deterioration of the water supply made suitable conditions for the spread of cholera. The

scourge has been worse than for forty years. In the city of Nanking, the ancient capital, 40,000 cases were considered to have occurred up to the date September 6.

While the Nippon Yusen Kaisha steamer *Riojun Maru* was lying in Hong Kong harbour last March, six of the crew contracted cholera. The steamer underwent quarantine and disinfection at Hong Kong and arrived here without any further trouble having occurred. A sailing ship when about to clear for Port Townsend from Shanghai had a case of cholera on board and was detained on that account, but other cases did not develop either at Shanghai or on the voyage. There were numerous instances of cholera developing on vessels at Manila and having to undergo quarantine for that reason, and on one of the United States transports bound for San Francisco a number of cases broke out between Manila and Japan where the steamer was quarantined. She reached San Francisco with all in good health.

The number of vessels inspected during the past twelve months was 442. This was 46 less than for the previous year, but if the gross tonnage were reckoned it would exceed that of previous year, as the smaller vessels have been giving place to the modern sized ones. There has been a falling off in the number of colliers plying between British Columbia and San Francisco, owing to the extensive adoption of oil as fuel throughout California. But notwithstanding this falling off, the total tonnage has been kept above that of last year owing to the great increase in the Oriental trade. The diseases presenting were small-pox, chicken-pox, measles and beri-beri. Three steamers were quarantined during the year on account of small-pox. They were the American ss. *Rosalie* from Seattle, the British ss. *Yangtsze* and the Japanese ss. *Kinshiu Maru*, both from Hong Kong via Japan.

The ss. *Rosalie*, one of the daily boats from Seattle to Victoria, was sent to the station on the morning of December 22 by Dr. R. L. Fraser, quarantine officer at Victoria, as he had discovered a well-advanced case of small-pox in a child. The steamer was disinfected and taken away by a new crew. The original crew and the passengers were detained at the station. These people were quarantined at an unfortunate time of the year as both Christmas and New Year's Day had to be spent at the station. The steamship company supplied a full quantity of the good things which come at holiday time, so that every one managed to enjoy themselves pretty thoroughly. The little patient in the hospital was made happy by the receipt of a stocking containing $40 in gold and silver coin subscribed by the passengers and crew. She also received a small decorated Christmas tree.

There was considerable stormy and rainy weather while the people from this steamer were here. The high boundary fence was blown down and other damage done. The guards had a very uncomfortable time of it, as their tents were flattened out and everything soaked by rain. I had to get them into a cabin on a neighbouring ranch. The needed quarters for the quarantine guards will, I hope, soon be erected. The lack of roads at the station was also much felt, as people could not go out without having to walk through wet grass. But this matter is to be remedied, as also others wherein discomfort and inconvenience were found to be incident to quarantine at this station in winter season. The lighting of the building and grounds will be a great boon, at this season particularly. This work is now under way.

The ss. *Yangtsze* arrived here on April 23 with one of the Chinese firemen suffering from small-pox. This steamer was one of the fleet of the China Mutual Company, which last year has extended its service to Victoria and Puget Sound and inaugurated a four-weekly steamship connection between London, England, and here, via Suez Canal and Asiatic ports. The sick man had been at once isolated by the captain in a temporary hospital constructed on the poop deck. To the prompt action thus taken must be attributed the fact that no other cases occurred, for but few of the crew were vaccinated. This steamer had eighty-one persons on board.

The ss. *Kinshiu Maru*, with 251 persons on board, arrived and was put into quarantine on May 6, as on mustering the passengers I found one of the Chinese to have small-pox. He had evidently been afflicted about ten days, during which time he had remained in the steerage. The ship's surgeon—a Japanese—had observed the rash as it broke out on the Chinaman, but evidently considered it of no moment and did not isolate

the case. Later he must have become suspicious as he vaccinated all the Japanese crew, without, however, mentioning the desirability of vaccination for the Europeans on board. To have done so would have let the cat out of the bag and interfered with the course he had decided upon of letting the Chinaman pass muster if he could. But on the morning of arrival here he could not have been satisfied about his doing this safely, and so bethought the use of cosmetics to obscure what little was left of the spots on the man's face and body. The Chinaman became a work of Japanese art. Although the application was said to be 'just medicine,' I was positive, from the evident trouble that had been taken and the fact that the 'medicine' had been prescribed for the first time that morning, that the application was made with dishonest intent. I may say that owing to his conduct of this case throughout, the ship surgeon came in for a severe reprimand from the captain and the steamship agents, and came nearly being mobbed by the cabin passengers. The plea 'no know' made in a case like this should not be allowed to stand, but on the other hand it is impossible to get such evidence from Asiatics as to make a prosecution satisfactory under the circumstances.

Fortunately, only one other case occurred amongst the people from this steamer. This was a Chinaman who had been sleeping close to the other one. He got sick four days after landing here. The Chinese passengers, who had been kept in separate quarters, were again disinfected and were detained four days longer than the other people. As I wanted to keep the Chinese separate on account of having been more exposed, and it was necessary as well to keep the people from the ss. *Yangtsze* apart from those of the *Kinshiu Maru*, the accommodation in the way of buildings was tried to its utmost. There was space enough, but it could not be utilized and keep the object in view of having the different groups properly separated. I am glad to say that now that the new small-pox hospital is completed that there will not be the same difficulty under similar circumstances in the future. It will now be possible to utilize the large hospital building, or part of it, for the accommodation of persons undergoing quarantine of observation.

Beyond those persons who arrived on the steamers on which the cases of small-pox were found, but few people were subjected to disinfection at the station during the year. This was owing to the fact that the routine disinfection of steerage passengers and Asiatic crew has been carried out at port of departure in case of all steamers which have arrived since last January from China and Japan.

This had been arranged for and carried out in the previous year by all the steamship lines going to Puget Sound calling first at Victoria. The Canadian Pacific Railway SS. Co. did not enter into the arrangement at the same time however, but did so about January last. From November 1 to January 8, when the last steamer was disinfected, five steamers of the C. P. R. line carrying steerage passengers and Asiatic crew to the number altogether of 1,532 arrived and were subjected to disinfection at this station. The fact that the disinfection of the crew and steerage passengers of all steamers now arriving from China and Japan is carried out at ports of departure is a matter of congratulation. The arrangement is very much more satisfactory and safer than having the disinfection left until arrival here. In Hong Kong the medical inspection of passengers is now made at the disinfection station instead of on the steamer as formerly and this summer in two instances plague cases were discovered amongst the intending passengers. Under the old practice passengers were accustomed to come on board as they happened along the day before sailing and were mustered for inspection the next morning. These cases might therefore have remained on the steamer over night without discovery and possibly have conveyed the infection to others, had not the new system of inspection been in vogue under which opportunity is given to turn back any such cases before they can get on board the steamer.

During the year a number of improvements were made at the station and others are in progress. Houses were built for the assistant medical officer and the engineer of the *Earl*. A new building was erected for the bacteriological laboratory and a cottage hospital for use of small-pox cases. This hospital was made of brick with hard finished walls inside and cement floors and will be well suited to the purpose intended. A boat house which will shelter the naphtha launch and small boat has been built, also store house for naphtha and a general store house. There were also built an ice-house with

storage room for meats, outside kitchen with large rice boilers for use of steerage passengers, and a small lock-up. At the disinfection building many improvements are being made or are to be carried out. A shed has been put up connecting the wharf with this building as a protection against the weather in going to or fro from bath rooms, &c. A new cylindrical steam chamber has been installed and has just been satisfactorily tested. This chamber has many improvements over the old box-shaped one, and in construction is much stronger and may be expected to last much longer. It is 9 feet in diameter and 25 in length and was built in Victoria, brought down on a scow and rolled on shore. All the riveting was done by machine, and so well done that it was found to be tight everywhere when tested. The doors are opened or shut by a pump forcing oil into a number of small cylinders on each door. A counter balance makes it so that the heavy door can be raised out of the way of the baggage car with the greatest ease. A steam air exhaust is to be connected to the chamber and will produce a vacuum in much less time than the air pump. Both the new and the old chamber are to be connected with the air exhaust as well as with the pump. A new brick boiler house was built last winter and the boiler moved into it from the main building so as to make room there for the new steam sterilizer. A second boiler is soon to be put in as the one boiler is not sufficient to supply steam to operate the two steam chambers and the electric light plant as well. The electric light plant is now being put in and should be in working order in a few weeks time. All the buildings are to be lighted with incandescent lamps and the wharf and grounds with the arc light. The baths for steerage passengers are being renewed and new bath rooms for cabin passengers should soon be built, an appropriation having been made for these as also for several other improvements which, however, can not be gone on with until later. Several of the buildings were re-painted inside and out and their appearance has been much improved. Some repairs, new piping, &c., were put on the water main and some repairs on the road connecting the station with the Provincial Government road to Victoria. The various improvements which were made during the past year together with others for which appropriation has already been made will go far on the way of putting the station towards completion.

During August, Dr. F. Montizambert, Director General of Public Health, paid the station a week's visit after having inspected the various quarantine stations along the frontier. In consequence of his investigation as to the status of small-pox in the bordering states he recommended that the medical inspection of passengers for British Columbia points be discontinued. This recommendation meeting with your approval, the inspection of passengers from neighbouring states and Alaska was stopped at the end of August. Dr. Montizambert made note of various things at this station, and I am sure that results beneficial to station will follow. He left Dr. Anderson and myself with many things to remember from the lessons of his long experience in quarantine work. On the invitation of Dr. M. H. Foster, assistant surgeon, marine hospital service, in charge of the quarantine at Port Townsend, Washington, Dr. Montizambert and myself visited that station and spent two very enjoyable and profitable days.

I have the honour to be, sir,

Your obedient servant,

A. T. WATT, M.D.,
Supt. B. C. Quarantines.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 9.

(W. H. K. ANDERSON, B.A., M.B.)

VICTORIA, B.C., October 31, 1902.

SIR,—I have the honour to submit the following report of the work done in the laboratory at William Head during the quarantine year 1901-2.

Supplies of Haffkine's prophylactic against bubonic plague have been manufactured from time to time during the year. The successive inoculation, with the plague germ, of animals (guinea pigs) has been continuous, and routine cultures and specimens have been taken from each case.

Various suspicious cases of disease have presented themselves, necessitating a bacteriological examination, but none have proved to be quarantinable.

During the summer a new laboratory building has been in course of construction upon plans sent in from this station, and with a view principally to work with the plague germ. The building and fixtures are now ready for occupation, and will prove a great improvement over the old temporary laboratory, which was fitted up in part of one of the detention buildings. The new apparatus, which is now on its way, and which includes the best microscope and accessories, will make the laboratory of this station fully up-to-date, and competent to fulfil the important work for which it was established.

I have the honour to be, sir, your obedient servant,

HAROLD ANDERSON, *B.A., M.B.*

The Honourable
The Minister of Agriculture,
Ottawa.

No. 10.

(R. L. FRASER, M.D.)

VICTORIA, B.C., October 31, 1902.

SIR,—I beg to present my report for the year just ended. Eight hundred and sixty ships in all were inspected. On June 7, a case of measles was found on ss. *Rosalie*, and on December 27, a case of small-pox on the same steamship. On both occasions the vessel was sent to Williams Head where she was dealt with in the usual way.

The danger from small-pox having largely disappeared, inspection of vessels at this port was, by direction, omitted after August 31.

I have the honour to be, sir, your obedient servant,

R. L. FRASER, *M.D.*,
Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 11.

(L. N. MacKechnie, M.D.)

Vancouver, B.C., October 31, 1902.

Sir,—I have the honour to submit this my report for the year just ended.

The number of vessels inspected was 429.

No case of contagious or quarantinable disease arrived at this port during the year.

On January 4, I was advised by Dr. C. J. Fagan, secretary of the Provincial Board of Health, of two cases of small-pox which had developed some five and eight days respectively after their arrival here on the steamer *Mainlander* from Seattle, and that he would require the vessel disinfected by us, otherwise she would be prevented from landing in future. Dr. Montizambert, the Director General of Public Health, on being informed by wire of the matter, replied that as the cases developed after landing, the matter was not a Dominion one, but provincial or municipal, but that if the local authorities desired they might send the steamer *Mainlander* to William Head where the minister would place appliances at their disposal, all expenses to be borne by the province or municipality.

As the master of the steamer was advised by Dr. Fagan that the expense of disinfection would have to be borne by the vessel, he proceeded to Seattle, at which place he had the vessel disinfected.

While Dr. Montizambert was in Vancouver, he was informed as to the advisability of installing a telephone at the pilot station, and on his recommendation the Board of Trade were asked to report fully to your department on the matter.

Since August 28, vessels from ports north of San Francisco have been exempt from inspection, while the inspection of vessels from San Francisco has been continued for plague.

I have the honour to be, sir, your obedient servant,

L. N. MacKECHNIE,
Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 12.

(James Patterson, M.D.)

Winnipeg, October 31, 1902.

Sir,—Last fall the North-west Territories were practically free from small-pox, but during early winter it was carried from Manitoba to Erwood, on the line of construction of the Canadian Northern Railway, and from there along the line to Kinistino and Prince Albert.

The cases which have come under my supervision during the past year are:—Prince Albert District, 230; Lebret District, 115; Vegreville District, 56; Wolsely District, 30; Edmonton District, 2; Indian Head, 1; Katepwa, 10; Balcarras, 1; Kenlis, 3; Grenfel, 1; Summerberry, 5 miles out, 2; Erwood, 3; Carnduff, near U.S. boundary, 3; Oxbow, 5; seven miles south of Oxbow, 2; Medicine Hat, one upon each

of three occasions, 3 ; Battleford, 8 ; Bresaylor, 25 miles west of Battleford, 6 ; Regina, 1 ; Moosomin, 1 ; Rocanville, 22 miles north of Moosomin, 3 ; Ferndale, 18 miles north-east of Moosomin, 5 ; Tantallon, 35 miles north of Moosomin, 12 ; Lethbridge, 13 ; 45 miles from Lethbridge, 2 ; Cardston vicinity, 8 ; Moose Jaw, on two occasions, 3 ; North-east of Moose Jaw, 5 ; Josephberg, 40 miles south of Medicine Hat, 1 ; Muskeg Lake, 8 ; Willow Bunch, 3 ; Coalfields, 5 ; Melfort, 3.

The large number of cases in the first four named districts were entirely due to the existence of the disease being concealed by those affected until the infection was widespread. In the other twenty-eight, when prompt notification was given, the cases were in all cases confined to the one or two families first affected, by at once quarantining, vaccinating and disinfecting. Out of the 564 cases fully 500 were half-breeds.

The appearance of cases at points scattered all over the Territories, is largely due to the unsettled wandering habits of these people. With their wagons, tents and a few personal belongings, many of them are constantly travelling all over this western country, both north and south of the international boundary.

The 230 cases of small-pox occurring in the Prince Albert District were scattered over a section of country with a radius of between 50 and 60 miles from Prince Albert, including within it Stony Creek, Kinistino, Millar's Crossing, the Baskerville section, Shell Brook, Duck Lake, Batoche, Fish Creek, St. Louis de Langevin, Lepine Settlement, Belleview and Carlton.

A large number of the cases in the Prince Albert District originated from a man from Manitoba who went looking for land east of Prince Albert. He stopped for a short time in one of the railway construction camps, returned from there to a tie camp, forty miles from Prince Albert. In the usual time he developed a moderate attack. No medical man was called in : as soon as he was able to walk about, the proprietor sent him away and immediately broke up his camp, the forty men he had working scattered to their homes all over the country and spread the disease broadcast.

I quote hereunder a report on this outbreak by the officer commanding the North-west Mounted Police for your information.

The Lebret District took in all the country around Lebret, Fort Qu'Appelle, the File Hill Settlement and more than half way to the Touchwood Hills.

The Vegreville District covered 40 miles west, 45 miles south-east and 18 miles north of that point. Cases occurred in the families of the postmaster and a land guide. They were concealed whilst these two men, Frenchmen, continued to perform their duties, and thus the infection was spread until fifty-six cases occurred.

In the Edmonton district only two cases occurred. They contracted it at Vegreville.

The Wolseley district took in the country for ten miles around. A threshing gang from near Alexander, in Manitoba, went to Wolseley to work. Within a week after they went there the disease broke out amongst them. It was carried directly by half-breeds from Wolseley to Lebret district, and cases occurring were concealed until the infection was widespread.

The disease still prevails in Montana. Cases have occurred directly due to Canadian half-breeds visiting there—taking the disease, keeping it concealed, and returning home without any effort at disinfection.

Cases have also been met with in bands of American Indians crossing into the Territories at points far distant from medical inspectors or customs officers.

The largest mortality occurred in Lebret district, where six adults died.

The type of the disease is gradually increasing in severity. Cases occurring now are severe, not of the mild type so common in 1901.

The disease has been almost wholly confined to the half-breed element. At Vegreville those who suffered were largely American immigrants not protected by vaccination.

In Prince Albert district only some half dozen white people had it. In Lebret district all were half-breeds. At Wolseley, outside of the threshing gang, all were half-breeds or French.

At Oxbow, a Canadian bachelor farmer, seven or eight miles out of town, received a letter from his brother in Ontario, who said in it that his family were all ill with this

disease that is called small-pox ; but he thought it was only chicken-pox. In two weeks this farmer developed small-pox—never having been off his farm during that time. He worked every day during the continuance of the attack, putting in his crop ; said he had to. From him his hired man developed a very severe case. A mounted policeman and his half-breed interpreter travelling over the country innocently called there for a meal. They took small-pox and nearly died. Three others in the hotel at Oxbow where these last boarded also contracted it. It is just in this way that the disease is spread and continues to crop up here and there. The type not being a fatal one, parties conceal the facts for fear of quarantine.

The virtue of vaccination becomes to me more and more apparent. There has not been a case of small-pox amongst those who availed themselves of free vaccine which I caused to be distributed, nor has there been a single case reported up to date from amongst the Galicians or Doukhobors.

The half-breed is an easy-going, careless, ignorant being. He will not use vaccine if given to him. He will not walk across the road to have it done free, unless small-pox be in the immediate vicinity. Ninety per cent of them will let you vaccinate them if you go to their houses to do it. I have only encountered one group who at first refused, and that was due to their late clergyman being an anti-vaccinationist.

The expenditure in connection with the control of this disease has been very considerable, for two reasons :—

1st. The Council of the College of Physicians and Surgeons for the Territories notified me that if I employed any young unlicensed medical men from outside in any of the outbreaks legal proceedings would be taken against them. I therefore had to arrange with local men on the best terms I could.

2nd. The class of people affected live from hand to mouth from day to day. When quarantined they have to be fed. I used this to aid as far as I could to maintain quarantine, threatening to stop supplies if quarantine was broken. This has proved more efficient than all the constables that could be placed around them. If you did surround them with constables you could not let them starve.

The food supplied has been of the plainest kind, but substantial, viz.: meat, flour, tea, sugar, and a very little of what might be called luxuries for patients seriously ill.

The North-west Mounted Police have been of inestimable value in establishing and maintaining quarantine, in the purchasing and distribution of supplies.

In the work I have had to do in the past there is one point which time and again has been brought most pointedly to my notice. It is this : When I find it necessary to quarantine individuals, to order supplies and medicines through the North-west Mounted Police, or to lay down regulations for disinfection, &c., I am continuously asked for my authority. My reply is, 'The Director General of Public Health, acting for the Minister of Agriculture.' People, otherwise intelligent, constantly mix up the Department of Agriculture at Ottawa with that at Regina. Others again assert that they were under the impression that the duties of the Director General of Public Health were confined to guarding the seaboard and international boundary, and had nothing to do with the interior.

If your office at Ottawa was styled by the minister, by order in council, or by the proper power, the Dominion Government Department of Public Health, then all your correspondence, suggestions, regulations, &c., coming from such a department, being headed Dominion Government Department of Public Health, would convey to the public at large a greater sense of authority and correctness.

This change would not entail any change of the minister at the head, any change of, or addition to, your officials, or any expense except what might be entailed in the printing of your blank forms, &c.

You will pardon me for suggesting this change. It perhaps should not form part of a report ; but the importance of the matter to my mind is my excuse.

I am, sir, your obedient servant,

JAMES PATTERSON.

The Honourable
The Minister of Agriculture,
Ottawa.

(Copy.)

PRINCE ALBERT, August 31, 1902.

The Commissioner,
N. W. M. Police,
Regina.

SIR,—I have the honour to report as follows concerning the small-pox epidemic in this district which commenced in February last, and is now gradually dying out.

At the present time there are still in quarantine some seventy persons, twenty-five of whom have been affected with small-pox, all of whom ought soon to be released from quarantine. For the six months commencing on March 1 and up to August 31, the number of persons quarantined for periods varying from three weeks to eight weeks is :

No. quarantined	587
" cases small-pox	212
" receiving government relief	432
" deaths	3

Of the persons receiving relief all were more or less destitute half-breeds who were deprived of their ordinary means of existence by being quarantined.

Thirty-two Sioux Indians included in the above were supplied provisions by authority of the Indian Commissioner at the expense of the Indian Department, two of the cases of small-pox being Sioux Indians out of a camp of thirty-two.

Deducting the thirty-two Indians from the above totals, these being supported while in quarantine at a total cost to the Indian Department of $80.43, it leaves 400 indigent persons receiving relief chargeable to the Department of Agriculture.

The total expenses to date for which accounts have been forwarded through the Commissioner's office to the Department of Agriculture are as follows :

1. Provisions to 400 indigents, consisting of meat, flour and tea, and including entire maintenance of an isolated hospital for almost four months	$1,053 99
2. Special constables in exceptional cases	52 00
3. Transport	24 50
4. One special constable acting as nurse, cook, &c., in an isolated hospital at $2.50 per diem	267 50
5. Board of N. W. M. Police on permanent quarantine duty	151 99
6. Disinfectants	89 90
7. Contingencies, travelling and billeting expenses of N. W. M. Police while on quarantine patrols	108 93
	$1,748 81

The provisions were delivered to the various recipients without extra cost to the Department of Agriculture, at the instance of the N. W. M Police.

Summary for the six months ended August 31, 1902 : Indian Department, thirty-two persons quarantined, of which two had small-pox, and all received relief amounting to $80.43 ; Agriculture Department, 555 persons quarantined, of which 210 had small-pox and 400 received relief at a total cost of $1,748.81.

I have the honour to be, sir,

A. ROSS CUTHBERT, *Supt.*,
Commanding 'F' Division.

No. 13.

(A. C. Smith, M.D.)

Tracadie, N.B., October 31, 1902.

Sir,—I have the honour to submit this my annual report on the Tracadie lazaretto, made up to this date.

To-day we have registered on the books of the lazaretto twelve males and seven females, the youngest 11 and the oldest 63 years of age. Of these fifteen are of French, three of Icelandic and one of English origin. Six are in what we may call the first stage of leprosy, eleven in the second and two in the third, or final stage when death is liable at any moment to end the scene.

There were no deaths during the year. One new case was admitted from an adjoining parish.

I have again to report that the diminution in the number of persons afflicted with leprosy in this province, although slow, has been steady for many years, owing, I believe, to the more effective segregation. It may be advisable to mention here a possible—but until recently an unsuspected—mode of communicating the disease. In a room containing lepers, Schaeffer, a German physician, placed microscopical slides upon a table near which he had the patients read aloud. On subsequent examination of the slides very large numbers of the leprosy bacilli were found thereon.

Although the pulmonary and enteric troubles from which our lepers suffer so much are, in my opinion, not merely complications, but are of a leprous character, much may be done to relieve the sufferers. I find that writers on leprosy confine their remarks on treatment to an enumeration of the so-called cures of the disease. For some time past I have given special attention to the relief of our lepers in their various intercurrent affections. During recurrent febrile periods—a very frequent source of suffering to our patients—I have found quinine to have a very beneficial effect. I have at times been surprised at the rapidity with which ulcers and wounds, the result of small operations, heal under treatment. We have, perhaps, some reason to believe that as our knowledge of the life-history of the lepra-bacillus becomes more complete we shall find a means to kill the parasite without at the same time killing its host. Chaulmoogra oil has been extensively used in the treatment of leprosy, but its proneness to disturb digestion has limited its use to a small proportion only of those affected. I now believe that I have overcome the difficulty by combining it with syrup of wild cherry bark, and have resumed its use here.

The institution was visited a few weeks ago by Dr. Stelwagon, whose recently-issued work on Diseases of the Skin contains the clearest and most satisfactory description of leprosy that I have seen in any text-book. Also, a few days later, by Dr. French, one of the physicians in charge of a leper colony in the Hawaiian Islands. Dr. French visited the lepers on Darcy Island before coming to Tracadie. He remained with us three days, and on leaving informed me that our lepers here are made much more comfortable and enjoy more privileges than those in the Hawaiian Territory.

As stated in a former report, the religious ladies who are passing their days as nurses in this "cemetery of the living" are untiring in their efforts to smooth the pathway of our unfortunates to the grave. Every want is carefully attended to; and the patience shown in dealing with whims, even in the matter of food, is surprising and beyond all praise.

The lazaretto is working out the designs of its organization as a place of detention for the purpose of reducing the number of foci of leprosy, and of relieving the com-

munity of a disgusting and dangerous menace. It is also a comfortable home for the poor outcasts gathered within its walls.

I have the honour to be, sir,

Your obedient servant,

A. C. SMITH,

Inspecting Physician and Physician to the Tracadie Lazaretto.

To the Honourable
The Minister of Agriculture,
Ottawa, Ont.

No. 14.

REPORT OF THE PUBLIC WORKS (HEALTH) INSPECTOR.

(Chas. A. L. Fisher, J.P.)

October 31, 1902.

Sir,—I have the honour to submit this my annual report as Public Works (Health) Inspector to October 31, 1902, and to append hereto the reports I have received from medical officers or engineers employed in their said capacity, on some of the various public works, I have personally inspected.

Since my last report I have covered the territory in the Dominion, from the Pacific to the Atlantic ocean, and have visited and inspected all public works of which any notice had been sent you, as required by clause 2 of the regulations under the Public Works (Health) Act, 1899, and others, of which no notification had been sent as required, and of which I became aware only by inquiry, or from items published in newspapers.

I have to draw your attention to the fact that some of said notices regarding public works that were under construction, were sent you by the parties responsible therefor, at such a late date, that in some instances, on my arriving at the works, shortly after receipt of notification, I found them almost completed, and so few men then employed thereon, that they would not come under the application of the Public Works (Health) Act, 1899, regulations, but as companies and contractors are beginning to better understand the intentions of said regulations, I hope for an improvement in the matter, in the future.

I am pleased to be able to report, that at a number of the public works visited during the past twelve months, I found considerable improvement in the medical supervision given thereon, the hospital accommodations and medicines provided, and in the sleeping quarters for the men when housed together, as compared with such works carried on during the previous year, under similar circumstances.

I do not feel that I would be doing justice to those interested, if I omitted to bring to your notice the fact that on all public works that came under my supervision since my last annual report, I have been given all possible assistance by the companies, contractors, medical officers, or others in charge of such works, towards enabling me to make a thorough inspection.

In giving a more detailed report, as hereunder, of the most important public works visited and inspected under the regulations of the Public Works (Health) Act, 1899, I will classify the same under four heads, viz: canals, railways, bridges, mines and works of other public companies.

CANALS.

The works of this kind carried on by the Dominion Government, on which a sufficient number of men were employed to bring them under the application of the regulations of the said Act, were five.

Galop Rapids Canal.—These works are at Cardinal, Ont., and are under contract to Messrs. Wm. Davis & Sons.

As they were approaching completion, there were not as many men employed as during the previous year, and these either occupied their own houses, or boarded with surrounding residents.

Medical supervision was at hand, the contractors having necessary tents, &c., for emergency use, and a permanent hospital is within a few miles.

No outbreak of disease had occurred on the works during the year, and the health of the men had been generally good.

Galop Rapids Canal (West).—These works are at head of canal some three miles West of Cardinal, and are under contract to Messrs. A. E. Cleveland & Co.

A large body of men are at work there, and the contractors have taken every sanitary precaution in the interest of their employees, the married men having comfortable detached houses, with water closets and baths, the single men being well housed and cared for, in two large boarding houses.

Necessary accommodation is at hand in case of an emergency, and medical officers, and a permanent hospital, are within telephone call.

No threatened outbreak of disease has ever occurred at these works, and the health of the men has always been good.

Trent Canal, Section No. 2.—These works are near the village of Kirkfield, Ont. and are under contract to Messrs. Larkin & Sangster.

At the time of my visit, I found about 225 men employed, a number of them being Canadians living in their own surrounding homes, or boarding with private families.

The contractors provide a boarding house, but only a few of the men avail themselves thereof.

Tents and buildings are on hand to be used as hospital accommodation in case of an emergency.

The boarding-house and other quarters occupied by the Canadian employees, are kept in good sanitary condition.

A large number of the men employed are Italians, who live in shacks erected by themselves, outside the jurisdiction of the contractors, and these are generally dirty and badly ventilated.

There had been no cases of contagious disease up to the time of my inspection, and the employees (Italians included) had been in fairly good health.

The works are under the medical charge of John McKay, M.D., whose report is as follows, viz.:—

WOODVILLE, ONT., Oct. 29, 1902.

DEAR SIR,—I beg to inclose you my report as medical officer to the men employed on Trent Canal, sec. 2, for the past year:—

There were on the works an average of 200 men, of whom two-thirds were Italians. The number varied from day to day, as men were continually coming and going. Many of the Canadian workmen are farmers living in their own homes; others lived in private houses and only a few lived in the company's boarding house.

The quarters of all such were, from a sanitary point of view, all that could be desired.

The Italians lived in their own shacks, generally filthy and always ill-ventilated.

Their bill of fare is the very simplest, consisting almost altogether of the everlasting macaroni boiled in water. When dinner is not macaroni, it is loaf bread washed down with cold water, and nothing else in addition.

I am bound to say in spite of this meagre diet, the large majority of Italians look well nourished and are in fairly good health and can stand work about as well as the Canadians.

I take pleasure in being able to report that there has not been a single death yet on the works, there has not been an accident worth reporting, not a bone has been broken the last year.

This fortunate condition of affairs I attribute largely to watchfulness of the contractor on the ground, Mr. Sangster, whom I frequently heard admonishing his foreman to take every precaution to guard the lives of his men.

There has not been a case of small-pox, diphtheria, scarlet fever, nor measles, the last year, and only one case of typhoid fever, in a Canadian, treated in his own home.

Still there are many cases of bruises, contusions, abrasions and minor injuries requiring treatment.

There are also a great many cases of colds and influenza.

Many of the Italians suffered in addition to the above with stomach and intestinal troubles, diarrhœa, &c., chiefly due, I fancy, to want of variety in their diet.

Permit me to point out that the company's boarding-house is about the only quarters the board of health can inspect, as the law stands.

I would also submit that in a case like the Trent Canal, passing through a thickly settled country, with villages every few miles, there is little necessity for so many hospitals as the regulations demand. When necessity demands it a hospital can be improvised on short notice.

I would also point out that 50c. per month is quite inadequate for attendance and medicine, for men working with machinery and explosives, it should not be less than 75c. per month.

Men who pay a fee, sick or well, are sure to require a great deal of attention for fancied if not for real diseases.

All of which I beg leave to submit.

JOHN McKAY, M.D.,
Medical Officer.

Trent Canal, Section No. 3.—These works are near the village of Gamebridge Ont., and are under contract to Messrs. Brown & Alymer.

I found from 125 to 150 men employed thereon at the time of my visit, a number of whom are boarded and lodged in quarters provided by the contractors.

The sanitary condition of the camp and the sleeping and eating quarters were good, and the sanitary condition of the Italians, who lodge and board themselves, seemed to have improved since my former visit to the works.

There has been no outbreak of disease and the health and condition of the men was satisfactory. Hospital accommodations are provided, and the medical supervision of the works and employees is under the charge of A. Grant, M.D., whose report to me for the year to date I append as under:—

BEAVERTON, October 30, 1902.

DEAR SIR,—I have the honour to submit my report respecting section 3, Trent Canal works, during the year ending October 31, 1902.

There is an average of 125 men on the works.

Their lodgings are quite comfortable, and board good.

The sanitary condition of the English portion of the men is good, and that of the Italians steadily improving.

The health of the men was fairly good.

There was only one case of contagious disease (typhoid fever), which was an importation.

Also a number of cases of bronchitis, pleurisy, diarrhœa, &c., two of erysipelas, and a few minor accidents.

Hospital accommodations are comparatively good.

I have the honour to be, sir, your obedient servant,

A. GRANT, *M.D.*

Welland Canal.—These works are at and near Port Colborne, Ont.

A large number of men are employed thereon, and the Health Act regulation sare being fairly well carried out by the contractors.

There had been no serious outbreak of disease on the works, and the health of the men has been all that could be desired.

Temporary hospital accommodation provided, and a permanent hospital within a reasonable distance.

RAILWAYS.

Public works of this class have been carried on in the two extremes of the Dominion, but to a greater extent in Manitoba, the North-west Territories and British Columbia, all of which have added considerably to the already extensive railway mileage of Canada, and have opened out a large tract of fine farming land for immediate settlement, and which is being fast taken up by first-class emigrants, many of them being from the United States, and having considerable means.

In Cape Breton the roads being built there run through fairly settled districts, but will greatly assist in opening out mining and other enterprises which are developing in that section, and which are likely to prove of considerable value and importance to the Dominion of Canada in the near future.

Canadian Pacific Railway.—This company have had under construction during the past twelve months, nine branches or extensions to their lines in Manitoba, the North-west Territories and British Columbia.

Having visited all these in my official capacity, I am pleased to say that at that time I found the regulations under the Public Works (Health) Act, 1899, being well and carefully carried out, excellent hospital accommodation provided, the men comfortably housed in tents or buildings, and well fed, the camps and quarters kept in good sanitary condition, and excellent medical supervision by a duly qualified physician in each and all of said works.

With one or two exceptions there had been no outbreak of contagious disease, and the health of the men was and had been excellent.

I give below the extent of these various works, and append thereunder a report thereon, lately received from the medical officer of each.

Field Cut-off. (From Field to Ottertail in British Columbia.)

This work was under contract to Messrs. J. W. Stewart & Co.

About 250 men were employed thereon.

A. W. Tanner, physician and surgeon, now of Moosomin, N.W.T., was in charge, and his report thereon follows :—

MOOSOMIN, N.W.T., July 31, 1902.

DEAR SIR,—As required by the regulations for the preservation of health on public works, I herewith inclose you a report *re* health on Canadian Pacific Railway construction at Field, B.C., October, 1901, June, 1902.

J. W. Stewart, Esq., contractor.

A. W. Turner, M.B., surgeon.

Extent of work.—Seven miles, being a new line following the Kicking Horse River from Field to Ottertail, with the purpose of improving the grades over the Ottertail hill.

Character of work.—Heavy rock work and heavy earth work, requiring the use of large quantities of dynamite and black powder.

Number of men employed.—Varied from 150 to 450.

Number of camps.—Four, all of which were well built log houses, giving ample accommodation for the men, and being supplied with stoves, windows, ventilators, &c.

Character of labour employed.—Mixed, English speaking and foreigners, the latter being Swedes, Austrians and Italians.

Hospital.—A board and tar paper building, double walls, dimensions 40 feet by 20 feet, accommodation for eight patients, which could be increased readily if necessary.

Surgeon.—A. W. Tanner, M.B., (Toronto University), Licentiate College, Physicians and Surgeons of British Columbia, Licentiate College Physicians and Surgeons, North-west Territories, resident on the work and distant not more than three miles from farthest camp.

Hospital Management.—An attendant was on hand at all times, acting as nurse. Patients on admission were bathed and furnished with clean clothes. As a result of this the hospital was always clean and in good shape.

Number of patients treated.—82 in hospital and many in the camps.

Cases of contagious disease.—One case of measles. Small-pox was never in any of the camps, although it was prevalent in the camps of other railway construction in British Columbia.

Labour pneumonia was observed more than any other acute disease,—of this there were twelve cases with one death.

Inflammatory rheumatism furnished four patients.

La grippe was fairly prevalent.

Pulmonary Tuberculosis—one case. This was not developed on the work, but brought in. Venereal disease was rare, and was as a rule imported.

Accidents.—There were three serious accidents from explosives, &c.

1. Louis Johnson (foreman), had a premature explosion of a small charge of dynamite and lost one eye as a result.

2. John Hunter (labourer) had a similar accident a few days later and lost his right arm below the elbow.

3. Patrick Griffiths (labourer) undertook to clean out a hole which had been loaded with dynamite and had not exploded, he used a pick and the charge exploded in his face,—he lost both eyes.

These were the only serious accidents, and in all cases they were the result of the men's own carelessness.

Other accidents consisted of one broken leg, one broken arm, broken fingers, sprains, twists, cuts and bruises.

The only death was that of Henry Watson, April 29, 1902, acute labour pneumonia, both lungs, died 5th day of exhaustion. The medical work on this contract was under the direct control of Mr. J. W. Stewart, contractor for the work from the C.P.R.

All of which is respectfully submitted.

A. W. Tanner, M.B.,
Surgeon for J. W. Stewart, Field, B.C.

Kootenay—Arrowhead Extension. (From Lardo to Gerrard in British Columbia.)

Only a comparatively small number of men were employed on this work, and no physician was necessary under requirements of the regulations, notwithstanding which, a regular qualified medical officer, Dr. Hartney, was in charge, and sanitary conditions were well looked after.

Yorkton Extension. (From Yorkton North-westerly, about 33 miles.)

This work was under contract to J. D. McArthur.

Number of men employed varied from about 100 to 300.

Medical officer in charge was W. S. Macdonald, M.D., whose report on the year's work follows:

Yorkton, October 26, 1902.

Dear Sir,—I have been employed by the C. P. R., especially to look after the men on construction here. Am not attempting to do work in any other division. Dr.

Irving and I have our offices together, so they are nearly always sure of securing someone.

There are about 200 men now employed at track laying. The contractor's men whom I attended, have finished grading, and gone.

There have been no infectious diseases whatever here, and the men are living under the best possible sanitary conditions.

We have an hospital in Yorkton which is endowed by the C. P. R. for maintenance, and I have been instructed by the superintendent of construction to take men who are in need of hospital attendance there.

Yours truly,

W. T. MACDONALD, *M.D.*

Pheasant Hill Extension. (From Kirkella, Man., 110 miles north-westerly, to Pheasant Hills, Assa.)

Contract let to Messrs. Foley Bros., Larson & Company, of Moosomin, N.W.T.

Number of men employed, about 500.

There were two cases of small-pox in this district, patients were immediately isolated, quarantine enforced, and no other cases developed.

Two physicians have had medical supervision over the men, A. T. Condell, M.D.C.M., and A. W. Tanner as chief surgeon, whose report on the work follows :—

MOOSOMIN, N.W.T., October 25, 1902.

DEAR SIR,—In regard to health on Pheasant Hills extension of C.P.R., from Kirkella, Man., north-westerly to Pheasant Hills,, Assa., I beg to report as follows :—

Work commenced May 12, 1902, and is at time of writing about finished, will probably be finished Nov. 1, or during first week of November, 1902.

Number of men employed never exceeded 600, and was usually about 450 to 500.

Camps were tents, and as the work was light, no camp was ever longer in one place than 4 to 5 weeks.

Hospital accommodation.—Tent, 18 x 30 feet, with a fly stretched over it,—tent floored and walled up at the sides.—beds 6 in number, the constant attendance at hospital as nurse, &c., a young medical student (2 years' experience). Hospital moved from time to time, to be as centrally located as possible.

Sickness.—Shortly after May 12, a man who had come in from Winnipeg, was discovered to be suffering from small-pox of a mild form. Isolated and camp quarantined May 20. Four other camps also quarantined May 20.

Dr. Patterson examined the patient and pronounced it small-pox.

A second case developed in the same camp as furnished the first.

Quarantine removed June 13, no further cases.

No other cases of any infectious disease whatever observed during the summer.

One death—August 14, 1902—Benj. Chrispen, perforation of vermiform appendix with acute peritonitis.

No accidents with explosives, one badly broken leg, close to ankle, and one broken collar bone, only accidents observed and treated in hospital.

Two cases acute rheumatism, several cases of tonsillitis, no typhoid fever.

Freedom from disease I attribute to the fact that camps were never long in one place.

I have the honour to be, sir

Your obedient servant,

A. W. TANNER, *M.B.*

Forrest Extension. (From Forrest, Manitoba, westward, tracklaying 10 miles, ballasting 42 miles.)

About 175 men were employed.

There was one case of small-pox, and one of typhoid fever at the works, both of which were isolated, quarantine enforced, and no further cases developed.

Medical supervision was under charge of A. T. Condell, M.D., of Brandon, who also had charge of the three following extension works, viz.: Snowflake, Brookdale, Waskada, whose report covering the four extensions, follows the last named :—

Snowflake Extension. (From Snowflake, Man., 10 miles southeasterly.)

Number of men employed about 150 to 175.

There were three cases of typhoid fever, four on these works, which were taken to Winnipeg for treatment.

Dr. A. T. Condell was medical officer of these works.

Brookdale Extension. (From Wellwood, Man., to 10 miles west.)

The number of men employed here were the same as at Snowflake, they having been transferred.

There were no serious diseases that I know of.

The same medical officer, Dr. Condell, was in charge.

Waskada Extension. (From Waskada to 20 miles west.)

Number of men employed ran about 200.

There were some cases of fever on this work, which were taken to Winnipeg for treatment. Dr. Condell was also in charge of this extension, and his report covering this and the three preceding ones is as follows :—

BRANDON, MAN., October 29, 1902.

DEAR SIR,—Herewith I beg leave to submit my report of the health and condition of men on the Forrest, Brookdale, Snowflake, and Waskada extensions of the C.P.R.

Forrest Extension.—On this extension from 180 to 200 men were employed.

The general condition and health of these men was excellent.

Very little disease and few accidents occurred.

The government regulations were closely observed by the officers in charge, and the instructions of the department carefully carried out.

Attention was given to sanitation, pits were dug, and garbage and refuse buried, and as camps were frequently moved, no contamination resulted.

Cases of sickness were immediately reported, and transportation or isolation effected at once.

Inspection, cleansing, purification and disinfection were closely looked after.

Brandon hospital being easily accessible, was used as a base hospital.

Isolation in one case of small-pox, was made by means of a sleeping car, specially fitted up and set apart in a lonely spot, and an experienced nurse attended patient.

Quarantine was removed at proper period, and after most thorough disinfection.

No further cases developed either among the men on construction, or among the people in the neighbourhood.

No cases of death from disease took place on this work.

There were a few cases of acute gastritis, some cases of diarrhœa of a transient character, later one case of bronchitis and one of pneumonia.

Recovery was early and complete.

One case of typhoid fever was isolated, and no spread of disease was seen.

A few cases of rheumatism were met with, and among the Italians one case of eczema, and one of tinea sycosis.

Accidents were few, and with the exception of the Kinto bridge accident, not serious. Here, however, five men were injured, two of them fatally, while the other three made uneventful and rapid recovery.

Another workman received a compound comminuted fracture of bones of left leg, the day they were leaving Forrest.

There were some slight injuries from jumping off moving flat cars, and from falling timbers, ties and rails.

A few slight injuries from handspikes, pit arms and hammers, proved simple and soon healed.

Snowflake Extension.—Here the same requirements were met, and the same conditions fulfilled, as in the Forrest construction. Owing to care in deposit of refuse, and frequent moving of camps, little infectious disease, and no epidemic occurred.

The district afforded little water that was good, and on this account some gastric and intestinal trouble was complained of. Severe cases were taken into Winnipeg General Hospital.

Three cases of typhoid fever went to Winnipeg. The other cases of sickness were of a trivial character.

One workman on pioneer car got mixed up with the trams and sustained a fracture of the tibia, a deep wound on inner aspect of the arm and some scalp wounds. He was taken to Winnipeg General Hospital, and resumed work in about ten weeks.

The number of men employed in construction at Snowflake was from 170 to 180.

The interior and exterior arrangements of the boarding cars and sleeping quarters were carefully looked after and satisfied the demands of the department.

Cases of accident and sickness were well attended to by officers in charge, and transportation, where necessary, was expeditious.

Wellwood (Brookdale) Extension.—The men on construction at Snowflake, together with their outfit, were transferred to this extension.

Splendid weather, excellent locality, and an early completion of the 10 miles of track combined to have little sickness or accident on this work.

Favourable conditions and hygienic precautions seemed to keep the men in first class condition.

Being near Brandon, that hospital was used for one case, which was the only one developing at Wellwood.

This was a case of tonsillitis which, as diphtheria had been in the district last year, we removed early to hospital. No further cases were known.

There were no accidents reported while this work was under construction.

Waskada Extension.—The number of men employed here varied from 150 to 280.

Arrangements were made for transferrence of emergency cases to private hospital in Deloraine. Other cases were taken to Winnipeg.

No deaths occurred on this construction. The general health of men was good. Very little sickness was experienced.

A few cases of fever were sent to Winnipeg. Poor water produced some slight trouble of alimentary tract, but nothing serious developed.

The men here, with their boarding and sleeping cars, were the same that constructed Forrest extension, and the same conditions were observed.

Those in charge exercised careful supervision of the cleanliness of the camp and of the health and comfort of the men.

No epidemics occurred

A few slight accidents happened, one workman was struck in the hip with a pick-arme, another was squeezed with two sticks of timber, but these injuries were slight and soon recovered from.

During the work on these four extensions, passing through several months, with differing seasons and varying climatic conditions, and with the employment of some hundreds of men, not a single death from disease occurred.

The instructions of your department were in the hands of the officers of the company, and they at all times evinced a willingness and eagerness to carry out those instructions.

The fullest assistance was given the medical officer in the discharge of his duties.

In cases of accident every facility at their disposal was placed for comfort or convenience of the injured, and their constant solicitude for the well-being of the camps is commendable.

I have the honour to be,

Yours faithfully,

A. T. CONDELL, M.D.

Selkirk Extension. From West Selkirk northward, 26 miles.

This work was almost completed on my arrival there, and only a few men were then employed.

A few cases of small-pox developed here early in the season, when a large gang of men were employed, but such cases were at once isolated, quarantine enforced, and there was no spread of the disease.

The regulations under the Public Works (Health) Act, 1899, had apparently been carried out since the commencement of the work, and were being complied with at the time of my inspection. Dr. Ross was the medical officer in charge on behalf of the Canadian Pacific Railway Company, and Dr. Irving, whom I saw personally, was attending at that time to some minor cases during the absence of Dr. Ross.

Canadian Northern Railway.—This company, under Messrs. Mackenzie, Mann & Co., contractors, have had under construction during the past year five extensions to their lines in Manitoba and the North-west Territories.

Having visited and inspected each of the said works, I may say that I then found the regulations under the Public Works (Health) Act, 1898, being most carefully fulfilled, the hospital accommodation provided being fully up to the requirements, the men being supplied with excellent food and comfortably housed, the sleeping and dining quarters and the various camps being kept in very good sanitary condition, and each of the works having careful medical supervision by a duly qualified medical officer each of whom was under the charge of R. MacKenzie, M.D., of Winnipeg, as the contractor's chief medical officer, who gave me every assistance towards my making the necessary inspections.

There were no contagious diseases at any of these works, with the exception of two cases of measles and one of scarlet fever, and the general health and condition of the men was excellent.

The extent of these works and the reports received from the medical officers of each will be found below, viz.:—

Erwood Extension. (From Erwood, Saskatchewan, N.W.T., to a point about 100 miles west.)

Number of men employed at time of my visit was about 600.

The eight camps along this line of construction were under canvas, but at the headquarters camp at Erwood there were well constructed log buildings, one of them being a well-fitted out hospital, with accommodation for 16 patients, another and separate building being the office dispensary, well supplied with medicines, &c., and the quarters of the resident medical officer.

The said officer in charge was A. H. Crawford, M.D., whose report up to date, follows :—

ERWOOD, N.W.T., Oct. 30, 1902.

SIR,—I beg to submit to you the medical report for the six months, May to November, of the work on the Canadian Northern Railway from Erwood west.

At Erwood there is a large, bright, well ventilated hospital, office and dispensary separate, built on the high bank of the river, accommodating 16 patients, iron beds, springs, matrasses, &c.

The camps were all under canvas and all sanitary precautions were taken.

No overcrowding in sleeping accommodations.

The food was of excellent quality, well cooked and plentifully provided.

The number of men varied from 800 in June to 300 in October.

There was very little sickness, eleven patients being treated in the hospital, all of minor importance.

The general health of the men was remarkably good.

Which report is respectfully submitted.

Your obedient servant,

A. H. CRAWFORD, *M.D.*

Grandview Extension. (From Grandview, Man., to about 100 miles west.)

About 400 men were employed thereon.

The several camps along this work were all under canvas, with specially fitted cars for various purposes at the Grandview headquarters.

The resident medical officer was Geo. D. Shortreed, M.D., whose report on the work of the year follows :

GRANDVIEW, MAN., October 13, 1902.

DEAR SIR,—I beg leave to submit a brief report for the season.

The camps have been visited regularly once a week. I have just returned from my thirteenth trip through them.

The health of the men in the camps has been exceptionally good.

There have been few serious cases of illness, and no fatalities.

There have been no cases of infectious diseases, except one or two of measles, and one of scarlet fever.

The last month, I had two cases of appendicitis, both of whom were sent to Dr. Mackenzie for surgical treatment if necessary.

There have been no accidents of a serious nature, and very little surgical work.

The hygienic conditions seem to have been carefully looked after.

Hoping that this brief report may be satisfactory,

I remain, your obedient servant,

GEO. D. SHORTREED.

Beaver Extension. (From a point north of Beaver, Man., to Neepawa, Man., a distance of twenty-seven miles.)

About 300 men were employed.

The camps were under canvas, as is customary, with some specially fitted cars at headquarters.

The health and condition of the men were excellent, the camps in a sanitary condition, and I heard of no serious diseases at time of my visit.

J. W. Leech, M.D., of Neepawa, was the resident medical officer.

Neepawa Extension. (From Neepawa, Man., to McCreary, Man., a distance of thirty-three miles.)

About 350 men were employed on this work.

The conditions as to quarters and health of men were similar to those on the above Beaver Extension.

The medical supervisor in charge of this work was also Dr. Leech, of Neepawa.

Carman Extension. (From a point eleven miles west of Carman to about nine miles further.)

About 100 men were employed, which was near the maximum, during this construction.

There were no contagious diseases, and health and conditions were good.

The resident medical supervisor was W. M. Pint, M.D., M.C., of Carman, whose report is added below :—

CARMAN, Man., Oct. 20, 1902.

SIR,—On construction of Carman extension

Camps.—The bridging, construction and grading camps, have been in a thorough health condition.

No infectious disease having made an appearance.

Board was I think unusually good, as I have had meals on several occasions, (sitting at the ordinary tables with the labourers.)

Lodging.—Appeared to be adequate, and in clean and tidy condition.

Health.—Health of nearly all appeared above usual.

Accidents.—There were quite a number, though of not great moment, such as bruises, scalds, cuts, with an occasional furuncle or abcess.

Diseases.—None that were infectious or contagious, a number of cases due to over-eating, diarrhœa, rheumatism, colds, &c.

The accommodation, when there were sick, was good, and each foreman always insisted on the patient retiring from work entirely, until able to resume it with satisfaction.

The foreman also spared no trouble to get medicine to patient, if I had not it with me at the time.

Number of men engaged on construction, varied greatly, even in the bridging and grading gangs, and I could not make anywhere near an accurate estimate, but think there were as low as 50 and as high as 100 men.

WM. M. PINT.

Prince Edward Island Railway.—This is a branch from Charlottetown to Murray Harbour, of about 48 miles, and is being built by the Dominion Government.

The contract is let to Mr. Willard Kitchen, whose headquarters are at Murray River, P.E.I.

The health and conditions of the men have been well looked after from the start of operations, and there has never been any contagious disease among the employees.

Patients from any of the camps are always looked after by the nearest physician in charge of said camp.

Many of the men reside in their own houses, or board with surrounding families.

Dr. W. R. Coles, of Murray River, has had general supervision over the works on behalf of the chief contractor, and his report thereon follows in full :—

MURRAY RIVER, P.E.I., October 28, 1902.

DEAR SIR,—*Re* sanitary condition of boarding houses and surroundings where the men who are working on the Murray Harbour Branch of P.E.I. Railway are quartered.

Willard Kitchen, the contractor, does not board any of the men, but the sub-contractors, of whom there are several, board and lodge their men.

I have had occasion to visit these boarding houses, and find them in a satisfactory condition.

I may also state that a great number of the workmen board and lodge at their own homes.

There have been several accidents, principal among them being one broken thigh, attending physician being Dr. J. F. Martin, of Eldon, one shattered forearm, attending physicians being Drs. J. A. C. Rodgerson and Martin Martin, one bruised leg, caused by cart wheel passing over it, one sprained foot and ankle from earth falling on it, these cases being attended by myself.

The accidents have been conspicuous by their rarity.

No cases have been treated in hospital.

There are good hospital facilities at Charlottetown, which is from eighteen to forty miles from the respective boarding houses.

There have been no outbreaks of contagious diseases, and typhoid fever is also unknown.

This report is not very extensive, but I trust that it will contain all you require.

Yours very truly,

W. R. COLES.

Halifax and South-western Railway.—The contract or proprietorship of this line is in the hands of Messrs. Mackenzie, Mann & Co., of Toronto.

The only portion connected therewith, at present under construction, is known as the New Germany and Caledonia branch, some fifteen miles.

Work on this branch has only lately been commenced, there being about 100 men employed, and all in good health.

Hospital accommodation is within reasonable distance, and the regulations under the Health Act, 1899, are being fulfilled as far as necessary up to the present.

The headquarters of the work and the engineer in charge, are at Bridgewater, N.S.

The medical officer in charge of the said work is W. H. Cole, M.D., whose report here follows:—

CALEDONIA, QUEEN'S Co., October 29, 1902.

DEAR SIR,—Referring to the employees of the Halifax and Southwestern Railroad, whom I have under my professional care, I beg to report the number at about one hundred, and all in good health at the present time.

There has been no serious illness or accident among them thus far.

The sanitary conditions of the different camps have had my careful attention.

There is no hospital accommodation here as yet, nor has there been any need for any up to the present time, though one cannot tell what a day may bring forth.

In case of serious sickness or accident, it would be very desirable to have suitable quarters provided, where patients might receive proper nursing and treatment.

I have nothing further to report.

Kindly advise how often these reports are required.

Yours faithfully,

W. H. COLE,

Physician to Halifax and South-Western R.R., New Germany and Caledonia Branch.

Inverness Railway and Coal Co. (From Point Tupper, Cape Breton, to Eastern Harbour, C.B., including a shipping pier at Port Hastings, C.B.)

The work at present under construction is the coal shipping pier and its approaches.

About 150 men were employed thereon, and there had been no serious disease in connection therewith. The men are not housed by the company or contractors, but board in the surrounding village, or live in their own homes.

Hospital accommodation is at Point Tupper, within three miles by rail.

The medical officer in charge has been D. J. McDonald, M.D., of Port Hawkesbury, C.B., who was just leaving for England at the time of my visit and was to be succeeded by Dr. Howard McDonald.

I embody below a report from the chief engineer, who has been in charge of the work since commencement:

PORT HASTINGS, C.B., October 29, 1902.

DEAR SIR,—As to the general health and condition of the men engaged on the coal pier being constructed at this point in connection with the Inverness Railway and Coa Co., I beg to submit the following statement:—

Work began on the pier and approaches about June 15, and has been carried on continually since.

During that time there have been engaged from one to two hundred men per month.

Until the end of September, Dr. D. J. McDonald, of Port Hawkesbury, was our regular physician, and since then Dr. Howard McDonald, of Port Hawkesbury, has occupied the position.

I have been constantly on the work during the summer and know thoroughly the conditions which have existed from a sanitary standpoint.

I am happy to say that we have had no sickness on the work, and only one slight accident, by which one of the men had his foot crushed and one small bone broken.

All the men board in the village at regular boarding houses and a great number of them live at their own homes.

There is an hospital at Point Tupper should one be required, but fortunately we have had no cause to use it.

The work is now nearing completion and not more than fifty men are at present engaged.

ANGUS SINCLAIR,

Chief Engineer.

Cape Breton Railway. (From Port Hawkesbury, C.B., to Louisbourg and Sydney, C.B.)

About 300 men were employed, among whom there had been no serious disease.

The men were housed in shacks, the sanitary conditions of which were fairly good.

The headquarters camp was at Port Hawkesbury, and regulations under the Health Act, 1899, were being carried out.

The hospital accommodation for this work is at Point Tupper, close by.

P. A. Macdonald, M.D., superintendent of the hospital, is the medical officer of the work, and his report thereon follows :—

PORT HAWKESBURY, C.B., October 29, 1902.

DEAR SIR,—There have been about 450 men employed on the Cape Breton Railroad at times, but at present there are only about 150.

The prevailing diseases during the year were bronchitis and pneumonia, from which there were no deaths.

One man aged 72 died of gastro-enteritis, another was maimed by a premature explosion of a blast, whereby he lost the sight of one eye, and several received incised and contused wounds, but made good recoveries.

The employees lived in shacks, which are fairly comfortable, and some lived in their own homes.

The manager is particularly kind and attentive to the men when ill or injured.

Your obedient servant,

P. A. MACDONALD.

BRIDGES.

There are only two works of this kind being constructed at present, as far as I have been made aware, that come under the regulations of the Public Works (Health) Act, 1899. They are as under :—

The Quebec Bridge.—This is being constructed from Quebec to Point Lévis.

A large body of men are employed, but they board and lodge with surrounding families.

Their health has been excellent and no contagious diseases developed.

Hospital accommodation is provided in the city of Quebec, and medical supervision is in force.

The Hillsborough Bridge.—This is being constructed from Charlottetown, P.E.I., and is to form the connection for the Murray Harbour Branch of the Prince Edward Island Railway.

It is being built by the Dominion Government, under contract to Mr. M. J. Haney, who also has a contract for a large wharf at Charlottetown.

Some 500 men were employed thereon, who were being well looked after as to board, lodgings and sanitary conditions.

Splendid hospital accommodation is provided at Charlottetown, and the men are taken charge of there, when necessary, at the expense of the contractor.

The health of the men has been good and no contagious or infectious diseases have developed among them.

Dr. P. Conroy, of Charlottetown, is the medical officer in charge of the men employed on the works, and a short report from him to date, follows :

CHARLOTTETOWN, P.E.I., October 27, 1902.

SIR, – I beg leave to report that I have been in attendance upon the men employed on the construction of the Hillsborough Bridge near this city, and that the said employees have had every medical, surgical and hospital accommodation suitable to their needs.

The city hospital affords up-to-date accommodation for a large number of patients, and arrangements are made whereby all the injured or sick employed on the bridge construction are freely admitted.

The injuries received by the men are those usually encountered in those engaged in the performance of a large work, with an additional large number of cases of the peculiar caisson disease.

The general health of men has been excellent, no contagious or virulent disease being found among them.

I have the honour to be, sir,

Your obedient servant,

P. CONROY, M.D.

MINES AND WORKS OF OTHER PUBLIC COMPANIES.

Of the works under this class I have only to report on five, but there are no doubt others, of which no notice has been sent to you, as required by the regulations.

Payne Mines.—These mines are situated near Sandon, B.C.

During the past year, a very considerable amount of construction work has been done in renewing tramways, erecting concentrator, completing water power and putting in electricity.

A considerable number of men have been employed thereon, who were comfortably housed and well fed by the company.

The sanitary regulations and health of the men were all that could be desired.

A miners' hospital and medical officer are close at hand in the town of Sandon.

Consolidated Lake Superior Works.—These are the works carried on by the Clergue Syndicate, at Sault Ste. Marie, Ont.

During the past twelve months construction work on the Algoma Central Railway and its branches has been about completed for the present, a street railway has been laid down through the town, telegraph lines have been constructed, steel rail works have been put in operation, pulp and paper mills built, and other works are contemplated or in progress.

A very large body of men are employed in the various enterprises.

The regulations under the Public Works (Health) Act, 1899, are carried out to the fullest extent.

There are two or three hospitals provided by the Syndicate, in connection with different works.

The health of the employees has been excellent and several medical officers are employed to supervise them at various points.

The St. Anthony Lumber Co.—This company have large lumber camps in the neighbourhood of Whitney, Ont., and were constructing a logging railway of some considerable length.

In June last, the Director General of Public Health received a complaint from the secretary of the Ontario Board of Health, that the regulations under the Public Works (Health) Act 1899, were not being carried out on said works.

On this being communicated to me, I immediately started for said works and on arrival inspected the same, but found no cause for the complaint.

There were 500 or 600 men employed in both the lumber and railway camps.

The railway construction was under contract to Mr. W. R. McQuigge.

The men were boarded and lodged by the company, were comfortably housed and well fed, and the camps kept in a good sanitary condition.

All necessary hospital accommodation was provided and medicine supplied.

There had been seven or eight cases of small-pox in the two camps and one of measles in the railway camp, but these were isolated and quarantine enforced, so that there was no further spread of these diseases.

The health of the men generally was good.

T. C. Bourns, M.D., of Whitby, was the medical officer in charge of the camps, and I append the following from him thereon up to date :—

WHITBY, ONT., October 25, 1902.

SIR,—During the previous twelve months, the St. Anthony Lumber Co., Limited, employed in lumber camps about 300 men and the logging railway construction about 200 men.

The railroad was built by W. R. McQuigge, for the St. Anthony Lumber Co., of which E. C. Whitney is manager.

We had in lumber camps four cases of small-pox, all of which were mild; and in railway camp three cases of small-pox and one of measles.

There was a hospital for contagious diseases in connection with each lumber camp, and two hospitals for contagious diseases in connection with all the camps for the railroad, one of which was used till disease was diagnosed and the other for treatment.

The greatest care was given to keep the cases isolated and thorough disinfection was pursued.

We had no severe accidents in either works, nor was there much other sickness.

The company furnished board and lodging for all these men, who were not overcrowded, the dining-room and cookery being in all cases separate from the sleeping camps.

I visited all the camps frequently, and the drainage and ventilation was good.

Fresh meat and vegetables were used in all camps, and water was obtained from either springs or wells, no water from swamps or dead water (dammed lakes or streams) being used.

I remain,
Yours very truly,
T. C. BOURNS, M.D.

Intercolonial Coal Mining Co.—The mines and works of this company are situated at Westville, N.S. The mines are well ventilated and the employees well housed. Permanent hospital accommodation is at New Glasgow, about five miles distant. The health of the men is good, and all necessary provision has been made for their comfort. Three medical officers are directly connected with and have supervision over the men and mines.

Dominion Coal Company.—This company, in addition to their coal mines and works, own and operate the Sydney and Louisbourg Railway, covering about forty miles in length.

A very large body of men are employed, and the health regulations as carried out are of the very best and cover all the requirements of the regulations under the Public Works (Health) Act, 1899.

Several medical officers are employed by the company, but R. A. H. MacKeen, M.D., has had the most general supervision over the men employed, and I give below a report from him covering the past twelve months, and which gives full information thereon :—

GLACE BAY, N.S., October 27, 1902.

SIR,—In reference to the conditions under which the employees of the Dominion Coal Co., Ltd., live and the provisions made for their welfare, with the general effects on their health and well-being, I beg to report as follows :—

There are employed by the company about 6,500 men and boys, of these about 5,000 are engaged underground, and the balance in various capacities on the surface.

A large and increasing number have their own cottages with more or less ground surrounding them.

The company provides houses which are rented to their employees at a moderate figure, of these some are old but fairly comfortable, while others are of modern construction and of the better class of tenants.

The large number of men employed and the amount of machinery in use entails the inevitable number of accidents incidental to work of such magnitude.

Many of these accidents are due to workmen growing careless of their own safety and incurring needless risks.

For the handling of cases of accidents the different collieries are provided with stretchers for carrying injured men to the surface, and ambulances are at hand to convey them to their homes or the hospital as they may elect.

The medical men are also connected by telephone with the works and are immediately notified if an accident occurs.

The first provision in the way of hospitals was made by the company in 1901, when an emergency hospital was provided by the company.

We now have in a central location St. Joseph's hospital, built by contributions from the workingmen and private citizens, supplemented by a substantial donation from the Dominion Coal Company.

This building is of brick, with accommodation for about 60 patients and is fitted in every way in the most modern style.

By a small monthly contribution a man is entitled to free attendance and nursing in this institution, and if not a regular subscriber may have the full benefits for $3.50 per week.

The general health of the community is good considering the population.

One year ago we had quite an epidemic of typhoid fever in Glace Bay due to bad water. This year there have been very few cases, generally of a mild type, and in a short time we will have a water system completed which will give us a plentiful supply of water which should be perfectly free from contamination.

Boards of health appointed under the provincial laws govern sanitary matters at all the collieries, and prompt measures are taken to stamp out infectious diseases when they make their appearance.

Yours truly,

R. A. H. MacKEEN, M.D.

I may here draw your notice to the fact that medical and municipal officers in Manitoba, the North-west Territories and British Columbia, seem to have the opinion that attention to and care of cases of contagious diseases occurring among employees on public works coming under the application of the Public Works (Health) Act, 1899, should be paid by the Dominion Government.

I humbly beg to submit that I do not think that was the intention of the said Act, and there is certainly nothing in the regulations of the said Act to warrant such an opinion.

It might, therefore, be advisable to take into consideration this matter, with the view of amending said regulations to cover the same and perhaps other matters.

I deem it a great pleasure to have to again draw your attention to the general healthfulness and excellent condition of all classss of employees on public works coming under the application of the Public Works (Health) Act, 1899.

I have the honour to be, sir,

Your obedient servant,

CHAS. A. L. FISHER,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

HEALTH OF ANIMALS

No. 15.

REPORT OF J. G. RUTHERFORD, V.S., CHIEF VETERINARY INSPECTOR.

From November 1, 1901, to October 31, 1902.

Ottawa, October 31, 1902.

Sir,—I have the honour to present my first annual report as Chief Veterinary Inspector for the Dominion.

Entering on my duties in February last my time has since been very fully occupied, as, in addition to the ordinary detail work of the office, it has been necessary for me to study closely the conditions relating to the various contagious diseases affecting animals in Canada and the means at my disposal for dealing with them.

Acting on your instructions, my first step was to assume executive control of the work of stock inspection and to take entire charge of the correspondence connected therewith. This change has, it need scarcely be said, added very considerably to the duties of the position but will, I think, as time goes on, be found to be a decided improvement on the methods formerly in use.

It is certainly a distinct advantage to the Chief Inspector, who is, very properly, held responsible for the effective performance of the work entrusted to him, to be in close touch with each member of his staff and to personally receive and deal with all professional communications and official reports.

In furtherance of your idea of centralizing the work at the Capital, I found it necessary to bring to Ottawa, Dr. Higgins, formerly Assistant Pathologist in charge of the Experiment Station at Outremont.

In view of the important part now played by the sciences of pathology and bacteriology in the diagnosis and control of animal diseases, it was deemed advisable to furnish proper facilities for this class of work. A very convenient and suitable laboratory has therefore been erected on the Central Experimental Farm. This building, which is now almost ready for occupancy, has been designed specially for scientific research into the nature and causes of animal diseases, more particularly tuberculosis. It is intended also in the near future to undertake the manufacture of tuberculin and other preparations of a like nature. As the services of a skilled pathologist are, however, constantly in demand by our inspectors and others, temporary quarters, pending the completion of the laboratory, were found for Dr. Higgins in the Imperial Building where he has during the past season done a very great deal of valuable research work in connection with several of our animal plagues, in addition to examining numerous specimens forwarded for diagnostic purposes.

Still further following out the plan of establishing a central bureau, I, with your approval, removed to Ottawa Dr. A. E. Moore, one of the veterinary inspectors of the department formerly stationed at Montreal. I have found his services invaluable during the past season, not only in visiting and dealing with outbreaks of disease and in the ordinary work of the branch, but as Acting Chief Inspector during my various unavoidable absences from Ottawa.

In March I met, in Toronto, a special committee appointed by the Dominion Shorthorn Breeders' Association to discuss with me the question of quarantine regulations with special reference to the tuberculin test. This conference, I am pleased to state,

resulted in the development of a better understanding among breeders as to the aims and objects of this branch of your Department, which has since been of great benefit to all concerned. Such meetings, if conducted in a proper spirit, cannot but improve the relations between owners of live stock and officers engaged in a service specially organized to further and protect live-stock interests.

I deemed it advisable to attend the annual meeting of the Western Stock Growers' Association which was held in Macleod on April 10. At this gathering a number of matters of importance were discussed, among them being the treatment of mange in cattle. I found all those present fully alive to the importance of dealing promptly and thoroughly with this disease. After some discussion the following resolution was adopted :—

Moved by Mr. George Lane, seconded by Mr. A. McLean, 'That this association 'agrees to impress upon its members and all others concerned, the necessity for the 'prompt isolation and proper treatment of all cattle showing symptoms of mange, and 'further, to see that such measures are effectively carried out under the supervision, 'when such is found necessary, of the Government Veterinary Inspectors.'

I am pleased to be able to state that, from the latest reports in my possession, the ranchers are evidently doing their best to carry out its provisions.

The question of glanders was also discussed at this meeting and arrangements were made for a general inspection of range horses at the spring round-ups.

While on this trip I had an opportunity of discussing with the Commissioner of the North-west Mounted Police the whole subject of the control of contagious diseases of animals in the North-west Territories, this work forming one of the multifarious duties of that force. I cannot speak too highly of the very efficient and satisfactory service rendered, often under great difficulties, by the veterinary officers of the Police, and of the systematic manner in which reports are furnished by the Commissioner and his staff at Regina.

I am convinced, however, that owing to the largely increased settlement and the consequent addition to the duties of the live stock inspectors of the force, it will be necessary to immediately provide more veterinary staff sergeants qualified for this work. I am accordingly taking steps to induce several suitable men to join the force in the above mentioned capacity.

While in Winnipeg on my return journey I made arrangements with Dr. Torrance, of that city, authorizing him to undertake, in conjunction with Dr. Bell, provincial bacteriologist, an investigation into the nature and causes of the exceedingly fatal, recurrent, malarial fever which has for many years been causing great mortality in horses in certain districts of Manitoba and the North-west Territories.

In pursuance of the arrangement made last year between this Department and the United States Bureau of Animal Industry, Dr. A. G. Hopkins was, early in May, despatched to Great Britain as quarantine officer to submit to the tuberculin test cattle destined for export to this country. He had a very busy season, as will be seen from his report, and filled a trying and difficult position in a highly satisfactory and creditable manner.

During May an entirely new development in the import cattle trade demanded my attention. This was the introduction to the North-west Territories in considerable numbers of young cattle from Mexico, as also from Texas, Virginia and other southern states. As some of these cattle, particularly those from Mexico, were brought from south of the United States Texas fever quarantine line, I deemed it advisable to insist upon the production by all persons importing such cattle, of health certificates signed by officers of the United States Bureau of Animal Industry. As a further precaution, I issued instructions to our officers at western points on the international boundary, that all southern cattle should be carefully inspected by daylight, and that any showing signs of being infested with ticks should be refused admittance to Canadian territory.

This caution was necessary, because, while the ticks, which are the only source of contagion, could not possibly survive our northern winter, the disease might, if introduced during spring or summer, destroy thousands of cattle before the advent of cold weather.

No bad results followed these importations, which were, I understand, very satisfactory from a business point of view.

In dealing with this matter I was greatly helped by the officers of the United States Bureau of Animal Industry, who with ready courtesy furnished all necessary information on the subject, and in other ways rendered valuable assistance.

Owing to the rapidly growing importance of the live stock trade it became necessary to make arrangements for a more frequent and thorough inspection of western stock-yards and cars than could possibly be undertaken by Mr. Auger, whose time is very fully occupied in looking after this work in the east. Mr. C. W. Peterson, of Regina, was therefore, with your approval, appointed from July 1st inspector of live stock yards and cars on all lines west of Winnipeg.

During the summer I visited Montreal for the purpose of familiarizing myself with the conditions relating to the inspection of stock for export. These I found very satisfactory, with the exception of the stock-yards of the Canadian Pacific Railway Company, which are not at all suitable for the requirements of the trade. Were it not for the fact that the company in question promises to erect new and commodious yards at an early date, I would recommend that steps be taken to compel the immediate improvement of those now in use.

I also inspected the quarantine stations at Point Levis, St. John and Halifax, notes in regard to which, as well as to the other stations visited, will be found in that portion of this report devoted specially to the subject of quarantine.

While at St. John I inspected the new stock-yards of the Canadian Pacific Railway Company, which are very commodious and well adapted for dealing with the large export cattle trade now carried on from this port at certain seasons.

The Intercolonial Railway is also improving its accommodation to a considerable extent.

Going from Halifax to New Glasgow, I met there Dr. Townsend, who is in charge of the inspection work in connection with Pictou cattle disease, and Dr. Pethick, of Prince Edward Island, who was also this season engaged in dealing with this troublesome malady. I discussed with these gentlemen the best means of carrying on a thorough investigation with a view to the discovery of some more satisfactory method of dealing with this disease than that now followed.

In August I attended an important and successful combination sale of Shorthorn cattle at Hamilton, Ont. A large number of animals were sold, which all were previously tested by our officers.

I arranged to meet Drs. Stubbs and Tennant at Hamilton on this occasion, as I found it necessary to consult them in regard to some questions which had arisen in connection with the work of testing cattle for export.

During this month I also visited Windsor, Ont., where, in company with Dr. Orchard, our officer there, I examined the methods of inspection and quarantine of animals entering the Dominion from the United States.

My next visit was to Sarnia, where, with Dr. Brown, the officer of the department at that point, I made a careful inspection of the quarantine station at Point Edward.

At your request I had been for some time investigating the conditions under which our export cattle trade to Europe is carried on, with a view to ascertaining the reasons why American cattle are landed in Britain in better condition and with less damage than those from Canada. I visited Chicago in the beginning of September for the purpose of looking into the methods followed by the inspectors of the United States Bureau of Animal Industry at that place.

Dr. Dyson, the officer in charge at the stock-yards, was exceedingly courteous, and explained fully the system under which the inspection work of the bureau is carried on at this great central shipping point. As I have furnished a short special report on this subject, together with a large amount of valuable information collected from our inspectors and others, I need not here enter into details.

Leaving Chicago I proceeded to Minneapolis for the purpose of attending the annual meeting of the American Veterinary Medical Association, which was held during the first week of September. While there I had the pleasure of meeting Dr. Salmon, chief

of the Bureau of Animal Industry, and discussing with him many subjects of importance to the live stock interests of Canada and the United States. A large number of the most prominent veterinarians of America were present at this meeting, and many of the papers read and the discussions thereon were of the most interesting and valuable nature.

One paper which attracted much attention was that of Dr. Torrance, of Winnipeg, dealing with the peculiar disease of horses commonly known as swamp fever, which, as before stated, is being investigated on behalf of this Department by the essayist, in conjunction with Dr. Bell, Provincial Bacteriologist for Manitoba.

A similar investigation is being carried on by Dr. Wesbrook, State Pathologist, and Dr. Brimhall, State Veterinarian, for Minnesota, and as these gentlemen very kindly offered to give us the benefit of their researches, I accompanied Dr. Torrance to the state laboratory where we had an opportunity of acquiring much valuable information not only in regard to this disease, but also several others affecting live stock in the North-west. We were, fortunately, able to effect an arrangement whereby the results of the investigations carried on by our officers and by those of Minnesota will be mutually beneficial to those interested.

In furtherance of this idea I authorized Dr. Torrance to accompany Drs. Wesbrook and Brimhall to Fertile, Minnesota, where some cases of swamp fever were under observation.

Later in the season the Minnesota scientists had an opportunity of visiting Manitoba and seeing some cases there. I am satisfied that considerable benefit will result from this collaboration and that the investigation is likely to produce earlier and better results than would otherwise have been the case.

Before leaving Minneapolis I invited the members of the American Veterinary Medical Association to hold their next annual meeting in Ottawa. I have every reason to believe that the invitation will be accepted and that much good will result to the profession in Canada from the visit of this large and influential body of highly trained and intelligent veterinarians.

My next visit was to Regina, where various matters of importance were discussed with the Commissioner of Police, and where I also took up the question of the supervision of stock cars and yards with Mr. C. W. Peterson, our newly appointed inspector for the western division.

At Macleod I had an opportunity of meeting Dr. Burnett, chief veterinary officer of the North-west Mounted Police force, and of obtaining from him much valuable information as to the health and condition of stock in the range country.

From Macleod I proceeded to Cranbrook, B.C., where Dr. Bell, one of the officers in charge of boundary inspection, resides, and where I was desirous of obtaining some information as to the local conditions under which the work of this branch is carried on.

At Nelson I met Dr. Armstrong, who has charge of the inspection at that port and at Rossland, as well as at one or two outports on the boundary.

At Grand Forks I visited Dr. Richards, inspector for that district.

I regret to have to report that the conditions under which the inspection of stock crossing the international boundary in southern British Columbia is performed are exceedingly unsatisfactory. The ports of entry are far apart; few facilities for quarantining or even detaining stock are available, while the nature of the country, as a general rule, is such that veterinary surgeons can with difficulty carry on remunerative practice. The problem of furnishing capable inspectors at these scattered points is complicated by the changes constantly taking place in the routes of travel brought about by the construction of new lines of railway. This question is receiving my most serious consideration, and I hope to be able ere long to devise some means of overcoming the difficulty.

At Vancouver I visited Dr. Hart and Dr. Bland. Of these two gentlemen the former is one of the salaried officers of the department, while the latter has been for some years doing the work of stock inspection at Vancouver and other customs ports in the vicinity and obtaining his remuneration by the collection of fees.

I inspected the Canadian Pacific Railway stock yards and the facilities for the shipment of cattle by sea and found them fairly complete and satisfactory.

At Vancouver I met, by appointment, Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, and discussed fully with him the question of the control of animal diseases in that province. This matter has for some time been engaging my attention and I hope soon to lay before you a practical scheme defining clearly the relative duties and responsibilities of our officers and those of the Provincial Government.

On the return journey I stayed over at Calgary for the purpose of inquiring as to the conditions affecting live stock in that vicinity. I called on Superintendent Sanders of the North-west Mounted Police, who arranged that I should meet Veterinary Staff-Sergeant Hobbs, who does most of the work of this branch in the country tributary to Calgary. From him I obtained interesting, detailed information regarding various outbreaks of disease in horses reported from the Red Deer district. These outbreaks are dealt with under the heads to which they properly belong.

I found the stock-yards at Calgary altogether inadequate for the heavy shipping trade done at that point. This matter is, however, receiving attention at the hands of Mr. Peterson.

On reaching Regina I made arrangements with Commissioner Perry for the sending of veterinary inspectors to Red Deer to deal with certain matters urgently requiring attention in that district.

At Emerson, in company with Dr. Robinson our inspector there, I visited the quarantine station at Fort Dufferin. A report of this inspection will be found later on.

At Winnipeg I had an interview with Dr. Little, the resident salaried inspector of the department at that point. The conditions prevailing there, owing to the constantly increasing importations of live stock from the United States and to a new departure, viz., the shipment of cattle in bond via Pembina, N.D., to Boston and Philadelphia, for export to Europe, are of such a nature as to demand some reorganization of the inspection service.

A definite understanding is also necessary as to the relative responsibility of this Department and the provincial authorities for the control of animal diseases, other than glanders.

While in Winnipeg I inspected the Canadian Pacific Railway Company's stock-yards, which I found in very satisfactory condition.

I discussed with Mr. J. T. Gordon and Mr. H. Mullins, two of the leading operators, the whole subject of the export cattle trade, and obtained from them much useful information on this important question.

A visit paid to the provincial laboratory and an examination of the work being done by Drs. Torrance and Bell in their investigation of swamp fever was very interesting. While the exact nature of the malady has not yet been defined, much necessary preliminary work has been accomplished and the ground cleared for further and more exact research. A full report of the investigation from the pen of Dr. Torrance is furnished herewith.

As, owing to the time necessarily occupied in transit, pathological specimens forwarded for diagnostic purposes from the North-west have frequently been found, on arrival, to have undergone such changes as to render them utterly useless, I discussed with Dr. Bell the making of an arrangement whereby such specimens might be sent to him for examination instead of to the laboratory here. I am satisfied that such an arrangement would be of great advantage to the work of the branch.

During my absence in the west a very serious outbreak of hog cholera occurred in the county of Kent. I had, previous to my departure, arranged with Dr. Tennant of London to assume charge of any serious outbreak which might occur in western Ontario. Several other inspectors were also called in as soon as the extensive nature of this recrudescence of the disease became apparent. I visited the district early in October, and after consulting with the officers on the ground and careful consideration of the whole question, I decided that in order to protect those engaged in the hog industry in other parts of the Dominion as well as to enable us to deal effectively with the disease in the affected area, it was advisable to forbid the movement of live hogs into, within or out of the townships of Tilbury East, Raleigh, Dover East and West, Chatham, Harwich and Camden. This decision meeting with your approval,

an order to that effect issued on October 22. A special report on this disease will be found further on.

I have endeavoured in the foregoing pages to give a rapid general account of my own work since assuming the duties of your Chief Veterinary Inspector.

I now beg to present separate statements, as brief and succinct as possible, of the work done during the year just past, in connection with each of the various matters dealt with by the officers of this branch of your Department, accompanied, in some cases, by suggestions as to future procedure regarding them.

HOG CHOLERA.

This disease has for many years prevailed to a greater or less extent in the south-western part of Ontario, making its appearance from time to time however, not only in other parts of that province, but elsewhere in the Dominion.

The majority of these latter outbreaks, where not due to hogs imported direct from infected districts in the United States, have been traceable in one way or other, to the portion of Ontario already mentioned, where the conditions appear to be very favourable for the preservation and propagation of the contagion.

Among these conditions may be mentioned the climate, which is there comparatively mild. This mildness is, in itself, an important factor, as the germs are much more likely to retain their activity, than if the winter were more severe. It operates also indirectly, for the reason that warm housing not being an absolute necessity, the buildings used for swine on many farms in this district are of the most unsanitary character, damp, ill-drained and of such materials as to render it almost impossible to thoroughly cleanse and disinfect them.

Again, the fact that corn is the staple crop in this district has much to do with the spread of the disease, not only for dietetic reasons, but also owing to the fact that many farmers turn their hogs in the fields till late in the fall, a practice which is very favourable to the dissemination of the contagion.

In spite of the serious losses which have occurred in past years and the efforts which have been made to impress owners of swine with the importance of reporting every outbreak, many do not yet seem to have become fully aware of the danger of concealing the disease or of the folly of attempting to treat it by the use of quack nostrums and so-called secret remedies. In view of the great risk to which the hog-raising industry is exposed by the existence in Ontario of such a malady and of the liberal manner in which owners are compensated for animals destroyed by order of the Department, there is absolutely no excuse for such methods of dealing with it. It is my intention therefore to enforce strictly the provisions of the Animal Contagious Diseases Act against all persons concealing the existence of the disease, or attempting, contrary to the provisions of the said Act, to doctor up or dispose of affected animals.

A frequent cause of the spread of hog cholera exists in a practice followed by some of those engaged in the business of buying hogs for sale to packing houses. These men are in the habit of reselling to farmers any hogs which they find, after purchase, too small or too thin for packing purposes. In itself, this practice is perfectly legitimate, but in the case of hogs purchased in districts which may be described as permanently infected, it is found to be a very prolific cause of fresh outbreaks elsewhere.

As a rule, such outbreaks arise from some of the hogs in the shipment having been in contact, prior to purchase, with the disease in an acute form. Some farmers on the appearance of disease in their herds, instead of reporting to the department, immediately sell all hogs which have been in contact, but show no external signs of being affected. Such animals, are of course, very likely to develop the disease and to convey the contagion to others.

Again, one of the peculiarities of this malady is, that animals which apparently recover from mild attacks, seem able to harbour the germs indefinitely without apparent ill effects to their own health or even condition, or to those of other hogs kept with them. So soon however as such hogs are removed from their accustomed surroundings,

subjected to sudden changes of diet, placed under unfavourable conditions or brought in contact with hogs never previously exposed or habituated to contagion, they appear to become active agents in disseminating the disease. This, however unexplainable, seems also to be true of the hogs mentioned above, as having been in contact with these recovered cases, although themselves at no time noticeably affected. Strangely however both classes of these apparently immune animals are liable to fall victims to the acute outbreaks seemingly developed through their own agency. This latter phenomenon is probably due to reinfection with germs which have acquired greater virulence from passing through the systems of the freshly infected hogs. Without dogmatizing as to the exact manner in which the infection is carried, it is a fact that a considerable number of the outbreaks which have occurred during the past season in districts far removed from the original seat of infection, have been undoubtedly caused by animals showing no symptoms of the disease, in the early stages of the outbreak, although they themselves later frequently succumbed.

Hog cholera during the past year has been confined to Ontario. The most serious individual outbreak occurred in May, at Hickson, eight miles north of Woodstock, when 27 hogs died while 256 were slaughtered by order of the Department, the whole being the property of one man. In this, however, as in the majority of similar cases, the disease has been stamped out and is not known to exist elsewhere than in the county of Kent, where towards the end of August, a very serious outbreak occurred in the townships of Tilbury east, Raleigh, Dover east and west, Chatham and Harwich. A few cases also developed in the township of Camden.

I had been anxious for some months regarding this district for the reason that, while but few cases of the disease were reported in Kent, the majority of the recent outbreaks in other parts of Ontario were directly traceable to hogs brought from that county. I had, therefore, previous to my departure, arranged with Dr. J. H. Tennant of London to assume charge of any serious outbreak which might occur in western Ontario. In consideration of the number of animals affected and the rapid spread of the disease, Dr. Perdue of Kingsville and Dr. Orchard of Windsor were called in to co-operate with the local inspectors, Drs. Kime of Chatham and Thorne of Wallaceburg, all being under the general supervision of Dr. Tennant. Through the united efforts of these five officers the disease has gradually, in spite of a number of adverse circumstances, been brought under control, not, however, before a very large number of hogs have been slaughtered and cremated. I visited the district early in October and after careful consideration of the whole question, I decided that, in order to protect owners of hogs in other parts of the Dominion, as well as to enable us to deal properly with the disease in the affected area, it was advisable to place the townships already named under close quarantine. This decision meeting with your approval, an order to that effect issued on Oct. 22.

Dr. Higgins has, during the summer, devoted a good deal of time and attention to pathological work in connection with this disease. His services also have been very valuable in establishing the true nature of outbreaks reported to the Department as hog cholera. In many cases his examination of the specimens forwarded has rendered certain the existence of the disease. On the other hand he has frequently saved considerable outlay by demonstrating, that outbreaks suspected by veterinarians to be hog cholera were due to other causes.

I have found it necessary to insist upon the adoption of more thorough methods in the inspection of the carcasses of hogs slaughtered by our officers, as many animals showing no external symptoms, are found, upon post mortem examination, to be diseased. The compensation paid for such animals is, very properly, less than that paid for contact hogs, but the saving to the Department, while considerable, is not so important as is the lesson thus conveyed to owners that only by promptly reporting every outbreak and otherwise co-operating with our officers in their efforts to eradicate the disease, can they hope to effectually protect themselves from serious and repeated loss.

I have in contemplation certain other changes which, with your approval I propose to adopt in dealing with outbreaks of this troublesome and costly malady. So long as it exists in the Dominion, the important industries of breeding and feeding hogs will be

exposed to a constant and very real danger, a danger to the elimination of which every possible effort should be directed.

The following statement shows the counties, townships and districts in which cases of hog cholera occurred during the past twelve months, and the number of farms quarantined in each.

County.	Township or District.	No. of Farms quarantined.
Algoma	Sault Ste. Marie	1
Brant	Burford	2
Dufferin	Mulmer	4
Essex	Gosfield, S.	1
"	Sandwich, East and West	4
Kent	Chatham and Gore	90
"	Camden and Gore	3
"	Dover	18
"	Harwich	44
"	Raleigh	32
"	Tilbury, East	68
Lambton	Sarnia	1
"	Sombre	5
"	Warwick	1
Middlesex	Ekfrid	1
"	Flamborough, East and West	3
"	London	4
"	Mosa	1
"	Westminster	2
Oxford	Blandford	4
"	Norwich, North	1
"	Zorra	2
Peel	Chinguacousy	3
"	Toronto	2
"	Toronto Gore	1
Simcoe	Collingwood District	7
Welland	Bertie	1
"	Humberstone	1
"	Willoughby	5
Wentworth	Ancaster	1
		313

During the past twelve months compensation amounting to $31,456.39 has been paid for 9,919 hogs slaughtered, of which 6,112 were diseased and 3,807 had been in contact with diseased hogs.

TUBERCULOSIS.

The situation as regards tuberculosis is practically unchanged. During the year 1,277 head of cattle were tested for export to the United States by the officers specially appointed for that work, in accordance with the agreement made in 1901, between the Bureau of Animal Industry and your Department. Of these 72 head reacted to the test, and consequently were not exported.

The burden of this work falls almost entirely on the officers stationed in Ontario and Quebec, few animals being exported from the other provinces. Drs. Stubbs, Tennant and Moore have been kept very busy, while Dr. Higginson has also been frequently called upon.

A small number of cattle were also tested by officers of the Bureau of Animal Industry, before being allowed to enter United States territory.

Cattle for breeding purposes and for milk production, other than settlers' effects, entering Canada from the United States, when unaccompanied by satisfactory charts, have been quarantined and tested by our officers at boundary points. The number so dealt with during the year was 43.

Very little testing of grade or dairy cattle has been done this year; 389 head were tested in all, of which 83 reacted. As the results of this work in former years had not been found at all satisfactory, a circular on the subject, issued by the Department in December, 1901, contained a notice that no testing of cattle, except for export, would be done between March 1, and October 1. Since the latter date a few applications have been received, and as the regular officers have been fully employed, an arrangement has been reached whereby, upon an applicant stating the number of his cattle, and sending in the name of a reputable, qualified veterinary surgeon, the latter is furnished, free, with sufficient tuberculin to test the cattle in question, on condition that he reports to the Department the result of the test on charts provided for the purpose.

I would, however, strongly recommend the adoption, as soon as possible, of a system of permanently marking all animals reacting to the tuberculin test, when applied by officers acting under the authority of the Department.

The present method of dealing with these animals is very unsatisfactory.

The testing in Britain of cattle for export to Canada is fully dealt with in the report of Dr. Hopkins, who is in charge of that branch of the work of the Department.

I may say, however, that at the opening of the importing season last spring, Dr Salmon, chief of the United States Bureau of Animal Industry, notified me that he had instructed Dr. Geddes, his officer in Britain, to refrain from further testing in herds where twenty per c nt or more of animals tested had reacted. In accordance with the policy of mutual action agreed on between the two countries, I at once issued similar instructions to Dr. Hopkins. Lists of herds coming under this restriction were exchanged by these two officers from time to time during the summer, with the result that a considerable number of British breeders are now debarred from having animals tested for shipment either to the United States or to Canada.

In the early part of October it became necessary for Dr. Hopkins, after asking for and receiving instructions by cable, to announce to Canadian importers that cattle purchased from certain herds, would be subjected to a further tuberculin test in quarantine, after arrival in Canada.

These new departures gave rise to considerable newspaper discussion in Britain, the result of which will, I think, eventually prove of great benefit both to breeders and importers.

While dealing with this subject, it may be noted that although tuberculin is steadily gaining ground among intelligent breeders as the best means of diagnosis in the early stages of tuberculosis, and therefore as a most valuable agent in detecting incipient cases with a view to their segregation, recent experiments have thrown much new light upon what is, perhaps, its most important limitation. It has, of course, been long understood that there must, in the very nature of things, be a period of latency or incubation between the time when an animal becomes infected and the time when it will give a reaction to the tuberculin test. In 1899 and 1900, the Tuberculin Committee of the Royal Agricultural Society of England, carried on a series of careful experiments with a view to determining the length of the period in question. At about the same time, but quite independently, Drs. Nocard and Rossignol conducted a similar series of experiments in France, under the auspices of the Société de Medecine Vetérinaire Pratique. In both cases the results were practically the same, demonstrating that the period of incubation, while depending largely on the mode of infection and the size of the dose, varies in length from eight to fifty days.

This knowledge is most important to people desiring to maintain healthy herds, showing as it does, the necessity for the repeated testing of animals which have been in contact with those affected.

Experiments with a view to discovering whether or not, as claimed by Von Behring, tuberculin possesses the power of rendering cattle immune to tuberculosis, have, during the past year, been conducted by Prof. McFadyean, principal of the Royal Veterinary College of London. The results so far, do not furnish conclusive proof on the point although Prof. McFadyean thinks the outlook is reasonably hopeful.

The possible curative properties of tuberculin in incipient cases have also been the subject of considerable discussion. It is beyond dispute that a percentage of reacting

animals, especially if young and strong, eventually cease to react and never afterwards develop the disease. Whether recovery in such cases is due in any way to the use of tuberculin or whether the curative process is a natural one, is a point not yet settled. There is here an opportunity for experimental work of great importance to stock owners.

I trust that in the near future, I may be able, with your approval and the able assistance of Dr. Higgins, to inaugurate and carry on a series of experiments with the object of clearing up this important point.

Our knowledge of tuberculosis is even yet far from complete. The realization of this fact has a tendency to promote caution in adopting drastic measures for the eradication of the disease. The policy should be one of mutual improvement of our knowledge by the free exchange of the fruits of observation and experience between stock owners and veterinarians. One of the most certain results of such a policy would be the recognition by breeders of the fact, that the maintenance of tuberculous cattle is not nearly so remunerative as that of sound animals. In order to eradicate the disease, indiscriminate slaughter is by no means necessary. So long as an animal, whether male or female, is not breaking down from generalized tuberculosis, or suffering from tuberculosis of the generative organs, its progeny can, with proper precautions, be reared absolutely free from disease.

Exception should also be made in the case of cows suffering from tuberculosis of the udder or of the glands in the mammary region as the element of danger in these cases, is too great to be trifled with. All such animals should be slaughtered.

The experience of Mr. Edwards, M.P., in our own country, has proved conclusively that, under the system inaugurated by Prof. Bang, of Copenhagen, perfectly sound calves can be reared from diseased sires and diseased dams. With proper care and patience, the transformation of a badly diseased herd into one absolutely sound is only a matter of time.

The theories advanced by Prof. Koch at the British Congress of tuberculosis last year, have not only not been adopted by other noted scientists, but have been utterly confuted by the results of careful experiments conducted by eminent pathologists both before and since his pronouncement. The mere fact however, of the possibility of such a difference of opinion existing between men of the highest scientific attainments, should have a tendency to check irrational dogmatizing among people of vastly inferior knowledge.

GLANDERS.

I regret to have to report that, as usual, a considerable number of cases of glanders have been dealt with by our inspectors during the past year. In the North-west Territories there have been altogether 112 horses killed. The outbreaks, however, have been limited in extent; in the majority of cases, one or two horses only being affected.

I am glad to say that very few cases have been observed in the range country, most of the diseased animals having been the property of settlers in the farming districts.

The disease appears to be more prevalent in eastern Assiniboia than elsewhere, although a considerable number of cases have been reported lately in the Red Deer country. This latter outbreak is said to have been caused by an importation of horses from Montana in the latter part of 1901.

One outbreak was reported last winter by Dr. Armstrong our officer at Nelson, B.C. Nine horses were destroyed at Slocan, and the disease appears to have been completely stamped out. This outbreak is stated to have been due to horses taken in from Alberta.

As in former years the disease has prevailed to some extent in Manitoba, but owing to the fact that it is there dealt with by the provincial authorities, we have no official record on the subject.

At Hamilton, Ont., three cases were detected in the early spring. The affected animals were destroyed on my advice, but this outbreak was not dealt with officially by the Department.

In the latter part of August I became aware of the existence of a number of cases of glanders in the city of Ottawa and in the surrounding country. Hitherto this disease, always in Ontario and generally in Quebec, has been left to the care of the provincial authorities, but owing to the serious and extensive character of this outbreak, I deemed it best to take prompt and effective measures for its suppression. Some few horses had been killed by officers of the city police department, previous to my being notified of the existence of the disease. From the time that I assumed charge of the outbreak, no animals were killed except by the orders and under the supervision of one or other of the veterinary inspectors of the Department.

Up till October 31 sixteen horses were destroyed by our order, and their carcasses properly disposed of either by burning or by deep burial.

Owing to the large number of cheap and inferior horses owned in Ottawa and Hull, the unsanitary conditions under which many of them are kept, and the ignorance or indifference of owners, our inspectors have experienced great difficulty in carrying out the provisions of the law. A considerable number of the animals dealt with were found in Hull and in its vicinity on the Quebec side of the river. Where any doubt existed as to the nature of the disease, the animals were tested with mallein for the purpose of confirming the diagnosis. All horses which had been in contact with animals actually affected were also tested.

Hitherto it has been the general practice of the department to order the destruction of horses reacting to the mallein test, whether showing clinical symptoms or not.

Experiments carried on during recent years in different parts of the world have shown that these extreme measures are by no means necessary. Mr. Wm. Hunting, F.R.C.V.S., of London, undoubtedly the greatest living authority on glanders in the English speaking world, is satisfied that animals not showing clinical symptoms, are not only non-infective, but that nearly fifty per cent of them, on being re-tested, cease to react and eventually become permanently cured of the disease. As a conclusive proof that the cure in such cases is complete, it may be stated, that when these ceased reactors die or are killed, although the lesions of glanders are invariably found in the lungs, it is impossible to obtain therefrom a culture of the bacillus mallei, or to transmit the disease to other animals by direct inoculation with the material obtained from these lesions.

This is in accord with my own experience, as also with that of other veterinarians in Manitoba and elsewhere on this continent.

Where, therefore, no clinical symptoms are shown our officers do not now order the animal to be destroyed, but serve the owner with a notice prohibiting the selling or otherwise disposing of the suspect, so that it may be re-tested at intervals of two or three months. Animals reacting for the third time to the test will be destroyed, as in such cases there is little hope of their becoming cured. On the other hand, those which cease to react will eventually be discharged from quarantine although they will for some time thereafter be kept under observation.

As no compensation is paid by the Department for horses destroyed as being affected with glanders, it is unreasonable to kill an animal which has what may be termed an even chance of recovery.

PICTOU CATTLE DISEASE.

There is a slight increase in the number of cases of this disease as will be seen from the report of Dr. Townsend, the officer in charge of the work of inspection in the affected district. This malady which is a specific cirrhosis of the liver, has received considerable attention from the officers of this branch of your Department for many years back, but as yet no definite results have been attained, the true nature of the disease being still a mystery, while practically nothing has been learned as to its cause. Lack of knowledge on this latter point renders the adoption of effective means of prevention impossible, while treatment so far has apparently been quite useless.

For some time back Dr. Gilruth, principal veterinary officer for the government of New Zealand, has been investigating a disease of a similar nature which prevails in th

district of Winton, Southland, N.Z., and which is known as Winton disease. This differs somewhat from the Pictou disease inasmuch as while affecting both species of animals, it is more frequently seen in horses than in cattle.

Dr. Gilruth is inclined to the belief that the liver is not, as has been generally supposed in Canada, the primary seat of the disease, but that the condition of that organ is due to an auto-intoxication from some toxic agent produced by fermentation or other abnormal digestive process.

He has been unable as yet to demonstrate the initial cause of the poison, which he thinks will prove to be some micro-organism belonging to the vegetable kingdom.

Should this hypothesis prove to be correct, it may possibly justify the belief entertained by many of those most familiar with the subject that the presence of the disease in Pictou county is due in some way to the Ragwort 'Senecio Jacobea' which, they state, is found only within the limits of the affected district. This plant may at some period of its growth or while in process of desiccation be the habitat of an organism such as that, the existence of which is suspected by Dr. Gilruth. Whatever the result of Dr. Gilruth's investigations may be, it is to be hoped that some more definite information regarding Pictou cattle disease may be obtained in the near future, as the present method of dealing with it is unsatisfactory to a degree.

It is difficult to see why the department should be called upon to compensate owners of animals affected with this disease. There is absolutely nothing to show that it is of a contagious nature, in fact the burden of proof is to the contrary.

Dr. Pethick, of Prince Edward Island, who has recently taken a special pathological course at McGill University, spent some six weeks during the past summer in eastern Nova Scotia in investigation work on this disease and in preparing and forwarding specimens of the various organs to the pathological laboratory here. This was done preliminary to an investigation as searching and thorough as can be made.

Without in any way discrediting the efforts of previous investigators, the hope may be expressed that with the more perfect scientific knowledge of the present day and the experience as well as the mistakes of others to guide his course, Dr. Higgins may be able to successfully demonstrate the true nature of this disease and so point the way to the adoption of intelligent means for its control.

Appended hereto is the special report of Dr. Pethick on his work in the affected area.

ACTINOMYCOSIS.

This disease, judging from the reports of our inspectors, is not so frequently seen as formerly among Canadian cattle. Actinomycosis, properly so-called, can scarcely be termed a contagious disease, as it is generally produced in animals by the consumption of grass or other herbage on which the fungus giving the malady its name has developed or found lodgment. The alarm which prevailed regarding it during the early years of the last decade has been dispelled by the recognition of the fact that it is very seldom transmitted from animal to animal, and scarcely ever from animal to man. Such cases as occur in human beings are, according to Nocard, generally caused by the use as food of uncooked vegetables.

Repeated experiments have shown that it is difficult to transmit the disease even by direct inoculation.

In Chicago, where at one time the greatest excitement prevailed regarding actinomycosis, the United States inspectors no longer regard as dangerous the use for food of the flesh of animals having local lesions about the head only, although the carcasses of those in which the disease is generalized are very properly condemned.

All leading pathologists concur in the view that actinomycosis proper is not a dangerous malady, nor one against the spread of which any elaborate precautions are necessary.

An important scientific discovery has, however, been recently made by M. Lignières, a prominent pathologist of Buenos Ayres. Careful investigation by this gentleman has shown that, closely resembling actinomycosis and hitherto confounded with or mistaken

for it, there exists a much more virulent and communicable disease to which he has given the name actinobacillosis. This disease, in which the lymphatic glands are affected to a far greater degree than is the case in actinomycosis, is due to a microbe apparently closely related to the Pasteurellæ and differing widely from the streptothrix, long known as the cause of the more familiar malady.

Actinobacillosis is prevalent in Argentina, where it spreads very rapidly, sometimes affecting over fifty per cent of the cattle in herds where it secures a foothold.

M. Nocard has also, since the discovery of M. Lignières, detected it among cattle in France.

We have as yet no evidence of its existence in Canada, and it is to be hoped that none will be found. I am, however, arranging to provide Dr. Higgins with as many specimens as possible of diseased tissue from animals affected with what we know as actinomycosis with a view to discovering whether or not we can justly lay claim to freedom from this newly recognized malady.

No statement has as yet been made as to the effect, if any, on this disease of the iodide of potassium treatment frequently so efficacious in actinomycosis.

ANTHRAX.

A few isolated cases of anthrax have been reported during the past year from various parts of the Dominion, but I am glad to be able to state that no serious outbreak of the disease has occurred.

In every instance where its existence was detected prompt and stringent measures were adopted for its control. Carcasses and debris were either burned or buried with such precautions as to ensure the destruction of the bacilli and the infinitely more resistant spores, while all other needful steps were taken to prevent the dissemination of infection.

The infected area at Swift Current, in Assiniboia, where, it will be remembered, a very serious outbreak occurred last year, was kept closely quarantined until October 10, when, no fresh cases having appeared, it was officially released.

This ground was twice burned over, and it is to be hoped that no recrudescence of the disease will take place.

At the meeting of the Western Stock Growers' Association, held in Macleod last April, I took occasion to impress upon the ranchers the importance of properly disposing of the carcasses of all animals found dead on the range, especially when no definite cause of death could be assigned. The destruction of such carcasses, while undoubtedly in many cases a task of considerable difficulty, is most important, particularly in districts where anthrax and black quarter are known to exist.

No preventive inoculation was undertaken by our officers, but during the year 450 doses of anthrax vaccine were supplied through the department to veterinary surgeons and stock owners. This was effected under an arrangement made last year with the Pasteur Vaccine Company, of Chicago, whereby a discount of $33\frac{1}{3}$ per cent is secured to Canadian purchasers. This vaccine is evidently of satisfactory quality, as no complaints have reached the department from those using it.

I hope, however, that we may, in the near future, be able to adopt the method followed by the United States Bureau of Animal Industry and, by manufacturing this and similar agents at our pathological laboratory, be in a position to furnish them to stock owners either free or at a merely nominal cost.

BLACK QUARTER.

A considerable number of cases of black quarter have been reported, principally from the North-west Territories and Manitoba, although a few small outbreaks have also taken place in Ontario and Quebec.

The mortality from this disease is, however, yearly decreasing on account of the rapidity with which the preventive inoculation of young cattle is growing in favour with stock owners.

The vaccine, the cord form of which is now generally preferred, is furnished through the department on terms similar to those described in the case of anthrax and at a similar reduction in price.

A great saving to stock owners would, however, be effected by having it manufactured in and supplied direct from our own laboratory, and I trust that we may soon be able so to arrange matters as to make this possible.

During the year 7,580 doses were supplied to applicants, either directly by the department or through our officers in the North-west.

VERMINOUS BRONCHO-PNEUMONIA.

Many of the outbreaks reported to the officers of the department as hog cholera, prove on investigation to be verminous broncho-pneumonia. This disease is very prevalent in Ontario and appears to be on the increase, particularly where hogs are kept under unfavourable dietetic and hygienic conditions.

Where proper attention is given to the feeding and housing of hogs it is unlikely to occur and, broadly speaking, may in the majority of cases be attributed to neglect. While not of nearly so serious a nature as hog cholera, it is much more widespread, and although in its milder form, it may not cause death, it is a source of great and needless financial loss to owners of hogs.

Hogs infested with worms, whether in the bronchial tubes, the lungs or the intestines, are always more or less unthrifty and, therefore, unprofitable.

While on this subject, I would direct attention to the statements in the report of Dr. Higgins as to the frequency with which these undesirable and unnecessary parasites are found in the pathological specimens forwarded to him for examination.

MANGE IN CATTLE.

The history of mange in cattle during the past year has been very similar to that of former seasons since its first appearance in the range country. It prevailed to a serious degree during the winter, but disappeared almost entirely with the advent of warm weather, only to reappear in the fall, although not yet to any considerable extent. In accordance with the terms of the resolution adopted at the last annual meeting of the Western Stock Growers' Association (see page 72), the majority of the cattle owners are looking closely after the treatment of affected animals. Where it is evident that proper measures are not being adopted, the officers of the North-west Mounted Police compel owners to take up and treat their cattle.

Treatment by hand is, where possible, preferable to dipping, although with favourable conditions, the latter is also very satisfactory.

Affected animals are not allowed to be shipped for sale, export or otherwise. One exception to this rule, viz., a car-load sent direct to Calgary for slaughter, may be noted in the report of the Commissioner of the North-west Mounted Police.

MANGE IN HORSES.

I regret to have to report the reappearance of mange in horses, which is now prevalent to some extent in several bands in the High River district.

Early last spring some cases were reported at Gleichen. These were dealt with by the North-west Mounted Police. No more was seen of the disease until the month of August, when it was detected in the High River district by Staff-Sergeant Hobbs.

A careful inspection of all the horses likely to have been in contact was ordered and all those affected or suspected have been placed in quarantine.

This disease prevailed to a considerable extent among horses in the North-west Territories some years ago, but had practically disappeared, although an occasional case was reported, until last spring, when, as already mentioned, it again showed itself. On the present occasion it has doubtless been imported from Montana.

SHEEP SCAB.

Very few cases of sheep scab have been reported of late. One suspected outbreak of the disease was dealt with in the county of Ontario in March last. All necessary precautions were taken and the suspected premises were released from quarantine on August 1.

In June last a small flock of sheep were quarantined at Valcartier, Quebec. The affected sheep were dipped twice and the quarantine has not yet been removed from the premises.

In the North-west Territories the disease was detected early in the year in a small band of sheep imported from Utah to Stirling, Alta. The affected animals were promptly subjected to treatment, with the result that the disease was completely stamped out. Immediately on this outbreak being reported, orders were issued that all sheep crossing the boundary into western Canada should be very closely inspected, and, if necessary, detained for a period sufficiently long to ensure their freedom from disease.

In September I was notified by Dr. Knowles, State Veterinarian for Montana, of an intended shipment of sheep from that state to Alberta. Acting on his advice, these sheep were held and very closely inspected but no evidence of disease was detected among them.

At present, so far as is known to this department, no sheep scab exists in Canada

SWAMP FEVER.

For many years past, in fact ever since settlement first began, there has been known in the Red River Valley a peculiar and very fatal disease of horses. Its exact nature has not even yet been decided, although it has long engaged the attention of stock owners and veterinarians in the districts, now widely extended, where it is most prevalent. It is a disease of low lying and swampy country, and is therefore popularly known as swamp fever, although it has been called by various names, such as surra, progressive pernicious anæmia, low fever, typhoid fever and malarial fever. This last is undoubtedly the most appropriate, although its malarial origin has not yet been clearly proved.

It generally makes its appearance in late summer or early fall, few fresh cases being observable between December and the latter part of July. Its onset is most insidious; the first three or four exacerbations, being slight and of short duration, are frequently overlooked by the owner, and in this way the disease gets a firm hold of the system before professional advice is sought or treatment adopted. Ordinary cases livelfrom two to four months after seizure, although, under favourable conditions, life may be prolonged to a much greater extent. The most prominent symptoms are emaciation, at first gradual, but becoming much more rapid as the disease progresses, œdematous swellings of the abdomen and limbs, constantly increasing pallidity of the visible mucous membranes on which also petechical spots are occasionally seen, a peculiar soft flat pulse which is in itself almost diagnostic, and most important of all a periodical rise and fall of temperature ranging from normal to 105 .

The appetite, though sometimes capricious, generally remains good until within forty-eight hours of the end. As the disease progresses there is frequently noticeable a lack of muscular control, but this symptom is not constant, and is, I think, due more to general weakness than to any specific cause.

The action of the bowels remains normal throughout, but there is frequently an increased flow of urine particularly in the latter stages of the disease. Recovery is, in my experience, very rare, although I have seen several animals rally under steady treatment and regain a full measure of strength and vitality. Occasionally a case will appear to improve, and hopes of recovery may be entertained, only to be destroyed by a sudden relapse leading to a fatal termination.

There is no evidence that the disease is contagious.

Post mortem examination reveals the muscular tissue almost bloodless; what little blood is to be seen in the vessels is pink rather than red, owing to the diminution and disintegration of the red blood corpuscles. Yellow gelatinous deposits are also found

among the muscles, especially in the pectoral region. The lungs are anæmic, but otherwise apparently normal. The liver is frequently enlarged while its tissue is soft and friable. The spleen is small, friable and light in colour. The kidneys are often somewhat enlarged but flabby and easily broken down, while pus is sometimes present in these organs, upon which also fatty deposits frequently occur. The bowels are pale and flaccid and not infrequently show on the mucous surface large petechial patches of a brownish colour. The muscular tissue of the heart is abnormally soft, and deposits of fat are generally to be seen on this organ. Greenish clots are almost invariably present in the heart, and the large vessels leading from it, and on the lower aspect of such clots is a thin layer of pinkish coagulum, which on examination proves to contain red corpuscles, many of them broken down.

Treatment has hitherto been of little avail, almost every agent in the pharmacopæia having been called into requisition with negative results. The treatment recommended for surra by Dr. Lingard, chief of the civil veterinary service in India, has of late years been adopted by some veterinarians. This consists of a long continued course of arsenic, beginning with a dose of four grains twice daily, working gradually up to eight or ten grains, continuing the maximum dose daily for a week and then gradually reducing the dose until four grains is again reached. This course continued for a long period when combined with mineral and vegetable tonics, and, if possible, change to high dry ground and generally healthy surroundings, has been perhaps more satisfactory than any other yet tried.

The mortality from this disease is in some districts simply appalling, many settlers having been completely ruined by its ravages among their horses. Fortunately there are many parts of the country where it is entirely unknown, and many other localities where only an occasional case is met with.

Its investigation has until this year been left almost entirely to private effort. Two years ago the government of Manitoba made a grant of $260 to which was added a small sum by the veterinary association of the province. This money was carefully expended by Dr. Torrance, who, in conjunction with Dr. Bell, Provincial Bacteriologist, was chosento conduct the work, but it of course proved altogether inadequate for the purpose for which it was intended.

With your approval I have this year arranged with the gentlemen already named, to make a thorough investigation which has now been in progress for some time. The report of this work furnished by Dr. Torrance will be found most interesting and instructive.

The disease has unfortunately been frequently confounded, not only by laymen, but by many veterinarians, with various forms of influenza, which latter malady has been more or less prevalent in Western Canada for the last ten or twelve years. Where the diseases are co-existent, as they undoubtedly are in several districts, there is some excuse for this confusion, but there is little real resemblance between them, and any one familiar with the so-called malarial fever cannot well mistake it for anything else.

It is to be hoped that the researches now being carried on will be the means of not only determining the true nature of this destructive malady, but of discovering a method of dealing with it which will put an end to the serious losses which it has hitherto caused.

QUARANTINE STATIONS.

During the summer I have inspected all the important animals quarantine stations throughout the Dominion, and beg to report thereon as follows:—

Point Lévis, Que.—This is in many respects an ideal quarantine station, and its management reflects great credit on Dr. Couture and his staff. During the year a number of improvements have been made, and the buildings are now in better condition than ever before, while the roads have been put in good repair, and a system of lighting has been introduced.

It is somewhat of a disadvantage that animals, after being landed must, in order to reach the quarantine, be driven for a considerable distance over the public highway.

While every precaution is taken to prevent possible contact with other live stock I think it advisable that steps should be taken to remedy this state of affairs. Several plans have been suggested, and I am giving the matter my most careful attention.

St. John, N.B.—No proper quarantine station exists at this port. A small plot of ground and several buildings on the outskirts of the city are held under lease by the department. This station also, can only be reached by driving the animals from the ship through the streets.

During my visit, I examined a considerable number of properties, with a view to the location of a permanent quarantine station which, owing to the rapidly growing importance of St. John as a winter port, will probably be more necessary in the future than in the past.

Dr. Frink, our officer there, is deeply interested in the improvement of quarantine facilities, and in consideration of the number of cattle now exported I would recommend that he be given authority to employ a suitable man to perform the duties of caretaker at the quarantine station, and to assist in the inspection and marking of cattle about to be shipped.

Halifax, N.S.—The quarantine station here is also somewhat unsatisfactory, inasmuch as it is situated on the Dartmouth side of Halifax harbour, and it is necessary to convey animals some twenty-five miles by rail from the deep water terminus, round by Windsor Junction in order to reach it without using the public highway. The buildings are also old and in bad repair. Very few animals are at present quarantined at Halifax, but as accommodation may be required at any time for stock landed from Europe or from the United States, I would strongly urge that a small property be purchased or leased on the railway line close to the city, and that a suitable building be erected thereon. The sale of the present grounds and buildings would somewhat lessen the expenditure required for this purpose.

Dr. Jakeman the officer in charge agrees with my views on this matter.

Windsor, Ont.—There is no proper quarantine station at this point, and although the number of animals dealt with is comparatively small, I would recommend that a building similar to that erected by the department at Niagara Falls should be provided in a location suitable for the purpose.

Dr. Orchard the officer in charge does his best to provide suitable quarantine facilities, but is heavily handicapped in the performance of his duties, by the want of proper accommodation.

Point Edward. This I found to be one of the best and most suitable of the quarantine stations under the control of the Department. While it does not at all compare with the station at Levis, in other particulars, it has the great advantage of being so situated as to allow of the unloading of stock direct from the cars into the grounds. The buildings on this property are solid, substantial and for the most part in excellent repair. This is no doubt largely owing to the fact, that a thoroughly reliable caretaker resides upon the grounds, and is thus enabled to keep a watchful eye on the property of the department. The accommodation is of course, largely in excess of what has been required, since the removal of the ninety days' quarantine between Canada and the United States, but as it co ts comparatively little for maintenance, I would strongly urge its retention by the Department, as under certain circumstances, such a station might be found exceedingly useful.

Emerson.—This station consists of a number of buildings known as Fort Dufferin, and formerly used as barracks by the British North American Commission. It is situated on lots Nos. 31 and 33, in the parish of Ste. Agathe, comprising some 220 acres of land partly covered with brush and scrub. The buildings are all more or less in need of repair, and are apparently used by the caretaker for ordinary farm purposes, a considerable number of horses, cattle and pigs being kept on the premises. While this station doubtless served a useful purpose in its day, it is not adapted for the present needs of the Department. It is some three miles from a railway station, thus rendering

it necessary to convey for that distance over the public highway the occasional pig or cow, which under the present regulations may have to be subjected to quarantine for a few days. Even when reached it is not a quarantine station in any sense of the word, but partakes more of the nature of an ordinary farm. Extensive repairs will be required immediately if the buildings are to be preserved from total ruin. I would therefore recommend that the whole property be leased for a term of years, provision being made for cancellation of the contract should the Department at any time find it necessary to reoccupy it. A small building erected in proximity to the railway at Emerson, or even at Winnipeg, would serve every purpose during the continuance of the present regulations, while the annual cost to the Department would be very much less than at present.

Some definite arrangements should be made as to points where animals imported from the United States might be properly inspected and quarantined. At the present time importers are in the habit of presenting themselves at any customs port along the boundary and demanding inspection and quarantine facilities. While owing to the large influx of settlers it may be advisable to remove all possible obstructions to the free passage of live stock into the west, the conditions in eastern Canada are not of such a nature as to render restriction to definite ports of entry a serious grievance. I would recommend therefore, that there should be selected, in addition to the stations at Sarnia, Windsor and Niagara Falls, one or two points on the St. Lawrence river and one or two points on the boundary between Quebec and United States territory. These, and the possible addition of Yarmouth, N.S., with existing stations, would be quite sufficient for all practical purposes. Such an arrangement would simplify and render much more effective the quarantine service.

I have the honour to be, sir,

Your obedient servant.

J. G. RUTHERFORD,
Chief Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 16.

REPORT OF THE PATHOLOGIST.

(Chas. H. Higgins, B.S., D.V.S.)

Ottawa, October 31, 1902.

Sir,—I have the honour to transmit this my report as Assistant Pathologist to the Department of Agriculture, covering my work from November 1, 1901, to June 30, 1902, and as Pathologist from July 1 to October 31, 1902.

During the first part of this period quarters for the conducting of the laboratory work were furnished at the Royal Victoria Hospital in Montreal, which quarters were occupied up to the time of the completion of the pathological and bacteriological research laboratories of the medical faculty of McGill University, at which time one of these newly equipped rooms was placed at my disposal. These quarters proved very convenient for the work in hand though the distance from the University to the Experiment

Station at Outremont, where all of the experimental animals were kept made it difficult to systematically pursue original investigations.

In April, owing to the concentration of the work of the Veterinary Branch of the Department, I was transferred to Ottawa from Montreal, and have since that time been engaged in equipping the Biological Laboratory, temporary quarters for which have been furnished in an office building on Queen street, situated in the heart of the city. It is expected that within another month we will be occupying our new and commodious laboratory buildinga tt he Central Experimental Farm, which is especially designed and equipped for the thorough investigation of the many and varied questions concerning the control and prevention of contagious diseases of animals as seen in the Dominion.

Aside from the laboratory experiments, there have been tested by me with tuberculin 156 head of cattle with 16 reactions, the majority being for export to the United States. Assistance has also been rendered in controlling the outbreak of glanders in Ottawa, when such aid did not interfere with the routine work connected with laboratory investigations.

DO ELECTRICAL CURRENTS OF HIGH FREQUENCY EXERT A CURATIVE INFLUENCE IN TUBERCULAR INFECTIONS?

It was suggested by Dr. G. P. Girdwood, shortly after the meeting of the British Congress on Tuberculosis, at which time Dr. Chisholm Williams read a paper upon the curative effects of such treatment in cases of tuberculosis in the human, that experiments be conducted on guinea-pigs, to determine what, if any effect was produced by the use of these particular electrical currents in tubercular infections. I was unable to attend to the matter immediately, but during the month of February prepared the preliminary animals from which the infective material was obtained. The carefulness with which this preliminary work was conducted subsequently proved of little value, it being impossible to complete the work on the original plan laid out, namely, to determine by cultures from the animals treated and untreated, what, if any change the bacilli had undergone, both as regards their pathogenesis and their cultural characteristics. Though these experiments as laid out were not fully completed, the work accomplished indicates that there was a decided change exerted both in the duration of the disease and upon the vitality of the animals treated.

In conducting these experiments the necessity of having data strictly comparable was ever in view and in their pursuit the treated and untreated animals were placed under as nearly identical conditions as it was possible to obtain. The animals used were taken from the breeding pens, all being in a perfectly healthy state. They were not as large as one would wish for such experiments, it being conceded that in testing the virulence of varieties of tubercle cultures it is essential to employ guinea-pigs weighing 800 grammes or thereabouts. While these experiments are not, strictly speaking, a testing of virulence, but of creating through their use an attenuation or destruction of the tubercle bacillus within the system of the animal, through the use of the electrical currents in question.

The source of the material with which the animals were inoculated was a tuberculous steer condemned for beef purposes at a Montreal abattoir. Nodules from the pleura costalis were used on a series of four guinea-pigs, one of which later furnished the material for the animals that were placed under observation and electrical treatment. The guinea-pig furnishing the material for the inoculation of all observation animals died of a generalized tuberculosis thirty days after infection. The three other guinea-pigs inoculated on the same date with the material in question, died in 32, 33, and 35 days respectively, and in each case a generalized tuberculosis was revealed at the autopsy. The method of inoculation in all of the animals above referred to was subcutaneous, a pocket being formed in the flank region by drawing up a fold of skin, cutting it across, and, with a small blunt instrument, tearing away the connective tissue; thus opening a space sufficiently large to admit a piece of tuberculous tissue about one-eighth inch cube.

As is already stated nodules from the pleura costalis were used on the first four animals, while in the inoculation of the twelve selected for the experiments here recorded,

portions of the liver were inserted in the subcutaneous pockets formed. These twelve animals were kept together in a large cage up to the time of the commencement of the treatment. Two of these animals died from septicæmia within a week from the date of inoculation, a third pig died seven days after the commencement of the treatment (the seventeenth day of the disease), from rupture of the rectum and subsequent peritonitis, occasioned by an accident in taking the temperature.

The above is a brief statement of the source of the material, together with that of the animals and their mode of preparation for the experiments in hand.

On the tenth day of the disease (March 14, 1902), they were taken for their first treatment to the Royal Victoria Hospital where they were subsequently quartered during the entire time of observation. At the commencement of the treatment the guinea-pigs were divided and kept separately, but not isolated in individual cages, there simply being a division of the treated from the untreated. The treatment consisted in exposing the animals for ten minutes daily to the effects of the electrical currents. After a few days treatment the daily exposure was increased to twenty minutes, the time being divided into ten minute intervals at 9.30 a.m. and 5.30 p.m. The manner of making the exposure was very simple. A box was constructed with a tin bottom and a slat top, the height being such that an animal could not get his feet out of contact with the tin bottom by crowding. Over the top of this box was placed a piece of sheet lead of sufficient size to completely cover the animals inclosed, the arrangement being such that this sheet was supported a sufficient distance from the backs of the animals to prevent accidental actual contact. The two poles of the electrical apparatus were connected, one with the tin bottom of the box and the other with the sheet of lead covering the animals. All animals were in this manner equally exposed to the effect of the electrical currents. The weights of all the animals were taken once daily, and the temperatures of those under treatment were taken in the morning and in the afternoon previous to their exposure, while the temperature of the untreated was taken but once daily and then in the morning. Both treated and untreated animals received at all times similar food materials and the same attention was observed in the cleansing and disinfecting of their respective cages.

CLINICAL OBSERVATIONS OF THE TREATED ANIMALS.

The variations in the temperature were marked and conform to variations noted by Dr. Chisholm Williams in his experiments upon the human being. The temperatures of all these animals were normal or slightly raised in the morning, with a rise in the afternoon varying from 1·0 to 2·2 degrees F. As the treatment progressed there was also an elevated temperature in the morning above the normal, but in few instances only was it higher than the point reached in the afternoon of the same day. In these temperature elevations while the variation between the morning and evening was considerable it is noted that there is a gradual temperature curve which first ascends then gradually recedes, but in no instance did it approach the normal temperature or that which was constant before the commencement of the exposure of these animals to the electrical currents. The continued manifestation of a febrile condition cannot be attributed to the electrical treatment the animals were receiving, for it is but natural to have this elevated temperature in acute tuberculosis; but the rise occurring constantly, eight hours more or less after exposure to a certain form of treatment, is unusual and it is to this rise that attention is particularly drawn. The weights of these animals fluctuated in a somewhat similar manner to their temperature. After inoculation during the ten days prior to the commencement of the treatment the weights of these animals decreased. During the first few days of exposure to the currents of high frequency the weights of the animals continued to fall. This fall was gradual, being followed by a gradual rise which in every case attained its maximum on the eighth day of treatment or the eighteenth day of the disease. Reference to the table will give detailed information as to the fluctuation in weights, also variations in temperatures, together with the number of days they lived.

SESSIONAL PAPER No. 15

TABLE OF WEIGHTS AND TEMPERATURES OF TREATED GUINEA PIGS.

			Designation of Animals.									
			15		16		18		19		20	
			Temp.	Wt.	Temp.	Wt.	Temp.	Wt.	Temp.	Wt.	Temp.	Wt.
At inoculation				357		378		320		308		270
1st	day	A.M.		360		400		310		307		262
2nd	"	"		355		405		305		310		256
3rd	"	"		355		382		310		310		260
4th	"	"		355		377		297		320		260
5th	"	"		355		380		300		315		260
6th	"	"		355		377		305		310		260
7th	"	"		355		375		310		310		265
8th	"	"	103·2	360	103·3	375	102·2	315	102·8	325	103·	265
9th	"	"	103·	350	103·2	375	102	305	103·	325	103·	260
10th	"	"	103·	345	103·	372	102·	300	103·2	327	102·	220
11th	"	"	103·	305	102·4	335	101·6	270	102·6	270	103·4	
	"	P.M.	103·6		103·6		103·4		104		103·4	
12th	"	A.M.	103·4	300	103·	310	102·8	255	102·4	260	102·2	210
	"	P.M.	103·		104·		104·4		103·2		103	
13th	"	A.M.	103·2	295	102·2	320	103	250	102·1	245	102	220
	"	P.M.	104·2		103·4		103·4		104·2		103·	
14th	"	A.M.	103·	295	103·6	310	102·8	255	102·4	250	102·6	205
	"	P.M.	105·		104·		103·4		103·8		103·4	
15th	"	A.M.	103·	290	103·4	320	102·6	250	102·	245	102·4	200
	"	P.M.	104·6		104·		103·4		104·4		103	
16th	"	A.M.	103·	285	103·	305	102·6	255	102	240	102·2	200
	"	P.M.	104·6		104·6		104·		103·		103·4	
17th	"	A.M.	104·4	290	104·6	320	103·8	265	103·4	255	103·1	205
	"	P.M.	104·4		104·4		101·8		104·2		104	
18th	"	A.M.	105·2	320	104·4	350	105·	280	104·6	275	104·4	235
	"	P.M.	105·8		105·		104·6		104·2		104·6	
19th	"	A.M.	105·8	305	105·	340	104·6	275	104·4	270	104·	230
	"	P.M.	105·6		105·2		105·6		104·8		104·6	
20th	"	A.M.	104·2	290	105·	330	104·6	275	104·4	265	104·2	225
	"	P.M.	104·6		105·		104·6		104·2		105·	
21st	"	A.M.	103·6	295	105·	320	104·6	270	104·6	265	104·	225
	"	P.M.	103·8		105·		105·		104·		104	
22nd	"	A.M.	102	270	102·6	295	101·1	250	102·	245	101·6	210
	"	P.M.	104·		105·		164		104		104·8	
23rd	"	A.M.	104·	290	104	305	103·	255	103·4	255	103·8	210
	"	P.M.	103·6		104·8		104·2		104·6		104·6	
24th	"	A.M.	103·	290	104·4	310	104·	255	104·	250	103·6	210
	"	P.M.	104·6		104·6		105		106·		105·	
25th	"	A.M.	103·6	285	105·	310	104·	255	104·6	250	104·2	210
	"	P.M.	104·		105·		103·		103·2		103·	
26th	"	A.M.	103·8	295	103·8	300	103·	250	104·2	250	103·3	200
	"	P.M.	104		104·6		104		104·6		104·3	
27th	"	A.M.	103·	290	103·4	305	102·6	245	103·4	250	103·2	205
	"	P.M.	104·		105·		104		105		103·6	
28th	"	A.M.	103·6	300	105·	315	103·4	255	103·6	260	102·8	210
	"	P.M.	104		104·6		103·8		104·4		104·	
29th	"	A.M.	104·6	280	104	290	103	245	103·6	245	103·6	200
	"	P.M.	104		104·6		104·		104		104·6	
30th	"	A.M.	103·6	275	103·	305	103·8	250	103·6	250	103	205
	"	P.M.	104		104·		104·		104·		103·6	
31st	"	A.M.	104·3	290	105·	310	103·6	255	104	270	104	220
	"	P.M.	103·2		104·		103·6		103·4		104·6	
32nd	"	A.M.	104·2	280	104·6	295	103·6	240	103	255	104·6	205
	"	P.M.	104		104·		104·8		104·		104·2	
33rd	"	A.M.	103·8	280	103·4	300	103·6	240	103·6	260	104	205
	"	P.M.	104·		104·2		104·4		104·6		104·2	
34th	"	A.M.	104·4	285	104·6	305	104·	245	103·6	265	104·	210
	"	P.M.	103·6		104·		103·6		104·4		103·6	
35th	"	A.M.	104·	295	104·4	285	104	285	104·	250	104·2	200
	"	P.M.	103·6		103·6		103·		103·6		103	
36th	"	A.M.	104·2	275	104·2	310	100·6	225	104·	260	104·4	195
	"	P.M.	104·6		104·2		104·		104·6		104·2	

TABLE OF WEIGHTS AND TEMPERATURES OF TREATED GUINEA-PIGS—*Concluded.*

			Designation of animals.									
			15		16		18		19		20	
			Temp.	Wt.	Temp.	Wt.	Temp.	Wt.	Temp	Wt.	Temp.	Wt.
37th	day	A.M	104·4	255	104·6	300	103·4	255	103·4	255	104·2	190
	"	P.M	104·		104·2				104·3		104·	
38th	"	A.M	104	270	104·2	320	dead.	195	104·	275	104·6	200
	"	P.M	104·		104·2				104·4		104·	
39th	"	A.M	103·	265	104	290			104·	255	dead.	175
	"	P.M	103·		104·6				103 6			
40th	"	A.M	104·	280	103·6	295			104·1	180		
	"	P.M	103·		101·4				103·4			
41st	"	A.M	102·	215	dead.	265			108·6	215		
	"	P.M	100·6						102·2			
42nd	"	A.M	104·4	265					102·4	265		
	"	P.M	104 4						104 4			
43rd	"	A.M	103·6	250					104·	260		
	"	P.M							103·6			
44th	"	A.M										
	"	P.M	103·4	245					104·2	260		
45th	"	P.M	103·	230						235		
46th	"	A.M	103·	240					104·	250		
	"	P.M	dead.	215					103·			
47th	"								No observation			
48th	"								Chloroformed.			

Another point worthy of mention in connection with the treated animals is the abscess formed at the point of inoculation. The abscess formed, broke externally, discharging the characteristic pus of a tubercular abscess, but in these treated animals a process unlike that seen under ordinary circumstances was noted. There was a gradual healing of the wound instead of an extension. During this healing process the pus was less watery than usual, new granulations were observed and in two cases the abscesses healed. After this healing process pus again formed, the external wall becoming very thin, and there was a total enucleation of the abscess. It is unfortunate that the date of this occurence in these two animals was not noted, nor the dates of the cessation of the discharge and the closing of the abscess wound. The enucleation of the abscess was noted by the attendant in charge, but the healed lesions together with the fresh granulations were seen by the writer.

Unforeseen circumstances necessitated the destruction of the longest lived animal designated as No. 19. While lesions of a generalized character were found at the autopsy it is more than probable that had it been possible to continue the treatment, this animal would have lived for quite a number of days.

CLINICAL OBSERVATIONS OF THE UNTREATED ANIMALS.

The guinea-pigs used for checking the results in the treatment of tuberculosis by currents of high frequency, presented nothing out of the ordinary during the course of the disease. There was a gradual rise in temperature as is ordinarily seen in animals inoculated with virulent tubercular material. The elevation in temperature persisted with more or less regularity up to the time of their deaths. The weight of these animals fluctuated, gradually becoming less and less toward the fatal issue. The animals died in 17, 22, 27 and 48 days, respectively. Why this last mentioned animal lived so much longer than the others is unexplained, the course of the disease being typical though not as acute as in the other instances.

MICROSCOPICAL EXAMINATIONS OF BLOOD AND PUS.

Examinations were made daily of blood smears, and as soon as the abscesses commenced discharging, smears of the pus were made and examined. These examinations were not made in the case of each individual animal, but two animals from each series, the treated and untreated, were selected. In no instance were tubercle bacilli detected in the smears of blood of either series of animals, although a careful search was made daily, of two smears from each animal from which material was taken.

In the pus bacilli were present in both series. Nothing characteristic was noticed in connection with the bacilli seen in the pus from the untreated animals, either in the method of taking and retaining the stain, nor in the grouping or shape of the bacilli.

With the treated animals, the changes in the grouping of the bacilli in the pus together with the manner in which the stain was taken and held were peculiar. There were also a far greater number of bacilli present in the smears than is usually seen, increasing as the treatment progressed. The first changes noted occurred on the eighth day of treatment or the eighteenth day of the disease. At this time clumps of bacilli were noted together with the giving up of the stain* by certain bacilli while others seemed not to have taken the stain at all. While the clumping was first noted at this time, this characteristic was not as marked as it was a few days later, from which time it continued to remain constant throughout the course of the disease. On and after the twelfth day of treatment (twenty-second day of disease) the decolorizing was more easily accomplished, and provided that the Gabbet's Blue was used the usual length of time the bacilli were relieved of the greater part if not all of their red dye. By experiment it was found that in order to have the bacilli retain their characteristic stain it was necessary to reduce the time of exposure to the effects of this decolorizing and counter staining agent to three-fourths the usual period. Twenty per cent solutions of nitric and hydrochloric acids were used with similar results to decolorizing.

In some of the specimens of pus, the bacilli were decidedly shorter and thicker than normal. These peculiar forms have been noted only in films from the animals treated by electrical currents, and not in connection with any investigations on other tuberculoses in which a virulent bovine germ has been used as the infective agent. While these stumpy forms were not numerous, they were fairly constant in the preparations of pus from the animals in question. Another peculiarity noted with the films was the consistency of the pus and the nature of the film produced. Films made from the pus of untreated animals were very even, while those made from the pus of animals receiving treatment were uneven and streaked, it being more difficult to obtain a preparation suitable for microscopic examination.

It may be well to mention that the examinations of the slides, both blood and pus smears, were carried out without the knowledge at the time of the examination as to whether a given slide came from a treated animal or one that was untreated. The slides were taken and numbered by the attendant, comparisons not being made till the completion of the microscopic examinations, thus avoiding any personal prejudice for or against the experiments.

PATHOLOGICAL FINDINGS.

The untreated guinea-pigs presented the usual changes noted in cases of acute miliary tuberculosis from the incipient tubercular infection to caseating nodules. These changes were noted particularly in the lungs, liver, spleen and lymphatic glands throughout the system. The superficial lymphatic glands particularly were affected, indicating that the infection was mainly carried through the lymph channels. The lesions in the treated animals presented a similarity in the involvement of the same organs and lymphatic system, but the lesions were more clearly defined from the healthy tissue,

*The stains used in all of the examinations were, Ziehl-Neilson's Carbol Fuchsin and Gabbet's Blue. A sufficient amount of staining material was freshly prepared for this work, that variations in the staining properties of the bacilli might be carefully studied.

especially was this true in the liver and spleen. Caseation was not a marked feature of the lesions. Microscopically this definition between the diseased and healthy tissue is also marked indicating that agencies other than the normal resistant power of the individual have been at work in the effort to aid nature in the struggle between the bacilli and the body cells.

SUMMARY.

These experiments, aside from being very interesting, teach that these high frequency electrical currents exert some beneficial influence in the effort of the system to overcome the effects usually produced in animals infected with the bacillus tuberculosis. We have an average life in the treated animals of 42·4 days; while those in which the disease was allowed to run its course, we have as an average life 28·5 days. This gives us a period of 15·9 days in favour of the treatment. In these examinations the two animals dying of septicaemia are not included, nor is the one which met with an accident during manipulations.

To say the least the results here recorded are very encouraging, the more so when it is considered that the germ used in infecting the experimental animals was a very virulent type, in fact much more so than is ordinarily met with in human tubercular infections. Again, the disease was pretty well advanced at the commencement of the treatment as is evidenced not only by the length of life in the untreated animals, but also by the animals inoculated preliminary to the experiments, from which the infective agent was obtained, and by the temperature record. These experiments are worthy of repetition with a germ of a less virulent type, conforming to that usually found in cases of human tuberculosis. The period of exposure could with advantage be extended to thirty minutes daily and given at one sitting, allowing the animals under observation the remainder of the 24 hours in which to recuperate from its effects. As we look back and study the records, it seems that the best results cannot be obtained by a treatment in the afternoon, when the temperature is at its heighth and the functions of the animal are already in a chaotic state.

We hope to pursue these investigations in the near future and will benefit by the experience already gained in conducting the experiments here recorded.

PICTOU CATTLE DISEASE.

This affection which still manifests itself in the locality from which it receives its name, has received but slight attention since the investigations by Dr. Wyatt Johnson in 1892 and that made by Dr. J. G. Adami, Pathologist to the Medical Faculty, McGill University, in 1894 and 1895.

In taking up the investigation of this affection, the work of this year has been only preliminary, with a view to determine the manner in which the best results may be had in an investigation having for its object the elucidation of the primary cause of the disease, that preventive measures may be taken. The material for this preliminary work has been taken in the field by Dr. W. H. Pethick who has had training in laboratory methods and I wish here to express my gratitude to him, for the condition in which such material has reached the laboratory.

The germ described by Dr. Adami as the causative agent of this affection has been found in the preparations forwarded. Aside from the finding of this germ and the lesions described by previous investigators on this subject, nothing of marked interest has been learned.

HOG CHOLERA.

The thorough investigation of hog cholera and allied diseases has received very little attention in Canada. Although more or less trouble has occurred from swine

diseases for many years, there is no record of a thorough scientific investigation as to their nature and method of prevention.

The recent outbreak in the county of Kent has afforded material for the pursuit of this work, and there are now in the laboratory numerous cultures from the various localities, together with a series of specimens which will enable an investigation of the subject that will prove a valuable adjunct to the pathology of swine diseases as seen in Canada. At present these investigations are just begun, hence the impossibility of giving a scientific report on their results. However, there are three points which have impressed themselves very forcibly, namely: The nature of the lesions, the presence of lung worms and the presence of intestinal worms. The nature of the lesions indicates that the disease has been of long standing; scarcely an outbreak occurring (from which organs have been received at the laboratory), where lesions indicating that a chronic non-fatal type of the disease has continually menaced the herd for a considerable period. This type, while not particularly injurious to the individual, may at any time convey to contact animals a most virulent and fatal type of the disease. Lung worms have been present in greater or less numbers in the lung specimens from nearly every outbreak. Intestinal worms have also been very abundant, appearing in all the specimens from the county of Kent. While these worms, both those of the lungs and the intestines, have no direct connection with the outbreaks, which are due to a specific bacillus, they undoubtedly exert a detrimental influence in the economical production of pork, and predispose the affected animals to any infection with which they come in contact.

GLANDERS.

With this disease no investigations on distinct original lines are as yet under way, but a number of diagnoses have been made both from material furnished by practitioners, and material which I have myself obtained in the city of Ottawa. With a means of diagnosis such as is afforded by the use of mallein, diagnosis by means of animal inoculations are tedious and of little value. These animal inoculations, however, have furnished material for the production of mallein, and during the past month one hundred doses of this product have been manufactured, which gives typical reactions not only in experimental animals, but in diseased horses. In the future there will be no difficulty in furnishing sufficient mallein to supply the needs of the department.

From September 10, at which time the dispensing of mallein was placed in my hands, 137 doses have been furnished veterinary inspectors and veterinary practitioners, on instructions from the Chief Veterinary Inspector.

TUBERCULIN.

On July 15 the dispensing of tuberculin was placed in my hands, relieving Prof. F. T. Shutt, chemist at the Central Experimental Farm, of this duty. Since that date 23,760 minims, a sufficient quantity to test 396 head of cattle, has been supplied to the various veterinary inspectors, veterinary practitioners and others, on instructions from the Chief Veterinary Inspector.

EXAMINATION OF SPECIMENS SENT FOR DIAGNOSIS.

During the past year as heretofore the examination of specimens sent for diagnosis has occupied considerable time, there having been examined some 32 series of specimens from various sources.

I have the honour to be, sir, your obedient servant,

CHAS. H. HIGGINS, B.S., D.V.S., *Pathologist.*

The Honourable the Minister of Agriculture, Ottawa.

No. 17.

CATTLE QUARANTINE.

(M. C. Baker, D.V.S.)

Montreal, October 31, 1902.

Sir,—I beg to report that for the year ending October 31 ult., there were inspected and passed for shipment at the Canadian Pacific Railroad stockyards, 37,938 head of cattle and 25,528 sheep, distributed monthly as follows:—

	Cattle.	Sheep.
November, 1901	3,170	5,405
May, 1902	5,815	736
June "	4,243	5,587
July "	5,265	4,066
August "	8,257	1,769
September "	5,258	4,956
October "	5,930	3,009
Total	37,938	25,528

Of these 499 head of cattle were from the United States, the balance of the cattle and all the sheep were Canadian.

Among the cattle and sheep passed for shipment, 3,280 head of cattle and 1,811 sheep were loaded at Quebec. There being no stockyards at Quebec, the cattle were inspected and marked here, taken to Quebec during the night and loaded on to the ships directly from the cars at daybreak. This arrangement under the present condition of affairs greatly facilitated the handling of the stock.

During the past year 44 head of cattle and 15 sheep were rejected as unfit for shipment for reasons as follows:—For actinomycosis, 6 cattle, mange, 2 cattle, injuries, 33 cattle, blindness, 3 cattle, and 15 sheep for injuries.

The remarkable freedom from disease enjoyed by Canadian cattle is a matter of extreme satisfaction to all who are interested in the development of this important source of wealth.

I am pleased to be able to report that the cattle from the North-west ranges, indicate that greater care is being taken in selection of bulls for breeding purposes, evidenced by the increased numbers of high grade beef animals that are being exported, all in splendid condition.

There still continues to be a large number of Canadian live stock exported from the Canadian Pacific Railway stock yards, via Boston and Portland.

I have the honour to be, sir,

Your obedient servant,

M. C. BAKER,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 18.

CATTLE QUARANTINE.

(CHARLES McEACHRAN, D.V.S.)

MONTREAL, October 31, 1902.

SIR,—I beg to report that for the year ending October 31, last, there were inspected and passed for shipment at the port of Montreal 655 horses, distributed monthly as follows:—

November, 1901	178
May, 1902	158
June	79
July	79
August	41
September	64
October	56
Total	655

Of the above, 51 horses were held back for the following, 27 horses suffering from strangles and 24 from influenza.

There were imported during the same period from Britain to Canada, inspected and found free from contagious or infectious diseases, 219 stallions, 14 mares and 20 jackasses.

I have the honour to be, sir,

Your obedient servant,

CHARLES McEACHRAN,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 19.

CATTLE QUARANTINE.

(B. A. Sugden, D.V.S.)

Montreal, October 31, 1902.

Sir,—I have the honour to report to you the number of cattle and sheep that have been inspected for shipment at the Grand Trunk stock yards, Montreal, during the period extending from November 1, 1901, to October 31, 1902.

The monthly shipments were as follows :—

	Cattle.	Sheep.
November, 1901	2,344	5,859
May, 1902	6,038	348
June, "	4,417	1,544
July, "	5,665	5,690
August "	5,189	3,656
September, "	6,971	5,381
October, "	6,311	4,555
	36,935	27,033

Included in the above figures are 707 cattle and 854 sheep from the United States. Forty cattle were rejected, 30 for injuries or lameness and 10 for actinomycosis.

There were also rejected for various reasons 51 sheep.

No disease was found in the American cattle or sheep.

The quality and condition of the cattle was about the average, certainly not above it, the improvement in condition so much to be desired not having as yet made itself manifest.

During the same period the following stock passed through the yards on their way to British ports.

Via Boston.	Cattle.		Sheep.
United States	9,294	United States	28,868
Canadian	20,871	Canadian	4,998
Total	30,165		33,866
Via Portland.			
United States	3,670	United States	20,260
Canadian	24,353	Canadian	11,636
Total	28,023		31,896

I have the honour to be, sir,

Your obedient servant,

B. A. SUGDEN, *Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

No 20.

REPORT OF VETERINARY INSPECTOR AT MONTREAL.

(V. T. D'Aubigny, V.S.)

Montreal, Que., October 31, 1902.

Sir,—I have the honour to submit to you my report of cattle inspected during the year ending October 31, 1902.

I have tested 28 pure bred cattle for export to the United States; also 24 cattle which were not for export.

I have the honour to be, sir,

Your obedient servant,

The Honourable
The Minister of Agriculture,
Ottawa.

V. T. D'AUBIGNY, *Inspector.*

No. 21.

CATTLE QUARANTINE.

(A. E. Moore, D.V.S.)

Ottawa, October 31, 1902.

Sir,—I have the honour to submit to you the following report of work done by me during the year ended October 31, 1902.

As it was deemed advisable to have the office of the chief veterinary inspector situated in your department, in order that the affairs of this branch should be directed from Ottawa, I, therefore, at the request of Dr. Rutherford, moved to Ottawa from Montreal in the early spring. This change has greatly facilitated my work in many respects.

When not engaged in my duties as travelling inspector, I have assisted Dr. Rutherford in the department, and during his occasional absence from Ottawa I have performed the duties of acting chief inspector.

TUBERCULOSIS.

During the year I have tested with tuberculin 139 cattle for export to the United States, seventy being in the province of Ontario and sixty-nine in the province of Quebec, twenty-one of them reacted and were, therefore, not allowed to be shipped.

I also tested sixty-four cattle which were not for export, of these twenty reacted.

HOG CHOLERA.

I have dealt with three different outbreaks of hog cholera this year, namely, at :—

Collingwood, Ont.	3 farms where	88 hogs were killed.
Lavender "	2 "	19 "
Hickson "	1 "	283 "

The Hickson outbreak was a most serious one. Fortunately the department was duly notified, and the disease was dealt with promptly and did not spread to other farms. There were a large number of hogs being fattened in pens adjoining this farm, and the farmers of the neighbourhood were very much alarmed lest the disease would spread. I, therefore, used the utmost precaution in dealing with this outbreak.

Mr. John King, the owner of these hogs, bought them in the vicinity of Dresden, Kent county, where hog cholera has existed for some years. They were brought to Hickson early in May, and on my arrival on May 19 there were twenty-seven dead and 121 sick pigs, the disease assuming a most virulent form. This case illustrates the fact that a change of environment in some way often causes the disease to assume a virulent form. In the post mortem I found a few chronic cases, and it is probable that infection started from these, in which the disease was latent.

I made a thorough inspection of the swine on farms in the immediate neighbourhood of each of the above outbreaks.

SUSPECTED HOG CHOLERA.

Numerous reports came to our notice where hog cholera was suspected. I visited many farms both in Ontario and Quebec, but found sickness in swine principally due to injudicious feeding or to bad hygienic surroundings, often both these conditions combined. Pneumonia and verminous bronchitis were very prevalent, the cold damp spring and summer being particularly favourable for these maladies.

Many cases of gastric troubles, both chronic and acute, were seen. A farmer near Toronto, who was feeding his pigs on hotel swill which contained strong alkalies (powdered soaps which are used in washing dishes), had over one hundred sick and unthrifty pigs. I also saw many lame and crippled hogs, their condition being due to feeding largely on highly carbonaceous foods.

GLANDERS.

During the outbreak of glanders in the city of Ottawa and vicinity, I have assisted in the inspection and also the testing with mallein of suspected cases.

I have tested thirty-two horses, five of which reacted. Seven horses that showed marked symptoms of glanders were destroyed without having to resort to the test.

I have inspected a large number of horses clinically in and around Ottawa and Hull, being suspected cases reported to us by the city police and others.

Dr. J. J. McGregor, of Carleton Place, Ont., reported two cases of glanders to the department. I visited Carleton Place and found two well marked cases of glanders. Both horses were destroyed, and the premises properly disinfected.

In my report of last year I mentioned that Mr. L. P. Cramer, of Windsor Mills, P.Q., had contracted glanders from his horses. I am sorry to inform you that Mr. Cramer died last September, having been ill for nearly two years with this dread disease.

BLACK-QUARTER.

Very few deaths from black-quarter have come to my notice this year. I visited [illegible] farms where the disease existed, but only a few deaths occurred on each. A change of pasture usually checked the disease.

OTHER REPORTS.

In July I inspected two hundred head of grade heifers at Cobden and Eganville, Ont., which were bought by the Indian Department for the reserve at Gleichen, Alberta. All were in good health and arrived at their destination safely.

In September it was reported that a number of cattle were dying from anthrax in the neighbourhood of Bury, P.Q. Acting on your instructions I proceeded to that place, and after a thorough investigation no anthrax could be found. Dr. Higgins examined several samples of blood which I submitted to him, but no anthrax bacilli were present.

I was unable to arrive at any definite conclusion regarding the nature of this disease. The first symptoms were dulness, high temperature—106 to 108° F.—which lasted for about two days; this was followed by dysentery, the temperature dropping to normal, some cases subnormal. There was great weakness, loss of appetite, hurried breathing and weak pulse. About eight cattle presenting the above symptoms died; the others that were attacked made a slow recovery. The disease did not seem to be contagious, as only an animal here and there took it, and some of the farms were several miles apart.

I was only able to perform one satisfactory post mortem. In the cæcum and colon were great clots of blood, in fact all the blood of the animal. There were no hæmorrhagic areas or serous exudate present in any part of this animal to indicate that the disease might be hæmorrhagic septicæmia. In fact there was no evidence of pathological changes in any of the organs.

A number of young cattle died in this vicinity some time before my visit, and by the description of the symptoms I am quite certain the disease was black-quarter.

On September 15 I visited Metcalf, Ont., for the purpose of investigating the cause of death in cows belonging to Mr. Samuel Woods.

Four cows were taken sick in one night. Three of them died quite suddenly, and the other recovered after a severe illness.

There was no evidence of any contagious disease, but there was a strong suspicion of poisoning.

I have the honour to be, sir,

Your obedient servant,

A. E. MOORE,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 22.

REPORT ON POINT LÉVIS CATTLE QUARANTINE STATION.

(J. A. COUTURE, D.V.S.)

QUEBEC, P.Q., October 31, 1902.

SIR,—I have the honour to send my yearly report of live stock imported into Canada, through this quarantine station, from November 1, 1901, to October 31, 1902, inclusive.

During that period there have come into quarantine 438 cattle, 368 sheep, 94 pigs, 13 goats, against 408 cattle, 1,026 sheep, 63 pigs for 1900-01.

We have received a total of 913 animals during the season, against a total of 1,497 animals in 1900-01. There was an increase of 30 cattle and 31 pigs; there was a decrease of 658 sheep.

In 1900-01 out of 408 cattle that came in this station, 141 were for the United States; this year out of 438 cattle imported through this quarantine 51 head only went to the United States. Out of the 1,026 sheep imported through this quarantine in 1900-01, 727 went to the States; this year 288 sheep (out of the 368) went to the States.

The cattle were of the following breeds:—Shorthorns, 363; Galloways, 47; Polled Angus, 15; Hereford, 7; Devons, 6.

The sheep were of the following breeds:—Rambouillet, 211; Shropshires, 72; Hampshires, 18; Oxfords, 17; South Downs, 16; Leicesters, 11; Lincolns, 5; Dorsets, 2; Suffolks, 2; Cotswolds, 1.

The pigs were of the following breeds:—Yorkshires, 90; Berkshires, 4.

I have the honour to be, sir,

Your obedient servant,

J. A. COUTURE, *Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

No. 23.

REPORT ON ST. JOHN CATTLE QUARANTINE STATION.

(J. H. FRINK, V.S.)

ST. JOHN, N. B., October 31, 1902.

SIR,—I beg to submit my annual report concerning duties performed at this station.

The following animals were inspected for export:

11,528	cattle,	6,046	sheep, 100 horses,	shipped to....Great Britain.
36	"	825	"	" ....France.
23	"	.....		" ....United States.
5,775	horses.....	.....		" ....South Africa.

Making a total of 24,333 head shipped.

The number of animals condemned was very small. One bull, suffering from actinomycosis, and one sheep suspicious of 'scab'. Five cattle were detained from injuries in transit, and six sheep were ordered to be slaughtered, from injuries received in a like manner. The percentage of deaths, occurring among sheep in transit has decreased, but greater care should be exercised in the loading of long woolled sheep, as there is considerable overcrowding.

Imports of animals through the St. John quarantine :—

Cattle	59	from Great Britain.
Cattle	8	" United States.
Sheep	12	
Swine	9	
Horses	1	" Scotland.

TESTING OF ANIMALS FOR TUBERCULOSIS.

Twenty-three animals were tested for export to the United States and passed satisfactorily. No requests have been made by local breeders for the testing of animals for tuberculosis. The declarations made by Professor Koch in Europe, in reference to the immunity which the human race enjoys from infection of bovine tuberculosis, appear to have been entirely satisfactory to our boards of health, who thus get rid of a troublesome question, and many of those who had determined to rid their farms of this plague have become apathetic.

INSPECTION FOR TUBERCULOSIS.

My attention was called by the chief inspector to the fact that certain animals which had been tested and re-acted in Nova Scotia, had escaped quarantine, and had been transported to St. John. These animals were located and disposed of satisfactorily. The remainder of the herd was also located in Nova Scotia, and duly quarantined.

FACILITIES FOR ACCOMMODATION OF EXPORT LIVE STOCK.

Additional shed-room has been provided by the Canadian Pacific Railway at West St. John, and there exist now comfortable quarters, for nearly 2,000 head of cattle. If shippers would take advantage of these facilities, and forward their cattle in good time for food and rest, the loss among cattle shipped across the ocean, from the port of St. John, would be reduced to a minimum.

There is no contagious disease among animals in the province, except actinomycosis and tuberculosis.

I have the honour to be, sir,

Your obedient servant,

JAMES H. FRINK,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 24.

REPORT ON HALIFAX CATTLE QUARANTINE STATION.

(Wm. Jakeman, D.V.S.)

Halifax, N.S., Oct. 31, 1902.

Sir,—I beg leave to submit the following statement of animals inspected by me during the twelve months, ended October 31, 1902 :—

EXPORTED.

Horses	63
Cattle	207
Sheep	1813
Swine	7

IMPORTED.

Horses	14
Sheep	6

I have the honour to be, sir,

Your obedient servant,

Wm. JAKEMAN,

Inspector

The Honourable
The Minister of Agriculture,
Ottawa.

No. 25.

REPORT AND STATEMENT OF CATTLE SLAUGHTERED FOR PICTOU CATTLE DISEASE.

(George Townsend, V.S.)

New Glasgow, N.S., Oct. 31, 1902.

Sir,—I have the honour to submit herewith a statement showing the number of cattle slaughtered for 'Pictou Cattle Disease', and the amount of compensation paid therefor, during the 12 months ended October 31, 1902.

I have the honour to be, sir,

Your obedient servant,

GEORGE TOWNSEND,

Inspector.

STATEMENT of cattle slaughtered and amounts paid in compensation from November 1, 1901, to October 31, 1902.

Month.	Number Slaughtered.	Amount Paid.
		$ cts.
November, 1901	2	16 00
December		
January, 1902	2	16 00
February	2	13 33
March	1	10 00
April	3	25 00
May	3	25 00
June	15	135 00
July	45	360 65
August	18	146 00
September	17	135 00
October	12	90 35
Total	120	972 33

GEORGE TOWNSEND.
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 26.

REPORT ON HEALTH OF LIVE STOCK IN ONTARIO.

(PROFESSOR ANDREW SMITH, F.R.C.V.S.)

TORONTO, Oct. 31, 1902.

SIR,—I have the honour to submit the following brief report on the health of the domestic animals in Ontario during the past year.

HORSES.

Influenza and strangles prevailed to a considerable extent during the early part of the year, and especially in connection with large stables. During the summer it has, to a great extent disappeared, and at present the general health of horses is good.

Three horses affected with glanders were destroyed in Hamilton.

CATTLE.

In this section, cattle have generally been healthy. There have been no evidences of enzootic or epizootic diseases. A large number of cattle are brought from various parts, principally north and west of here, to the cattle market, Toronto. These are mostly good grades, fat and healthy, in prime condition for butchering. Any of

them that present any evidences of abnormal conditions or disease, are detained and butchered under veterinary inspection, and as a result of the post mortem examinations only a very few carcases have been condemned as unfit for food.

SWINE.

No outbreaks of contagious disease in this locality, but several outbreaks of hog cholera have occurred in the western part of the province.

SHEEP.

Also healthy.

I have the honour to be, sir,

Your obedient servant,

ANDREW SMITH, F.R.C.V.S.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 27.

REPORT ON POINT EDWARD CATTLE QUARANTINE STATION.

(ARTHUR BROWN, V.S.)

SARNIA, October 31, 1902.

SIR,—I have the honour to submit my report of cattle and swine received into the Ontario cattle quarantine at Point Edward from November 1, 1901, until October 31, 1902.

There have been no diseased animals in quarantine this year, and I may state that no contagious disease exists in this district at present, with the exception of some cases of tuberculosis and actinomycosis.

The following is a statement of the animals which entered Canada from the United States at this port during the past twelve months :—

Cattle, 103 valued at	.....	$18,665
Sheep, 305 "	.....	8,000
Swine, 14 "	.....	355

I have the honour to be, sir,

Your obedient servant,

ARTHUR BROWN,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 28.

REPORT OF VETERINARY INSPECTOR AT NIAGARA FALLS, ONT.

(S. E. Boulter, V.S.)

Niagara Falls, October 31, 1902.

Sir,—I have the honour to report that very few diseases of a contagious character have occurred amongst the domestic animals in this district during the past year.

Recently hog cholera has made its appearance on six farms in the vicinity of Black Creek, appearing first on the farm of Horace Beam in a chronic form. Not suspecting cholera, Mr. Beam admitted neighbours on the premises and allowed some hogs to be removed. In this way, no doubt, it was carried to adjoining farms.

On my first visit or two I could not find on post mortem examination any lesions of hog cholera. In fact, symptoms were very obscure; so sent viscera taken from some that had been sick for several days to the department for bacteriological examination, and promptly received a message stating the disease was cholera. I then destroyed all hogs on the farm and had the premises thoroughly disinfected. I noticed as the disease appeared on the adjoining farms it was more virulent in character. Symptoms became very well marked within a short period of sickness. All hogs have been slaughtered where disease has existed, and places thoroughly disinfected. The bulletin issued by the department has been distributed among the farmers, and they are acquainting themselves with the nature of the disease and taking every precaution against it spreading. The source of origin in this outbreak is still a profound mystery.

The following animals entering Canada from the United States at Niagara Falls were inspected and quarantined by me during the twelve months ended October 31, 1902. They were all found to be healthy, and were forwarded to their destinations:—

Cattle	13
Sheep	29
Hogs	12

I have the honour to be, sir,

Your obedient servant,

S. E. BOULTER,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 29.

REPORT OF VETERINARY INSPECTOR AT KINGSVILLE, ONT.

(M. B. PERDUE, V.S.)

KINGSVILLE, October 31, 1902.

SIR,—I beg to submit, herewith, my report for year ending October 31, 1902.

I am glad to say that since my last annual report, this district, South Essex, has been free from hog cholera and swine plague, which had been constantly recurring for many years back.

On July 4 it was reported that some dead hogs had come ashore along the bank of the Detroit river, in Malden township. A previous outbreak of hog cholera had occurred from this cause in 1900. I investigated the matter as far as possible, but was unable to trace the origin of the carcasses.

On August 15, by request of Mrs. Grove Whaley, of the township of Gosfield South, I visited her farm and inspected the hogs. Finding them showing symptoms resembling swine plague, I placed them under quarantine on suspicion, afterwards releasing them.

On October 1, I was called to Kent county by telegram from the department to assist in suppressing an outbreak of hog cholera there. Under instructions of Dr. Tennent, I worked there along with Dr. Orchard, of Windsor, Dr. Thorne, of Wallaceburg, and Dr. Kime, of Chatham, and during the month dealt with 23 outbreaks, involving the slaughter of 961 hogs. Of these only 65 were contact animals, showing the extreme virulence of this epidemic. On October 29 I was called to Middlesex county to investigate a suspected case of swine plague on the farm of Mr. D. Leitch. I placed his hogs under quarantine on suspicion, but afterwards released them, as the disease did not develop.

I have the honour to be, sir,

Your obedient servant,

M. B. PERDUE,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 30.

REPORT OF VETERINARY INSPECTOR AT CHATHAM, ONT.

(Jos. Kime, Jr., V.S.)

Chatham, October 31, 1902.

Sir,—I have the honour to submit herewith my annual report for the twelve months ended October 31, 1902. Owing to the very serious outbreak of hog cholera in this district, covering nearly the whole of the county of Kent, which has kept me exceedingly busy for some time past, I have been prevented from preparing a more lengthy report.

During the past twelve months I have slaughtered on account of hog cholera the hogs on 147 farms, which have been placed under quarantine. Previous to July, I inspected 72 farms on which hog cholera had existed and satisfied myself that cleansing and disinfection had been properly carried out. These farms I recommended should be released from quarantine.

This outbreak of hog cholera is a very serious one, and I am glad to say that almost all veterinary surgeons and farmers understand that it is necessary that every one should take a helping hand in endeavouring to stamp it out. A great many farmers are slaughtering all hogs that shippers will take, and also fattening their brood sows, as they consider it too risky to keep many hogs at the present time.

I have the honour to be, sir,

Your obedient servant,

JOS. KIME, Jr.,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 31.

REPORT OF VETERINARY INSPECTOR AT WALLACEBURG, ONT.

(J. R. Thorne, V.S.)

Wallaceburg, Ont., October 31, 1902.

Sir,—I beg to report that during the first ten months of the year ended on October 31, 1902, there was comparatively little disease among the domestic animals in my district, but I am sorry to report, that during the last two months the outbreak of hog cholera or swine plague has been the most severe and far-reaching in its effects of any outbreak during my term of office.

The present outbreak originated near the town of Dresden, and seems to have followed the natural and artificial water courses through the townships of Chatham and Dover.

The past season has been very wet; the streams have overflown their banks and have thus left the farms and the quarters where swine are kept in a damp and unsanitary condition: many farmers, owing to the excessive rainfall, were unable to harvest their crops and to prevent a total loss thereof, many of them turned their hogs into the fields, and thus allowed them access to large quantities of undesirable food. The apple crop in this district has been enormous, and many farmers have fed large quantities of fallen and inferior fruit to their swine, and while I do not believe this course has actually caused the disease, still I think it has aggravated the outbreak.

I have made frequent visits to the Walpole Island Indian reserve during the past year but have not discovered any actual cases of disease among the swine on the reserve; the Indians take no care of their hogs, allowing them to run at large through the forests and disease might easily exist there without discovery.

The local Indian agent informs me that there are about eight hundred hogs on the reserve; these hogs are never in a thrifty condition, and on account of the lack of care which the owners exercise over their animals, and the irresponsible nature of the inhabitants of the reserve, I would strongly recommend that the present quarantine regulations be continued.

I fear that reports of the outbreaks of hog cholera are not made by the farmers as promptly as they should be, and thus the contagion is spread widely before your officers have an opportunity of enforcing the regulations.

I have the honour to be, sir,

Your obedient servant,

J. R. THORNE,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 32.

REPORT OF VETERINARY INSPECTOR AT WINDSOR, ONT.

(GEO. W. ORCHARD, V.S.)

WINDSOR, ONT., October 31, 1902.

SIR,—I submit to you my report of work done for the Department of Agriculture, from November 1, 1901 to October 31, 1902.

I am pleased to state that I have had no reports of hog cholera in North Essex since last April. Owing to the heavy losses sustained by the farmers of North Essex in recent years from hog cholera, they have more regard to sanitary and preventive measures than formerly and house their hogs better and feed them with more care. If farmers in general will give their hogs as much care as they give their horses and cattle, they will find the chances of contagion from infectious diseases much lessened.

The following animals have been inspected by me during the year :—

FOR EXPORT.

Cattle	184
Sheep	1
Swine	8

IMPORTED.

Horses	8
Cattle	33
Sheep	34
Swine	1

I have the honour to be, sir,

Your obedient servant,

GEO. W. ORCHARD,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 33.

REPORT OF VETERINARY INSPECTOR AT LONDON, ONT.

(J. H. Tennent, V.S.)

London, Ont., October 31, 1902.

Sir,—I have the honour to submit the following report of work done by me during the past year, viz., Nov. 1, 1901 to Oct. 31, 1902.

I beg to report that I have tested for tuberculosis, 381 cattle, intended for export, 19 of which reacted. Certificates were given for 29 animals under six months old. I also made private test of 30 animals, 14 of which reacted and 1 was suspicious.

Cattle in this district are apparently quite healthy, nothing of a special character occurring among them.

Horses have been in good demand and good prices were realized, nothing of a serious nature having broken out among them. Last November quite an epidemic of influenza appeared in this district, with few if any unfavourable results.

In my report of a year ago, I mentioned that I had just completed an investigation of an outbreak of hog cholera at Norwich. About Jan. 12 last, the disease appeared in 5 pigs on a farm in that district, since that time there has been no further trouble, and I consider it stamped out.

On June 15, 1902, the disease appeared near Waterdown, 14 pigs being affected, I could not trace it to place of infection. No further outbreaks occurred in that neighbourhood.

On July 14, an outbreak occurred in the vicinity of London, on 6 farms, 77 hogs being affected.

On September 15, I investigated a small outbreak at Bright, 26 hogs affected, also at Hickson, 10 pigs affected.

October 20. The disease occurred south-west of Hamilton in 6 store hogs.

The above outbreaks were handled and disposed of as the law directs, as to quarantine, cleaning and disinfecting, and not a single case has yet been reported where contagion spread from these places.

In all the above cases except at Waterdown, the disease was traced to hogs that had been shipped from the west to local packing houses and resold to feeders.

On September 18, 1902, I took charge of a very serious outbreak of hog cholera in the county of Kent. We appear to be getting it under control, not so many new cases appearing, we hope to keep it confined to the area quarantined as affected.

I have the honour to be, sir,

Your obedient servant,

J. H. TENNENT,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 34.

REPORT OF VETERINARY INSPECTOR AT CALEDON, ONT.

(Wm. Stubbs, V.S.)

Caledon, Ont., October 31, 1902.

Sir,—I have the honour to submit this, my annual report on the inspection of cattle in the province of Ontario, from Nov. 1, 1901 to Oct. 31, 1902. Acting on the instructions received from the Department of Agriculture, I have tested with tuberculin, 406 pure bred cattle for export to the United States, 17 of which reacted.

For particulars with regard to the foregoing, I beg to refer you to the detailed reports which I have from time to time forwarded to your department.

On April 5, acting on instructions received from the department, I visited the farm of Johnston Gibson, lot 10, con. 3, Caledon, where two animals had died from black leg. I had the carcasses properly disposed of.

From Sept. 1 to 3, I visited the farm of William McNabb, Sullivan township, Grey county, to examine into the cause of death in cattle of that district. In my detailed report you will observe that I consider the cause of death was probably due to poisonous plants, which I found to be abundant in the pastures.

I have the honour to be, sir,

Your obedient servant,

WILLIAM STUBBS,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 35.

REPORT OF VETERINARY INSPECTOR AT ROCKLAND, ONT.

(Geo. W. Higginson, V.S.)

Rockland, Ont., October 31, 1902.

Sir,—I have the honour to submit to you my annual report for the year ending October 31, 1902.

During the year I have tested with tuberculin 162 pure bred cattle which were for export to the United States, five of which reacted. I also tested 275 cattle not for export, eighty-one of which reacted.

On January 21 I was sent by your department to attend the Farmers' Institute meetings at Monckland, Avonmore, Newington and Berwick to give a discourse on anthrax.

On July 1 I was sent to Merrickville, Ont., to the farm of Mr. Wm. Nichelson to investigate into a reported outbreak of hog cholera among his hogs. I diagnosed the trouble as being verminous broncho pneumonia.

On September 20, acting on instructions received from the department, I visited a farm at Bright, Ont., for the purpose of dealing with an outbreak of hog cholera. Thirty-one pigs were killed, and on post mortem, all but seven showed lesions of hog cholera. Disinfection and disposal of the carcasses was carried out according to the regulations.

I have the honour to be, sir,

Your obedient servant,

GEO. W. HIGGINSON,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 36.

REPORT OF VETERINARY INSPECTOR AT BEDEQUE, P.E.I.

(W. H. Pethick, V.S.)

Bedeque, P.E.I., October 31, 1902.

Sir,—I have the honour to forward you my report for the twelve months ending October 31. I am glad to be able to say that no contagious disease of animals exists in this very healthy province. Last year I was called upon to deal with an outbreak of symptomatic anthrax, and we feared a recurrence this year, but you will be pleased to learn that all animals on the infected farms remain healthy. I believe this is largely

due to the thoroughness with which my instructions were carried out by the interested parties.

The reported existence of a contagious disease from which cattle were dying in the vicinity of Crapaud, and which Dr. Rutherford instructed me to carefully investigate was found to be of a non-contagious character and the report as to number of deaths much exaggerated. I am often called to visit different sections of the province to decide as to the cause of death amongst farm animals, but careful clinical and post mortem examination, and in some cases experimental inoculation has proved the disease in every instance to be due to causes other than contagion.

During the winter I have employed the tuberculin test in the examination of a number of herds, and as you will have noticed by the charts which have been forwarded to you from time to time, that not one animal has reacted, and I again beg to give, as my opinion, that this disease is exceedingly rare amongst cattle on this island.

With the permission of the chief veterinarian I have at the present a small flock of sheep under close observation, a few having died from unexplained cause, and although the owner feared contagion and promptly reported the matter, we find nothing to justify this view; and I may mention here that I have had the privilege of looking over about four thousand sheep and lambs coming from all parts of the province, and all appeared to be in excellent health and condition. When at Amherst last December I had the honour of receiving instructions from you to visit the Shemogue district in New Brunswick to inquire into the cause of abortion among cows in that locality. You have already kindly acknowledged receipt of my report on the subject. I may just say that I found the owners anxious and willing to take every precaution to guard against a recurrence, and you will be pleased to hear that the herds are this year free from this very troublesome disorder. On June 24 I had the honour and pleasure of meeting Dr. Rutherford at New Glasgow, and in accordance with his instructions I remained in eastern Nova Scotia until September 1, holding autopsies on animals that had suffered with Pictou cattle disease, and supplying your pathologist with such specimens from each case as he required in his more advanced study of this disease. A report of my work has been forwarded to the chief veterinary inspector.

In compliance with your wish, I have, as in the past, endeavoured to be of service to our stock owners by advising them, both in public meetings and elsewhere, as to the best means of keeping their flocks and herds healthy, i.e., by preventing the introduction of diseased animals, proper feeding and sanitary surroundings.

I have had occasion during the past year, from time to time, in cases where I was undecided as to cause of death, to forward to your pathologist specimens from autopsies which I have held. I have found Dr. Higgins courteous and prompt, and his decisions very satisfactory. Permit me to say that I look upon the establishment of the pathological laboratory at Ottawa as exceedingly helpful to us in our work.

The following inspections were made by me of animals previous to shipment by sea from the port of Summerside during the twelve months ending October 31, 1902, all were free from disease of any kind:—

Horses	35
Cattle	166
Sheep	124
Swine	18

I have the honour to be, sir,

Your obedient servant,

W. H. PETHICK,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 37.

REPORT OF VETERINARY INSPECTOR AT CHARLOTTETOWN, P. E. I.

(ANDREW A. LECKIE, M.R.C.V.S.)

CHARLOTTETOWN, P.E.I., October 31, 1902.

SIR,—The following is a report of the year's work from November 1, 1901, to October 31, 1902.

Animals inspected for shipment from this port and their destinations:—

—	Horses.	Cattle.	Sheep.	Swine.
To Great Britain		200	3,803	
" United States	1	1	6	
" West Indies and Bermuda	49	10		34
" Newfoundland	57	800	2,496	35
Total shipped	107	1,011	6,305	69

The animals imported at this port were 6 Shropshire ewes from England and 1 thoroughbred stallion, 'Haphazard,' from the United States, for John Richards, Bideford, P. E. I.

I have the honour to be, sir,

Your obedient servant,

ANDREW A. LECKIE,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 38.

REPORT OF VETERINARY INSPECTOR AT WINNIPEG, MAN.

(CHARLES LITTLE, V.S.)

WINNIPEG, MAN., October 31, 1902.

SIR,—I beg to submit to you my annual report of inspections at Winnipeg for the year ended October 31, 1902.

The following is the total number of animals imported from the United States:—

Horses	8,941
Mules	245
Cattle	2,369
Sheep	1,291
Hogs	205

I gave certificates for 262 cattle exported to the United States as stockers and for beef. I also tested 44 head of pure bred cattle for export, one of which was found to be diseased and was slaughtered by the owner, and gave certificates for 2 pure bred sheep and 1 hog for export. I also inspected 500 head of cattle for export in bond through the United States, via Philadelphia to Liverpool.

Of the horses I inspected, 3,629 belonged to settlers and 5,312 were imported by dealers or contractors, or for exhibition and racing.

There have been a number of outbreaks of symptomatic anthrax in different parts of the province this summer, but the loss has not been very heavy. I have advised vaccination of all the calves.

With this exception the cattle have been very healthy. A large number of horses have died this summer with what is known as swamp fever, but I am pleased to know that your department has taken the mattter up and instructed Messrs. Bell and Torrance to investigate this disease.

I have the honour to be, sir,

Your obedient servant,

CHAS. LITTLE,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 39.

REPORT OF VETERINARY INSPECTOR AT EMERSON, MAN.

(P. A. Robinson, V.S.)

Emerson, Man., October 31, 1902.

Sir,—I have the honour to submit herewith the annual statements of stock inspected by me at Gretna and Emerson, Man., for the year ended October 31, 1902.

Statement showing inspections at Gretna :—

Horses	150
Cattle	8
Sheep	43

Statement showing inspections at Emerson :—

Horses	379
Cattle	429
Sheep	45
Swine	12

I have the honour to be, sir,

Your obedient servant,

P. A. ROBINSON,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 40.

REPORT OF THE COMMISSIONER OF THE NORTH-WEST MOUNTED POLICE.

(A. Bowen Perry.)

Regina, Assa., October 31, 1902.

Sir,—I have the honour to forward my annual report of work performed by the North-west Mounted Police for your department during the twelve months ended October 31, 1902, together with the annual reports of the following veterinary inspectors, which give in detail the various duties performed by them :—

Inspector Burnett, V.S.,	Macleod	District
Staff-Sergt. Coristine, V.S.	Maple Creek	"
Staff-Sergt. Carter, V.S.	Lethbridge	"
Staff-Sergt. Hobbs, V. S.	Calgary	"
Staff-Sergt. Sweetapple, V.S.	Edmonton	"
Staff-Sergt. Mountford, V.S.	Prince Albert	"
Staff-Sergt. Mitchell, V.S.,	Regina	"
Staff-Sergt. Ayre, V.S.,	North Portal	"
Constable Perry, V.S.,	Wood Mountain	"
J. C. Hargrave, V.S.,	Medicine Hat	"
R. Riddell, V.S.,	Calgary	"

The general health of the stock in the Territories has been wonderfully good I am glad to report, and there has been no outbreak of any contagious or infectious disease to chronicle.

HORSES.

Glanders in some parts of the Territories still exists. There has been no serious outbreak in any one locality, and no cases have occurred in livery stables or in towns, but it is scattered about amongst the farmers and small ranchers. To show what damage one diseased animal can do, Dr. Hargrave reports having destroyed 21 horses suffering from glanders. In all but two of this number the infection was traced back to a horse brought from Regina some three years ago, which horse was worked at a sawmill in the Cypress Hills. This horse ran at large for a length of time, and nearly all these cases came in direct contact with him, and were within a radius of twelve miles from the sawmill.

The public at large are quite alive to the seriousness of this disease, and have in nearly every case given the inspectors every help in stamping it out. A pamphlet dealing with this disease was received from your department last year, and distributed as widely as possible throughout the Territories.

Glanders was found to exist lately to a rather dangerous extent in the Red Deer country. It was traced to a herd of horses imported from Montana last year, and Staff-Sergeant Sweetapple has been, and is still employed in stamping it out.

The number of horses destroyed for the past twelve months is as follows:—

Eastern Assiniboia	39
Maple Creek	1
Medicine Hat	21
Lethbridge	0
Macleod	3
Calgary	11
Edmonton	17
Prince Albert	20
Total	112

During the spring round up, the greatest part of the range horses in the Cypress Hills were carefully examined, and not one was found affected with this disease.

Influenza.—Influenza has appeared in various parts of the Territories, and in its minor forms has caused little loss, but considerable inconvenience to stock owners. In the northern sections of the Territories principally, typhoid has caused quite heavy losses. This disease appears to be very fatal and even when the animal is given the best of treatment and apparently recovers, experience has shown that it is never fit for work again.

Dr. Hargrave states the disease is contagious beyond question.

Another form of influenza, called swamp fever by several of the inspectors, appears to have been very fatal. It is confined mostly to the wet country in the northern districts. There appears to be considerable variance of opinion as to the cause and nature of this disease, and it has been under investigation during the past season by your department.

Mange.—Mange has appeared amongst range horses in a few localities in the west, but to no great extent, and is well under control.

Strangles.—Strangles has, as usual, caused some loss amongst young stock.

CATTLE.

Mange.—Mange caused some trouble during the past winter in some sections of the Cypress Hills, and in the High River district. Macleod and Lethbridge district appear to have been comparatively free. The disease disappeared with the advent of green grass in the spring, but within the past few weeks, cases have been reported from various points. Amongst the cattle offered for shipment 121 head were rejected in Calgary district, 3 in Medicine Hat district, 1 in Macleod district, and 23 showing symptoms were allowed to be shipped from Medicine Hat to Calgary for immediate slaughter, and the car used in their carriage was immediately and thoroughly disinfected.

Actinomycosis.—Acting under instructions from your department, this disease has not been treated as a contagious one, and the only restriction now imposed is not to allow them to be shipped for export. Reports show this disease to be on the decrease, and it is the almost universal custom on the ranges when a diseased animal is found, to destroy it, and to feed it to the dogs. Nine were destroyed before the instructions referred to were received.

Symptomatic anthrax has not occurred to such an extent as in former years, owing, I have no doubt, to the increased use of vaccine.

Tuberculosis.—There have been very few cases reported.

SHEEP.

Anthrax.—One case was reported from Wood Mountain, but I doubt very much the diagnosis. Every precaution was taken to prevent the spread of the disease, and no further cases occurred.

Quarantine was strictly enforced in the Swift Current district. Notices giving the limits of the quarantined ground were posted at the corners of each township and where every trail entered the infected area, and at public places within the district. The quarantine ground was burned over last fall, and what could not be burned then was finished last spring. A party of three men continually patrolled the quarantined area. The greater portion of the sheep belonging to the Canadian Land and Ranche Co., were ranged off the infected district, but some 60 or 70 head were ranged within the infected area. No cases occurred, and by orders from your department under date of October 10 instant, the quarantine was raised.

Some losses occurred in the spring in the western country from continued cold rains, otherwise there have been none except from unavoidable and natural causes.

Scab.—None has been reported except in a small band at Stirling, and they were promptly dealt with.

SWINE.

Swine appear to have been unusually healthy, no disease whatever having been reported amongst them.

The number of stock imported and inspected was as follows:—

Cattle	30,581
Horses	16,341
Mules	394
Sheep	83,134
Hogs	764

The total amount of inspection fees collected amounted to $6,322.73, which has been forwarded to your department.

In addition to this there is the sum of $844.70, collected at Wood Mountain, yet to be forwarded.

The number of cattle inspected for export shipment was 46,233.

GENERAL REMARKS.

Quite a large number of young cattle from Texas and Mexico were imported during the past season. They were very carefully examined and found to be clean.

Some few cattle have been driven from Western Assiniboia and Southern Alberta to the Great Northern in Montana and shipped through in bond. They were destined for the English market. Should any more shipments occur, a health certificate will accompany the cattle and Dr. Knowles, the American State Veterinarian, will be notified.

As will be seen by examining the inspectors' reports, their duties at the different ports of entry have largely increased. Next year, as far as at present can be judged, there will be still heavier work, and it may become necessary to station an inspector at Cardston or at some point near the boundary line south of there, as the imports last season were quite heavy, amounting to 8,458 cattle and 3,612 horses.

During the past year, the chief veterinary inspector has visited the Territories twice, and conferred with me regarding quarantine matters.

Attached to the different inspectors' reports will be found statements which show fully the amount of work done in each district.

Weekly and monthly reports from each inspector have been regularly sent to the chief veterinary inspector during the past year, and special reports in all instances when necessary.

I have the honour to be, sir, your obedient servant,

A. BOWEN PERRY,
Commissioner, N.W.M.P.

The Honourable
The Minister of Agriculture, Ottawa.

MACLEOD, October 31, 1902.

SIR,—I have the honour to inclose herewith return of inspections made for the Department of Agriculture by the veterinary staff of 'D' division for the year ending October 31, 1902.

The animals owned and ranged in this district have been remarkably free from contagious or infectious diseases during the year, notwithstanding the fact that large numbers have been brought in from different parts of Canada and the United States.

Some few cases of mange were reported from different sections of the country during the winter, but so far as I could learn the owners of affected cattle gathered them and treated them at home, and by the time the shipping season opened the disease had practically disappeared.

Actinomycosis appears to be just about as prevalent as ever, and animals suffering from this disease are disposed of in the usual way, viz., by feeding to dogs that are kept for wolf hunting or are given to Indians. Very few animals suffering from actinomycosis are brought in for shipment, those shown on the returns as rejected were, with one or two exceptions, cut out of the bands before the beef cattle were cut for shipment.

This appeared to be an unfavourable year for the development of black leg, no cases having been brought to my notice since July, and those who applied for blacklegine had small losses.

Tuberculosis appears to be unknown among the range cattle of this country, at least I have never seen a case or heard of one.

The cattle shipped out this year have been an exceptionally good lot—better, I think, than those of former years. An abundance of feed and water, cool weather and an absence of insect pests, made it a particularly favourable year for the putting on of beef. The improvement in the breeding is also a factor in this connection, and is so marked that cattlemen do not now draw attention to any particular animal by the shape of its horns or the colour of its hide, but designate it as Polled Angus, Hereford, Shorthorn or Highlander, as the case may be.

I understand that the loss of sheep early in the summer was heavy, due to the heavy rains falling at that time. No disease, however, made its appearance among the flocks of this district.

Horses have also been particularly healthy, there being nothing of interest to note.

Business in horses has been good during the year, there being a good demand for saddlers, workers and drivers, and I suppose twice the number could have been disposed of had they been in the country.

I have the honour to be, sir,

Your obedient servant,

JNO. F. BURNETT,
Veterinary Inspector.

The Officer Commanding,
North-west Mounted Police,
Macleod.

MAPLE CREEK, October 31, 1902.

The Officer Commanding
'A' Division, N.W.M.P.

SIR,—I have the honour to submit this the annual quarantine report of this district for year ended this date.

There have been very few cases of contagious disease of any kind in stock. With the exception of an outbreak of anthrax in the cattle of Mr. G. Ambrose on Maple creek, nothing of an alarming nature has existed; anything else being confined to individual cases or nearly so. In the above case I imposed a strict quarantine on stock

and premises, embracing all buildings, corrals, &c., had a thorough course of cleansing and disinfection carried out with the result that the disease was effectually stamped out and quarantine raised after a period of three months by authorization of the Hon. the Minister of Agriculture. Mr. H. Fauquier's horses near Maple creek which were under quarantine at time of last annual report, after a period of three months to allow indications of glanders to develop, they having been exposed to infection, were thoroughly inspected, and no indications of glanders being apparent, quarantine was terminated. One case of glanders came under my notice during the year, that of a stallion owned by Mr. Chas. Reid of Swift Current. This animal showed unmistakable symptoms of the disease and was destroyed, and the regulation relating to such cases carefully carried out. Other cases of contagious disease comprised individual cases of actinomycosis, tuberculosis and mange.

Regarding mange, no complaints have been made during the past year, and from observation of the stock in different parts of the district and inquiries from ranchers, little trouble appears to have been experienced with this disease. Treatment by hand is the only means used in its cure and prevention and is in every way satisfactory, and ranchers claim to have no difficulty in handling in this manner all cases which turn up.

Shipping began at an unusually early date this year. Conditions were favourable for the maturing of beef, and although the number of beef cattle shipped to date is slightly less than last year at this date, the next two months will more than make up the difference, as there are yet a great many prime beef animals on the range. I might say that during the year I have not found it necessary to reject one animal as being unfit for shipment or human consumption.

Imports were greatly in excess of last year in both horses and cattle, which were all found free from contagious disease.

Quite a number of Mexican cattle, practically all two-year old heifers, have been brought into the district. These are to be crossed with purebred Hereford bulls, and being largely in the nature of an experiment, will be watched with interest, and if successful, will no doubt lead to large importations of that class of cattle. The class of horses imported during the year has generally not been all that could be desired to aid in the building up of this most important industry. By this I mean lack of breeding and quality, they being to a great extent of the cayuse type.

The imports of sheep were about the same in number and of a decidedly better class, younger and better bred.

Large numbers of dogies have been brought into the district and find a ready market at good prices.

The following animals were imported during the year:—

Horses	2,870
Cattle	2,993
Sheep	8,760
Mules	42

There were inspected during the year, 5,975 beef cattle for exportation from Canada and 1,318 for local markets.

The veterinary inspection fees collected during year amounted to $1,211.05.

I have the honour to be, sir,

Your obedient servant,

D. CORISTINE, *V.S., S. Sgt.*

The Officer Commanding
N.W.M. Police, Lethbridge, N.W.T.

COUTTS, October 31, 1902.

SIR,—I have the honour to state that I have made out and forwarded my annual reports of veterinary work peformed for the Department of Agriculture, for the twelve months ending October 31 inst.*

I have the honour to be, sir,

Your obedient servant,

JOS. E. CARTER, *V.S.*

To the Officer Commanding
N.W.M. Police, Calgary.

CALGARY, October 31, 1902.

SIR,—I have the honour to make the following report of the work done for the Department of Agriculture during the year ending October 31, 1902.

Eleven animals have been destroyed during the past year for glanders. This disease, I regret to say, appears to be on the increase.

S. S. Sweetapple is at present following up an outbreak of it in the Red Deer district, which he will doubtless stamp out.

Two cases of actinomycosis were destroyed at the owner's request, having reached the stage in which both animals were worthless.

Two steers, the property of P. Burns & Co., were also destroyed at their request, for tuberculosis. These animals were in a most dilapidated condition, and I recommended their destruction, and held a post mortem in both cases.

During the summer months mange in cattle seemed to have almost entirely disappeared, but now that the green grass has disappeared, it is again showing up on the range. Mange has existed and still exists in the High River district amongst the horses of Messrs. Eckford, and has done so in Mr. George Lane's, but I think I am safe in saying that in his case it is almost entirely stamped out.

From time to time deaths occur in the horses, ranging from Olds as far north as Red Deer. I am not in a position to state the pathology of the disease, but am under the impression it is a form of typhoid influenza. Some few cases of it have existed around Calgary, and from what practitioners have told me, it exhibits the symptoms of the above named disease.

Mr. R. Riddell, V.S., has been acting as veterinary inspector in this district when required, and I attach herewith his report for the year.

With the exception of mange in cattle and horses, the health of the stock in this district is everything that could be desired.

I have the honour to be, sir,

Your obedient servant,

ARTHUR HOBBS, *V.S.*
Veterinary Inspector.

To the Officer Commanding,
N.W. M. Police, Calgary.

* Statements inclosed not printed.

CALGARY, October 27, 1902.

SIR,—I have the honour to report that during the past three months I have inspected for shipment one thousand six hundred and thirteen (1,613) head of cattle.

I have found the cattle all in good healthy condition and free from any contagious or infectious disease.

I have the honour to be, sir,

Your obedient servant,

R. RIDDELL, V. S.

To the Officer Commanding
N.W.M. Police, Calgary.

FORT SASKATCHEWAN, October 31, 1902.

SIR,—I have the honour to forward the following report of services performed for the Department of Agriculture for the year ending October 31, 1902.

I have frequently visited the different parts of this district, and have found that swamp fever has caused the death of a number of horses in almost every locality.

There is a marked increased in the number of cases of glanders and especially in the horses brought by settlers from Montana.

A mild epidemic of influenza occurred among horses during the early part of the summer.

Contagious abortion apparently exists in certain localities, as there is a great decrease in the number of calves born to what was expected Besides this, cattle, sheep and hogs have been particularly free from disease of any kind.

A detailed statement of work done by me here has been forwarded to the department from time to time.

I have the honour to be, sir,

Your obedient servant,

C. H. H. SWEETAPPLE, V. S.,
Vet. S. Sgt.

To the Officer Commanding.
N. W. M. Police, Fort Saskatchewan.

PRINCE ALBERT, October 31, 1902.

SIR,—I have the honour to forward the annual report of the work performed for the Department of Agriculture for the twelve months ending October 31, 1902, which is detailed on the accompanying form (not printed). I inspected no stock for shipment and collected no fees. About 5,000 head of cattle left this district for the southern part of the territory and about 2,000 fat cattle went to England.

The general health and condition of the stock in this district for the past year have been good.

I have the honour to be, sir,

Your obedient servant,

J. J. MOUNTFORD, V. S.,
Vet. S. Sgt.

The Officer Commanding,
F Division, Prince Albert.

NORTH PORTAL, November 3, 1902.

SIR,—I have the honour to inclose herewith quarantine return for North Portal for year ending October 31, 1902. (Tabulated statements inclosed not printed).

I have the honour, to be, sir,

Your obedient servant,

H. T. AYRE, S. Sgt.,
In charge of detachment.

The Officer Commanding,
Regina District, N. W. M. Police.

WOOD MOUNTAIN, October 31, 1902.

SIR,—I have the honour to forward you the following report of veterinary work done for the Department of Agriculture since my arrival here in April last. I received orders on arrival at Willow Bunch to proceed to Mr. Halle's place, and examine twelve carcasses of cattle supposed to have died from anthrax, but as I found out that they had been dead and buried over a fortnight, I considered it inadvisable to exhume the carcases for a post mortem examination. At the same time I received orders to examine a horse belonging to Mr. Peter Hourie of Regina, running with a bunch about 12 miles from the detachment, and supposed to be suffering from glanders. I proceeded to the place, examined the horse and found it free from disease.

On August 23, when I was at Willow Bunch, a sheep belonging to Mr. L. Dumas died, which on post mortem examination proved to have been affected with anthrax, I immediately had the carcase burnt, and up to the present there have been no further cases.

On September 28, I examined a bay mare and colt belonging to Mr. Longe, reported to be suffering from glanders, but found both free from disease. I might here state that influenza has been very prevalent through the district this summer, with the result that people report all catarrhal affections as glanders.

I make it a point when out to examine all stock in the vicinity where I stop, and am satisfied that there are no cases of glanders in this district.

I examined two stallions for Mr. W. Murray, which he was taking over to Saco, Montana, U.S.A.

I have the honour to be, sir,

Your obedient servant,

F. PERRY, V.S.,
Constable.

To the Officer Commanding
Regina District.

REGINA, October 31, 1902.

SIR,—In compliance with your instructions, I have the honour to forward this, my quarantine report, for the year ending October 31, 1902.

And in addition to the detailed statement herewith submitted, it might be stated in general terms that a very considerable amount of work along the same lines, but outside the scope of that statement, has been performed. Obviously in the prosecution of duties of this kind, scattered over a wide area and occurring at points widely separated, a considerable amount of time and labour were involved, but, nevertheless, in every instance the localities in question were visited with the utmost promptitude, and such

action taken at the time as has rendered unnecessary, with scarcely an exception, any subsequent interference.

In common with previous years and necessarily connected with the agricultural pursuits of the people, glanders among horses has been the chief source of trouble. The unusual influx of immigrants that has characterised the past season, not only from the adjacent states, but from the eastern provinces as well, implying in nearly every instance the introduction of outside horses in corresponding numbers, is no doubt accountable, to a large extent, for the prevalence of this disease during the past season. Instances have occurred in certain localities where, notwithstanding the vigilant eye of the inspector, the presence of the disease could only be accounted for on that theory.

In dealing with this disease, in a large majority of instances, the mallein test was resorted to as an aid to a correct diagnosis, but in no instance has an animal been destroyed merely as the result of a response to the use of that preparation. In a word while the utmost vigilance has been exercised in stamping out disease wherever it has been found to exist on the one hand, an equal degree of care has been exercised in guarding the interests of owners on the other, so that it can be safely stated that no animal has been destroyed for glanders that was not affected with that disease, and, agreeably with this course of procedure, in every instance where it has been found necessary to destroy an animal, post mortem examination, if at all practicable, preceded the act of burning the carcass.

With the exception of glanders no disease of a strictly contagious character affecting horses or other domesticated animals has come directly before my notice. During the summer and autumn months, in certain low-lying districts and in connection with the grading outfits on the new railway, swamp fever in horses for the first time made its appearance, and, as a result, considerable mortality among horses occurred. In these instances symptoms of an unusual character were presented thereby occasioning considerable alarm to the owners of the affected animals, but an investigation invariably established the non-contagious nature of the malady.

Altogether the general health of stock has been good. Even in the case of glanders no serious outbreak has occurred, the cases reported having been confined to agricultural horses, and usually limited to the ownership of a single rancher; black leg, too, usually more or less prevalent in the ranching districts does not appear to have occasioned much trouble, while so far as anthrax is concerned no instance of its presence has been brought to my notice.

I have the honour to be, sir,

Your obedient servant.

W. MITCHELL, V.S.,

Vety. Staff Sergeant

The Officer Commanding
Regina District, Regina.

MEDICINE HAT, October 31, 1902.

SIR,—I have the honour to submit this my report for the twelve months ending October 31, 1902.

All classes of live stock have been particularly healthy in this district.

7,644 head of cattle were inspected and passed for shipment, the major portion for the English market.

A statement of these inspections is appended herewith,* as will be seen from this statement, six (6) head were rejected, twenty-three (23) head were permitted to be shipped for immediate slaughter, these had been treated for mange, but still looked suspicious. The shipper was notified to have the car disinfected immediately on unloading. The officer commanding, Calgary, was asked to see that this was carried into effect.

Beef cattle were in the best of condition, perhaps never better.

Appended hereto you will find a statement* of stock imported from the United States during the last 12 months, showing that 4,433 head have been inspected, this

* Statements inclosed not printed.

number does not include sucking colts or calves. Of this number 193 were entered as part of settlers' effects. Upon the balance, inspection fees to the amount of $990.65 has been collected.

Vaccine sales to the amount of $326.40, have been made during the year. Blackleg vaccine is being used more than heretofore, as a result little or no loss from symptomatic anthrax has been reported this fall.

Glanders.—During the year twenty-one (21) head of horses were shot, about half the number of last year. At the time of this report eleven (11) others are in quarantine having responded to the mallein test. Of the 21 head shot, 14 presented clinical symptoms of glanders, and one of farcy; the balance responded to the mallein test. Since March, none have been destroyed unless presenting clinical symptoms, and since August temperature charts of all tests made have been forwarded for your consideration. With two exceptions, these cases can be traced to a horse brought from Regina about 3 years ago and worked at a local saw mill in the Cypress Hills district. This horse ran at large for a length of time and nearly all these cases came in direct contact with this horse, they all being within a radius of twelve (12) miles from the mill.

On May 9, instructions were received to inspect all horses as rounded up with a view to ascertain to what extent glanders existed, not one case was found.

In addition to horse round up, all stock inspected by me under the Animal Contagious Diseases Act, are included in the list.

Influenza.—Influenza appeared in different forms in the district. In one part it appeared in that form commonly called pink-eye and, although no loss to speak of, still it caused considerable inconvenience to the ranchers, as it occurred during the busy season.

In that district lying between Calgary and Edmonton it took the abdominal form namely, typhoid influenza. A large number die each year in this part, especially among the range horses and those away from points where professional aid can be had. That it is contagious is beyond question. The period of incubation would appear to be of various lengths. Some would be quite sick one day that were quite healthy the day before. Some cases run a very rapid course and some remain sick from 3 to 5 weeks. Some never recover completely, i.e. apparently all right, but will not stand work. One case I saw while at Bowden was affected with a weakness of the heart, would not stand more than half a day's work. As a rule they stand motionless, head drooped, eyes swollen and running, staggering gate when moved, especially a weakness of the hind quarters. In later stages an odematous enlargement on the under surface of chest and abdomen. Temperature 105 and 106, 106·5 in one case I saw. Heart rapid and strong, pulse weak, almost complete loss of appetite. I pointed out to the ranchers the necessity of complete isolation and careful nursing. In some cases expectant treatment was all that was necessary, with alcohol or digitalis in later stages.

Actinomycosis appears to be gradually decreasing, only three (3) head were seen at the stockyards and only a few have been reported on the range.

Mange caused some trouble during the past winter in one or two localities, one rancher having to treat about 50 per cent of his band. In the Walsh district a very small per cent were affected, but the major portion of the district was free from it. No cases have been reported since April, until within the last two weeks when a few head have been reported. Three head were rejected at the shipping points, and 23 others showed evidence of mange recently cured.

Tuberculosis.—Only one animal was treated with tuberculin, giving negative results.

Symptomatic Anthrax occurred during last fall and up to the latter end of January, but since then only two instances where loss has been reported. All outbreaks stopped upon use of vaccine. The increased use of vaccine this year no doubt accounts for its non-appearance.

Opthalmia occurred to quite an extent this fall, but the majority of cases made a complete recovery. Among sheep no loss, other than from spear grass and poisonous plants has occurred.

On June 17, 11 head of sheep died at Gull lake; owing to the interval between time of death and my visit did not make an examination of them, but from the history and *post-mortem* appearances described by the shepherd, I feel positive that deaths were due to the poisonous plant, known as Death Camus, which grew there in abundance.

No loss among the sheep at Swift Current from anthrax, although some 60 or 70 head were allowed to pasture on the infected lands all summer. The balance of the companies sheep have been kept away from the infected lands.

Permission was applied for and granted to the Canadian Land and Ranch Co., at Swift Current to ship their wool stored at that point.

Respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

J. C. HARGRAVE,
Inspector

The Honourable
The Minister of Agriculture,
Ottawa.

No. 41.

REPORT OF VETERINARY INSPECTOR AT NELSON, B.C.

(J. A. Armstrong, V.S.)

Nelson, B.C., October 31, 1902.

Sir,—I have the honour to submit to you this my report for the year ending October 31, 1902.

I am glad to report that this district has been comparatively free from disease during the past year, there being only one outbreak of glanders in January, 1901, at Slocan City, Wardon Bros. losing five horses and Mr. R. Allan three horses and one colt.

The following is a statement of the stock imported into this district during the year:—

Horses	53
Mules	13
Cattle	171
Swine	98
Sheep	2,463

I have the honour to be, sir,

Your obedient servant,

J. A. ARMSTRONG,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 42.

REPORT OF VETERINARY INSPECTOR AT GRAND FORKS, B.C.

(S. C. Richards, D.V.S.)

Grand Forks, B.C., October 31, 1902.

Sir,—I have the honour to submit my annual report of stock entered for inspection into the Kettle River district during this year ending Oct. 31, 1902:—

Horses	442
Cattle	7
Sheep	2,246
Hogs	48

It is my pleasure to state that the condition of the stock in this district is splendid, and that there has not been a single outbreak of a contagious disease in this district during the last year.

I have the honour to be, sir,

Your obedient servant,

S. C. RICHARDS,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 43.

REPORT OF VETERINARY INSPECTOR AT VANCOUVER, B.C.

(J. B. Hart, D.V.S.).

Vancouver, B.C., October 31, 1902.

Sir,—I have the honour to report a gratifying scarcity of contagious diseases of animals in this district.

There is a certain amount of tuberculosis and actinomycosis and, along the Lower Fraser valley, a disease which, owing to the finding of red hemoglobin globules in the tissue voided, the circumscribed area covered and its recurrence, I judge to be caused by a malarial agent, probably a microbe, though as yet I have not been able to isolate such.

There have been but few cases of symptomatic anthrax in cattle, and only one outbreak of contagious pneumonia (lung fever) in horses. The latter was easily controlled by isolation and disinfection.

I have the honour to be, sir,

Your obedient servant,

J. B. HART,
Inspeitor.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 44.

REPORT OF VETERINARY INSPECTOR OF ANIMALS ARRIVING AND DEPARTING FROM PORT OF VANCOUVER BY SEA.

(J. W. Bland, V.S.)

Vancouver, B.C., October 31, 1902.

Sir,—I have the honour to report that the general health of horses, cattle, sheep and swine in the province of British Columbia during the past year has been good with few exceptions.

On May 1 I inspected 61 head of American Merino sheep for Pliny B. Morton and R. D. Clark, of Addison, Vermont, U.S.A., valued at $53,000—a magnificent flock, indeed. Mr. Morton had twelve new wooden crates built here for their ocean voyage to Sydney, New South Wales, Mr. Morton and myself removing them from palace horse car No. 58958, Canadian Pacific Railway, to new wooden crates with greatest possible care.

On May 5, for A. D. Patterson, Esq., I inspected and quarantined 6 purebred cattle, valued at $1,900, giving tuberculin test without reaction. Quarantine raised: tuberculin chart, in A. D. Patterson's name, sent to your office.

During the 12 months ended October 31, 1902, I inspected 238 horses, 3,540 cattle, 6,534 sheep and 1,290 swine in accordance with the regulations. Of these 10 horses, 54 cattle, 1 sheep and 1 pig were the property of settlers from the State of Washington, U.S.A.

In conclusion, I have again to thank the officers of His Majesty's Customs for assistance in carrying out the regulations.

I have the honour to be, sir,

Your obedient servant,

J. W. BLAND,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 45.

REPORT OF VETERINARY INSPECTOR, VICTORIA, B.C.

(C. R. Richards, M.D.C., V.S.)

Victoria, B.C., October 31, 1902.

Sir,—I have the honour to submit the following as my report of inspection made at this port for the year ending October 31, 1902:—

There was a total importation of 232 horses, 4 mules, 4 cattle, 355 sheep and 1 swine, and the total exports consisted of 18 horses and 1 sheep.

The imported horses and mules were mostly from Eastern Washington, Oregon and Idaho, a few having come from California, they consisted principally of general purpose and light drivers and some were racing stock. Sixty of the horses so imported belonged to the dog and pony show of Gentry Bros., which is a travelling show, and entered British Columbia at this port having come from the State of Washington. The cattle were imported from Washington and Oregon and in consequence of the importers having failed to comply with the regulations for the importation of cattle they were placed in quarantine and subjected to the tuberculin test; all proved to be in a healthy condition and were released. The sheep were imported for breeding purposes and were mostly entered at Sidney a sub-port of Victoria, the hog was imported from Texas.

The exports consisted mostly of racers the majority of which had been inported from Washington for the purpose of taking part in the annual races in connection with the exhibition held at Victoria.

I have the honour to be, sir,

Your obedient servant,

C. R. RICHARDS,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 46.

REPORT OF VETERINARY INSPECTOR AT CRANBROOK, B.C.

(W. S. Bell, V.S.)

Cranbrook, B.C., October 31, 1902.

Sir,—I have the honour to submit my annual report of the health of animals in the district of South East Kootenay.

I am pleased to report that the general health of animals has been good, with the exception of an outbreak of influenza amongst horses during the months of November, December and January. Quite a number died which was mostly due to their not receiving proper care. A number developed a chronic nasal gleet.

The following is a statement of animals imported from the United States and inspected by me during the twelve months ended October 31, 1902 :—

Horses	363
Mules	28
Cattle	41

I have the honour to be, sir,

Your obedient servant,

W. S. BELL,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 47.

REPORT ON LIVE STOCK CARS AND YARDS.

East of Winnipeg.

(MICHAEL AUGER, INSPECTOR.)

OTTAWA, October, 31, 1902.

SIR,—I have the honour to submit to you this my annual report, covering the period from November 1, 1901, to October 31, 1902.

In compliance with your request, in March last I visited Calgary and several places in British Columbia and the Territories. It being rather early in the year, the shipping of cattle had barely commenced and I decided to return west in June or July. I then found that the cause of complaint about cars coming uncleaned from the United States, made by the veterinary officers of the government and the head officials of the Canadian railroads, had been removed and that cattle cars were being cleaned as the law requires.

On account of the increasing cattle trade in the West, I think the appointment of Mr. Chas. W. Peterson, of Regina, as Inspector of live stock cars and yards west of Winnipeg, is a move in the right direction.

I spent the balance of my time in Ontario and Quebec, and found that the different railroad companies were willing to comply with the regulations as soon as any neglect of their employees was reported to them.

The cattle-yards are being improved slowly but surely. During the year I have travelled over twenty-five thousand miles, having thus had a good opportunity of seeing the cattle cars and yards.

I have the honour to be, sir,

Your obedient servant,

M. AUGER,
Inspector of Live Stock Cars and Yards.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 48.

REPORT ON LIVE STOCK CARS AND YARDS.

West of Winnipeg.

(Chas. W. Peterson, Inspector.)

Regina, N.W.T., October 31, 1902.

Sir,—In accordance with your directions, I have the honour to submit herewith for your information, a brief report upon my inspection work from the date of my appointment, June 1 last. Up to a few years ago, complaints as to uncleaned stock cars and dirty or inadequate shipping yards were not very numerous, through that portion of Canada lying west of Winnipeg, but the rapid expansion of the cattle industry in the Territories, which has increased from an export trade of twenty thousand head in 1898, to about seventy thousand head during the present calendar year, coupled with a corresponding growth in grain production and other branches of agriculture, has taxed the resources of the railways severely, and made the situation particularly acute, and the abnormally wet seasons which have prevailed during recent years, having also had a very unfavourable effect upon the conditions, under foot, of stock-yards throughout the West. It is only fair to state, however, that any neglect as to the cleaning and disinfection of cars and stock-yards is almost invariably due to the failure on the part of employees to carry out their instructions, and not to any unwillingness of the railway company to comply with the law and to furnish proper accommodation for the loading and handling of live stock in transit. While travelling about the State of Montana recently, I took the opportunity of looking carefully into the yard and car equipment of American lines entering that State and found that the stock cars placed at the disposal of shippers were superior to those in use on Canadian lines, but the railway stock yard accommodation of Montana would have been equally as defective as in western Canada, had the seasons there been as humid as they have been here during late years.

My office work since my appointment has been fairly heavy, as I have made it my business to bring to the attention of the chief officials of the railways all complaints that have come to my notice from reliable sources, and such are of very frequent occurrence. I have not found it necessary to adopt any coercive measures during the year owing to the fact that cases of complaint have generally been attended to as promptly as circumstances would permit of, in fact, the railway managements have been rather pleased than otherwise to receive notification of defects in their facilities for handling live stock and of negligence of employees.

There can be no doubt that vast improvements are required in stock-yards throughout Manitoba, the Territories and British Columbia. Stock-yard facilities have by no means kept pace with the rapid expansion of the live stock traffic, both incoming and outgoing, and it is to be hoped that the earnest representations that have been addressed to the railway authorities on the subject, and which are now under consideration, will have the desired effect. Yards at all important points require extension badly, and the water supply in a great many cases is most inconvenient and deficient. It is most important that frequent inspections should be made of yards at feeding and resting points, as much depends upon the condition these yards are in. That a depreciation of a couple of dollars per head may easily take place in dogie cattle unloaded and kept in wet, uncomfortable yards when in an exhausted condition, will readily be admitted by all experienced shippers. In fact, the statement is freely made that enough cattle perished during the early spring through the defective condition of the Calgary stock-yards to more than pay for their reconstruction on a proper basis.

The following statement shows the railway stock-yard facilities available in Manitoba and the Territories up to date.

	Number of Yards.	Total capacity in carloads.	Average capacity in carloads.
Manitoba	66	265	4·01
North-west Territories	64	668	10 13
Total	130	933	7 17

Since my appointment I have inspected all yards on the main line within the territories west of Regina as well as those along the Prince Albert line, also the principal yards on the Crow's Nest line and the Winnipeg stock-yards. Some of these have been reinspected at intervals.

A considerable number of cases where uncleaned cars have been furnished came to my attention during the year. Complaints were lodged in every instance and the offending employees reprimanded. Generally speaking, there can be no doubt that the type of stock car in use on Canadian lines in the west leaves much to be desired, and it would be a boon to breeders and shippers if the Street's stable car or some other similar style of car were generally introduced. It is probably a little premature to hope for such a step on the part of railway companies, but undoubtedly the value of cattle is seriously depreciated in transit owing to the present defective car service.

I have the honour to be, sir,

Your obedient servant,

CHAS. W. PETERSON,

Inspector.

No. 49.

REPORT OF VETERINARY QUARANTINE OFFICER FOR CANADA IN GREAT BRITAIN.

(A. G. Hopkins, B. Agr., M.D.V.)

Ottawa, November 15, 1902.

Sir,—Herewith I beg to lay before you a report of the work performed by me as veterinary quarantine officer for Canada in Great Britain during the twelve months ended October 31, 1902.

Under the instructions of the chief veterinary inspector, I proceeded to Great Britain the beginning of May, and on arrival there May 15 at once began testing.

The question of the importation of Canadian horses, and the inspection of those horses having arisen, I was authorized to look into the matter with Mr. Wm. Hunting, F.R.C.V.S., London, Eng., which I did and have already reported on.

My experience with the testing was similar to that described by Dr. J. G. Rutherford, my predecessor in the work, by whose experience I was materially aided in meeting the peculiar conditions encountered in the pursuance of tuberculin testing in Great Britain.

The work kept up steadily during the summer except for a short lull in September, during which time I was engaged in investigating the condition on arrival at the lairages (Yorkhill, Birkenhead and Deptford) of Canadian bullocks, regarding which I have reported elsewhere. The number of cattle tested by me was 571 head, all Shorthorns, except for a few Galloways and Aberdeen Angus. Owing to the great demand for Shorthorns and to the severe culling out of some herds, this and previous seasons, a number of inferior animals have been shipped across the Atlantic.

Fortunately for me the buying was more evenly timed and regular than last year, consequently I was enabled, except in two instances, to dispense with any professional assistance.

The percentage of reactions was 23, this season comparatively few cows were tested, buyers profiting by former experience, and thus bought only two years olds and under to be submitted to the test. As far as I can gather from the tests made, the percentage of cattle affected increases with age, more yearlings are affected than calves and more two year olds than yearlings. The poorly lighted ill-ventilated byres undoubtedly assist in the spread of the disease. My observations lead me to believe that in byres as described where diseased cattle are housed the chances of the young stock escaping infection are very small, and that little improvement can be looked for in the results from the testing of British herds until owners attend to the lighting and ventilation of their byres, the testing of their herds and the segregation of the reactors. As indicated by the present Chief Veterinary Inspector in last year's report, the eradication of this disease (bovine tuberculosis) is quite possible to effect at a comparatively small loss of time and expenditure.

As the American markets are the great stimuli to British pure-bred cattle values, it behoves the agriculturist of the British Isles to grapple with the question at once. A marked feature of the exportations was the great preponderance of females over males, and in nearly every case were they selected from certain fashionable families.

From the observations made I should think the average price paid per head to the British breeders to be between forty five to sixty pounds ($225—300 dollars approximately) and as the greater number of the cattle shipped were two years old or under, the Old Country breeders have obtained good prices for their bovine stock. I had my headquarters at the Canadian Government offices, Glasgow, where I received many courtesies and much assistance from the agent, Mr. H. N. Murray. As the season for shipping to the Lévis quarantine has closed, I have returned to Canada according to instructions.

I have the honour to be,

Your obedient servant.

A. G. HOPKINS.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 50.

REPORT ON 'SWAMP FEVER' IN HORSES.

(F. TORRANCE, D.V.S.)

WINNIPEG, October 31, 1902.

SIR,—Acting upon the instructions contained in a letter from Dr. Rutherford, dated April 15 last, I have been engaged, with the assistance of Dr. Bell, in the investigation of 'swamp fever' of horses, and have the honour to submit the following report on the work done :—

History of the disease—There are no data for ascertaining when the disease first made its appearance in the province of Manitoba. The old settlers that I have interviewed can give no definite information on the subject. Veterinarians who came to Winnipeg in 1881 and '82 soon had their attention called to the disease, so that we may safely say that it has been known for more than twenty years. With the advent of new settlers came the importation of large numbers of eastern horses, and the gradual extension of the territory affected. At first this seems to have been confined to the country bordering the Red river, then that lying along the Assiniboine up to and including the Portage plains, and gradually extending its scope until at the present time it is recognized over a large area of Manitoba and in some parts of the Territories. In order to ascertain to what extent the disease was known, the following circular letter was addressed to every known veterinarian in Manitoba and the North-west Territories :—

WINNIPEG, May 22, 1902.

DEAR SIR,—In conjunction with Dr. Bell, the provincial bacteriologist, I am engaged in the investigation of 'swamp fever' in horses, with the object of discovering the cause of the disease, and a reliable method of prevention and cure. We wish to get information on the subject from different parts of the country, and I am, therefore, addressing this letter to you in the hope that you will kindly write me full particulars of the disease.

I may add, for your information, in case the disease is unknown in your locality, that 'swamp fever' is characterized by weakness, especially in the hind quarters, gradual loss of flesh while the appetite continues good, or even ravenous, paleness of the mucous membranes (anemia) ; variable temperature, debility and generally death. The points on which information is desired are :—

1. Is the disease prevalent in your locality, and to what extent ?
2. How long has the disease been known there ?
3. What are the symptoms usually observed ?
4. What lesions are found on p. m. examination ?
5. What is the usual duration and termination of the disease as you have seen it ?
6. Have you discovered any reliable remedy or special mode of treatment ? If so, what ?

Your letter will be treated as confidential and not published without your permission. I inclose stamped envelope for your reply, for which, allow me to thank you in advance.

Yours, sincerely,

F. TORRANCE.

Forty replies were received, seventeen of which stated that the disease was prevalent in the district of the writer, sixteen unknown or rare, seven slightly prevalent. Analysing these reports it is found that the districts affected are :—

First, the Red river valley, in its larger sense, which includes the area formerly occupied by the geological Lake Agazzis, including :

1st. The country up to the Pembina and Riding mountains, the Portage plains and Dauphin country.

2nd. The western part of Manitoba, the Binscarth, Russell and Yorkton districts.

3rd. The country north and south of Edmonton.

The south-western part of Manitoba, Assiniboia and Alberta, with the exception of the Edmonton district, appear to be free from the disease.

In the affected districts the loss from the disease is very serious, especially in wet seasons, and causes more deaths than all other diseases put together. To farmers the loss is very heavy, for when the disease makes its appearance on a farm, it is apt to recur from year to year, carrying off one horse after another.

For instance, Mr. Stewart of Westbourne is reported by Dr. Hilton, to have lost during two years, sixteen horses out of eighteen. Mr. Walter Burns & Son of Blythfield, during seven years farming, lost seventeen horses and forty colts, mostly from 'swamp fever,' and any number of similar cases could be cited. Railway contractors are often heavy losers from the disease. One of them who has had many large contracts in Manitoba and North-west Territories, told me that his loss in horse flesh, from this disease alone was over $10,000. Veterinarians, who have had experience with it, are unanimous in saying, that it is the most serious equine malady they are called upon to treat, and consider the losses occasioned by glanders, trifling in comparison with it.

The Veterinary Association of Manitoba, has frequently discussed the disease and at the annual meeting of 1900, petitioned the local government to make a grant of money for the purpose of investigating its pathology and if possible discovering some means of prevention and cure. The Minister of Agriculture recognized the importance of the matter and made a grant of two hundred dollars, subsequently increased to two hundred and sixty, to the writer and Dr. Bell. With this money we continued the investigation previously begun by us, and made considerable progress, which was arrested by coming to the end of our grant. In 1901 the association petitioned for a renewal of the grant, but the local government failed to respond, and in 1902 the association addressed the following petition to the Dominion Minister of Agriculture :—

Whereas the disease of horses, commonly known as 'swamp fever' has been and is causing serious losses to the farmers and ranchmen of Manitoba and the Territories, losses besides which glanders is comparatively a trifling matter, and

Whereas the investigation hitherto carried on under the auspices of this association, assisted to a small extent by the Provincial Government have been hampered for lack of funds, and the pathology of the disease is still unknown, and a certain remedy for it still undiscovered.

Resolved, that this association do hereby memorialize the Department of Agriculture of the Dominion Government to make a sufficient grant for the purpose of investigating the disease.'

This request was graciously acceded to. A sum of money was placed in my hands, and with the valuable assistance of Dr. Bell, the work of investigating the disease has been going on for the past five months.

Nature of disease, symptoms and course.—The disease is essentially a fever of a remittent type. It is characterized by a progressive anaemia, gradual emaciation, while the appetite remains good, oedema, weakness and loss of power in the hind legs. The earliest symptom noted is weakness. The horse tires out easily, seems to have no life and is unable to do his usual work. If examined carefully at this stage, it is difficult to decide what is the matter with him, as the pulse may be normal and the temperature elevated 1 or 2 degrees only. Following closely the weakness, there is noticed some uncertainty in the movements of the hind legs, the horse appears weak in the loins, the toe is sometimes dragged along the ground, and in turning the horse sways the hind

quarters and crosses the legs. He continues to eat well, and sometimes ravenously, but grows thinner all the time. His pulse is now increasing in frequency and runs from 50 to 60 or even 70 and a peculiar thrill is felt in it, as if the blood vessel were only partly filled. The temperature becomes elevated to 103 degrees or higher, and varies considerably, remaining high for a few days and then falling almost to normal for an irregular time and again rising, but towards the end remains persistently high, an unusual amount of rumbling in the bowels is heard. The horse is now too ill to work, and it is usually at this stage that the first attempt is made to do something for him. He is laid off work and submitted to treatment of various kinds. He may improve for a time, but as a rule the improvement is only temporary, he takes the downward track again, gets thinner and thinner, his mucous membranes are pallid with a profound anæmia, his eye is sunken and bright with a glassy stare, œdema of the legs and under surface of body is noticed. His pulse becomes more rapid and weak. Venous regurgitation is seen in the jugulars. The heart sometimes labours so that its beating can be heard at a little distance. The skin is often dirty and feels greasy. The horse passes unnatural quantities of water. Finally death comes suddenly either from syncope or exhaustion.

Such is the usual course of the disease, the duration extending over two or three months. Sometimes, however, we meet with more acute cases in which all the symptoms are noted and present in an aggravated form from the first, and the horse dies in two or three weeks. And occasionally we meet with cases that respond to treatment and recover.

To deal more minutely with the symptoms I will take them one by one.

The Pulse.—The peculiar thrill already referred to is felt just as the pulse wave has passed and the vessel is subsiding. Once the observer has felt it he rarely fails to detect it even in early cases. Another feature of the pulse is its want of proportion to the temperature. In most diseases when the temperature is high we also find the pulse rapid, but in 'swamp fever' it is not uncommon at the outset to have a high temperature and a comparatively slow pulse, for instance a temperature of 105 degrees and a pulse of 50 degrees.

Anæmia.—The pallor of the mucous membranes, so well marked in the later stages of the disease, is not so noticeable at first, when the gums may only be a little less rosy than they should be. In fact a blood count may show a decrease of two or three million corpuscles before the appearance of the mucous membranes is appreciably altered. With a decrease of from three to four millions the pallor is very noticeable, and when the corpuscles are reduced to two and a-half or three millions the membranes appear almost completely blanched.

The Temperature.—In the early stages the temperature is very variable, high for a few days, then falling almost to normal for several days, then rising again: but towards the later stages of fatal cases remaining persistently high. After following closely very many cases I am unable to assign any definite period to the exacerbations of the fever. They vary in different cases. But I would like to point out that one should be careful in diagnosing a case when there is slight elevation of temperature, as it may be in the quiescent stage and in two or three days show a marked rise.

The Appetite.—One of the most curious features of the disease is the way a horse will eat while suffering from this fever and getting thinner every day. If allowed the horse will eat hay almost continually, besides consuming as much oats or bran as a working horse. The ravenous appetite is characteristic of the disease.

Oedema of the legs is not generally seen until the later stages are reached, and in well-bred animals may not be seen at all. In many cases we also have oedema of the under surface of the body.

Petechiæ on mucous membranes we have observed in a very few cases, and only on the surface of the membrana nictitans. In one case that I was able to follow to its termination the petechiæ remained throughout its whole course.

Polyuria. A marked increase in the quantity of urine secreted is often noted during the course of the disease and may be taken as an unfavourable sign, indicating a destructive katabolism.

Such are the clinical features of the disease as seen in ordinary practice as well as in the experimental cases kept under observation, and I will now give a more detailed account of our observations and experiments.

Two cases of 'swamp fever' were obtained through Dr. Hilton of Portage la Prairie, and shipped to Winnipeg by train, where they were placed in a small stable convenient to the laboratory. One of these cases represented the chronic type of the disease and had been sick since the previous fall. The other was a more recent type and had only been affected about one month. Both were greatly emaciated and so weak that it took over an hour to get them from the stock-yard to the stable. They were numbered I and II and clinical investigations begun at once. Records of the pulse and temperature were made twice daily, the blood frequently examined for hæmatozoa, the corpuscles counted and cultures made. While this work was going on it was desirable that experiments should be made to find out whether the disease is transferable from horse to horse.

With this object a healthy horse, No. III, was purchased, placed in the stable with the diseased ones, and after a short period of observation, to ascertain whether his health was normal, he was injected with blood from one of the diseased horses. His temperature and pulse were recorded twice daily and blood counts made. A rise of temperature twelve days after the injection made it probable that the horse had been infected: however we noticed two subsequent rises of temperature at intervals of ten to twelve days without any clinical symptoms of the disease, and the horse continued in his usual state of health.

Thinking that perhaps the failure to infect this horse might be due to natural immunity upon his part, he was a native broncho, we looked about for a healthy horse of eastern breeding. After some time we bought a mare, No. IV, suffering from 'broken wind' but otherwise healthy. She was placed in the stable and used for testing the communicability of the disease.

Experiments were now made upon the two sick horses to discover if possible some remedy for the disease. The clinical fact of a good appetite existing concurrently with progressive anaemia and emaciation, rendered it probable that intestinal digestion was faulty, toxins were forming in the bowels, and chronic auto-intoxication taking place, The suitable remedy for this condition appeared to be some drug of the antiseptic class, and it was desirable that it should be free enough from taste and odour to be taken by the horse in its feed. After many experiments with various drugs, salol was adopted as most nearly filling the requirements. This is a combination of salicylic and carbolic acids, in appearance not unlike granulated sugar, has very little taste or smell and is readily taken in the food. It was given to a mare and a horse beginning with one drachm three times a day, increasing the dose to two drachms.

The mare tolerated the drug very well, and a gradual improvement was seen, the blood corpuscles increased in number and she finally recovered. The horse had hardly begun to improve when an unfortunate accident terminated his existence. He was one day tied to the fence near the stable to get the benefit of the sun and what grass was available, but lay down close to the fence and somehow got caught partly underneath it. No one observed his predicament, and it was sometime before he was finally released, completed exhausted by the struggle to get free. He walked back to the stable and two days after died from acute peritonitis, resulting directly from the injury he had received under the fence.

Possibly if this accident had not intervened, he might have recovered from the fever. Some other cases of fever were obtained and kept under observation until they died, when careful autopsies were made and cultures obtained from the blood, heart and other organs, details of which are given elsewhere.

THE DISEASE IN MINNESOTA.

In September I had the opportunity of seeing the disease existing in the neighbouring State of Minnesota, and which is considered probably identical with our 'swamp fever.' In company with Dr. Westbrook, director of the State Board of Health, and Dr. Brinhall, veterinarian to the board, I saw several cases near Fertile and Beltrami and assisted at the autopsy of a horse killed for the purpose. The farms upon which these cases were found were flat, with little or no drainage, the soil a heavy clay, the water from flowing wells. In most cases these wells were surrounded by an area of water-soaked clay, through which horses had to wade to get to the drinking trough. The buildings were wooden, sometimes deficient in air space per head, and generally with no floor but the natural earth tramped hard. The cases of the disease I examined appeared to resemble our 'swamp fever' in many respects while differing in some others. The duration of the disease, its fatal termination, many of the usual symptoms, such as loss of flesh while the appetite remains unimpaired, loss of muscular control in the hind legs shown by wabbling gait, are all usually seen in 'swamp fever,' but the abcess formation commonly seen in the Minnesota disease is not seen except rarely in 'swamp fever,' and in the cases I saw there was not the profound anaemia so characteristic of 'swamp fever.' The post mortem lesions too were slightly different.

In addition to the abcesses referred to, there were numerous areas of gelatinous tissue with haemorrhagic spots, and the muscular tissue redder than in 'swamp fever.' The other conditions, enlargement of spleen, &c., were similar. On the whole I considered it doubtful if the disease was identical with ours and invited Drs. W. and B. to come to Manitoba and see some of our cases. This they subsequently did, but unfortunately the case which I had secured for their inspection died before they reached it, and another case hurriedly obtained in place of the former was not by any means typical, and the post mortem results were disappointing, most of the cultures remaining sterile. While these investigations have failed to positively identify the Manitoba with the Minnesota disease, enough information has been gathered to convince me that if not actually caused by the same germ, the diseases are closely allied. The Minnesota authorities are co-operating with us in the exchange of cultures, records of cases, &c., which should greatly facilitate the work.

The close resemblance of 'swamp fever' to an East Indian disease called surra, which is caused by a parasite in the blood (*Trypanosoma Evansi*), naturally turned our earliest investigations in that direction.

We therefore examined the blood of every case, not only those we had constantly under observation, but also whenever an opportunity occurred in any everyday practice. The following method was adopted :—

(*a.*) The corpuscles are counted, using the Thoma-Zeiss haemocytometer, and taking the blood as it issued from a large hypodermic needle inserted in the jugular vein. After trying other methods this was adopted as giving the most trustworthy results.

(*b.*) The hæmoglobin is estimated, using Oliver's tintometer, and latterly Tallquist's hæmoglobin scale as well. The latter is very convenient in use, but we doubt if it is as accurate as the former,

(*c.*) Fresh slides are examined unstained for parasites, ova, &c.

(*d.*) A thin layer of blood is dried on a cover glass (blood smears) stained, mounted and examined for micro-organisms.

(*e.*) Some fresh blood is drawn from the vein, with the usual precautions, into a sterile flask containing peptone solution. This is afterwards placed in the incubator and kept at body temperature for a few days and examined at intervals for any evidence of bacterial growth. Should such occur, fresh cultures are made in various media, and the organism studied in the usual bacteriological methods.

RESULTS.

(*a.*) 'Swamp fever' is not surra. If it were, the organism that causes surra should be present in all patients at some stage of the disease. We have never found the surra

parasite, which is a large organism, as long as three diameters of a red blood corpuscle, and not difficult to detect in fresh specimens of blood examined with a comparatively low power. A sufficient number of observations have been made upon numerous cases to warrant the opinion that 'swamp fever' and surra, while clinically alike, are different and distinct diseases.

(*b.*) An organism discovered.—Among the various bacteria which we have found in different cases, there is one which stands out from the rest in several particulars. It has been found oftener than any other microbe in our 'swamp fever' cases, and has characteristics which differentiate it from other known bacteria, and toxic properties when injected into animals. It is a large bacillus, non-motile, spore-forming, positive to Gram, and has been found in such a number of cases that it appears to have some connection with the disease. Several experiments have been made to ascertain whether this bacillus can convey the disease, but hitherto without success. Pure cultures of it have been injected into the blood of healthy horses producing a temporary rise of temperature, followed by some œdema of the legs, and a slight diminution in the blood cells, but without developing the disease. We have also instituted an experiment by feeding pure cultures of this organism to a healthy horse, the result of which will be given in the next report.

In conclusion, while it is to be regretted that the investigation has not yet resulted in the discovery of the cause of the disease, it must be remembered that years of patient research have been required to elucidate the pathology of many well-known diseases, and if the fruit of our labours is not yet apparent, the facts already noted, and the experience gained, lead us to hope for tangible results in the near future.

I have the honour to be, sir,

Your obedient servant,

F. TORRANCE, *D.V.S.*

The Honourable Minister of Agriculture,
Ottawa.

No. 51.

SPECIAL REPORT ON PICTOU CATTLE DISEASE.

CENTRAL BEDEQUE, P. E. I., Sept. 19, 1902.

SIR,—In response to your letter under date August 29, asking for report of my work during the six weeks which I spent in eastern Nova Scotia, in connection with the Pictou cattle disease investigation I beg to say, that after receiving instructions from you at New Glasgow on July 23, I started at once for the town of Antigonish, in order to be more in the centre of the area in which the disease seemed to be most prevalent, your wish being that I should reach all available cases, hold autopsies selecting when possible animals suffering from the disease in its varied stages, and to forward to your pathologist at Ottawa, such material from each case as he may require.

In endeavouring to carry out your wishes I thought wise to secure animals for post-mortem examination on farms in localities somewhat apart. Autopsies were held at Cape George, two cases, Springville, Ardness, Pictou Landing, Ballantyne's Cove, Arisaig, McArras Brook, Antigonish three cases, New Glasgow, Bailey's Brook and Pleasant Valley.

As I before stated my duty was to forward to Dr. Higgins such material as he would require in his investigation, so in accordance with his wish it was my aim to send from each autopsy, Pasteur pipettes and smearings of blood, pipettes of ascitic fluid, fluid

from pericardial sac, and from gall bladder, also pipettes of pulp from the liver, spleen, kidneys and lymph glands, smearings from the different organs and glands also from intestinal contents, specimens from different organs preserved in formalin, portions of the mucosa of abomasum showing ulcerated patches, also specimens of bone.

I regret to say that I found it impossible to supply all this material from each case, for it must be remembered, that, these autopsies were held in the open field or mountain side, exposed to all kinds of weather. In many cases the sick animals were found in a swamp or bog covered with mud, such conditions as you are well aware, render it a most difficult matter to secure specimens free from contamination, and it was often found after much hard work in holding a post-mortem examination, that most of the material collected was valueless. I have, however, been able to forward to your pathologist fourteen sets of specimens more or less complete, and I trust free from contamination. I have also forwarded post- mortem notes dealing with each individual case which although more or less valuable as an aid in laboratory work, would not I presume be required or in place here, for we find that the same gross anatomical changes were constant in each case though varying much in degree of severity. For the reasons just stated as well as for conciseness I feel that it will meet with your approval if I give here post-mortem notes of what may be classed as a fair average case.

A cow six years old in poor condition would weigh about 600 pounds, animal is lying down, gets up with difficulty and walks with staggering gait, pulse quick and weak, temperature normal, breathing quick and irregular, eyes prominent and amaurotic, some dark coloured diarrhea, visible mucous membranes pale, some froth escaping from mouth, hair rough and general appearance of unthrift. Killed by cutting carotid artery, blood dark coloured and coagulates quickly, muscular tissue soft and flabby a little yellow, peritoneum normal, peritoneal cavity contains a medium quantity (say about four gallons) of serous dropsical fluid which thickens on exposure to air. The mesenteric fat is yellow and infiltrated with fluid, in some places the effusion is thickened, the paunch is half full of food, the muscular walls are somewhat thin and oedematous, the mucosa dark and soft. The second and third stomachs are in much the same condition, the muscular walls of the abomasum are very thin and easily torn, the mucosa is separated in places and hangs in loose folds, it seems thickened and is studded here and there by ulcers in different stages, some recent, some healed, the rest of the alimentary tract is more or less oedematous, but no ulceration of the mucous coat, many of the mesenteric glands are normal in size and structure while others are enlarged and soft. The liver is normal in size and firm, it cuts a little tough and on section shows fibrous bands giving it a mottled or gray appearance, capsule is hard to tear off. Gall bladder is larger than usual, walls are thick, it contains about sixteen ounces of green bile. Sublumbar fat is deficient and saturated with serum, kidneys are normal in size, capsule smooth and on section show nothing abnormal. Suprarenals are also normal, spleen is normal in size but on section is soft and easily broken up, pelvic viscera fairly normal. No fluid in pleural cavity, no adhesions, pleura normal, pericardial sac contains about two ounces of light coloured fluid, heart normal in size, on section appears normal, lungs pale but otherwise healthy, large blood vessels appear normal, thyroid glands normal, other organs not examined.

I omitted to say that Dr. Higgins wished for a few sets of specimens from healthy animals raised in the infected district, and I wish here to thank Messrs. Trotter Bros. of Antigonish who kindly allowed me to visit their slaughter house at my pleasure and to procure the material required.

Much of the time I was in company with Dr. Townsend and as I found him remarkably accurate in diagnosing insidious cases, in fact my post-mortem examinations always confirmed his decisions, and as I considered it might be valuable to have a record of the clinical symptoms as noticed by this gentleman, who has certainly had the opportunity of seeing many more cases of this peculiar disease than has any other person, I requested him to furnish me with a record of the usual clinical symptoms which I take the liberty to give here in his own words.

'History of diseased animals much the same in all cases, isolation for week or so appetite failing, milk going off in quantity and takes on bad odour and flavour. On examination, general appearance unthrifty, emaciation and weakness vary with stage of

disease, coat rough, patches of old hair unshed, eyes staring and wild expression especially in acute cases, mucous membranes injected and of yellow cast, abdomen pendulent, staggering gait, nibbles at top of grass, partly masticates food, seems unable to complete act. In majority of cases purging which may continue until end, or may be entirely suppressed last few days before death, or you may have constipation throughout whole course of disease, or again may have foeces voided of natural consistency but of dark colour. Very often in connection with these symptoms you have tenesmus. Cases in June, July and August run a shorter course and are more acute in character from 10-15 to 21 days, the balance of year assume a more chronic type, running from two weeks to six or eight, in fact some appear unthrifty all winter and develop in spring when in pasture. Towards end they begin to wander travelling around until they bring up in some bog or swamp. Pulse 70 to 90, temperature subnormal.'

In consideration of the fact that systematic investigations are at the present time in progress at your laboratory and that Dr. Higgins' more advanced work may throw some light on the subject you will not I presume expect me to touch upon the possible cause of disease, which, after all, would be mere speculation on my part.

In conclusion I may just say that the sufferers by the disease still hold fast to the popular idea that it is caused either directly or indirectly by the plant 'ragwort' which is growing abundantly all over the disease area, and they account for the reoccurence of the disease this summer on farms which have remained healthy for a number of years, to the fact, that the exceptionally dry season of last year resulted in a considerable scarcity of fodder which led to the harvesting and feeding of weedy hay, that, had the prospect been more favourable, would have been left uncut.

Although much can be said to offset this view, and without expressing an opinion which in the absence of any direct experiment would be mere speculation, I would but say that it is impossible for any unprejudiced person to listen to the honest testimony of these people who have suffered much by the disease and consequently have given the subject a great deal of thought, without admitting that they have much strong circumstantial evidence upon which to base their suspicions. It is certainly, to say the least, a most remarkable coincidence that the disease should keep so closely within the weed area. It is interesting to note that not one case has ever been reported outside the weed limit, and the disease has never preceded the advance of the weed as the latter has slowly spread from Pictou town where it first gained a footing, and from there we had the first report of the cattle disease.

I have the honour to be, sir,

Your obedient servant,

W. H. PETHICK.

DR. J. G. RUTHERFORD,
Chief Veterinary Inspector,
Ottawa.

No. 52.

CATTLE TRADE WITH EUROPE.

OTTAWA, October 31, 1902.

SIR,—On July 31 you referred to me the following letter from Mr. C. W. Peterson, secretary of the Territorial Purebred Cattle Breeders' Association, with a request that I should look into the matters dealt with therein, with a view to the securing of definite information as a basis for possible future action :—

REGINA, N.W.T., July 18, 1902.

DEAR SIR,—I have the honour to submit for your information and such action as you may deem advisable, the following resolution which was passed at the recent annual meeting of the Territorial Purebred Cattle Breeders' Association. The resolution was moved by the Honourable G. H. V. Bulyea, Commissioner of Agriculture, and seconded by S. W. Paisley of Lacombe :—

'That the Dominion Department of Agriculture be requested to cause inquiries to be made in connection with the cattle export business, particularly bearing upon transportation facilities and rates to the seaboard, both in the United States and Canada, as well as steamship accommodation and rates from ports in both countries, with a view to discovering why the United States cattle are landed at British ports cheaper and in superior condition compared to the bruised and ill-handled Canadian ranch cattle, consequently commanding higher prices, in order that steps may, if possible, be taken to remedy the difficulties by legislation on the part of the proper authority or otherwise.'

For your information I may state that the rate on a car of cattle from Calgary to Winnipeg is $98 and for a car of horses, $108. From Malta, Montana, to St. Paul, Minnesota, a greater distance, the charge is $85 a car for cattle, and the same rate for horses. It is also understood that the shipping charges on export stock from Winnipeg to the seaboard is much higher than for corresponding distances between corresponding United States points.

Apart from the high transportation rates under which the cattle exporters of the North-west Territories are suffering, it is claimed by those who should be in a position to know, that the facilities for handling stock and the accommodation afforded shippers on this side of the line are inferior to those enjoyed by United States competitors. The result is that the inferior condition of Canadian cattle is materially aggravated by having them landed at British ports in a bruised and exhausted condition which, it is alleged, affects their value. One prominent commission man at Deptford, who was through the west recently, stated that he could almost at any time pick out a dressed carcass of a Canadian steer by its bruised condition. It is possible that the fault to a certain extent lies with the breeders or shippers, and also that it is one which would readily lend itself to correction. Western producers are, however, anxious to ascertain the causes of this, leaving the question of remedy to be considered after the causes have been located.

Yours very truly,

CHAS. W. PETERSON,

Secretary.

Immediately upon receipt of the above letter I placed myself in communication with a number of gentlemen from whom I had reason to believe, reliable information on the matter in question might be obtained. Among these may be mentioned Mr. Robert Ironside of Montreal, Mr. J. T. Gordon and Mr. H. A. Mullins of Winnipeg, Drs. Baker and Sugden, inspectors of export cattle for the port of Montreal, Dr. Frink,

inspector at the port of St. John, N.B., and Dr. Hopkins, the veterinary quarantine officer of the department in Great Britain. I also personally asked Mr. Peterson to report on the conditions under which the trade in ranch cattle from Montana and other western states was conducted. I would call your attention to the correspondence herewith furnished, in which the views of these gentlemen on the subject at issue will be found in detail. Their evidence, when summed up, points to the conclusion that while there is room for improvement in the quality of the cattle shipped, and great need for reform in the methods of transportation, the principal cause for the difference in the condition of Canadian and American ranch cattle landed in Britain, and the consequent difference in price, is the fact that the former are shipped directly from the range, while the majority of the latter are finished in the middle States before being sent forward for export.

It would appear, however, that in order to reach a definite conclusion these three matters must be considered together.

Cattle of poor breeding and inferior quality, shipped under the most favourable conditions as regards transportation to eastern Canada, there finished for export and carried to Britain by the most faultless steamship service, will still fail to bring top prices.

Well bred steers of the best quality and in prime beef condition, shipped direct off grass to Europe, are certain to shrink by the way, and to land, as I have often seen them and as described by Dr. Hopkins, in 'store condition.' This is inevitable even with transportation facilities almost perfect.

Again, the very best class of range cattle shipped under existing faulty freight conditions to Eastern Canada, will require much longer time and more feed to finish them for export than if they had been transported in better cars, properly fitted and run at a reasonably fast rate of speed. Furthermore, if the accommodation and attendance on shipboard are, as is reported, inferior and imperfect, a consequent undue shrinkage is bound to occur on the transatlantic trip, which will absorb a large share of the profit on the shipment.

The ideal condition would thus appear to demand for its fulfilment cattle well bred and of good quality, in prime flesh, carried from the range by a vastly improved railway service, finished on a grain ration in the East, and conveyed to Britain with every precaution on specially fitted cattle ships under the care of experienced and skilful attendants.

This is not by any means a fancy picture. It is exactly what is being done with the majority of the American cattle shipped to Europe at the present time.

The inferior cattle seen by Mr. Peterson in Montana never, as a rule, get east of Chicago. The railway cars and the cattle freight service on the American roads are admitted on all hands to be much superior to those furnished by the Canadian Pacific Railway Company.

Dr. Dyson, the officer in charge of the inspection work of the Bureau of Animal Industry at the Chicago stock-yards, assures me that not more than ten or twelve per cent of the cattle coming from the western ranges are exported direct, and that the number is decreasing year by year.

The great majority of the range cattle are sold to farmers and dealers in the corn belt, dehorned if this has not already been done, and fed for a period of about ninety days. They are then brought to Chicago, carefully inspected, all the inferior cattle culled, and the remainder passed and tagged for export. The inspection is done by the officers of the bureau, and every precaution is observed to ensure the rejection of all but the best animals.

From Chicago they are taken to the sea-board by fast trains and in cars specially fitted for feeding and watering en route. They are loaded on these cars under careful inspection, no over-crowding being allowed. The men in charge are almost invariably regular, salaried employees of the shippers, and the same is true of the foremen on the ships and of those employed under them.

As a result of this systematic handling American cattle, originating on the range, arrive in Britain in much better condition than do similar cattle from Canada, and of course, command correspondingly higher prices.

It is a question as to how far the system on which American range cattle are handled could be profitably applied to those from western Canada. Eastern Canadian prime stall-fed cattle land as a rule in excellent condition and compete closely in prices with the best American bullocks. There is no reason why Canadian range cattle, if treated on similar lines, should not compete as closely with steers from the western states.

I understand that you have arranged for an interesting experiment to take place in the near future with the object of testing the effect of a grain ration on a number of Canadian range cattle.

I trust that this may prove so successful as to lead to a general movement in the same direction. The present system of marketing these cattle is wasteful to a degree and no time should be lost in arousing both the western rancher and the eastern feeder to the opportunity now offering for the building up of a trade mutually beneficial and nationally profitable. Meanwhile nothing should be left undone in the way of improving transportation conditions between the range country and the sea-board, carriage being a most important factor no matter what the ultimate destination may be.

It must also be borne well in mind, that good feed and high freight rates give much better returns on well-bred cattle than on scrubs, and that for this reason a steady stream of good bulls of the beef breeds should be kept constantly flowing into the great grazing region of the Dominion.

I have the honour to be, sir,

Your obedient servant,

J. G. RUTHERFORD,
Chief Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

MONTREAL, August 8, 1902.

SIR,—Yours of the 6th inst. to hand and noted. I shall give you my views.

Bulk of stock cars at present used by C. P. R. are too narrow, cattle cannot stand at ease across them, tails get rubbed and causes the animal to keep moving, crowding, thereby slipping, falling, bruising, &c. Also it is reported from time to time, that trains are handled in a very careless manner, rough shunting, hard jolts, &c., throw cattle and bruise them, our men oftimes so report.

I am not posted on rates from Malta to St. Paul, but I do know that the rate from Cut Bank, Montana, to Chicago is 67½ cents and to Boston from Chicago it is 28 cents, making 95½ cents. The rate from similar points north of Cut Bank in Alberta to Boston, C. P. R., is 102 cents per hundred pounds, or $13 per car more on Canadian cattle as against Montana. The Montana cattle get a much superior car to travel in, better handling in transportation. To get back to steamship rates, at present there is very little difference between vessels plying between Canadian ports and Liverpool and American ports and Liverpool. We have some poor class ships, also poor class ships from American ports and good at each port as well. The rates are 5 shillings lower from American ports at present, but that is offset by extra railway rate C. P. R. exact. I do not know the reason why the C. P. R. should retain the old rate that was in force years ago from the west on live stock, when grain rates have been reduced from time to time. If the government has any power they should exert it to help one of the principal industries in the west.

Respectfully yours,

R. IRONSIDE.

J. G. RUTHERFORD, Esq.,
Chief Veterinary Inspector,
Ottawa, Ont.

15—10

WINNIPEG, August 21, 1902.

DEAR SIR,—Your letter of August 7 to hand, stating that the Dominion Department of Agriculture has been requested to make inquiries in connection with the cattle export business, particularly bearing upon the transportation facilities and rates to the seaboard, with a view to discover why the United States cattle are landed in British ports cheaper and in superior condition, compared to the bruised and ill-handled Canadian ranch cattle, &c.

In the first place, the Americans have better cars for transportation; the old Canadian Pacific Railway cars now in use are too small and narrow, although a very great improvement has been made in the last few years by putting on new cars, and that is considered one reason why the American cattle are landed in the sea ports in much better condition than the Canadian stock. Another reason is that no American cattle are shipped direct from the ranches to the old country: any cattle that are shipped to Chicago that are not slaughtered there are sold to the farmers in the surrounding states, fed five or six months, and properly domesticated. In the case of Alberta cattle, they are loaded there and shipped direct to the old country, so you can readily understand that cattle that have never been handled and wild as they are must be bruised more or less in going into the cars, while domesticated animals would not be so wild, and consequently be in better condition.

You will readily see that the Alberta ranchers have no idea but that the American cattle are shipped direct from the ranchers for export, the same as the Canadian cattle, which is not the case. In reference to the rates, I have not got them at my fingers' ends to-day, but can give them to you if required. The American freight rates are much cheaper than ours, and their mode of transportation is much better, not only in the cars supplied, but their stock trains are given much faster runs than ours.

I presume, the proper way to get at the bottom of this would be to appoint a commission to investigate the matter thoroughly, that is, the handling of the stock, both in this country and on the other side: then you would see the reason for such a discrepancy between the price of American and Canadian stock.

I might say, for your information, that I visited the lairages in Liverpool ten years ago and also last spring, and I was amazed at the great improvement there was in the transportation facilities during that time: I saw a whole ship-load of Ontario domesticated cattle landed there, and they looked as if they had come from their own stables.

We are paying in Alberta this year, for four-year-old steers, from $50 to $55 per head, I think this is a very large price for ranchers when you consider that we have to sell them for a penny a pound less than the American corn-fed cattle sell for.

This is a subject which I am very pleased that you have taken up and introduced, and one that will stand a very close investigation; we will be very glad, either as a firm or as individuals, to give you all the assistance possible.

We do not wish to be unfair with the corporation, but to have the matter dealt with fairly. You being a late resident of the west, should know how very important it is that nothing should be put in the way of the cattle interest to hamper it. I feel that anything in that respect would be a very great detriment to the North-west Territories.

* * * * * *

Yours truly,

(Signed), J. T. GORDON.

DR. J. G. RUTHERFORD,
Chief Veterinary Inspector,
Ottawa, Ont.

WINNIPEG, August 30, 1902.

DEAR SIR,—In reply to your favour of August 7, I may say that the delay in answering same was due to my being West on the ranges.

The main complaint of the Canadian shipper is the bad condition of the stock cars provided for the shippers out West and not enough feeding yards suitable along the route. Some of the cattle get badly bruised by the stock cars having bolts projecting. The company is giving us better dispatch this year, but there should be an effort made to run stock trains with the best engines and not less than 22 miles an hour.

The rates are much higher than those charged to the south of us considering the class of cars and dispatch given. In fact, there are a number of our cattle going south so the shipments from here will be lighter.

The cancelling of the stock buyers' transportation will stop many cattle from getting out this season, as the distances are so great out here and a new country, that many bunches are left because of the expense of getting to them.

Yours truly,

H. A. MULLINS.

J. G. RUTHERFORD, Esq.,
Chief Veterinary Inspector,
Ottawa, Ont.

MONTREAL, August 18, 1902.

SIR,—In reply to your letter of the 7th instant, I beg to say that so far as rates are concerned I have no special knowledge, therefore can say nothing on that point.

The facilities for the shipment of cattle from Canadian ports now that all cattle are loaded on barges comparatively near the stock yards, and put from the barges directly on to the ships, ought to make it possible for them to be shipped with a minimum of bruises of any kind.

I think from what I have seen or had reported to me, the facilities in that respect are as good at this port as at any. It might be an improvement if the barges were nearer to the stock yards, but the present arrangement is such an improvement on the former mode of loading that there is little ground for complaint. So far as I can see the Canadian cattle that are more liable to be bruised than American, are those from the North-west ranches, and due to the difference in the character of the cattle rather than to any defect in the shipping facilities at this port as compared with those at the United States ports. The American cattle are, as a rule, quiet, whilst the great majority of Canadian ranchers are wild, and when they are unloaded from the cars, rush out in spite of efforts to restrain them and are very frequently bruised against the sides of the car doors, and in the yards they rush about on the slightest disturbance, hitting against posts and gateways. Some of these cattle arrive with bruised rumps, that is, I think, partly due to the use of some of the old narrow cars which are not wide enough for large cattle to be brought such long distances. I do not think that cattle arrive in such a bruised condition as is represented by the Deptford salesman. Mr. Ironsides, of Messrs. Gordon & Ironsides, who are the largest shippers of Canadian ranch cattle, assure me that the percentage of bruised carcasses is exceedingly small. He showed me the returns of several shipments; the largest number of bruised sides was four out of 202 head.

In order that the possibilities of cattle being bruised in coming to port of shipment, may be lessened, I would suggest that all shipping cattle, especially ranchers, should only be shipped in the wide, long, modern cars, not in the old-fashioned narrow ones; that all car doors should be widened and have rounded edges at both sides, to make it less likely for the point of the hip to catch. It is in going through the car doors that a large proportion of what bruising there is occurs. I think if it could be practically accomplished, it would be a benefit if some arrangement could be made for feeding and watering the

cattle coming long distances in the cars, so that it would be unnecessary to unload them so often. I also think it is worth considering the advisability of dehorning all calves on the ranches to make them quieter and easier to handle, and the mixing of eastern bred steers with the ranch-bred also makes these cattle quieter and much easier to handle, which is the thing most to be desired.

The fittings and space in the ships are the same from Canadian and American ports, hence there can be no reason that I can see, why cattle cannot be carried as safely from our ports as from those in the United States. I believe a large proportion, if not all, American cattle that are shipped are grain fed, and whilst this would not (except by making them quieter to handle) prevent their being bruised, must make it reasonable to expect that they will stand the voyage better than cattle taken directly from the ranges, consequently will land in better condition. If the cattle from the North-west could have at least forty-eight hours for rest and feeding at the stock-yards, I feel certain they would be in better condition to stand the voyage.

I have the honour to be, sir,

Your obedient servant,

M. C. BAKER,

Inspector.

J. G. Rutherford, Esq.,
Chief Veterinary Inspector,
Ottawa.

MONTREAL, August 15, 1902.

DEAR SIR,—The resolution of the Territorial Pure Bred Cattle Breeders Association in regard to export cattle, the wording of which is contained in your letter of August 7, raises the question of rates, transport facilities, and the condition of Canadian ranch cattle when landed in England. The question of rates is, as you know, a most complicated one, upon which I can give you no information with the exception that the cattle rate out of American ports is usually slightly lower than out of Montreal.

The facilities for handling cattle in the port of Montreal have been very much improved of late years.

The yards at Point St. Charles have been improved almost beyond recognition, and the system of bargeing cattle down to the ship has done away with the reloading on cars or the other alternative of driving them to the ship's side.

I am not familiar with any American port with the exception of Portland. There the cattle are reloaded on cars at the stock-yards and unloaded at the ship's side. The facilities at Portland are no better than here, and I am told by such men as Mr. Snell and Mr. Coughlin, both of whom are heavily engaged in the cattle trade, that they are no better in Boston.

The American cars are in my opinion somewhat superior to ours, being about two feet longer and, what is of more importance, a little wider; and also some are provided with means for feeding and watering en route.

I have noticed that American cars coming into Montreal from Chicago average about 17 to 18 cattle per car, while Canadian cars from Toronto carry from 19 to 20 head. While there are at present some cattle ships sailing from Montreal which leave nothing to be desired, the average boat is not so good as the average boat leaving American ports.

The United States Government also keep careful records of the losses on each ship. Should the loss on any ship be above the average, the matter is at once made the subject of investigation.

At the present time a great many Canadian cattle (domestic) are passing through Point St. Charles for shipment to England via Portland and Boston.

I am informed that these cattle do not land in any better condition, that the losses are no less, and that they do not make any more money than similar cattle shipped on the same class of vessels out of Montreal.

With reference to the condition of the cattle when landed in England I judge that the resolution of the Pure Bred Cattle Breeders Association and the remark of the Deptford commission man is intended to apply solely to ranch cattle.

I should find it somewhat hard to believe otherwise, for in a note made two years ago at Deptford I see that a city of London meat inspector told me distinctly that from the point of view of a meat inspector that Canadians left nothing to be desired. No Canadian ranchers pass through my hands at Point St. Charles, but until the present year a fair number of American ranchers passed over the Grand Trunk Railway for shipment at Montreal.

Now between the American and Canadian ranchers there are some marked differences. The Americans are not so wild, they do not knock themselves or each other about when being handled or unloaded on cars nearly so much as do the Canadians.

The Americans are evidently not solely grass-fed, and are partially domesticated. Again, most of them are dehorned.

I am told that there are very few, if any, solely grass fed American ranchers shipped direct from the ranches to the seaboard as the Canadian ranchers are, and I believe that the partially domesticated condition of the American ranchers has a great deal to do with the superior condition in which they land.

Dr. Baker, being in charge of the Canadian Pacific Railway yards, will no doubt give you particulars of the journey which the cattle take over that road, and his ideas as to how it may be rendered less harmful for the cattle.

To sum up, it would seem that there are three factors operating against the Canadian ranch cattle. 1st. Their somewhat inferior condition before starting on their journey to the seaboard. 2nd. The length and hardships of that journey. 3rd. The wildness of the cattle themselves, resulting in their own injury.

I have the honour to be, sir,

Your obedient servant,

B. A. SUGDEN,

Inspector.

J. G. RUTHERFORD, Esq., V.S.,
Chief Veterinary Inspector,
Ottawa, Ont.

ST. JOHN, N.B., August 12, 1902.

SIR,—I herewith submit summary of opinion in regard to resolution forwarded in letter August 7, 1902.

The maximum number of fat cattle to be placed on car should not exceed 17. (U. States method).

All cattle for export should be dehorned. (U. States method).

Export cattle should be shipped on cars fitted in some measure to supply food and water en route. (U. States method).

All stock cars should be fitted with a drop or swing door providing a safe exit. (U. States method).

Insist upon railway authorities passing an imperative order that loafers and all idlers be ejected summarily from stock-yards and that responsible men only be employed who shall display badge of office and that the value and perishable nature of the property entrusted them be duly impressed upon employees. That the foreman of the stock-yards shall be sworn in and have all powers of a policeman to summarily arrest any one engaged in an act of cruelty to any animals confined therein.

Particular care should be taken that no crippled or lame animal be allowed to proceed to the seaboard for export.

That thoroughly capable men and interested men should accompany the shipment en route to the seaport.

Insist that every animal shall be roped before being placed on shipboard.

Cattle should not be placed on shipboard until the loading of general cargo is completed.

Insist that the men shipped on the articles as cattlemen are able-bodied sober, capable men and paid a living wage.

Insist that when ranch cattle arrive at the port of export that they may not be held back on every flimsy excuse to save a small expense for food and rest at the stock-yards. Send cattle a day or two ahead for rest and food, the port of St. John, N.B., has the accommodation.

Trace out the ships which lose cattle and act accordingly.

I have the honour to be, sir,

Your obedient servant,

JAMES H. FRINK,

Inspector.

J. G. RUTHERFORD, Esq., V.S.,
Chief Veterinary Inspector,
Ottawa.

GLASGOW, SCOTLAND, September 9, 1902.

SIR,—In accordance with the instructions sent me in letter of August 2, I visited the Yorkhill (Glasgow), Birkenhead and Deptford (London), foreign cattle markets.

I consulted with a number of officials, commission men and shippers, in addition inspected the cattle myself and saw some sales made.

It is important at the beginning in reply to an assertion regarding the bruised and otherwise inferior condition of the Canadian ranch cattle as compared with States ranch cattle, to mention the fact that, as is well known, Canadian ranch cattle come right off the grass, have no grain in them, are wild, and have a long tedious unbroken railroad trip before reaching the seaboard.

The States rancher is rarely shipped direct to the market from the range, but is taken to feeding places in the corn belt and when well finished from there to Chicago, at which place it may be picked out for export. The frequent handling has had the effect of rendering States bullocks comparatively quiet, which is also aided by the fact that those bullocks are polled either by breeding or dehorning. Under such conditions the States bullock has a big advantage.

Visits to Yorkhill lairage showed a few shipments of Ontario cattle of inferior quality on hand, but on the whole free from bruises. These cattle comprised the cargoes of the SS. *Rosarian* and *Corean*. At this port practically no cattle are reported bruised, but on the other hand few ranchers are marketed there. The best price obtained for the cargoes above mentioned was £19 10s. (about $97), the average stuff bringing £14 ($70).

A few days later (August 29) I visited the Birkenhead lairage where I saw the cargo of the SS. *Roman* (694 head). In the lot I saw fifteen to twenty cattle with badly bruised hooks, the swelling in some cases being extensive. A couple of steers had their stifles out (patellar dislocation), the damaged ones I am informed by the veterinary inspector at this lairage, belonged to a consignment of forty rushed on board at the last moment. Out of the forty three were badly bruised and seven were ordered to be slaughtered right after arrival.

The veterinary inspector reports 'that on the whole few cattle are bruised and that when bruising occurs, it is due to the wildness of the ranch cattle, who bruise themselves during the unloading by rushing up the gangways and chutes, thus causing jams with the resultant damaged hooks and bruises.' No branded (range) States cattle were coming to this market at the time of my visit.

A visit to the Deptford lairages was paid September 6, and notes taken of the classes of cattle there. I had the good fortune to meet Mr. Philcox, superintendent of the lairages, who said 'any bruising that occurs is due to the wildness of the cattle, and

may occur at any point during their passage from the range to the market, may be on the cars or in the loading and unloading.'

The impression one gets of the Canadian ranch bullock is that it has shrunk heavily on the trip; in conversation with the European representative, Mr. Ironside, jr., of Gordon, Ironside & Fares, he remarked on the great amount of hay it took to get the ranch cattle filled up after landing.

Deptford is the market for the tops of the foreign cattle, consequently large numbers of grass-fed range cattle do not appear there as compared with Birkenhead.

From the condition of the ranchers on arrival a person is warranted in assuming that the methods of handling and shipping can yet be greatly improved upon. However good the condition the ranch bullock is on leaving the west, it never seems to reach the old country markets in any better than 'store condition.'

I have the honour to be, yours obediently,

A. G. HOPKINS,

Inspector.

J. G. RUTHERFORD, V.S.,
Chief Veterinary Inspector, Ottawa.

REGINA, N.W.T., September 25, 1902.

SIR,—I returned from Montana a few days ago, and in accordance with our conversation on the subject, I took occasion to acquaint myself with the stock-yards and car system of the American transcontinental lines. Contrary to my expectations, I found that the yards along the Great Northern Railway Company's line were not as a rule as convenient and well kept as those on the Canadian side. I went from Helena to Bozeman in order to look over the yards of the Northern Pacific Company's line, and, while they are in a much better condition than those of the Great Northern, in my opinion, the yards of the Canadian Pacific Railway Company compare very favourably with those of the companies above referred to. I found that where chutes had been constructed such had been built at the expense of the Montana Stock Growers' Association. Much dissatisfaction exists throughout the state in consequence of the insufficient stockyard accommodation, but the railway companies in Montana do not seem to have any desire to meet the wishes of shippers in the matter. I am reporting separately on the subject of live stock cars.

I am, sir, your obedient servant,

CHAS. W. PETERSON,

Inspector.

J. G. RUTHERFORD, Esq., V.S.,
Chief Veterinary Inspector,
Ottawa.

REGINA, N.W.T., September 25, 1902.

SIR,—In accordance with our conversation on the subject of live stock cars, I devoted some little attention during my recent trip through the State of Montana to the obtaining of information respecting the accommodation furnished to shippers of live stock, in order to ascertain whether the facts were correct as set forth in the resolution recently submitted to your department by the Territorial Purebred Cattle Breeders' Association, to the effect, that Canadian cattle were landed at old country ports in a much worse condition than United States cattle, owing to the superior shipping accommodation available on United States railway and steamship lines. The result of my investigation is, that there can be no reasonable doubt, that the cars furnished for the transportation of range stock from the State of Montana, both on the Great Northern Railway and the Northern Pacific Railway, are infinitely superior to the Canadian

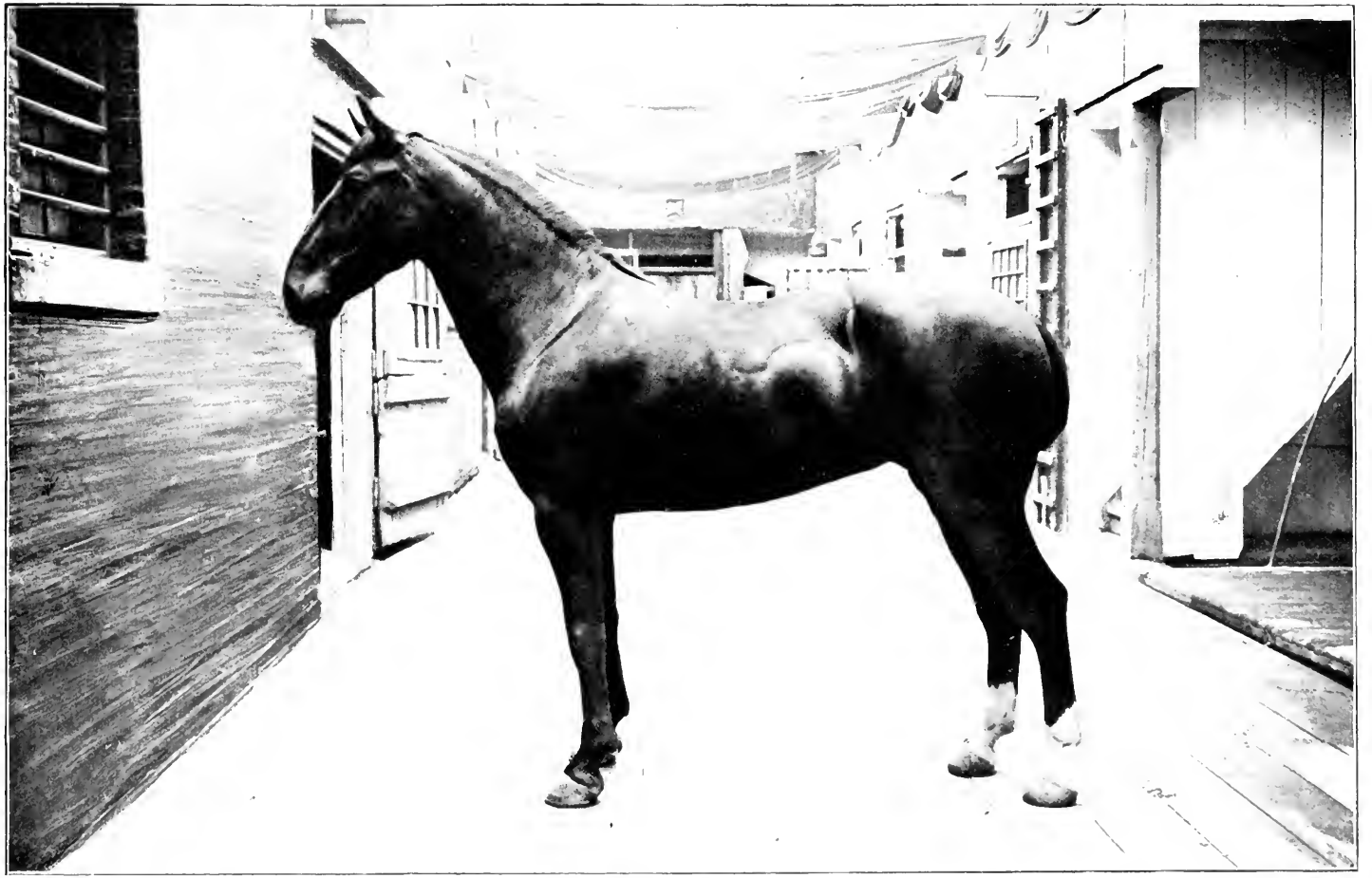
stock cars. Montana shippers informed me that Street's stable cars are invariably furnished, which enable them to feed and water as often as necessary en route, thus obviating the necessity for starving the animals between feeding points. It is not to be understood that the cattle are taken straight through from Montana points to Chicago, as such is not the case, feeding points being established where the cattle may rest on the trip. I made careful inquiry as to dehorning and found that the practice is not general throughout that particular state. As a rule, Montana range cattle are of a very much inferior quality compared to cattle raised in Southern Alberta and Western Assiniboia, which may be partly accounted for by the fact that the grade bull is a very popular institution on the other side of the line. The great bulk of Montana cattle are sold as feeders in the southern states, but I was rather surprised to find, that in favourable years, a considerable number of cattle are purchased in Montana for direct export. If records could be obtained of the sale of such shipments in Liverpool, a fair comparison would be established. It stands to reason that grain fed and docile cattle will ship better than Canadian range steers, but granting that transportation facilities are equally favourable, the Alberta steer should land at Liverpool in as good condition as a Montana export steer.

I am, sir, your obedient servant,

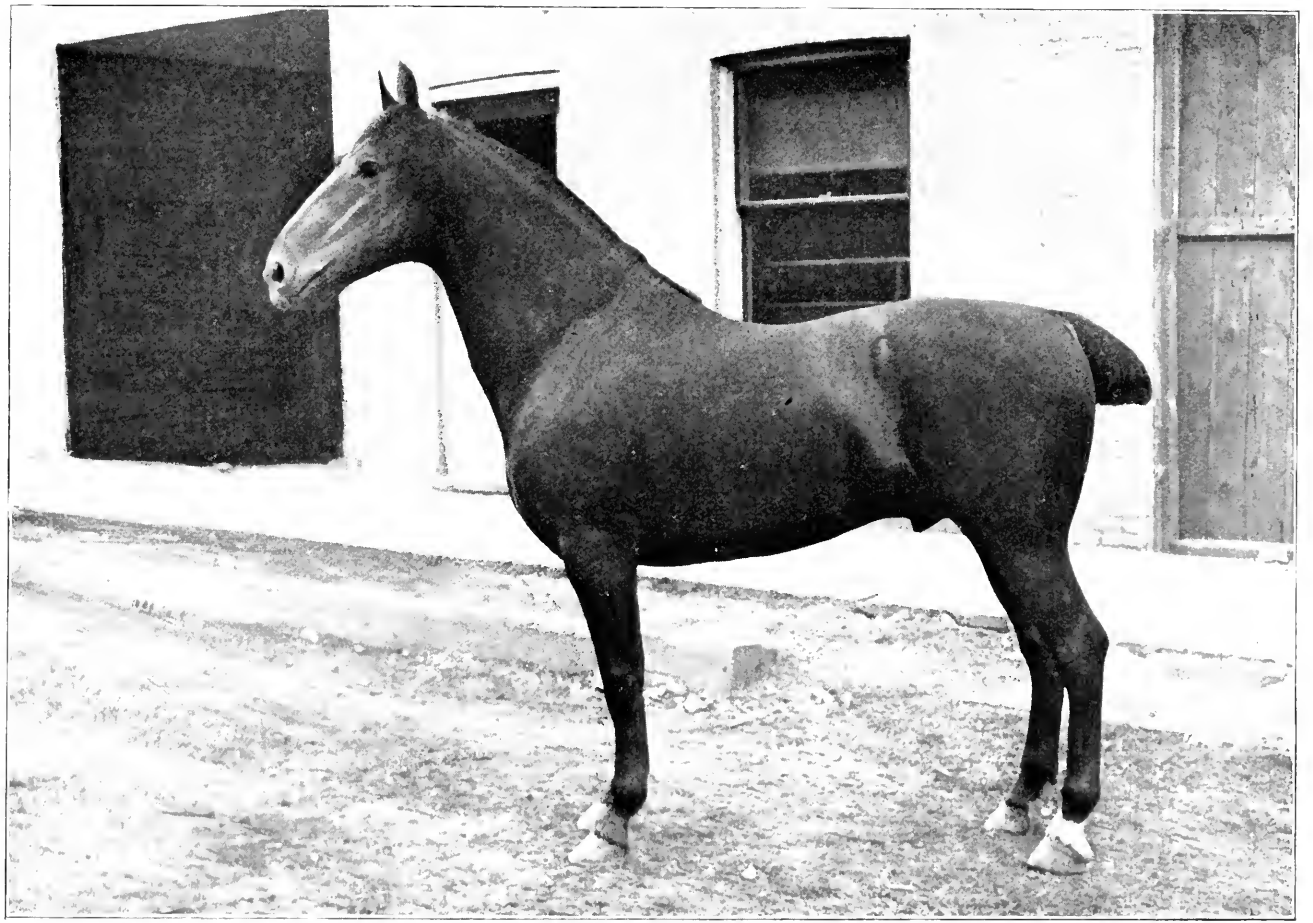
CHAS. W. PETERSON,
Inspector.

J. G. RUTHERFORD, V.S.,
Chief Veterinary inspector,
Ottawa.

GENERAL.



CASSANDRA.



HERO.

No. 53.

THE BREEDING IN CANADA OF HORSES FOR ARMY USE.

While the supply of horses suitable for military use has always, even in times of peace, been a serious question, the experience of our South African troubles has given it an importance altogether new and somewhat startling. It has now been clearly shown that troops under modern conditions of warfare must be able to move rapidly from place to place, and that the mounted soldier has thus an immense advantage over the less mobile infantry man.

This development has led to the purchase by the British Government, during the present campaign, of a very much larger number of horses than would otherwise have been required. Nor has the lesson been learned by Britain alone; all military nations have been closely watching the operations in South Africa, and there is no room for doubt, that the general demand for horses suitable for army purposes will be much greater in the future than in the past. Of the horses purchased for use in Africa the Dominion has by no means furnished her fair share, although in addition to those taken by our own contingents, a considerable number have been picked up in Eastern Canada by Lt.-Col. Dent, of the Remount Department of the British Army. It is not, however, an easy matter at present to obtain in this country any large number of horses altogether suitable for army use. No encouragement to produce them has, until very recently, been shown to breeders, and there being no very active home demand for any but the very best of the sorts now asked for, they have not been bred to anything like the extent of which the country is capable. After the visit of Colonel Ravenhill, in 1887, the western ranchers, in expectation of a market, went to much trouble and expense in securing and importing suitable foundation stock, and as a result were successful in producing many first class cavalry horses. As, however, beyond a limited number taken by the North-west Mounted Police and a few by foreign buyers, there was no sale for them as such, the breeders have largely turned their attention to other and, under the circumstances, more profitable lines of stock.

The natural conditions in Canada are, it need hardly be said, most favourable for the production of the animals wanted, while in the event of serious international disturbance Canadian horses would always be available for Imperial use while it might be impossible to procure them in foreign countries. Again, through the medium of our great trans-continental railway they could be shipped from either Atlantic or Pacific ports to any part of the world where they might be required.

In view of the strong probability that the demand hitherto lacking will in the future be such as to warrant the breeding in fair numbers of the horses needed for military use, a brief description of those now being sought for and purchased by the agents of the British war office, and a few hints as to how they may be produced, will not be out of place.

They are of three fairly distinct types as required for artillery, cavalry and mounted infantry.

At the Canadian horse show held in Toronto in April, 1900, the Dominion Government gave special prizes for each of these classes, and as Lt.-Col. Dent, the Imperial remount officer detailed to purchase in Canada, was one of the judges, thus making the selections authoritative, a description of each first prize animal, together with its measurements, will be appended to the general list of requirements in all three divisions.

THE ARTILLERY HORSE.

The artillery horse asked for by the army buyer is really a smart, active van or express horse on short legs, with plenty of bone and substance and enough quality to

ensure staying power in fairly fast work. He should stand from 15-2 to 16 hands, weight not less than 1,300 lbs., and measure at least 8 inches below the knee and 72 inches in girth. Considerable variation in type is permissible, the work of the horse artillery demanding greater speed and therefore more warm blood than are necessary for ordinary field artillery, while in all batteries properly horsed, the lead and centre pairs are slightly taller and more rangy than the wheelers, the latter requiring greater strength and substance. The first prize entry at Toronto last spring was of the lighter sort, being in fact the pure-bred Hackney mare 'Cassandra.' She stood 16 hands, weighed 1,325 lbs. and girthed 76 inches. She measured $8\frac{1}{4}$ inches below the knee and $20\frac{1}{4}$ inches round the arm; from crest to withers 36 inches, withers to croup 29 inches, croup to tail, an important point in all military horses, 19 inches. Although in this particular instance the prize went to a Hackney, it does not, by any means, follow that gun horses should be either wholly or partly of that breed. They may be obtained by the judicious use of the Thoroughbred horse on mares of size, substance and action, or by stinting good half-bred or strong roadster mares to a biggish Hackney or breedy coach sire. So long as they show sufficient quality to ensure activity and endurance and at the same time meet the requirements as to size and substance, the question of pedigree is of secondary importance.

THE CAVALRY HORSE.

The cavalry horse is of a somewhat different type, and one at present too rare in Canada, owing to the preference shown by many light horse breeders for the American trotting sire, an animal possessing but few of the qualities and characteristics of the riding horse.

Colonel Ravenhill in his report says:—'A malformation in the Canadian horses which might advantageously be brought to the notice of breeders is that their quarters are short and very drooping, a serious defect in a military horse. Indeed we had to reject as unsuitable a considerable proportion on this account; this is not only a great dissight, but where a mounted soldier has to carry a kit on his horse's back it amounts to an insuperable objection; it has arisen from the too extensive use of the American trotter for stud purposes, this defect being very apparent in that horse. This is an additional reason for the more continuous introduction of the English Thoroughbred, or such horses which are very straight in their backs and quarters, with tail set on high.'

To get good cavalry horses the Thoroughbred sire is almost indispensable, as in no other way can the lengthy rein, sloping shoulder, deep chest, strong loin and long quarter so necessary in this class, be obtained with any certainty or regularity. Freedom of movement is essential, but high action and great trotting speed are neither required nor wanted. Horses of this class should stand not less than 15·1 nor more than 15·3, and should measure at least 8 inches below the knee and 70 inches in girth.

The first prize at Toronto was taken by a brown gelding named 'General' said to be by a Thoroughbred horse. He was a remarkably well proportioned weight carrier of considerable length and great substance. His measurements were as follows:—height 15·3, cannon bone 8 inches, arm 21 inches, crest to withers 37 inches, withers to croup 33 inches, croup to tail 15 inches, girth 74 inches.

Horses of this stamp can best be procured by the use of selected Thoroughbred sires on strong half-bred mares, on the better class of roadster mares, or on mares from Hackney or Coach sires, provided they show some blood and quality. On mares having a preponderance of warm blood or those showing any inclination to weediness, a good Hackney horse might be advantageously used.

THE MOUNTED INFANTRY HORSE.

The mounted infantry horse for which such an unprecedented demand has recently arisen and which is likely to be even more sought after if present war conditions continue to prevail, is a smaller and cheaper animal than either of those already des-

cribed. He is in fact a cob, a strong pony on short legs, with as much quality as can consistently be looked for in conjunction with the substance required to carry an armed man. He must have a fair shoulder and a good back, be deep through the heart and stand squarely on good legs well furnished with bone. In height he may be from 14·1 to 15·1, but 14·3 is the favourite standard with Lt. Col. Dent. Strength is the great desideratum, but a reasonable amount of activity is indispensable.

The little horse 'Hero' which took first prize in Toronto, stood 15·1, measured 7¾ inches below the knee and 19½ round the arm: from crest to withers he was 34 inches, withers to croup 27 inches, croup to tail 15 inches. He girthed 73 inches and as the measurements show, was an excellent type of the weight carrying cob. Such horses can be obtained by a stout Thoroughbred sire from French Canadian or other strong pony mares, or by the judicious use of the Hackney horse on the smaller roadsters and on those little mares too common in Canada, resulting from the ill-advised use of the racing or rather sprinting type of Thoroughbred on light mares of trotting blood or other mixed breeding.

GENERAL REQUIREMENTS.

In times of peace no horses are bought at less than four nor more than seven years old.

As regards colour, bays, browns, chestnuts and blacks are preferred: a few grays are required for special corps, but odd coloured horses are not wanted.

No unsound or seriously blemished horse will be taken; the veterinary examination is fairly strict but is also strictly fair. Un-docked horses are preferred and no horse with a very short docked tail will be taken.

In time of war, however, when the demand, as a rule, exceeds the available supply, purchasing officers overlook many minor defects, provided the animals offered are sound and serviceable, while conforming generally to the requirements of the service.

Fig.

ADVICE TO BREEDERS.

Breeders on the Western ranges will, no doubt, find it profitable from this time forward, to devote considerable attention to the production of horses especially adapted for military use.

In the other portions of the Dominion the supply of such horses can be enormously increased with but little extra effort or expense on the part of the breeder.

Immense numbers of light horses and ponies are annually bred in Canada of which, many when grown are, owing to their non-descript character, of but little value. If the breeders of these animals would send their lighter mares to pure bred stallions, of the British breeds, intelligently selected with a view to the production of a definite type of military horse, a vast improvement in our clean-legged stock would speedily manifest itself.

High prices would then as now be easily obtainable for really superior animals: most of the others would find ready sale for army use as well as for other purposes, while the misfits and object lessons would be less numerous and, except by comparison, not less valuable, than they are at present.

J. G. RUTHERFORD,
Chief Veterinary Inspector.

REPORT

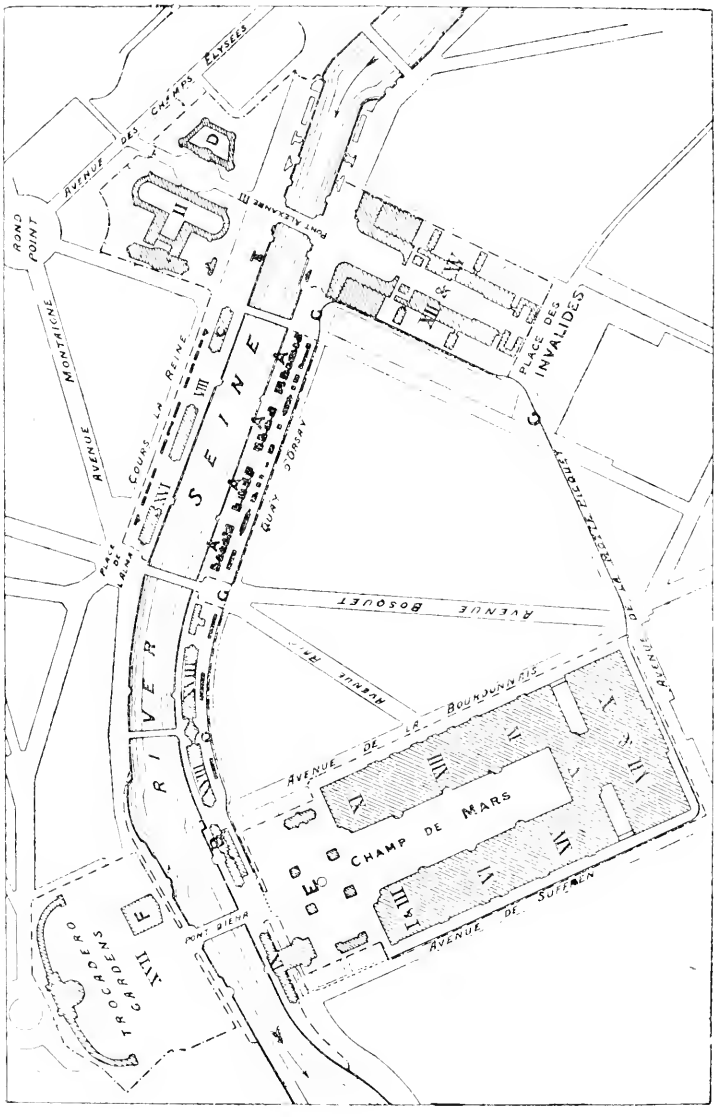
OF THE

CANADIAN COMMISSION

AT THE

PARIS EXHIBITION

PLAN OF EXHIBITION GROUNDS AND BUILDINGS.



KEY TO PLAN OF EXHIBITION GROUNDS AND BUILDINGS.

I. Education and Instruction.
II. Works of Art.
III. Appliances and General Processes relating to Literature, Science and Art.
IV. Mechanical Engineering.
V. Electricity.
VI. Civil Engineering and Transportation.
VII. Agriculture.
VIII. Horticulture and Arboriculture.
IX. Forests, Sport, Fishing, &c.
X. Food Products.
XI. Mining and Metallurgy.
XII. Decoration and Furniture of Public Buildings and of Dwelling Houses.
XIII. Thread, Yarns, Textile Fabrics and Clothing.
XIV. Chemical Industries.
XV. Various Industries.
XVI. Social Economy, Hygiene, and Public Charitable Relief.
XVII. Colonization.
XVIII. Army and Navy.
AAAA. Foreign Pavilions.
B. Mercantile Marine (Part of Group VI.).
C. Pavilion of the City of Paris.
D. Historical Exhibition of French Art.
E. Eiffel Tower.
F. British Colonies and India.
G. Circular Railway.
——— . ——— . ——— Boundary of the Exhibition.

REPORT OF THE CANADIAN COMMISSION AT THE PARIS UNIVERSAL EXHIBITION, 1900

The Canadian Commissioners to the Paris Universal Exhibition of 1900 have the honour to present the full report of their operations.

In September, 1896, the Canadian Government received through the Imperial authorities an official invitation from the French Government to take part in the great Universal Exhibition of 1900, which was then in course of preparation, and having decided to embrace the opportunity of showing the developments that had been made in all departments of trade and commerce in Canada, as well as of supplying information to Europeans concerning the natural wealth of the Dominion, accepted the invitation by Order in Council of April 24, 1897.

By Order in Council dated October 20, 1897, the Right Honourable Lord Strathcona and Mount Royal, G.C.M.G., &c., was appointed representative of Canada on the Imperial British Commission, Chairman of Colonial Committee and member of the General Executive Committee.

Another Order in Council was passed on February 2, 1899, appointing the following named gentlemen to be Canadian commissioners at the Paris Universal Exhibition, and to proceed at once with the work of organization. Subsequently the Honourable J. I. Tarte, Minister of Public Works, was appointed by Order in Council, dated March 13, 1900, Chief Commissioner.

BOARD OF COMMISSIONERS.

The Honourable Sydney A. Fisher, Minister of Agriculture, Chairman.

Dr. G. M. Dawson, C.M.G., LL.D., F.R.S., Director of the Geological Survey, Ottawa.

Dr. William Saunders, LL.D., F.R.S.C., Director of Experimental Farms, Ottawa.

James W. Robertson, Esquire, Commissioner of Agriculture and Dairying, Ottawa.

Major F. F. Gourdeau, Deputy Minister of Marine and Fisheries, Ottawa.

A. H. Gillmor, Esquire, St. George, N.B.

J. X. Perrault, Esquire, Chevalier de la Légion d'Honneur, 80 St. Denis Street, Montreal, P.Q.

James George Jardine, Esquire, 28 Front Street East, Toronto, Ont.

William D. Scott, Esquire, Winnipeg, Man.

Auguste Dupuis, Esquire, of the Village des Aulnaies, P.Q., Secretary.

On August 9, 1900, the Honourable Charles Burpee, of St. Stephens, N.B., was appointed commissioner in the place of the Honourable A. H. Gillmor, whose resignation was accepted on April 4, 1900.

Subsequently the following appointments were made by Order in Council :—

On April 17, 1900, the Honourable F. G. M. Déchene, Minister of Agriculture of the Province of Quebec, was appointed Honorary Commissioner.

On April 25, 1900, the Honourable F. E. A. Evanturel, Speaker of the Ontario Parliament, was also appointed Honorary Commissioner.

On March 13, 1900, Madame Raoul Dandurand, of Montreal, was appointed Honorary Lady Commissioner.

On August 16, 1900, the Honourable Thomas Ballantyne, of Stratford, Ont., was appointed Honorary Commissioner for the term of three months.

On August 25, 1900, the Reverend Father C. P. Choquet, of St. Hyacinthe, Que., was also appointed Honorary Commissioner for the same term.

The several members of the staff were engaged by letter, and payment for their services authorized by Order in Council dated March 13, 1900.

After several meetings the Commissioners came to the conclusion that, taking into consideration the very limited space awarded to Canada, it was impossible to attempt an exhibition by provinces, however desirable it might be to do so, and that the best result would be obtained by combining the superior productions of each province as an exhibit of the capabilities and resources of the Dominion of Canada. The soundness of this decision was afterwards abundantly shown.

In framing the conditions governing Canadian exhibits the Commissioners had to follow to a large extent the rules and regulations of previous exhibitions; in London 1851, Paris 1855, London 1862, Paris 1867, Philadelphia 1876, Paris 1878, and Chicago 1893. These conditions were liberal on the part of the Canadian Government, involving free space, transportation, show cases, installation, power, light, maintenance and representation, with sale or return of goods after the exhibition, with the exception only of specially large and extensive exhibits involving considerable expenditure, part of which was by a special arrangement paid by the exhibitors themselves.

This entailed a large outlay of money, but it was found that, to secure a complete and creditable display in every section, inducements had to be offered to desirable exhibitors, and in some cases much persuasion was found necessary to induce them to take part in the exhibition.

To carry out this work systematically and well, the Dominion was divided into four great sections under the special care of their respective Commissioners, as follows:—

For the Maritime Provinces, A. H. Gillmor, Esq., St. John, N.B.
For the Province of Quebec, J. X. Perrault, Esq., Montreal, Que.
For the Province of Ontario, J. G. Jardine, Esq., Toronto, Ont.
For the Western Provinces, W. D. Scott, Esq., Winnipeg, Man.

Moreover the following named special departmental Commissioners were instructed to complete collections and supervise their shipping and installation in Paris:—

Mineral and geological collection, forestry—Dr. G. M. Dawson, Director of the Geological Survey.

Agricultural and horticultural productions—Dr. Wm. Saunders, Director of Experimental Farms.

Food products—Professor J. W. Robertson, Commissioner of Agriculture and Dairying.

Fish and Game—Major F. F. Gourdeau, Deputy Minister of Marine and Fisheries.

In order to provide intending exhibitors with full information, the following general instructions, rules and regulations, classification and forms of entry, were at once printed and widely circulated in every province of the Dominion:—

THE PARIS UNIVERSAL EXHIBITION OF 1900.

This exhibition is attracting world-wide attention and is expected to afford a most complete representation of all countries, products and manufactures of the world. The French authorities have invited all nations to participate, and nearly all have accepted the invitation.

The British Government has appointed a very strong Imperial Commission, with His Royal Highness the Prince of Wales as chairman, and this Commission has invited the co-operation of the British colonies.

For the purpose of securing and organizing a proper representation of the colonies, there has been named in the Imperial Commission a colonial committee. Canada was, about a year ago, invited to name a representative on this committee, and the government responded by nominating the High Commissioner in London, Lord Strathcona and Mount Royal. Lord Strathcona and Mount Royal was chosen by this committee their chairman, and was appointed the representative of the colonies on the general executive committee of the Imperial Commission; so that Canada occupies a very honourable and advantageous position upon the Imperial Commission, the more so in consequence of the high standing in London of her representative.

The French exhibition authorities deal exclusively with the British Imperial Commission in regard to all matters connected with the participation of each and every part of the British Empire in the exhibition. The colonial committee in London with the object of affording an abundant opportunity to the British Colonies for proper representation, obtaining the privilege of a special building set apart for the occupation of these Colonies. Much correspondence and negotiation has taken place between the Imperial Commission and the French authorities in regard to the concession of a separate building &c. It was not until January 1, 1899, that this was finally granted and the conditions fully determined.

In the course of this correspondence it became evident, that the space thus accorded to the colonies as a whole was such that the portion allotted to Canada would be quite incommensurate with the requirements of the Dominion. On representations made to this effect we have been able, however, to obtain a considerable additional allotment in the space accorded to the British empire over and above that granted us in the special colonial building.

The colonial building finally decided upon, situated on the Trocadero grounds, overlooking the Champ de Mars not far from the great Eiffel Tower, covers 36,000 square feet, of which Canada has been allotted 27,100 square feet. In the Canadian portion of this building, exhibits of all characters and classes can be placed, the space being entirely within the control of the Canadian authorities.

The general plan of the exhibition is to have the exhibits divided by classes in 18 general groups according to their nature, without respect to the country from which they come. Thus, the portion of the Imperial space which has been granted to Canada, apart from the colonial building, is distributed through the different buildings according to the different classes, and in this space the exhibits must appear as exhibits of the British Empire, and cannot be grouped as coming especially from Canada, although each exhibit will be clearly marked with the name and full address of the exhibitor. There are, at the present time, 12,000 square feet of such space granted to Canada by the Imperial Commission.

It will be seen at once that the whole space at the disposal of the Canadian authorities is very limited in proportion to the capabilities of the country, and, therefore, it is evidently of importance that there shall be a careful selection of exhibits such as to insure that only the best representative examples or specimens of each kind shall be sent, and the reputation of Canada's products be maintained or established. It thus becomes necessary that the exhibits shall be so arranged as to be of a national character, illustrative of the products, arts and manufactures of the entire Dominion, without respect to locality of origin.

The government proposes to arrange for some exhibit in certain classes, but even in those must very largely depend on the various local organizations and on private individuals to supply specimens—for instance, in mineral, agricultural, fishery, or forestry exhibits—which will insure a fair representation of all parts of the country. In the classes of manufactured articles the chief dependence must be placed upon the enterprise of private companies and individuals.

It is decided that the government will undertake, at the public expense, the transportation of all exhibits from certain seaports of the Dominion to Paris; and that the unpacking, setting up and care of the exhibits at Paris, and the repacking and return to the shores of the Dominion of such exhibits as are not disposed of at Paris, will also be managed at the public expense.

The rules and regulations for exhibitors, as well as the full classification of the exhibition, are given in following pages. Further information, if required, can be obtained from the secretary of the Canadian Board of Commissioners, or from the respective members of the Board at their local addresses.

OTTAWA, January 24, 1899.

GENERAL CLASSIFICATION OF EXHIBITS.

Group I.—Education and Instruction.

Group II.—Works of Art.

Group III.—Appliances and General Processes Relating to Literature, Science and Art.

Group IV.—Mechanical Engineering.

Group V.—Electricity.

Group VI.—Civil Engineering. Transportation.

Group VII.—Agriculture.

Group VIII.—Horticulture and Arboriculture.

Group IX.—Forests, Sport, Fishing, Gathering Wild Crops.

Group X.—Food Products.

Group XI.—Mining, Metallurgy.

Group XII.—Decoration and Furniture of Public Buildings and of Dwelling Houses.

Group XIII.—Thread, Yarns, Textile Fabrics, Clothing.

Group XIV.—Chemical Industries.

Group XV.—Various Industries.

Group XVI.—Social Economy, Hygiene, Public Charitable Relief.

Group XVII.—Colonization.

Group XVIII.—Army and Navy.

GENERAL REGULATIONS FOR CANADIAN EXHIBITORS.

1. *Opening and Close of Exhibition.*—The exhibition will open on April 15 and close on November 5, 1900.

2. *Applications for Space.*—Forms of application for space must be returned to the Canadian Commission, Department of Agriculture, Ottawa, as early as possible, and in any case not later than June 1, 1899. All applications will be considered by the Commission, but owing to the limited amount of space at their disposal, the Commissioners cannot undertake to allot the whole or any part of the space applied for, their object being to secure the best possible exhibition of Canadian goods in each group. There will be no charge to exhibitors for space.

3. *Date of Reception of Exhibits and Transportation.*—Accepted exhibits from Quebec, Ontario and the West, packed in strong cases, must be delivered, at the exhibitors' expense, at the Customs Warehouse, Montreal, or the Queen's Wharf, Quebec, not later than November 1 next, 1899; and exhibits from the Maritime Provinces at Halifax, N.S., not later than November 15, 1899, to be shipped to Paris by the Canadian Commission free of charge. Exhibitors will be free to ship their goods by other routes not later than January 1, 1900, but at their own personal expense.

4. *Prohibition of Transfer of Space or Substitution of Exhibits.*—No exhibitor will be permitted to transfer his allotment, or to allow any other than his own duly accepted

exhibits to be placed thereon. All goods must be exhibited in the name of the person or firm who signed the form of application.

5. *Forfeiture of Allotted Space.*—Space not occupied thirty days previous to the opening of the exhibition will be forfeited, and allotted at the discretion of the Commission.

EXHIBITS.

6. *Position of Exhibits.*—Exhibitors will be required to place their exhibits so as to contribute as much as possible to the general effect. The whole of the arrangements relating to show-cases, signs, notices and all similar matters, will be subject to instructions issued by the Commission.

7. *Maximum Height of Stands, &c.*—No stand, including sign-board, may exceed twelve feet in height, without special permission.

8. *Uniformity of Decoration.*—In order to insure uniformity of decoration and general effect, no exhibitor will be allowed to put up flags, banners, or any other kind of decoration, without special permission from the Commission.

9. *Railing of Exhibits.*—Exhibitors may place railings round their stands, subject to approval. In every instance the railings must be within the space allotted.

10. *Partitions.*—No partitions may be erected between the stands without permission from the Commission, nor anything put up to interfere with the sight of adjoining stands, or to impede the general view in all directions throughout the building.

11. *Sign and Name Boards.*—No sign or name board may be placed in such a manner as to interfere with the vista, or otherwise than parallel with the front of the stand. All signs placed over show cases or stands must be uniform in style. Instructions upon this point will be issued later, and the maximum dimensions will be specified.

12. *Conveyance, Expenses.*—The Commission will bear the cost of transportation of all exhibits from the ports of Montreal, Quebec and Halifax to Paris.

13. *Supervision of Arrival, Installation and Departure of Exhibits.*—In the absence of the exhibitor or his accredited representative, the Commission will free of charge, receive, unpack and install the exhibits in Paris, provide the necessary platforms, counters and other fixtures, and show-cases where it may be decided that the nature of the exhibits requires these. The Commission will also repack and return free of charge to the above-mentioned ports such exhibits as are not disposed of in Paris. Exhibitors are expected to dispose, in Paris, of their exhibits when these have a commercial value; only valuable collections of objects of special character being granted free return transportation.

14. *Pricing Goods.*—Exhibitors are particularly requested to mark their goods with the home selling prices, for the information of the jury and public. Prices, weights and dimensions should be given in French equivalents, as well as in Canadian figures.

15. *Placards and Handbills.*—No printed or written placards, handbills or descriptions may be displayed or distributed without the permission of the Commission. Such permission may be withdrawn at any time.

16. *Dangerous and Unhealthy Exhibits.*—Dangerous articles, especially those of an explosive nature, are excluded. Percussion caps, fireworks, matches, and similar articles will only be accepted in the form of imitations, and on condition that they contain no inflammable matter.

Exhibitors of unhealthy products, or of products which may cause inconvenience, must conform at all times to any measures which may be prescribed by the Commission in the interest of public health and safety.

Spirits or alcohols, oils and essences, corrosive substances, and such as are liable to injure other exhibits or inconvenience the public, will only be accepted provided they are contained in such vessels of convenient size, shape and material, as may be approved by the Commission.

17. *Unsuitable Exhibits.*—The French executive reserve the right to remove at any time any article which they may deem objectionable or unsuitable for exhibition.

18.—*Opening and Closing Exhibits.*—All show-cases, machinery, and exhibits generally, must be uncovered and properly cleaned each day previous to the hour at which the exhibition is open to the public. They must not be again covered until the closing of the building.

19. *Attendance of Exhibitors.*—All exhibits must be on view on every day on which the exhibition is open. If exhibitors or their representatives do not wish to be in attendance at the exhibition, the Commission will be prepared to undertake the superintendence of the exhibits, but in that event the Commission will not be responsible for any loss, damage, or accident, however occasioned.

20. *Removal of Exhibits.*—No exhibit may be removed before the close of the exhibition without special permission from the French executive. This rule does not apply to articles which exhibitors may be authorized to manufacture in the exhibition.

MOTIVE POWER.

21. *Motive power.*—Motive power will be provided free of charge under conditions which will be communicated to the exhibitors.

22. *Foundations and Connections.*—The Commission will provide at their own expense all necessary foundations, connections with the water, gas, electric and steam mains, as well as exhaust pipes, drains, &c., and also provide pulleys (which must be made in halves), or any intermediate gearing that may be necessary to convey power from the main shafting.

23. *Fencing of Machinery.*—All machinery in motion must be railed off in such a way as to protect the public and the workpeople from injury, and to the satisfaction of the Commission.

CASES.

24. *Labels.*—All cases containing goods for exhibition must bear special labels, inside as well as outside, which will be supplied to exhibitors in due course.

25. *Unpacking of Cases.*—All cases must be unpacked on arrival. Any cases remaining unpacked fifteen days prior to the opening of the exhibition will be liable to be removed to the custom-house, but neither the French executive nor the Commission will be responsible for any damage which may arise, or any expense which may be incurred in consequence of such removal.

26. *Storage of Empties.*—The Commission will make arrangements for the collection, storage and redelivery of cases. Cases must be distinctly marked by the exhibitor for the purposes of identification.

GENERAL.

27. *Freight and Duties.*—Information regarding any reduction of freight charges, duties, &c., will be issued by the Commission from time to time.

28. *Customs Duties. Forwarding of Goods.*—The buildings of the exhibition will be treated as bonded warehouses. Exhibitors not taking advantage of the Commission's

shipment may transmit their goods through any forwarding agent, or direct to the exhibition, at their own expense. Goods will be dealt with according to the ordinary regulations in force in bonded warehouses by a special customs service connected with the exhibition. Goods for exhibition only will not be liable to duty, but on goods removed from bond the usual rates will have to be paid by the purchaser.

29. *Copyright.*—No work of art or object exhibited in the buildings or grounds may be drawn, copied or reproduced in any form whatsoever without the exhibitor's written permission, countersigned by the French executive.

The French executive may, however, allow general views to be taken and reproduced.

30. *Protection of Patents.*—With regard to inventions, designs, and trade marks, exhibitors will enjoy the rights and protection afforded by the French Law of May 23, 1868, within the periods and under the conditions specified in said law.

31. *Nature of Awards.*—Awards to exhibitors will take the form of diplomas signed by the Minister of Commerce, and by the Commissaire-Général.

These diplomas will consist of:—

Grand Prize Diplomas.
Gold Medal Diplomas.
Silver Medal Diplomas.
Bronze Medal Displomas.
Honourable Mention Diplomas.

32. *Compliance with Instructions.*—Exhibitors, their representatives and workmen, must comply with all instructions issued by the Commission.

33. *Protection of Exhibits.*—The French executive will take all precautions for the protection of exhibits, but neither that executive nor the Commission are to be held responsible for loss or damage however caused. It is left to exhibitors to insure their own goods should they desire to do so.

34. *Liability of Exhibitors.*—Every exhibitor shows at his own risk as respects wear and tear, damage from exposure, breakage, accident in packing, transportation, or from any other cause, and it is a condition that he hold the Commission harmless, and indemnify it against any legal proceedings, whether in the French or the Canadian courts, arising from any injury or accident caused or occasioned by his machinery or other article exhibited by him, or from any action which it may be necessary to take in enforcing compliance with the regulations. The above rule applies to companies and firms as well as to individual exhibitors.

35. *Co-operation of Exhibitors regarding Regulations.*—As the above regulations are laid down solely in the interests of the general body of exhibitors, and to insure the satisfactory working of the Canadian section, the Commission trust that the exhibitors generally will co-operate in carrying them into effect.

36. *Alteration of Regulations.*—These regulations are subject to alteration and amplification from time to time.

37. *Infringement of Regulations.*—The infringement of any of the above regulations, or any of the regulations of the French executive, will subject the exhibitor to the forfeiture of his space, and to the removal of his goods from the building, without any liability attaching to the French executive, or to the Commission or their representative in any way whatsoever, in consequence of such removal. The question whether any such regulations have been infringed, and whether the exhibitor's space has been forfeited, and whether his goods shall be removed, is to be determined according to the sole discretion of the Commission.

In view of these liberal conditions, many applications for space were made beyond the area at the disposal of the Commisssoners, but with care and discrimination 1,750 distinct exhibits were secured, covering almost every class of the whole exhibition.

To transport these goods across the Atlantic a contract was entered into with the Leyland line of steamers to Antwerp, the first shipment taking place in November, and followed fortnightly till the month of April. From Antwerp the exhibits were transported by rail to Paris and delivered at the exhibition grounds, the first shipment arriving early in January, 1900, the land transport having been previously arranged by Mr. J. X. Perrault, who had left Canada in advance to prepare the colonial pavilion for the reception of the exhibits. A section of the unfinished colonial pavilion was secured for the housing of the cases, till the building operations should permit of the setting up of the show cases.

With the arrival of the Hon. Mr. Tarte, Minister of Public Works, as Chief Commissioner, and of the Commissioners, Messrs. Jardine, Scott, Gourdeau, and staff in February and March, a large force was put to work, and the installation was far enough advanced to inaugurate the Canadian section on Her late Majesty's birthday. The balance of Canadian exhibits were shown in the British sections of the forestry, horticultural, carriage, bicycle, marine, ironware, furniture and agricultural implements buildings, and to provide ample space for all our implement manufactures the Commission erected, at Vincennes, a special building measuring 5,000 feet, which, when finished and decorated, was handsome and convenient.

The colonial building itself, as transferred to the Commission, required considerable improvement, that is, electric lighting, gas, water mains and fire protection. The whole of the ceiling had to be decorated, which was done with coloured vellums, the rough floors were covered with linoleum and carpeting, decorative designs, relieved with plush and other drapings, numerous flags and coats of arms of the several provinces of the Dominion were distributed with much taste on the plain walls, columns and gallery, with the result that the Canadian court received favourable comment from all those who visited it.

The ground plan of the colonial pavilion will show at a glance the position of the several departments, office and reception rooms of the commission, as well as the location of the exhibits of the several exhibitors, of whom the following is a complete alphabetical list:—

INDEX OR ALPHABETICAL LIST OF EXHIBITORS.

The several Provinces of the Dominion are indicated thus: Ont., Ontario; Que., Quebec; N. S., Nova Scotia; N. B., New Brunswick; P. E. I., Prince Edward Island; Man., Manitoba; B. C., British Columbia; Alta., Alberta; Assa., Assiniboia; Atha., Athabasca; Sask., Saskatchewan.

SESSIONAL PAPER No. 15

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

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INDEX OR ALPHABETICAL LIST OF EXHIBITORS *Continued.*

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

SESSIONAL PAPER No. 15

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

INDEX OR ALPHABETICAL LIST OF EXHIBITORS—*Continued.*

INDEX OR ALPHABETICAL LIST OF EXHIBITORS *Concluded.*

LIST OF AWARDS MADE TO CANADA.

The list of awards conferred by the International jury upon Canadian exhibitors will illustrate better than anything else the success achieved by the Dominion of Canada in its competition with the world. To the British Empire was allotted the nomination of eighty judges and assistant judges divided in the 120 classes of the Exhibition. Of these seven were transferred to the Canadian Commission in the following classes :—

Class 39.—Field productions, J. X. Perrault.
Class 40.—Animal food products, M. L'Heritier.
Class 45. Fruit and fruit trees, M. Hamilton.
Class 51. Products of Hunting, M. Gourdeau.
Class 63.—Working of mines and quarries, M. Faribault.
Class 35.—Agricultural implements, M. Geo. Collins Levey.
Class 58.—Preserved foods, M. Petitjean.

As will be seen in perusing the following prize list, Canadian exhibitors have obtained a large share of the most important awards in every group and class of the Paris Exposition, a thing that was quite unexpected by the manufacturing and mercantile classes of Europe.

LIST OF DIPLOMAS AWARDED TO CANADIAN EXHIBITORS IN GROUPS 1, 2, 3.

(Sent to Lord Strathcona and Mount Royal on January 23, 1903.

CLASS 1.—TRAINING OF CHILDREN—PRIMARY EDUCATION—TEACHING OF ADULTS.

Canada, Government of, Ottawa—Grand Prix Diploma.
Canadian Office and School Furniture Co., Preston, Canada—Silver Medal Diploma.
Clercs des Saints Viateurs, Joliette, Canada—Honourable Mention Diploma.
Ecole Normale Laval, Montreal, Canada—Bronze Medal Diploma.
Frères des Ecoles Chrétiennes Montreal, Canada—Silver Medal Diploma.
Frères de l'Institution Chretienne, Canada,—Honourable Mention Diploma.
Les Frères du Sacré-Cœur au Canada, Coaticook, Canada—Honourable Mention Diploma.
Les Sœurs du Bon-Pasteur, Quebec, Canada—Honourable Diploma.
Les Sœurs de la Charité, Canada—Honourable Mention Diploma.
Les Sœurs de la Presentation de Marie, St. Hyacinthe, Canada—Honourable Mention Diploma.
Les Sœurs de Sainte Anne, Lachine, Canada—Honourable Mention Diploma.
Manitoba, Provincial Government of, Winnipeg, Canada—Bronze Medal Diploma.
Montreal Catholic School Commissioners, Montreal, Canada—Gold Medal Diploma.
Montreal Protestant School Commissioners, Montreal, Canada—Gold Medal Diploma.
Ontario, Provincial Government of, Toronto, Canada—Grand Prix Diploma.
Quebec, Provincial Government of, Quebec, Canada—Grand Prix Diploma.
Sœurs de la Congrégation de Notre Dame, Montreal, Canada—Silver Medal Diploma.

CLASS 2.—SECONDARY EDUCATION OF BOYS; CLASSICAL SIDE, MODERN SIDE. EDUCATION OF YOUNG GIRLS.

Canada, Dominion of, Ottawa, Canada—Grand Prix Diploma.

CLASS 3.—HIGHER EDUCATION—SCIENCE SCHOOLS.

Canada, The Universities of the Dominion of—Grand Prix Diploma.

CLASS 4.—SPECIAL TEACHING OF FINE ART, INCLUDING MUSIC.

(Schools, Colleges and Institutes for teaching Drawing and Music.)

Conseil des Arts et Manufactures de la Province de Québec—Silver Medal Diploma.

CLASS 5.—SPECIAL AGRICULTURAL EDUCATION.

Guelph School of Agriculture, Canada—Gold Medal Diploma.

CLASS 6.—SPECIAL INDUSTRIAL AND COMMERCIAL EDUCATION.

Canada, Dominion of—Gold Medal Diploma.

CLASS 7.—OIL PAINTINGS. WATER COLOURS. DRAWINGS. CARTOONS.

Beau, H., Montreal, Canada—Bronze Medal Diploma.
Bruce, W. Blair, Hamilton, Canada—Bronze Medal Diploma.
Dubé, Mrs. Montreal, Canada—Bronze Medal Diploma.
Harris, Robert, P. R. Canadian, A., 23 Philips Square, Montreal, Canada—Honourable Mention Diploma.
MacPherson, Miss, Newfoundland—Bronze Medal Diploma.
Suzor-Coté, A., Montreal, Canada—Bronze Medal Diploma.

CLASS 9.—SCULPTURE.

Bruce, Mrs. W. Blair, Hamilton, Canada—Bronze Medal Diploma.
Hebert, Phillipe, Montreal, Canada—Silver Medal Diploma.
Wallis, Miss K. E., Canada—Honourable Mention Diploma.

CLASS 11.—TYPOGRAPHY. VARIOUS PRINTING PROCESSES.

Canadian Composing Company, Montreal, Quebec, Canada—Grand Prix Diploma.
Montreal Lithographic Co., Canada—Bronze Medal Diploma.
W. Stephen, 'Collaborateur', Canadian Composing Co., Canada—Gold Medal Diploma.

CLASS 12.—PHOTOGRAPHY.

Cochran, Charles S., St. James St., Hamilton, Ontario, Canada—Silver Medal Diploma.
Jackson, John Francis, Barrie, Ontario, Canada—Bronze Medal Diploma.
Laprès et Lavergne, Montreal, Canada—Gold Medal Diploma.

PICTORIAL PHOTOGRAPHY.

Taylor, Mrs. A. Dunbar, Vancouver, British Columbia—Grand Prix Diploma.
Rowley, E. J., 455 Spadina Avenue, Toronto, Ontario, Canada—Gold Medal Diploma.
Sherk, Wendell, B., Waterloo, Ontario, Canada—Honourable Mention Diploma.

CLASS 13. BOOKS, MUSICAL PUBLICATIONS, BOOKBINDING.

(*Appliances and Products*). *Newspapers, Posters.*

Burrows, Toronto, Canada—Honourable Mention Diploma.
Granger Brothers, Montreal, Canada—Silver Medal Diploma.
LeMoyne de Martigny, Dr., Montreal, Canada—Bronze Medal Diploma.
Leveillé, Ed., Montreal, Canada—Silver Medal Diploma.
Prat, Madame, (Minnie), Windsor, N.S., Canada—Silver Medal Diploma.
Lemieux, R., Collaborateur of Theorot, Canada—Bronze Medal Diploma.
Theorot, Camille, Montreal, Canada—Gold Medal, Diploma.

CLASS 14.— MAPS AND APPARATUS FOR GEOGRAPHY. COSMOGRAPHY. TOPOGRAPHY.

Canadian Government, Ottawa, Canada. (Collective Exhibit of maps)—Gold Medal Diploma.
Deville, Capt., Ottawa, Canada—Gold Medal, Diploma.
Taché, E., Quebec, Canada—Silver Medal Diploma.
Derozier, E., (Dominion of Canada)—Honourable Mention Diploma.

CLASS 16.—MEDICINE AND SURGERY.

Tourangeau, Napoléon, Montreal, Canada—Honourable Mention Diploma.

CLASS 17.—MUSICAL INSTRUMENTS.

Barthelemes & Co., Toronto, Canada—Bronze Medal Diploma.

Dominion Organ & Piano Co., Ltd., Bowmanville, Ontario, Canada—Silver Medal Diploma.

Knaggs, William, 70 Wood St., Toronto, Ontario, Canada—Bronze Medal Diploma.

Morris Field Rogers Company, Ltd., Listowell, Ont., Canada—Bronze Medal Diploma.

Newcombe & Co., Octavius, (now the Newcombe Piano Co.), Toronto, Ont., Canada—Gold Medal Diploma.

Pratte & Co., L.E.N., Montreal, Quebec, Canada—Silver Medal Diploma.

William, R. S. Jr., Canada—Honourable Mention Diploma.

LIST OF DIPLOMAS AWARDED TO CANADIAN EXHIBITORS IN GROUPS IV. TO IX.

CLASS 20.

Ontario Wind Engine and Pump Co., Brantford, Canada—Honourable Mention Diploma.

CLASS 21.

Dodge Manufacturing Co., Ltd., 74 York St., Toronto, Canada—Bronze Medal Diploma.

McLaren, D. K., Victoria Square, Montreal, Que., Canada—Silver Medal Diploma.

Wilson & Son, C., 67 Esplanade St. East, Toronto, Ont., Canada—Silver Medal Diploma.

CLASS 22.

Bertram & Sons, John, Canada Tool Works, Dundas, Ont., Canada—Silver Medal Diploma.

Hart Emery Wheel Co., Hamilton, Ont., Canada—Honourable Mention Diploma.

CLASS 28.

Linehouse Cement Works, Toronto, Canada—Silver Medal Diploma.

Owen Sound Portland Cement Works, Owen Sound, Canada—Silver Medal Diploma.

Queenstown Cement Works, Queenstown, Canada—Silver Medal Diploma.

Thorold Cement Works, Thorold, Canada—Silver Medal Diploma.

CLASS 29.

Canada, Government of, for Canal Saint Laurent, Ottawa, Canada—Grand Prix Diploma.

Canadian Pacific Railway, Montreal, Canada—Gold Medal Diploma.

Grand Trunk Railway, Montreal, Canada—Gold Medal Diploma.

Robertson, Geo. A., 383 Lansdowne Ave., Montreal, Que., Canada—Bronze Medal Diploma.

CLASS 30.

Armstrong Manufacturing Co., Ltd., J. B., Guelph, Ont., Canada—Bronze Medal Diploma.

Bain Wagon Co., Ltd., Woodstock, Ont., Canada—Honourable Mention Diploma.

Brown, Alfred, Canada—Silver Medal Diploma.
Canada Carriage Co., Brockville, Ont., Canada—Bronze Medal Diploma.
Canada Cycle and Motor Co., Toronto, Canada—Silver Medal Diploma.
Clarksburg Wood Rim Co., Clarksburg, Canada—Bronze Medal Diploma.
Ledoux & Co., B., Montreal, Canada—Gold Medal Diploma.
McLaughlin Carriage Co., Oshawa, Ont., Canada—Silver Medal Diploma.
National Cycle and Automobile Co., Toronto, Ont., Canada—Bronze Medal Diploma.
Roux, Jean, L'Assomption, Que., Canada—Honourable Mention Diploma.
Scott & Son, R., Galt, Ont., Canada—Honourable Mention Diploma.
Verret & Co., Que., Canada—Honourable Mention Diploma.

CLASS 31.

Lamontagne & Co., 304-306 St. Paul St., Montreal, Canada—Silver Medal Diploma.

CLASS 32.

Canadian Pacific Railway, Montreal, Canada—Silver Medal Diploma.

CLASS 33.

Peterborough Canoe Co., Ltd., Peterborough, Ont., Canada—Silver Medal Diploma.
Pratt, F. W., Gore's Landing, Rice Lake, Ont., Canada—Bronze Medal Diploma.
Herald Bros., (Rice Lake Canoe Co.,) Gore's Landing, Ont., Canada—Bronze Medal Diploma.
Strickland & Co., Lakefield Canoe Works, Lakefield, Ont., Canada—Silver Medal Diploma.

CLASS 35.

Cockshut Plow Co., Ltd., Brantford, Ont., Canada—Gold Medal Diploma.
Coulthard Scott Co., of Oshawa, Ltd., Oshawa, Ont., Canada—Silver Medal Diploma.
Fleurys' Sons, J., Aurora, Ont., Canada—Silver Medal Diploma.
Gerolomy, William A., Tara, Ont., Canada—Silver Medal Diploma.
Major Manufacturing Co., Ltd., Montreal, Canada—Bronze Medal Diploma.
J. W. Mann Manufacturing Co. Ltd., Brockville, Ont., Canada—Gold Medal Diploma.
Massey, Harris & Co., Toronto, Ont., Canada—Grand Prix Diploma.
Maxwell, David & Sons, St. Mary's, Ont., Canada—Gold Medal Diploma.
Noxon Company, Ltd., Ingersoll, Ont., Canada—Gold Medal Diploma.
Peter Hamilton Manufacturing Co., Peterborough, Ont., Canada—Silver Medal Diploma.
Verity Plow Co., Ltd., Brantford, Ont., Canada—Gold Medal Diploma.
Ontario Wind Engine & Pump Co., Peterborough, Ont., Canada—Silver Medal Diploma.
Vessot et Cie. S., Joliette, Que., Canada—Silver Medal Diploma.
Collaborateur—Hilliard (Cockshutt Plow Co.)—Silver Medal Diploma.

CLASS 38.

Canadian Minister of Agriculture—Grand Prix Diploma.
Saunders, Dr., Director, Experimental Farms, Ottawa, Canada—Silver Medal Diploma.

CLASS 39.

British Columbia, Province of, Canada—Gold Medal Diploma.
Canada, Dominion of,—Grand Prix Diploma.

Manitoba, Province of, Canada—Grand Prix Diploma.
New Brunswick, Province of, Canada—Gold Medal Diploma.
North West Territories, Canada—Gold Medal Diploma.
Nova Scotia, Province of, Canada—Grand Prix Diploma.
Ontario, Province of, Canada—Grand Prix Diploma.
Prince Edward Island, Province of, Canada—Gold Medal Diploma.
Quebec, Province of, Canada, (Collective Exhibit)—Grand Prix Diploma.

CLASS 40.

Canadian Government, (Collective Exhibit of Canadian Agricultural Produce)—Grand Prix Diploma.
Canadian Minister of Agriculture, Ontario—Grand Prix Diploma.
Canadian Minister of Agriculture, Quebec—Grand Prix Diploma.

CLASS 41.

Canada, Dominion of (collective exhibit)—Nine Gold Medal Diplomas.
Canadian Experimental Farms—Gold Medal Diploma.
Collaborateur—Hay, W. H. (Canadian section)—Silver Medal Diploma.

CLASS 42.

Canada, Dominion of—Nine Gold Medal Diplomas.

CLASS 43.

Canadian Minister of Agriculture, Ottawa, Canada—Silver Medal Diploma.
James Smart Manf. Co., Ltd., Brockville, Ont., Canada—Bronze Medal Diploma.
Maxwell & Sons, David, St. Mary's, Ont., Canada—Bronze Medal Diploma.

CLASS 44.

Canada, Dominion of, Ottawa, Canada (collective exhibit)—Nine Gold Medal Diplomas.

CLASS 45.

Abbotsford Fruit Growers' Asso., Canada—Gold Medal Diploma.
Archibald, W. C., Wolfville, Nova Scotia, Canada—Bronze Medal Diploma.
Aubertin, Alex., Cote St. Paul, Que., Canada—Bronze Medal Diploma.
Barr, Chas., Covey Hill, Que., Canada—Honourable Mention Diploma.
Beatty, J., Canada—Bronze Medal Diploma.
Brenar, J. J., Grimsby, Ont., Canada—Bronze Medal Diploma.
British Columbia, Fruit Growers' Asso. of, Canada—Silver Medal Diploma.
British Columbia, Province of, Canada—Gold Medal Diploma.
Brome County Horticultural Society, Canada—Gold Medal Diploma.
Burrel, M., St. Catharines, Ont., Canada—Honourable Mention Diploma.
Burt, J. K., Paris, Ont., Canada—Bronze Medal Diploma.
Canada, Agricultural Department of—Grand Prix Diploma.
Canadian Experimental Farms, Canada—Grand Prix Diploma.
Caron, Hon. Judge, L'Islet, Que., Canada—Honourable Mention Diploma.
Carwin, H., Goderich, Ont., Canada—Silver Medal Diploma.
Caston, G. C. Craigshurst, Ont., Canada—Silver Medal Diploma.
Chapais, J. C., St. Denis, Que., Canada—Honourable Mention Diploma.
Craig & Sons, Wm., Abbotsford, Que., Canada—Honourable Mention Diploma.
Dempsey, J., Fairview, Ont., Canada—Silver Medal Diploma.

Dunlop, W. W., Outremont, Que., Canada—Bronze Medal Diploma.
Dunsmore, W. A., Stratford, Ont., Canada—Bronze Medal Diploma.
Edwards, G. B., Covey Hill, Que., Canada—Silver Medal Diploma.
Fisk, John M., Abbotsford, Que., Canada—Bronze Medal Diploma.
Furse, S., Goderich, Ont., Canada—Bronze Medal Diploma.
Goderich, Horticultural Society of, Ont., Canada—Gold Medal Diploma.
Grimsby, Horticultural Society of, Canada—Gold Medal Diploma.
Guelph, Collège d'Agriculture de, Canada—Honourable Mention Diploma.
Hagar, L. L., Grimsby, Ont., Canada—Silver Medal Diploma.
Huggard, R. L., Whitby, Ont., Canada, Honourable Mention Diploma.
Johnson, George, Canada—Silver Medal Diploma.
L'Ile d'Orleans, Societé d'Horticulture de, Canada—Honourable Mention Diploma.
Lington, Canada—Gold Medal Diploma.
L'Islet, Societé d'Agriculture du Comté de, Canada—Gold Medal Diploma
Miller, James, Paris, Ont., Canada—Bronze Medal Diploma.
Missisquoi, Horticultural Society of, Canada—Gold Medal Diploma.
Mitchell, J. G., Clarksburg, Ont., Canada—Bronze Medal Diploma.
Montreal, Horticultural Society of, Canada—Gold Medal Diploma.
New Brunswick, Province of, Canada—Gold Medal Diploma.
Newman, C. F., Lachine Rapids, Que., Canada—Bronze Medal Diploma.
Nova Scotia, Fruit Growers' Association of, Canada—Gold Medal Diploma.
Nova Scotia, Province of, Canada—Grand Prix Diploma.
Ontario, Agricultural College of, Canada—Gold Medal Diploma.
Ontario, Fruit Growers' Association of, Canada—Gold Medal Diploma.
Ontario, Province of, Canada—Grand Prix Diploma.
Orr, W. M., Fruitland, Ont., Canada—Silver Medal Diploma.
Owen Sound, Horticultural Society of, Canada—Silver Medal Diploma.
Patriquin, C., Wolfville, Nova Scotia, Canada—Honourable Mention Diploma.
Peart, A. W., Freeman, Ont., Canada—Bronze Medal Diploma.
Burlington Horticultural Society, Canada—Gold Medal Diploma.
Pettitt, A. J., Winona, Ont., Canada—Silver Medal Diploma.
Pettitt, M., Winona, Ont., Canada—Bronze Medal Diploma.
Pomological Society of the Province of Quebec, Canada—Grand Prix Diploma.
Prince Edward Island, Province of, Canada—Gold Medal Diploma.
Quebec, Horticultural Society of, Canada—Silver Medal Diploma.
Quebec, Province of, Canada—Grand Prix Diploma.
Quebec, Société de, Canada—Silver Medal Diploma.
Read, E. H., Port Dalhousie, Ont., Canada—Bronze Medal Diploma.
Salkeld, Isaac, Canada—Honourable Mention Diploma.
Sanderson, W., Stratford, Ont., Canada—Bronze Medal Diploma.
Sherrington, A. E., Walkerton, Ont., Canada—Silver Medal Diploma.
Smith, A. M., St. Catharines, Ont., Canada—Silver Medal Diploma.
Starr, A. G., Town Plot, Nova Scotia, Canada—Silver Medal Diploma.
Starr, G. R., Canada—Silver Medal Diploma.
Stratford Horticultural Society—Gold Medal Diploma.
Warnock, W. N., Goderich, Ont., Canada—Silver Medal Diploma.
Winnipeg, Horticultural Society of, Canada—Silver Medal Diploma.
Wood, J. P., Stratford, Ont., Canada—Bronze Medal Diploma.

Collaborateurs :

Bigelow, J. W. (Nova Scotia)—Silver Medal Diploma.
Verrault, Albert (Société de L'Islet)—Silver Medal Diploma.
Allan, Alexis, Department of Agriculture, Canada—Gold Medal Diploma.
Dechene, A. (Société de L'Islet)—Silver Medal Diploma.
Saunders, W. (Experimental Farms of Canada)—Gold Medal Diploma.
Dupuis, August (Société de L'Islet)—Silver Medal Diploma.

CLASS 49.

Canadian Geological Survey, Ottawa, Canada—Silver Medal Diploma.

Collaborateur:

Macoun (Canadian Geological Survey Department)—Bronze Medal Diploma.

CLASS 50.

Canada, Dominion of, (Collective Exhibit)—23 Grand Prix Diplomas.

William Cane & Sons' Manufacturing Co., Newmarket, Canada—Silver Medal Diploma.

Collaborateur:

Macoun, J. M. (Canadian Section)—Silver Medal Diploma.

CLASS 51.

Star Company, Nova Scotia, Canada—Silver Medal Diploma.

CLASS 52.

Atkinson, G. E., Portage la Prairie, Man., Canada—Gold Medal Diploma.
Brownell, Franklin, Ottawa, Canada—Bronze Medal Diploma.
Calder, Alex., Winnipeg, Man., Canada—Bronze Medal Diploma.
Canada, Dominion of—Five Grand Prix Diplomas.
Caron, Sir A. P., Ottawa, Canada—Honourable Mention Diploma.
Davies, Sir Louis H., Prince Edward Island, Canada—Gold Medal Diploma.
Dechene, Hon. F. G. M., Minister, Province of Quebec, Canada—Gold Medal Diploma.
Desjardins, Chas. & Co., 1537 St. Catherine St., Montreal, Canada—Gold Medal Diploma.
Egan, Thomas J., Halifax, Nova Scotia, Canada—Gold Medal Diploma.
Gill, Robt., Ottawa, Ont., Canada—Honourable Mention Diploma.
Hudson's Bay Company, Winnipeg, Canada—Grand Prix Diploma.
Menier, Henry, Anticosti, Que., Canada—Gold Medal Diploma.
Miller, Lusel, 238 Yonge St., Toronto, Canada—Silver Medal Diploma.
Paquet, Hon. J., Arthur, Que., Canada—Gold Medal Diploma.
Parker & Co., R., Toronto, Ont., Canada—Bronze Medal Diploma.
Perrett, John, Sherbrooke, Que., Canada—Silver Medal Diploma.
Wilkie, D. R., Toronto, Ont., Canada—Honourable Mention Diploma.

CLASS 53.

Canadian Department of Marine and Fisheries, Ottawa, Ont.—Five Grand Prix Diplomas.

Collaborateur:

Halkett, Prof. Andrew (Canadian Section)—Silver Medal Diploma.

LIST OF DIPLOMAS AWARDED TO CANADIAN EXHIBITORS IN GROUPS X TO XVIII.

CLASS 55.—APPLIANCES AND PROCESSES USED IN THE MANUFACTURE OF FOOD PRODUCTS.

Vessot et Cie, S., Joliette, Canada—Bronze Medal Diploma.

CLASS 56.—FARINACEOUS PRODUCTS AND THEIR DERIVATIVES.

Canada, Dominion of, Agricultural Department, Canada—Grand Prix Diploma.
Catelli, C. H., Montreal, Canada—Silver Medal Diploma.

CLASS 58.—PRESERVED MEAT, FISH, VEGETABLES AND FRUIT.

Canadian Department of Agriculture, Canada—Gold Medal Diploma.

CLASS 59.—SUGAR AND CONFECTIONERY, CONDIMENTS AND RELISHES.

Canada, Dominion of, Collective Exhibit, Canada—Gold Medal Diploma.
Coombs, H. F., Summerside, St. John, New Brunswick, Canada—Bronze Medal Diploma.
Davis & Co., Toronto, Canada—Silver Medal Diploma.
Simcoe Canning Co., Simcoe, Canada—Silver Medal Diploma.
Small Bros., Dunham, Canada—Bronze Medal Diploma.
W. G. Walker, Ottawa, Ontario, Canada—Bronze Medal Diploma.
Windsor Salt Company, Windsor, Ontario, Canada—Bronze Medal Diploma.

CLASS 61.—SYRUPS AND LIQUEURS, VARIOUS SPIRITS, COMMERCIAL ALCOHOLS.

Melchers' Gin Spirit Distillery Co., Montreal, Canada—Silver Medal Diploma.
Spalding & Stewart, Perth, Ontario, Canada—Silver Medal Diploma.

CLASS 62.—VARIOUS BEVERAGES.

Ontario Brewers and Maltsters' Association, Toronto, Canada—Bronze Medal Diploma.

CLASS 63.—WORKING OF MINES AND QUARRIES.

Albert Manufacturing Company, Hillsborough, New Brunswick, Canada—Silver Medal Diploma.
Asbestos and Asbestic Company, Ltd., Asbestus, Quebec, Canada—Silver Medal Diploma.
Bell's Asbestos Company, Canada—Silver Medal Diploma.
Blackburn Brothers, Ottawa, Ontario, Canada—Bronze Medal Diploma.
British Columbia, Department of Mines of the Province of, Canada—Grand Prix Diploma.
Canada Copper Company, Sudbury, Canada—Gold Medal Diploma.
Canada, Geological Survey Department of, Ottawa, Canada—Grand Prix Diploma.
Canada Iron Furnace Company, Montreal, Canada—Gold Medal Diploma.
Canadian Commission, Ottawa, Canada—Grand Prix Diploma.
Canadian Peat Fuel Company, Toronto, Ontario, Canada—Honourable Mention Diploma.

Coleraine Mining Company, Canada—Bronze Medal Diploma.

Crow's Nest Pass Coal Company, Ltd., Fernie, B.C., Canada—Silver Medal Diploma.

Diamond Merchants' Company, Canada—Bronze Medal Diploma.

Dominion Coal Company, Montreal, Canada—Gold Medal Diploma.

Eustis Mining Company, Eustis, Quebec, Canada—Honourable Mention Diploma.

Fish, C. E., Newcastle, New Brunswick, Canada—Bronze Medal Diploma.

Fossil Flour Company, Bass River, Nova Scotia, Canada—Honourable Mention Diploma.

Imperial Oil Company, Canada—Gold Medal Diploma.

Jack & Bell, Halifax, Nova Scotia, Canada—Silver Medal Diploma.

Keystone Graphite Company, Canada—Bronze Medal Diploma.

Labrador Union Industrielle and Metallurgique du, Quebec, Canada—Silver Medal Diploma.

Laurentian Granite Company, Montreal, Canada—Honourable Mention Diploma.

Le Roy Mining Company, Rossland, B.C., Canada—Gold Medal Diploma.

Mac Machine Company, Belleville, Canada—Bronze Medal Diploma.

Milne, Coutts & Co., St. George, N.B., Canada—Silver Medal Diploma.

Milton Pressed Brick Company, Milton, Canada—Bronze Medal Diploma.

Montreal Gold and Silver Development Company, Canada—Gold Medal Diploma.

New Vancouver Coal Mining and Land Company, Ltd., Canada—Gold Medal Diploma.

Nichols Chemical Company, Capeltown, Quebec, Canada—Bronze Medal Diploma.

Nova Scotia, Department of Mines of the Province of, Canada—Grand Prix Diploma.

Nova Scotia Steel Company, Ltd., New Glasgow, Canada—Gold Medal Diploma.

N. Sydney, General Mining Association, Nova Scotia, Canada—Gold Medal Diploma.

Ontario, Bureau of Mines of the Province of, Canada—Grand Prix Diploma.

Quebec, Department of Mines of the Province of, Canada—Grand Prix Diploma.

Union Colliery Company, Canada—Silver Medal Diploma.

Walker Mining Company, Canada—Silver Medal Diploma.

Wallingford Brothers, Ottawa, Canada—Silver Medal Diploma.

Windsor Salt Company, Ltd., Windsor, Ontario, Canada—Silver Medal Diploma.

Winter & Co., Samuel, Moncton, New Brunswick, Canada—Bronze Medal Diploma.

Class 64.—metallurgy.

Canadian Nickel Ores and Smelting, Canada—Gold Medal Diploma.

Hall Mines Smelter, Nelson, B.C., Canada—Silver Medal Diploma.

Orford Copper Company, Canada—Gold Medal Diploma.

Trail Smelter Company, Canada—Silver Medal Diploma.

Walker Mining Company, Canada—Silver Medal Diploma.

Class 65.—metal working.

Chapleau & Sons, G., Canada—Bronze Medal Diploma.

Lessard & Harris, Montreal, Quebec, Canada—Honourable Mention Diploma.

McClary Manufacturing Company, London, Ontario, Canada—Bronze Medal Diploma.

Metallic Roofing Company of Canada, Ltd., Dufferin Street, Toronto, Canada—Silver Medal Diploma.

Smart Manufacturing Company, Ltd., The James, Brockville, Canada—Silver Medal Diploma.

Star Manufacturing Company, Halifax, Canada—Gold Medal Diploma.

Thos. Davidson Manufacturing Company, Ltd., 187 Delisle Street, Montreal, Quebec, Canada—Gold Medal Diploma.

Whitman & Barnes, St. Catharines, Ontario, Canada—Silver Medal Diploma.

CLASS 66.—FIXED DECORATION OF PUBLIC BUILDINGS AND DWELLING HOUSES.

Brunet, Jos., Montreal, Canada—Bronze Medal Diploma.
Canadian Office and School Furniture Company, Preston, Canada—Honourable Mention Diploma.
Edwards & Co., Ltd., W. C., Ottawa, Ontario, Canada—Bronze Medal Diploma.
McClary Manufacturing Co., London, Ontario, Canada—Bronze Medal Diploma.
Milne, Coutts & Co., St. George, N. B., Canada—Bronze Medal Diploma.
Paquette, Jos., 286 Craig Street, Montreal, Quebec, Canada—Silver Medal Diploma.
Rogers, Chas. & Sons Co., Toronto, Canada—Bronze Medal Diploma.

CLASS 68.—WALL PAPERS AND PAPER HANGINGS.

Watson Poster Company, Ltd., Montreal, Quebec, Canada—Silver Medal Diploma.

CLASS 69.—HOUSEHOLD AND ART FURNITURE.

Ives, H. R., & Co., Montreal, Canada—Silver Medal Diploma.
May & Co., Samuel, Toronto, Canada—Silver Medal Diploma.
North American Bent Chair Company, Owen Sound, Ontario, Canada—Honourable Mention Diploma.
Preston Furniture Company, Preston, Ontario, Canada—Honourable Mention Diploma.
Rogers, Sons & Co., Charles, Toronto, Ontario, Canada—Bronze Medal Diploma.
Snider, John B., Waterloo, Ontario, Canada—Bronze Medal Diploma.

CLASS 72.—POTTERY AND PORCELAIN.

Canada, Dominion of (Collective Exhibit).
Contributed by: Albert Manufacturing Co.; Milton Pressed Brick Co., E. North; Montreal Terra Cotta and Lumber Co., Canada—Silver Medal Diploma.

CLASS 74.—APPARATUS AND PROCESSES FOR HEATING AND VENTILATION.

Butterworth & Co., Ottawa, Ontario, Canada—Bronze Medal Diploma.
Chapleau & Son, Montreal, Canada—Bronze Medal Diploma.
McClary Manufacturing Company, London, Ontario, Canada—Gold Medal Diploma.
Montreal Gas Company, Montreal, Quebec, Canada—Honourable Mention Diploma.
Record Foundary and Machine Company, Moncton, New Brunswick, Canada—Silver Medal Diploma.
Star Iron Company, 593 Craig Street, Montreal, Quebec, Canada—Bronze Medal Diploma.

CLASS 78.—APPLIANCES AND PROCESSES USED IN BLEACHING, DYEING, PRINTING, AND FINISHING TEXTILE MATERIALS IN THEIR DIFFERENT STAGES.

Toronto Merchants' Dyeing and Finishing Co., Canada—Bronze Medal Diploma.

CLASS 79.—APPLIANCES AND PROCESSES USED IN SEWING AND IN MAKING WEARING APPAREL.

Coté, Louis, St. Hyacinthe, Quebec, Canada—Silver Medal Diploma.
Duplessis Pegging and Sewing Machine Company, St. Hyacinthe, Quebec, Canada—Silver Medal Diploma.
Peyry, Jean B., 88 St. Denis Street, Montreal, Quebec, Canada—Bronze Medal Diploma.

CLASS 80.

Canadian Coloured Cotton Mills Company (Morrice, Sons & Co., D.) Montreal, Canada—Silver Medal Diploma.

Dominion Cotton Mills Company (Ltd.), Montreal, Quebec, Canada—Gold Medal Diploma.

Montreal Cotton Company, Valleyfield, Quebec, Canada—Grand Prix Diploma.

CLASS 82.—WOOLLEN YARNS AND FABRICS.

Paton Manufacturing Company, Sherbrooke, Quebec, Canada Gold Medal Diploma.

Rosamond Woollen Company, Almonte, Ontario, Canada—Silver Medal Diploma.

Willett, S. T., Chambly, Canada—Bronze Medal Diploma.

CLASS 83.—SILKS AND SILK FABRICS.

Corticelli Silk Company, St. John's, Quebec, Canada—Gold Medal Diploma.

CLASS 84.—LACE, EMBROIDERY AND TRIMMINGS.

Canada, lace and embroidery, collective exhibit of, contributed by: Beaton, Miss Maggie B., 96 Earl Street, Kingston, Ontario: Gabard, Madam, Octavie, 797 St. Denis Street, Montreal, Quebec: Gabard, Miss Laura, Montreal, Quebec: Barry, Miss, Montreal Bronze Medal Diploma.

CLASS 85.—TAILORING, DRESSMAKING AND CLOTHING FOR MEN, WOMEN AND CHILDREN.

Boucher & Mercier, 314 St. Laurent Street, Montreal, Quebec, Canada—Silver Medal Diploma.

Desjardins & Co., Charles, 1,537 St. Catherine Street, Montreal, Quebec—Bronze Medal Diploma.

Paquet, Hon. J. Arthur, Quebec, Canada—Silver Medal Diploma.

CLASS 86.—VARIOUS TRADES CONNECTED WITH CLOTHING.

Balcer Glove Manufacturing Company, Trois-Rivières, Quebec, Canada—Gold Medal Diploma.

Dominion Corset Company, Quebec, Canada—Silver Medal Diploma.

Dominion Umbrella Factory, 139 St. Catherine Street, Montreal, Quebec, Canada, Bronze Medal Diploma.

Galibert, Frédéric, 931 St. Catherine Street, Montreal, Quebec—Silver Medal Diploma.

King & Co., Ltd., J. D., Toronto, Ontario, Canada—Gold Medal Diploma.

Lamontagne & Co., H., 304-306 St. Paul Street, Montreal, Canada—Silver Medal Diploma.

Marsh & Co., William A., St. Valier Street, Quebec, Canada—Gold Medal Diploma.

Paquet, Hon. J. A., Quebec, Canada—Gold Medal Diploma.

Slater Shoe Company, Ltd., Montreal, Quebec, Canada—Silver Medal Diploma.

Standard Shirt Company, Ltd., Quebec, Canada—Silver Medal Diploma.

Union Hat Works Company, St. Johns, Quebec, Canada—Silver Medal Diploma.

CLASS 87.—APPLIED CHEMISTRY AND PHARMACY.

American Dressing Company, Montreal, Quebec, Canada—Bronze Medal Diploma.

Canada Paint Company, Montreal, Quebec, Canada—Bronze Medal Diploma.

Imperial Petroleum Co., Canada—Honourable Mention Diploma.

Lyman Brothers Company, Ltd., 71 Front Street East, Toronto, Ontario, Canada —Silver Medal Diploma.

McKinnon, Neil, Summerside, Prince Edward Island, Canada—Honourable Mention Diploma.

CLASS 88.—MANUFACTURE OF PAPER.

Grand-Mère Pulp and Paper Company, Grand Mère, Canada—Gold Medal Diploma.

Laurentide Pulp Company, Ltd., Grand-Mère, Quebec, Canada—Gold Medal Diploma.

Papier Roland, Compagnie de, 373 St. Paul Street, Montreal, Canada—Grand Prix Diploma.

Pulpe de Chicoutimi, Compagnie de, Chicoutimi, Quebec, Canada—Gold Medal Diploma.

CLASS 89.—LEATHER AND SKINS.

Bickell & Wickett, Toronto, Ontario, Canada—Silver Medal Diploma.

Breithaupt Leather Company, Berlin, Canada—Bronze Medal Diploma.

Galibert & Sons, C., 929 St. Catherine Street, Montreal, Quebec, Canada—Gold Medal Diploma.

CLASS 90.—PERFUMERY.

Kottini Malouf Freres, 4 Le Royer Street, Montreal, Quebec, Canada—Honourable Mention Diploma.

Lyman Sons Company, 384 St. Paul Street, Montreal, Quebec, Canada—Silver Medal Diploma.

Savage & Son, Alfred, Montreal, Quebec, Canada—Bronze Medal Diploma.

CLASS 91.

Canada (collective exhibit of tobacco), Canada—Gold Medal Diploma.

CLASS 92.—STATIONERY.

Papier, Rolland, Cie de, 373 St. Paul Street, Montreal, Quebec, Canada—Gold Medal Diploma.

Perfect Mucilage Bottle Company, Paris, Ontario, Canada—Bronze Medal Diploma.

CLASS 93.—CUTLERY.

Bailey Cutlery Company, Ltd., Brantford, Ontario, Canada—Bronze Medal Diploma.

CLASS 95.—JEWELLERY AND PRECIOUS STONES.

Kent & Sons, Ambrose, Toronto, Canada—Bronze Medal Diploma.

CLASS 98.—BRUSHES, LEATHER ARTICLES, FANCY ARTICLES, AND BASKET WORK.

Coombs, Henry F., St. John, New Brunswick, Canada—Silver Medal Diploma.

CLASS 99.—INDIA-RUBBER AND GUTTA-PERCHA INDUSTRIES.

Canadian Rubber Company, Montreal, Quebec, Canada—Gold Medal Diploma.

Lamontagne & Co., Montreal Canada—Silver Medal Diploma.

CLASS 100.—TOYS.

Coombs, H. F., New Brunswick, Canada—Bronze Medal Diploma.

Paquet, Hon. J. A., Quebec, Canada—Bronze Medal Diploma.

CLASS 109.—PROVIDENT INSTITUTIONS.

Independent Order of Foresters, Toronto, Canada—Gold Medal Diploma.

CLASS 112.—PUBLIC CHARITABLE RELIEF.

Institutions for the Deaf and Dumb, Mile End, Canada—Honourable Mention Diploma.

Ontario, Institutions for the Blind of, Brantford, Canada—Gold Medal Diploma.

Ontario, Institutions for the Deaf and Dumb of, Belleville, Canada—Gold Medal Diploma

AWARDS TO 'COLLABORATEURS.'

(Firms' Assistants, Engineers, Foremen and Workmen.)

N.B.—The Exhibition Regulations provided that assistants, engineers, foremen and workmen who had co-operated in the production of the exhibits were qualified to receive awards.

GROUP III.

LIBERAL ARTS.

CLASS 14.—MAPS.

Desrosiers, E. (Dominion of Canada)—Honourable Mention Diploma.
Deville, E. (Dominion of Canada)—Gold Medal Diploma.

GROUP VII.

AGRICULTURE.

CLASS 37.—IMPLEMENTS AND PROCESSES USED IN RURAL CULTIVATION.

Hay, W. H. (Canadian Section)—Silver Medal Diploma.

GROUP IX.

FORESTRY AND SPORT.

CLASS 49.—APPLIANCES AND PROCESSES USED IN FORESTRY.

Macoun, (Canadian Geological Survey Department)—Bronze Medal Diploma.
Macoun, J. M. (Canadian Section)—Silver Medal Diploma.

CLASS 53.—FISHING APPLIANCES.

Gourdeau, Lieut.-Col. (Department of Marine and Fisheries, Canada)—Gold Medal Diploma.

Halkett, Professor Andrew (Canadian Section)—Silver Medal Diploma.

GROUP XI.

MINING AND METALLURGY.

CLASS 63.—WORKING OF MINES.

Faribault, E. R. (Geological Survey Department, Ottawa, Canada).

Gilpin, Edwin (Mine Department, Nova Scotia, Canada)—Gold Medal Diploma.

Low, A. P. (Geological Survey Department, Ottawa, Canada)—Gold Medal Diploma.

Robertson, William Fleet (Provincial Mineralogist, British Columbia, Canada)—Gold Medal Diploma.

GROUP XVI.

SOCIAL ECONOMY.

CLASS 109.—PROVIDENT INSTITUTIONS.

Breton, P. N. (Independent Order of Foresters, Toronto)—Silver Medal Diploma.

GROUP I.

EDUCATION AND INSTRUCTION.

In this department, the first in the general classification of the Universal Exhibition, the Dominion of Canada came prominently forward and attracted great attention, Numerous educationalists made it their special duty to attend daily, ascertaining for themselves how far Canada was advanced in primary, secondary and superior education.

Ample means to assist investigation were placed at their disposal in the several thousands of pupils' books, filled with their daily work, illustrating thoroughly the excellent education given to our younger generation to prepare them for the battle of life. The extensive wall space of the department was well covered with a unique collection of large and remarkably fine photographic views. They showed the splendid architecture of our several universities and other educational buildings, surrounded by handsome grounds and ornamental trees. These institutions of learning, with their thousands of vigorous and intelligent looking students, illustrated to perfection the great progress made under generous expenditure by Canada in providing our boys and girls with an excellent training.

In Classes 1, 2 and 3 (Primary, Secondary and Higher Education) Canada has obtained, at the Paris Exhibition, the highest awards that could be granted by the international jury. For days these scientists made a thorough examination of our educational department. Their investigations must certainly have been most satisfactory to themselves, judging by the three Grand Prizes unanimously given to the collective educational exhibits of the Dominion of Canada for primary, secondary and university education, besides the two other Grand Prizes specially given for primary education to the collective exhibits of Ontario and Quebec.

It is worthy of remark that Canada stands alone in the world with a complete bilingual educational system in French and English, from the primary to the highest education. We are thus the only people who can enjoy the great advantage of a thorough education in the two most widely spread and indispensable languages of modern times. It was a great surprise to the many foreign educationalists to see for themselves, in the thousands of pupils' books exhibited in Paris, how perfectly our boys and girls were being educated in both French and English. The French professors specially, frequently accompanied by large numbers of their pupils, were most agreeably impressed in ascertaining that, after a century and a half since Canada became a British colony, the French language should yet be spoken and written to such perfection.

In the Canadian catalogue the education department occupies thirty eight pages of closely printed matter, and consists of a full collection of standard books and official reports from each province, together with extensive albums and photographic views of educational buildings, classes and interior arrangements, all being complete and interesting. Thousands of school books were filled with pupils' work, drawings and needle work.

In Class 4 (Special Teaching of Fine Art, including Music) the Quebec Provincial Council of Arts and Manufactures was awarded a silver medal for its interesting collection of pupils' work in architectural, mechanical and free hand drawing, modelling, lithography and other excellent specimens of work from the Montreal, Quebec, Lévis, Sherbrooke and other schools. Professor Meloche's decorative church designs attracted special attention. Taken altogether, this class gave a favourable impression of the good work being performed in the industrial schools of Canada.

Besides the five grand prizes awarded to Canada, as already stated, a gold medal was granted to the Dominion, in class 6, for its special industrial and commercial teaching. Both the Ontario and Quebec industrial and commercial institutions were favourably noticed by the international jury, which took considerable interest in our educational system.

Both the Protestant and Roman Catholic school commissioners of Montreal were given gold medals for their remarkable display of pupils' work. The ladies of the Notre Dame Congregation of Montreal, were justly awarded a silver medal. The Christian School Friars of Montreal and the Canadian Office and Furniture Company of Preston, were equally successful. Numerous other institutions obtained awards of less importance, as shown in the prize list.

GROUP II.

WORKS OF ART.

In a European exhibition Canada's works of art were necessarily of a subordinate character, but such as were shown received the commendation of the international jury.

Most prominent amongst our artists stands Hébert, the distinguished author of several of our most important public monuments in Canada. Taking advantage of the Federal government's order for a statue of Her late Majesty to be erected on the parliamentary grounds at Ottawa, and which he had just completed in Paris, Hébert exhibited this spendid piece of bronze statuary in front of the Canadian pavilion on Iéna avenue. The Honourable Alex. MacKenzie's monument and a number of other groups of statuary of less importance by the same artist were considered worthy of a silver medal by the international jury, and the French government has lately crowned Hébert's successful career by bestowing upon him the knighthood of the Legion of Honour.

A valuable collection of some sixty oil paintings contributed mainly by the Canadian artists now in Paris, obtained five bronze medals, awarded to Mrs. Dubé, Miss MacPherson, Messrs. Beau and Blair Bruce. Mrs. Blair Bruce also obtained a bronze medal for her statuary and Miss Wallis an honourable mention. Mr. Herbert Harris was awarded an honourable mention. A bronze medal was awarded to the Montreal Lithographic Co., for a full collection of chromo-lithographic works. The pictures contributed largely to the elegant appearance of the reception room of the commission, where they were admired by a large number of visitors. They were also placed to advantage in other parts of the Canadian pavilion where wall space was available.

GROUP III.

APPLIANCES AND GENERAL PROCESSES RELATING TO LITERATURE, SCIENCE AND ART.

In Class 11 (Typography, Various Printing Processes) the Canadian composing machine was the most remarkable success of the Canadian department, for its ingenuity,

excellent workmanship and low price of production. This piece of excellent machinery was perfected and built in Montreal by the inventor, who is now on the full tide of success. The international jury, after careful examination, awarded the 'Monoline' the highest award, a grand prize. Day after day numerous interested parties were standing by the operator, admiring the splendid work done by this machine. Many orders were given to the agent of the company, though it was not possible to execute them all on account of pressure of business in Canada.

In Class 12 (Photography) Canada had one of the largest and most interesting collections of photographs. The Canadian Pacific and Grand Trunk Railways, the Geological Survey, the Forestry, Agricultural and Education Departments showed excellent illustrations of the scenery, buildings, monuments and resources of the Dominion. Gold medals were awarded to Laprés & Lavergne of Montreal, and E. G. Rowley of Toronto, and the silver medal to C. S. Cochrane of Hamilton.

In Class 13 (Books, Musical Publications, Bookbinding) M. Théoret of Montreal was awarded a gold medal for a valuable collection of Canadian law books, specially prepared and bound for the Paris Exhibition. This collection was certainly unique of its kind, dating from the very first occupation of the country by the French government up to our latest legislation. Full reports of our courts of law, statutes and legal editions, some of them very rare, were much inquired about by gentlemen of the legal profession. A sale was easily made on advantageous terms, amounting to several thousand dollars, on account of the Paris National Library.

Mr. Granger, of Montreal, and his brother were awarded a silver medal for a small, complete and valuable collection of several hundreds of elegantly bound books of French literature and science by the best Canadian authors.

Mr. Ed. Léveillé, of Montreal, whose binding of Mr. Théoret's and Mr. Granger's books was very much admired, contributed also some special ornamental work which obtained for him a silver medal. Miss Minnie S. Pratt, of Windsor, N.S., also obtained a silver medal for fancy amateur binding of elegant design. Dr. F. L. de Martigny's medical publication, *La Clinique*, was awarded a bronze medal.

Clause 14 (Maps and Apparatus for Geography, Cosmography and Topography). One of the finest maps in the exhibition grounds was undoubtedly the large map of the Dominion of Canada, specially prepared by order of the Honourable the Minister of Public Works, and executed by Mr. Desrosiers of the department. This valuable map, measuring some 18 feet x 12, indicated with the most accurate and minutest details the latest available information concerning the Dominion of Canada from the Atlantic to the Pacific. Our extensive railways, canals lakes and rivers, mineral and agricultural lands, cities and towns, telegraphic lines and special productions, were all visible at a glance. When information was required by visitors the great map was surrounded by the public while explanations were given concerning the vast capabilities of the country. For the preparation and execution of this map the Government of Canada was awarded a gold medal, as was Mr. E. Deville, of the Department of the Interior, as collaborateur. Mr. Desrosiers was given an honourable mention. Mr. Etienne Taché, the Deputy Minister of Crown Lands of the province of Quebec, was awarded a silver medal for an excellent map of the province of Quebec.

In Class 16 (Medicine and Surgery), Canada had a single exhibitor, Mr. Napoléon Tourangeau of Montreal, who exhibited a collection of orthopedic apparatus, which was considered worthy of an honourable mention by the international jury.

Class 17 (Musical Instruments) was one of the triumphs of the Canadian section. Our collection of pianos, organs and string instruments was a surprise to the international jury.

Messrs. Octavius Newcombe & Co. of Toronto, who manufacture over a thousand instruments yearly, received a gold medal for their splendid collection of half a dozen pianos.

The Dominion Organ & Piano Co. of Bowmanville obtained a silver medal for a complete and valuable exhibit of pianos and organs. Pratte & Co. of Montreal also obtained a silver medal for a fine make of pianos of which they have been making a speciality. A bronze medal was awarded for two pianos manufactured by Morris,

Field, Rogers & Co. of Listowell. A. A. Barthelmess & Co. of Toronto also obtained a bronze medal for a remarkable exhibit of piano actions of their manufacture.

In string instruments Wm. Knaggs of Toronto exhibited a grand concert violin and a quartet of viols, after Antonio Stradivarius, consisting of two violins, one viola and one violincello, which were valuable instruments and received the award of a bronze medal.

Mr. R. S. Williams of Toronto, exhibited a fine collection of guitars and other string instruments and received honourable mention.

Mr. O. T. Nokes of Toronto made a special exhibit of valuable drums, consisting of two snare drums, one single head and one double head, two drum pedals, moveable and cymbal beaters, one drum stand and music tray combined, for which he received honourable mention.

GROUP IV.

MECHANICAL ENGINEERING.

In machinery and machine tools the Canadian exhibits were limited owing to the bulky nature of these articles, the heavy cost of transportation, installation, maintenance, &c. Those, however, that were shown were very creditable to the country. Thus, in Class 20 the Ontario Wind Engine and Pump Co. exhibited one of their well-known wind pumping mills, which was installed in the Park of Vincennes on the border of a large lake and in the immediate neighbourhood of our agricultural implement department. They were awarded an honourable mention.

In Class 21 the firm of D. K. McLaren, of Montreal, exhibited a splendid pyramid of oak tanned leather belting varying in size from 3 feet to 8 inches. This exhibit was one of the most remarkable of its kind on the grounds, and was awarded a silver medal by the international jury for its superior workmanship and quality.

C. Wilson & Son, of Toronto, were equally successful in obtaining a silver medal for their full collection of fine scales, from the smallest confectionery to the 1,000 lbs. platform scale. These scales, which indicate price and weights, were regarded with much interest by visitors who had no previous knowledge of the system.

The exhibit of the Standard wood split pulley, with standardized interchangeable bushing, of the Dodge Manufacturing Co., of Toronto, was equal to any competing collection on the grounds. It is with pride that Canada can boast of possessing the largest wood pulley works in the empire, with sufficient capacity to supply the largest demand. Considerable inquiry was made about these goods, with a probable result of a large increase of business. A medal and diploma were awarded to this exhibit.

In Class 22 (Machine Tools) the firm of John Bertram and Sons, of the Canada Tool Works of Dundas, might have filled the whole pavilion with a full display of their well-known and superior metal and wood working machinery in operation: but they were allowed only two samples of their work. One gap-lathe, twelve feet bed, to swing twenty-four inches over bed and forty inches in gap, with leading screw ten M.M. pitch and longitudinal turning and cross-feed, automatic stop, and with friction countershaft, having forward and reversing motion, weight 7,484 lbs. One drilling machine, capacity twenty-five inches diameter, with back-gear, power, lever and hand feed and automatic stop motion, drill head and spindle counter-balanced, with vertical adjustment: weight, 1,985 lbs. These were both considered valuable machines, and gave rise to such a high appreciation of the general work of this firm that a silver medal was awarded by the international jury, though in competition with the largest and best equipped establishments in the world.

GROUP VI.

CIVIL ENGINEERING.

In an extensive country like Canada, requiring special transportation facilities by land and water, this group should have contained a very large collection of important

exhibits. In models and plans relating to our public works, carriages and wheelwrights' work, railway plant and mercantile marine, all of which are contained in civil engineering, Canada stands in the front rank of the most progressive countries. But in this group, on account of distance and large expenditure required, we could only bring forward a comparatively modest exhibit.

In class 28 (Building materials) the Limehouse Co. of Toronto, Owen Sound, Queenstown and Thorold Cement works, all obtained silver medals for their well known Portland cement.

In class 29 (Models, Plans and Drawings relating to public works) the greatest success was obtained by Canada. On the large map, specially prepared by order of the Honourable the Minister of Public Works, could be traced the great achievement of the St. Lawrence canals and navigation from the Atlantic to Lake Superior, two thousand miles in the interior of the continent. The fact that ten and twelve thousand tons vessels can reach the port of Montreal, a thousand miles from the seaboard, through the St. Lawrence channel, was forcible evidence of the extensive works that have been carried out to improve the navigation of the river, securing a depth of from 28 to 32 feet.

In view of these and other facts connected with the inland navigation which were brought to the notice of the international jury, there was but one opinion amongst its members, that the Dominion of Canada should be granted the highest award, a Grand Prize, for its unparalleled river navigation improvements.

In railway transportation, both the Grand Trunk and Canadian Pacific Railways rivalled one another in a striking display, well illustrating the magnitude of those main arteries of the trade, commerce and transportation of the Dominion of Canada. Both these companies had full collections of large photographic views, representing some of their most remarkable engineering works, our finest agricultural sections and summer resorts, our lakes and rivers, forest and mountain scenery, fish and game reserves and mining camps. They were very effective in giving to the general public a most favourable impression of life in Canada. The splendid large oil paintings, measuring 8 feet by 4 feet, exhibited by the Canadian Pacific Railway, were specially attractive. The view of their Pacific express train, winding round the steep curves of the mountains, half way between the deep canons and the lofty peaks of the Rocky and Selkirk ranges, was most impressive; nor could any scenery speak more eloquently of the illimitable resources of the North-west than the view of thousands of well conditioned cattle grazing within view of the railway, to be in due course shipped to the English market. And when we explained to the admiring crowds that these fine oxen had been born and raised on the open prairie, without having ever entered a barnyard, our visitors returned home perfectly convinced that nowhere was there a better field than in Canada for stock raising.

The same impression prevailed as to crop growing when we turned their attention to the vast wheat fields. These pictures showed the numerous reapers and binders at work, soon to be followed by the giant threshers and separators which would fill the sacks and wagons, ready to be shipped by rail, or to be stored in the numerous elevators studding the railway tracks of the North-west.

One of the most interesting exhibits of the Canadian Pacific Railway was a large map, measuring 8 feet by 6 feet, illustrating, in vivid colours, their trip around the world, traced on the northern hemisphere. This double-faced plate glass tableau, illuminated interiorly by electric lights, presented a most striking appearance, and was certainly the most ornamental specimen of map work on the grounds. Close by stood a large model of the *Empress of India*, showing our perfect steamship connections with both Japan and Australia. This railway company's exhibit contained a cross-section of one of the C. P. R. parlour cars, gorgeously furnished and lighted, showing the day and night accommodation of our railway system.

Both the Grand Trunk and Canadian Pacific obtained for their remarkable exhibit the high award of a gold medal. When we take into consideration that they had to compete with the most powerful railway companies of the Continent, which had brought into Paris complete trains, this award was the highest that could be expected, and does great credit to the Dominion of Canada.

Class 30 (Carriages and Wheelwrights' work) was well filled by very elegant and much-admired carriages and sleighs from our workshops. The American style of building differs entirely from the Continental in general design, accommodation and weight of the several kinds of vehicles. Our builders did not consider that they could exhibit to advantage their landaus and other large carriages in competition with the most celebrated houses in the world. They confined themselves to the lighter and cheaper victorias, buggies and family traps which are in general use in Canada. Foreigners, unacquainted with the solidity of these vehicles although of exceedingly light construction, were under the impression that they could never stand the wear and tear of every-day usage. They had to be convinced that their power of resistance was due to the high quality of the raw material employed and to their excellent workmanship. The result was a ready sale of all our exhibited carriages, and this might have been duplicated. Many inquiries were made by visitors desiring to open trade with Canada. Some inquiry was made about sleighs, but no definite purchase was made as very little snow, if any, is to be seen during the Paris winters. Of course the general exhibition of carriages was most gorgeous and consisted of thousands of foreign vehicles of all descriptions, especially of French makers, so that in obtaining a gold medal for top phaeton, buggy, polo sleigh and cutter Mr. Ledoux, of Montreal, achieved all that could reasonably be expected.

The McLaughlin Carriage Co., of Oshawa, exhibited three four-wheeled vehicles, which obtained a silver medal for their general excellence. A gentleman's business buggy, a four-passenger trap and a three-spring leather top phaeton formed this much-admired collection, a fine sample of that well-known company's work.

The J. B. Armstrong Manufacturing Co., of Guelph, exhibited also three of their elegant vehicles, comprising an adjustable seat trap for two or four passengers, a four passenger surrey with extension top and a top phaeton carriage. A large demand exists for these carriages, which have been successfully introduced in Canada, Great Britain, the United States and other countries. The firm was awarded a bronze medal.

The Canada Carriage Co., of Brockville, manufacture 55 different styles of vehicles, but exhibited only two samples of their excellent workmanship. A gentleman's road wagon and an elegant four-passenger vehicle of the Aberdeen model promptly found a purchaser. This company also were awarded a bronze medal.

Honourable mentions were granted to the following exhibitors:—Verret & Co., of Quebec, for two comfortable winter vehicles, a family sleigh and a business sleigh, both being generally adopted in Canada; the Bain Wagon Co., of Brantford, for a substantial transportation wagon with cover; R. Scott & Son, of Galt, for wheels, spokes and hubs; Jean Rioux, of Ste. Thérèse, for a collection of unbreakable hubs.

Canada's cycle exhibition attracted considerable attention and inquiry. It consisted of two elegant and extensive stands in the cycle building at Vincennes and carriage building in the Champ de Mars, showing the manufactures of the Canada Cycle and Motor Company, of Toronto. They are manufacturers, wholesalers and exporters of bicycles, bicycle parts, and bicycle sundries, motor vehicles and motor parts. Their exhibit showed complete lines of Massey Harris, Ivanhoe, Wellandvale and Brantford cycles, chain and chainless machines, laminated and single piece wood rims, finished and unfinished parts of bicycles and motor vehicles. The were awarded a silver medal by the international jury for their splendid exhibit, and, if the general opinion of visitors had been acted upon, even a gold medal would not have been thought too high in view of the evident superiority of their work. A large extension of foreign trade has been the practical result of their exhibition in Paris.

The National Cycle and Automobile Co., of Toronto, also exhibited a full set of their valuable Evans and Dodge patent, 4 point ball bearing bicycles, guaranteed to be absolutely oil and dust proof. They were awarded a bronze medal, as were the Clarkburg Woodrim Co., for their bicycle woodrim with patent lock joints, wood guards and chain guards.

In Class 31 (Saddlery and Harness) the firm of H. Lamontagne & Co., of Montreal well known for their excellent work, and who have executed several army contracts for the Canadian and British Governments, to the entire satisfaction of the War Office, exhibited a full collection of Canadian single and double harnesses. The collection was

very much admired and closely examined by the international jury, which was unanimous in awarding it a silver medal for elegance of design, adaptability and superior workmanship.

In Class 33 (Materials and Plant used in the Mercantile Marine) Canada was placed at considerable disadvantage as it was practically a competition between our canoes and the most powerful Atlantic steamers. Under these circumstances it was an impossibility to obtain grand prizes or gold medals, which were naturally reserved for the great liners and other modern productions of Marine Architecture. But what Canada did obtain was a silver medal for her unequalled canoes, which were unanimously recognized as the best in the world for their elegance, perfect workmanship, excellence of material, lightness of build and low price of production. The consequence has been immediate sales and large orders from foreign countries. At the head of the list stood 'The Peterborough Canoe Co.' and 'Strickland & Co.,' of Lakefield, who obtained silver medals. W. F. Pratt, and Herald Bros., of Gore's Landing, were awarded bronze medals. They were all, without exception, excellent boats, a credit to Canada, and far superior to anything on the grounds.

GROUP VII.

AGRICULTURE.

In the vast agglomeration of agricultural products and appliances from every part of the world, exhibited in Paris, the Dominion of Canada stood, unquestionably, in the first rank of the most progressive and successful nations. In all the classes of this most important group Canada was largely represented. Field and dairy productions were certainly most creditable, but, in agricultural implements, our manufacturers distinguished themselves beyond all expectations. It was a daring enterprise for Canada to thus enter into competition with the best known houses in the world. But the result has proved beyond a doubt that our workshops are absolutely up to date, and even leading in the advance of agricultural progress. If ample space had been given, our implement manufacturers alone would have made the largest and most remarkable exhibit of any foreign nation on the grounds. As it was, after reducing by half or more every application for space, Canada occupied in the agricultural building, at the Champ de Mars, a large area entirely taken up by the Massey-Harris exhibit. Then the Canadian Commissioner had to construct a large building at Vincennes, so as to procure 5,000 additional feet of space for the exhibits which could not possibly be accommodated at the Champ de Mars.

The Massey-Harris firm, of Toronto, which is known to control the largest foreign trade and implements manufacturing workshops in the world, was prominent in the Paris fair, for the perfection, workmanship, solidity, elegance and low price of production of its splendid implements. The collection was recognized as without a rival on the exhibition grounds, and was granted the highest award, a grand prize. This collection consisted of self binding harvesters, reapers, mowers, tedders, hay rakes, cultivators and seeders of various descriptions, all of which were viewed with general admiration, both at Vincennes and at the Champ de Mars.

The large bulk of our implement exhibit was placed in the Park of Vincennes, where a space of some 5,000 feet had been allotted to Canada. The general appearance of this Canadian building, placed in the immediate neighbourhood of the lake and surrounded by a large grove of ornamental trees as a back ground, was most attractive. Drapery, flags, escutchons and a full decoration of the interior with grain sheaves made the most favourable impression on visitors generally. These elegant surroundings induced many of them to give considerable time to the splendid collection of implements displayed by Canada for their appreciation; and many were the farmers who made a daily call on our manufacturing agents entrusted with the sale of these goods. Extensive orders from every part of the world may be looked for as a consequence of the many inquiries made at this exhibition. The international jury, when called upon to visit the Canadian implement exhibit, expressed their great admiration of the whole collection,

and were loud in their praise of the great advance made by Canada, especially in the implement department.

In Class 35 (Implements and Processes used in Rural Cultivation) the general exhibition of our ploughs could stand competition with any on the grounds. They presented an array of improved implements unsurpassed for variety, material, adaptability and workmanship. The well known Cockshutt Plough Co., of Brantford, which makes a specialty of these implements, exhibited a full collection of 22 single and gang ploughs of superior design and quality, including a sulky plough, which was very much admired by the grand jury and unanimously awarded a gold medal.

The Verity Plow Co. of Brantford, came in a close competitor with a specialty of six different styles of gang-ploughs, with horse hoes, garden and field cultivators. The jury awarded this company a gold medal for this exhibit.

J. Fleury & Sons, of Aurora, exhibited a valuable collection of six different styles of single, gang and sulky ploughs with a 'Rapid Easy' grinder of various sizes, from four to twenty horse power. The collection was awarded a silver medal.

In close competition to the Massey-Harris firm stood the full collection of the Noxen Co., of Ingersoll, consisting of mowers, reapers and binders, cultivators, seeders, horse hoes and spike, spring and disc harrows. The collection was a great show of itself and reflected credit on Canada. It was in every respect worthy of the gold medal which the international jury awarded.

Equally worthy of an award of a gold medal was the excellent exhibit made by David Maxwell & Sons, of St. Mary's. It consisted of mowers, reapers and binders, horse rake, hay tedders, horse hoe, cultivators and a collection of churns of seven different sizes, forming altogether a most valuable collection and very much admired for its acknowledged very high standard.

The J. W. Mann Manufacturing Co., of Brockville, was also awarded a gold medal for its special display of agricultural implements, consisting of seed drills and broadcast seeders, steel cultivators and harrows, all very valuable implements indeed and much inquired about.

Wm. A. Gerolamy, of Tara, Ont., followed closely with a remarkable collection of farming mills, ensilage and clover cutters and ploughs; all well designed and of an excellent workmanship. They were awarded a silver medal.

The same award was granted to the Peter Hamilton Manufacturing Co., of Peterborough, for their exhibit of spring tooth field cultivators.

S. Vessot & Co., of Joliette, also obtained a silver medal for their flour mill machinery, consisting of three sizes of economical and efficient grinders of wheat, as well as of corn for the feeding of stock. The collection is well known to give excellent results in Canada and found a ready sale and agency in Paris, with the prospect of a good export business.

In Class 38 (Agronomy) the Ottawa Department of Agriculture was very justly granted a grand prize, the highest award in the gift of the international jury. There was but one opinion amongst the members of the international jury and distinguished visitors coming from every part of the globe concerning the superiority of Canada's agricultural exhibit. Much of this result is due to the departmental work of the Director of the Government Experimental Farms, and of the Commissioner of Agriculture, who were both awarded gold medals. The Canadian reports are so replete with valuable information concerning the experimental work of the department that they strongly impressed the international jury with the conviction that Canada occupies a pre-eminent position in the field of agricultural operations.

Class 39.—vegetable food products.

In no class did Canada show to better advantage than in its collection of vegetable food products. The fine display of our cereals, in the grain and in the straw, their artistic arrangement, producing the best effect, was unquestionably the most admirable on the grounds. It elicited enthusiastic praise from every visitor, as well as from the experienced members of the international jury. The result was most gratifying, as it

secured the highest awards, including five grand prizes to the Dominion of Canada as a whole, and to the provinces of Ontario, Quebec, Manitoba and Nova Scotia, as a special recognition of their particular excellence, in addition to four gold medals awarded to the provinces of New Brunswick, Prince Edward Island, British Columbia and the North-west Territories for their superior display.

The collection was presented as a whole on a geographical basis, Ontario and Quebec occupying the central stand, the Western Provinces occupying the left, and the Maritime Provinces the right section of the Dominion exhibit, thus showing that Canada, from the Atlantic to the Pacific, has a continuous and fertile belt of agricultural lands and field productions. This general collection of 10,000 samples contributed by some 350 farmers from every section, was unquestionably a most complete and thorough exhibit of the very best varieties of wheat, barley, oats, rye, buckwheat, corn, peas, beans, both in the grain, which were shown in glass jars, and in well trimmed sheaves artistically arranged. They were extensively photographed and published in illustrated periodicals all over the world. Mr. W. H. Hay, who is attached to the Ottawa Experimental Farm, and who had charge of this installation, received a silver medal from the international jury as a complimentary appreciation of his remarkable work and elegance of design. Many inquiries were made about these products by intending purchasers, as well as by many farmers who were anxious to obtain samples for seed. A large quantity of our products were thus given during the exhibition, as well as at the close, and will no doubt give very interesting results, as they are placed in proper hands.

Class 41 (Non-edible Agricultural Products). Interspersed among the food exhibits were the non-edible agricultural products such as clover seed, flax seed, hemp and flax plants, hops and timothy seed. A full collection of prairie and other grasses considerably improved the general appearance of the stands as ornamental accessories. The wool collection and other non-edible products were awarded a gold medal as a collective exhibit by the Department of Agriculture, and another gold medal was awarded to the Director of the Experimental Farms for his contribution of some 4,000 specimens to the whole agricultural collection.

Class 40 (Animal Food Products). The dairy exhibit was one of the greatest triumphs of the Canadian Pavillion. The butter and cheese industries of the Dominion have attained such a colossal development of late years that about 186,000,000 pounds of cheese and 25,000,000 pounds of butter were exported in 1900. To show these products to the best advantage a refrigerating electric plant was installed in the Canadian Pavillion, on the Lynde system, with a large plate glass show case, measuring 10 by 15 feet where the average temperature was kept just one or two degrees over freezing point. In this case were exhibited several cases of butter and boxes of cheese, eggs and fruit, which were kept there for months without alteration, much to the surprise and admiration of the crowds of visitors, who were intensely interested in this very remarkable show. It was a telling object lesson of the results obtained in Canada with cold storage, and the only refrigerating plant to be seen on the Exhibition Grounds. The international jury was greatly interested, took copious notes, and will no doubt report extensively on the progress and up-to-date policy adopted by Canada, to place some of its excellent products on the foreign markets. After a thorough examination of both our cheese and butter they were declared excellent and awarded the very highest prizes, one grand prize to the Dominion of Canada as a whole, and one to each of the provinces of Ontario and Quebec as a special recognition of their unrivalled dairy products.

Class 42 (Useful Insects and their Products). The collective honey exhibit of Canada was undoubtedly the most complete and finest on the grounds. Stored in large glass jars our honey presented a clear, pale amber appearance which was very much admired. Some fifty of these large jars formed a pyramidal stand of imposing aspect. When examined by the international jury the Canadian honey exhibit was awarded a gold medal, the highest award granted to honey, and it was declared that the flavour was equal to the best in the world.

In closing this report of the agricultural group, Canada may be proud of the universal recognition of its eminent position as the best and greatest agricultural country now open to the energies, work and welfare of the intending emigrant.

GROUP VIII.

HORTICULTURE AND ARBORICULTURE.

The reputation of Canada as a fruit growing country, has been well known in France from the earliest days, when some of the best fruit trees were imported from France by the French colonists. But to horticulturists of the international jury were scarcely prepared for the collection which Canada exhibited. This collection which occupied 1,300 square feet of space, was prepared with the greatest care, and was the contribution of every province in the Dominion. It consisted of thousands of specimens of preserved and natural fruit: apples, pears, peaches, plums, cherries and other small fruit of the best varieties which were well displayed in ornamental stands and classified by provinces. They were placed under the management of Mr. M. Hamilton and Mr. Allen, who had special charge of the fruit section and did valuable work. Many inquiries were made as to price, and important orders were received for wholesale foreign houses, from all over the continent. The exhibition will result undoubtedly, in extensive commercial transactions so that there is every prospect that the million packages of fruit which are now exported from Canada to the British market, will receive an important accession from the continental demand. In fact during the exhibition Mr. Allen sold and delivered 166,640 bushel boxes of apples, distributed in Germany, Norway, Sweden, Egypt, France, Belgium, Austria, Hungary and Great Britain.

The experience obtained during the Paris Exposition, is a very valuable one. The 500 bushel boxes of the crop of 1899, contained 100 varieties of the best keeping apples. Kept in cold storage in Montreal, at a temperature of 32 Fahrenheit, they were shipped in 1900 via Liverpool and London and arrived in Paris during the summer months, with 80 to 90 per cent of the fruit in sound condition.

On October 3, 1900, the first shipment of 60 cases of fresh fruit was received, consisting of apples, pears and peaches, which when exhibited, created a lively interest amongst fruit growers. Never before had Canada attempted such a grand display. It was a marvellous sight to see a collection of peaches in their full bloom, especially the Lord Palmerston variety, exhibited to perfection at a distance of over 3,000 miles. There was, of course, considerable loss on the peach shipment, but the other fruit was in excellent keeping condition and remained so for the balance of the Exhibition, winning grand prizes and gold medals during the several competitions which took place.

On October 20, a second shipment arrived, to compete with France, Germany, the United States, Austria and Russia, in fruits for export. On this occasion the fruit was packed in barrels, boxes and baskets, showing the various methods of packing for foreign markets. A grand prize, the highest award was granted to the Dominion of Canada for its display of full collections of large, well formed and beautifully coloured fruit, true to name and suited to climate of each province. Mr. McD. Allen, of Goderich, in charge of the fruit department, has come to the conclusion that Canadian apples, well selected, packed in boxes, wrapped in paper, and bedded in excelsior packing, bottom, sides, ends and tops of cases, would sell at the highest prices in the European market in any quantity. Under these conditions, apples are more profitable than any other crop on the farm in Canada, and Europe will take it all, as well as pears, on account of the exceptionally fine flavour of our fruits.

Great improvements have been effected in the form of the packages used for marketing fruit, which are now made as convenient and attractive as possible. For home market, flat handled baskets are mostly used, holding 6, 8 or 12 quarts, while for special handsome fruit for export, boxes are used, one foot wide and two feet long, and from 4½ to 6 inches deep, according to the size of the fruit, which is packed two deep, wrapped in tissue paper.

Cherries, strawberries, raspberries, currents and gooseberries are sent forward in packages of from one to five pounds; fancy apples, also plums, peaches and pears, from five pounds to twenty pounds. Experience has shown that such packages are most convenient and acceptable to the public.

The cold storage for transporting tender fruits, is a great saving, permitting of the sending of fruit by freight, which would otherwise have to be forwarded by the more expensive express routes.

All the large cities of the Dominion are centres to which the fruits of various kinds are sent, and from these they are distributed to every town, village and hamlet, so that they can be procured at low rates and in convenient sized packages, by all classes of consumers.

In the Canadian pavilion also, the international jury was very much surprised and interested, to find absolutely perfect fruit of last year's crop, exhibited in the cold storage show case erected by Canada. This practical demonstration of our ability to transport natural fruit to the Paris market all the year round from a distance of over three thousand miles, in perfect condition, was undoubtedly, from a business point of view, the most striking feature of the whole Horticultural Exhibition. This object lesson, more than anything else perhaps, created a strong impression that the people of Canada employed the best methods in carrying on the fruit business.

Close by stood an imposing trophy of our agricultural and horticultural productions. There also in some 1,500 handsome glass jars was a collection of the finest preserved fruit of all kinds.

As a consequence of these exhibits the Dominion obtained from the international jury the highest award, a grand prize, for its fruit display and methods of preservtion, in addition to the 25 gold medals awarded during the several monthly fruit exhibitions which took place during the summer. These circumstances seemed to have established Canada's reputation as one of the leading fruit exporting countries.

GROUP IX.

FOREST, SPORT, FISHING, GATHERING WILD CROPS.

From time immemorial Canada has always been looked upon as a country of illimitable timber, whose forest productions were extensive enough to supply the foreign demand of the world. At every previous international exhibition since 1855 in Paris, the highest awards were always taken by Canada. In 1900 there was but one opinion, that in the forestry building the Dominion exhibit was the most complete and interesting collection from a commercial and practical point of view, and altogether worthy of the grand prize which was unanimously awarded by the international jury.

It consisted of 45 large sections of trees, some of them 8 feet in diameter, blocks and squares, hardwood specialties, indurated fibreware, 30 polished panels and unpolished boards, flooring and wainscoting, shingles and tan bark, railway ties, pulp wood, veneers, cigar boxes, kitchen woodenware, sash and door stock, baskets, boxes and packages for fruit, hubs, axles and spokes for carriages, spools, bobbins and turned wooden boxes, chair and table stock, cloth boards, oak and hickory handles, whiffletrees, elm and ash barrel staves, hoops and heading woodenware, pails and tubs and rustic furniture.

The samples collected from every province of the Dominion constituted the most valuable commercial collection that could possibly be gathered together for exhibition. But as an educator of the daily operations of our timber country, nothing could be more effective than the eighty-seven large photographic views illustrating the life and work of of the lumberman's camp and saw mill. Eighty other photographs of the various trees of Canada, elegantly framed in their own wood, presented a most scientific and much admired collection of our forest wealth.

The whole exhibit was certainly most creditable to the Dominion of Canada and to Mr. Macoun, who had charge of Classes 49 and 50, and who was awarded a silver medal by the international jury as a recognition of his services.

In Class 52 (Products of Hunting and Shooting) Canada had the finest exhibition on the grounds, and obtained the highest award, a grand prize. The Quebec exhibition made in New York in 1899, which so greatly surprised American sportsmen, largely contributed to the still more extensive and complete display made in the Canadian pavilion of the Paris exhibition. There stood at the Canadian entrance on the Iena

avenue, to welcome the sportsmen of the world, a full sized moose, surrounded by a full collection of the fish and game of the Dominion. From the province of Quebec, contributed mainly by the Hon. G. M. Dechêne, Minister of Agriculture, were eighteen fine heads of buffalo, wapiti, mountain sheep and cariboo and deer, besides bears, wolves and all other denizens of the Canadian forests. The international jury awarded this exhibition a gold medal.

The Hudson Bay company, the largest fur dealers in the world, were awarded a grand prize for their very fine exhibition of musk ox, black, brown and cinnamon bear, and many other furs, common to the country and others of rarer quality.

Mr. Menier, of Anticosti, also exhibited a fine collection of red, silver and cross foxes and other furs, for which he was awarded a gold medal. The other gold medal awards, in Class 52, were to Hon. J. Arthur Paquet, of Quebec, Chas. Desjardins & Co., of Montreal, G. F. Atkinson, of Portage la Prairie, and Col. J. J. Egan, of Halifax. Mr. G. E. Atkinson, taxidermist, of Portage la Prairie, taking advantage of the innumerable birds of all descriptions which migrate through the prairie regions, contributed several hundred specimens. They found ready purchasers in Paris amongst the many sportsmen, amateurs and scientific men, anxious to enrich their own collections by the addition of the specimens coming from Canada. Mr. L. E. Miller, of Toronto, obtained a silver medal for his fur exhibit.

Messrs. Alexander Calder, of Winnipeg, John Perrett, of Sherbrooke, Walkeham, of Halifax, also obtained silver medals for their very fine contribution of water birds, perching, climbing and ground birds. Bronze medals and honourable mentions were granted to contributors of less importance.

In Class 53 (Fishing Appliances, Tackle and Products, Fish Culture), the Dominion of Canada was granted the highest award for the extensive display made by the Marine and Fisheries department. A large family of a dozen seals, ranging from babyhood to the fullest size, gave a fair impression of the wealth to be found on the ice floes of our northern regions. Both on the seal grounds of the northern Pacific, as well as on the north Atlantic, thousands of our fishermen are busily engaged in gathering their yearly crop.

From the banks of Newfoundland and the shores of Labrador were splendid specimens of our codfish, mackerel and halibut. Salmon and lobster specimens of great size impressed the visiting multitudes with the conviction that the Canadian Atlantic and Pacific canneries with their immense production were fully able to supply the foreign markets of the world with any amount of this food.

As to our innumerable lake and river trout and other fishes, one hundred well prepared specimens told of the sport which was enjoyed by the many fishing clubs, which have secured from the several provincial governments, valuable reserve grounds for the sport in Canada.

The fish and game exhibit in Paris had a double object. First to show to the world the wealth of our fish and game grounds, and secondly, to induce the foreign sportsmen to take advantage of the splendid reserves to be found in the wilds of Canada. This double object has certainly been obtained, and a gold medal was awarded to the Honourable the Minister of Marine and Fisheries, and his Deputy, and a silver medal to Professor Halkett, who was in special charge of the section.

GROUP X.

FOOD PRODUCTS.

Class 56 (Farinaceous Products and their Derivatives). In this Class, the Dominion of Canada obtained the highest award. Exhibits of flour manufactured from Manitoba hard and other wheats were made by the Lake of the Woods Milling Co., of Keewatin, the Hudson Bay Co., James Innes, Souris ; Jacob Steinmiller, and Vogan, Son & Co., of Walkerton. Rolled oats, flaked wheat, oats and oatmeal were also exhibited by the Brackman-Ker Milling Co., of Victoria, and Martin Bros. of Mount

Forest. All of these were closely examined by the international jury and declared of superior extra quality, and received a grand prize, the highest award.

To give a practical aspect to this exhibition of our food products, the exhibits were not only contained in large glass jars, but in standard barrels and sacks, fully branded, showing to the men in the trade, the attractive way in which the packages were prepared for exportation to the foreign markets. Taken altogether the breadstuff stand of the Canadian pavilion was a credit to the country and to the several exhibitors who contributed so largely to its excellence.

In Class 55 (Appliances and Processes used in the Manufacture of Food Products) we could have exhibited the most modern and improved milling machinery, if the great distance, cost of transportation and installation had not prevented the Canadian Commission from making a practical display. All the Commission could allow, was a small sized collection of portable grain and feed grinders for both farmers' use and large flour mills, which obtained bronze and silver medals from the international jury. A strong house in Paris has assumed the agency of these machines manufactured by S. Vessot & Co., of Joliette, with every prospect of doing a large business.

The house of C. H. Catelli, of Montreal, exhibited a complete collection of macaroni and Italian pastes of various kinds. It is well known that our hard Manitoba wheat is specially adapted to the production of these superior Italian pastes and are largely exported abroad for this trade. The international jury, after examining Mr. Catelli's exhibit, awarded him a silver medal, a high honour considering the competition of Italy, France and other foreign countries.

In Class 58 (Preserved Meat, Fish, Vegetables and Fruit) the Dominion of Canada made a complete exhibit, which was awarded a gold medal.

In this class the Simcoe Canning Co., and the William Davies Co., of Toronto, made a remarkably comprehensive and much admired exhibit of canned goods, and were awarded silver medals by the international jury. It is no exaggeration to say that Canada now enjoys the highest reputation on the English market and especially at the London War Office, for the excellence of its food products. In fact the South African expedition has been largely supplied by Canadian canned goods, and the War Office reports have been most satisfactory in every respect.

The preserved codfish, lobsters and salmon were the great attraction in this class. Wurzburg and Co., of Vancouver, had a fine exhibit of crabs, packed in half pound cans, containing only the white meat which lies in the small body cells, and the meat of legs and claws taken out whole. The salmon exhibit was packed in pound flat cans, of a quality equal to the best on the Fraser river.

Mr. Ludw. Wurzburg, of Halifax, had a very attractive exhibit of lobsters, preserved in patent glass jars, in the same way in which lobsters are packed in the cans. These glass jars, hermetically closed by atmospheric pressure, being free of all metallic solder, and allowing the purchaser to see for himself the fresh appearance and cleanliness of the meat, were much appreciated by the trade, and large orders were given in consequence.

Codfish, canned, kippered and smoked herrings were also exhibited by Henry F. Coombs of St. John, Chas. Robin, Collas & Co., of Paspebiac, and other parties, the whole of which formed a most valuable collection which largely contributed to the gold medal obtained by the Dominion for its preserved fish.

In preserved fruit and vegetables, Canada had a large collection of valuable exhibits, the Simcoe Canning Co. leading with many varieties of fruits and vegetables, which, with an exhibit of evaporated apples formed a complete collection. The Kelowna Shipping Co. exhibited a fine specimen box of Agen and Italian prunes from British Columbia.

In Class 59 (Sugar and Confectionery, Condiments and Relishes) Canada obtained a gold medal for its collective exhibit. The collection of maple syrup and sugar was a surprise to the visitors who had not the remotest idea of the making of sugar from the maple tree. Samples were constantly at hand in small pieces so that people could taste it. A large stand was covered with some fifty large glass jars, filled with amber coloured syrups. Never before had such an exhibit been made in Paris, and the

Canadian pavilion was the only place on the grounds where maple sugar and syrup could be seen. The Minister of Agriculture of the Province of Quebec was the principal contributor to this splendid collection, almost exclusively the product of the province.

In confectionery, W. J. Walker, of Ottawa, and Henry F. Coombs, of St. John, exhibited assorted creams, bon-bons, chocolates and other fancy confectionery for which special bronze medals were awarded by the international jury.

In class 61 (Syrups and Liqueurs; Various Spirits Commercial Alcohols) Canada obtained two silver medals, one for Melchers Gin Spirit Distillery Co., of Montreal, the other for Spalding and Stuart's Scotch Whisky "Old Perth", and "Mountain Dew". Other exhibitors in this class did not arrive in time to be fairly appreciated, and as a consequence could not fairly enter in competition with the other exhibitors.

GROUP XI.

MINING METALLURGY.

Previous to the Paris Universal Exhibition there was a general impression abroad that Canada was above all a great timber and agricultural country, with no great pretensions to mineral or metallurgical prominence. Years ago this impression was perhaps well founded, but of late the Dominion has developed in a most marvellous manner. After going through the primary period of forestry and agriculture, Canada has rapidly advanced to the industrial stage of its existence, and has now arrived at the mining and metallurgical era, the crowning industry of the most progressive nations of the new century.

The Canadian department of Mining and Metallurgy was a great revelation to the industrial world, so ignorant generally of our unbounded resources. To-day the Dominion is looked upon, by the other nations, as the coming young giant who, in the near future, will contest their supremacy in the markets of the world. No better or more complete demonstration of our great mining wealth could be made than by the splendid specimens so handsomely exhibited in Paris by the Geological Survey. Not caring for purely scientific display only, the Director, Dr. Dawson, took special care that, as constituted and finally installed, his exhibit should offer by far the largest and most important display ever made of Canada's mineral products. In the opinion of the numerous visiting foreign experts, it was not only the largest but the best arranged and most instructive series of economic of minerals on the grounds.

Covering most of the northern half of the North American Continent, Canada is traversed by mountain ranges, from the Labrador regions to the Pacific coast, in which are innumerable deposits of minerals to be found. Large specimens weighing several tons each of coal from the Maritime Provinces were exhibited to the admiring visitors, and much inquired about by the people in the trade. Close by stood other large specimens of British Columbia Coal representing some fifty thousand square miles of coal regions, worth untold millions of money.

In the immediate neighbourhood of the coal exhibit, was our great collection of gold nuggets and other specimens, taken from the Klondike, Kootenay and other mines, together with a sixteen foot column of auriferous gravel, illustrating the Bonanza creek stratification of the soil, which thousands of much interested visitors gazed upon with evident surprise and outspoken admiration.

As to our nickel exhibit, it was certainly without a rival on the exhibition grounds. It was shown in every stage of preparation, from the rough ore to the manufactured article, which consisted of an elegant gate and railing, sixteen feet long, of solid polished pure nickel metal, estimated to cost over five thousand dollars.

Twelve hundred and twenty-three separate exhibits of silver ores, copper, iron, asbestos, mica, mineral oils, quartz, building stone, cement and other specimens from every province in the Dominion formed a complete and admirable collection of the mineral wealth of Canada. Large and much admired transparent photographic views illustrated the mining camps of the Rocky Mountains and other regions. The geological maps of the survey, which, under Sir William Logan, always obtained the highest

awards at previous international exhibitions, maintained their reputation for scientific work and value. They were closely examined by scientific schools and associations, which made it their duty to frequently visit the Canadian pavillon as the most practical school of mines on the grounds. Mr. Faribault, who was in charge of the installation of the section, was indefatigable in giving full information to visitors and to the international jury, during his presence in Paris. He was succeeded by Messrs. Low and Stuart, who also did excellent service, fully appreciated by the Canadian Commission.

Class 63 (Working of Mines and Quarries). As the result of our grand mineral exhibit, which occupied 3,550 square feet of space in the Canadian Pavilion, six of the highest awards were granted to the Dominion of Canada, as follows: The Canadian Commission, The Geological Survey, The Ontario Mining Bureau, The Quebec Mining Department, The Nova Scotia Mining Department, and the British Columbia Mining Department. Each of these obtained grand prizes for the excellence of their contributions.

Eight gold medals were also awarded to the Canadian Copper Co., the Oxford Co., the Canadian Iron Furnace Co., the General Mining Association of Sydney, the Dominion Coal Co. of Montreal, the Montreal Gold and Silver Development Co., the West LeRoi Mining Co. of Rossland, the Nova Scotia Steel Co., and the Imperial Oil Co. All these companies had full representations of their valuable products. The Imperial Oil Co. especially had a full collection of crude petroleum, illuminating and lubricating oils and waxes, paraffine, benzine, naphtha, &c.

Silver medals were granted the Albert Manufacturing Co., the Asbestos and Asbestic Co., the Crow's Nest Pass Coal Co., the Union Industrielle du Canada, the Windsor Salt Co., Bell's Asbestos Co., Jack & Bell, Halifax, the Union Colliery Co. of B.C., the Walker Mining Co., Wallingford Bros., Ottawa, and Milne, Coutts & Co. of St. George.

A large number of bronze medals and honourable mentions were also awarded to other valuable but less important exhibits to be found in the official prize list. As collaborateurs, Messrs Faribault and A. P. Low of the Geological Survey, Ottawa, Aubray White of Toronto, Mr. Edwin Gilpin of Halifax, and Mr. W. Fleet Robertson of Victoria were awarded gold medals for their services.

Numerous inquiries were made from every part of the world about our mining resources, and it is to be hoped that a large investment of capital and increase of immigration will be the results of the splendid display made by Canada at the Paris Exhibition. The special catalogue and other mining publications widely circulated by Canada largely contributed in giving information concerning the mineral resources of every province in the Dominion.

In Class 64 (Metallurgy) the Canadian Nickel Ore and Smelting Co. was awarded a gold medal for its exceptionally fine and complete exhibit. The same award was granted to the Oxford Copper Co. Silver medals were given to the Hull Mines Smelter of Nelson, the Walker Mining Co. and Trail Smelter Co.

In Class 65 (Metal Working) Canada could have made a better display had it not been that manufacturers were so busy filling pressing orders that it was very difficult to induce them to contribute to the Paris Exhibition. A few of our most prominent firms were induced, however, to take part in the Canadian section with most satisfactory results.

The Thomas Davidson Manufacturing Co. of Montreal spared no trouble in making a display of enamelled steel wares, embossed and japanned goods. An extensive show case, measuring eighteen feet by seven, was completely filled with an attractive and ornamental collection of some thousand different articles of kitchen ware, decorated household and table furniture, jardinieres, tea, coffee and dinner sets of elegant patterns. A full collection of ornamental japanned boxes for various trades and of all sizes and designs also attracted much attention. The whole exhibit will probably create a demand for these goods, as the international jury was both surprised and satisfied with the whole exhibit, which for variety and excellence of design and workmanship had no superior on the ground. The international jury promptly awarded a gold medal to the Thomas Davidson Manufacturing Co. as a recognition of the superiority of this creditable display of Canada's progress in metal working.

The Star Manufacturing Co. of Halifax was equally successful in exhibiting their gold, silver and steel skates of all sizes and designs. This elegant exhibit was placed as one of the centre-pieces of the Canadian pavilion. The star, shaped case, standing on a well designed pedestal of mahogany, was certainly one of the most ornamental accessories of the Canadian pavilion, and attracted every visitor's attention.

The Metal Roofing Co. of Toronto had two very fine specimens of their metal work, an ornamental portico, in the Canadian pavilion, and three large panels in the main building, both of which were considered of superior workmanship and design by the international jury, who awarded them a silver medal.

A silver medal was awarded the James Smart Manufacturing Co. of Brockville, who exhibited a fine collection of Canadian hatchets, axes and hammers, which were a surprise and an educator to the average continental workman, who still uses the tools of a century ago. A claw hammer, for instance, could not be found on the whole continent probably, and as to the finish of tools, generally, they could not compare at all with the elegant, well kept implements of the Canadian workman. A silver medal was also awarded to Messrs. Whitman & Barnes of St. Catharines, who had also a full case of forge tools, reapers and mowers, root and other cutters, which were much admired for their superior finish and quality. Bronze medals and honourable mentions were granted for other exhibits of less importance, as seen in the official prize list.

GROUP XII.

DECORATION AND FURNITURE OF PUBLIC BUILDINGS AND OF DWELLING HOUSES.

The furniture industry of Canada has now been so developed that not only is the local demand supplied with a better class of goods, but the foreign trade is absorbing the whole production of some of our larger factories. It is to be regretted that the Furniture Manufacturers Association did not fulfil their first engagement, to exhibit in Paris a full line of their stock, for they would have done credit to an important industry, especially adapted to our great timber resources and extensive water powers. No country in the world is better situated to produce an excellent article at the lowest possible price. This trade is likely to be largely extended in foreign markets, and the Paris Exhibition of 1900 has afforded a valuable advertisement for it.

A few manufacturers contributed to make a fair exhibition of household furniture, which attracted great attention, and could have been sold ten times over. Those who exhibited were Messrs. Charles Rogers & Sons, of Toronto, the North American Bent Chair Co., of Owen Sound, and Messrs. Ives & Co., of Montreal, who produced a dozen of the most elegant brass single and double bedsteads that could be found on the grounds. As a result of their exhibit, numerous inquiries have been received about these goods from several parts of the world, and important orders will probably spring from their exhibition at Paris.

The Preston Furniture Co., and Mr. John B. Snider, of Waterloo, both contributed a collection of office desks. These could have been sold several times over.

Messrs. Samuel May & Co., of Toronto, exhibited in the main building a carved oak English billiard table, with complete fittings, which attracted considerable attention. Mr. May was awarded a silver medal, as well as Messrs. Ives & Co. Bronze medals were granted to the other exhibitors, notwithstanding the fact that they were competing with the most costly and finest upholstered furniture in the world. This seemed to be a somewhat unfair position, but the awards given were certainly the highest that could be expected for furniture designed to be sold at moderate figures, when in competition with a different class.

In Class 66 (Fixed Decoration of Public Buildings and Dwelling Houses), Messrs. W. C. Edwards & Co., of Ottawa, and Mr. Joseph Paquet, of Montreal, made a complete and elegant show of doors, blinds, sashes and ornamental joinery. Show boards of mouldings and turnings, window frames, stair rails and newel posts, parquetry flooring and borders, showed to perfection the excellence of the materials employed and the

superiority of their workmanship. The whole display did credit to Canada. They were awarded silver and bronze medals from the international jury.

In Class 66 (Wall Paper and Papers Hangings), the firm of Watson, Foster, of Montreal, made an excellent display of their goods. Their showcase, one of the largest of the Canadian pavilion, was also one of the most attractive. Visitors seemed to be surprised at Canada producing such high class articles. But when it was explained to the international jury that this firm had recently built one of the most extensive wall paper factories in America, fitted with all the most modern machinery and appliances, and that the inherited artistic taste of the French Canadian workman, together with the facilities afforded for paper making by the natural resources of Canada, they came to the conclusion that Canada should be able presently to supply a large proportion of the foreign market demand. This is being already done to some extent. Messrs. Foster, Watson's display obtained a silver medal, the highest award that could be obtained for the commercial class of goods exhibited by this firm.

The Diamond Glass Co., of Montreal, supplied an exhibit of glassware, including table service, glass jars, flasks, and a thousand different articles of elegant design and finish, suited to the Canadian demand. Twenty years ago the company started work with a few thousand dollars capital, and it now has developed into a large and important company, supplying the market with the cheapest and best goods required for home consumption.

In Class 74 (Apparatus and Processes for Heating and Ventilation), the Dominion was expected to make an important exhibit, and the numerous visitors at the Canadian pavilion admitted that this had been done. The exhibit was a complete collection of heating and cooking appliances. The leader of this excellent exhibit was the McCleary Manufacturing Co., of London, with some fifty different styles of their hall, parlour and kitchen coal, wood and oil stoves and ranges of latest improvements and styles. They presented a good appearance and were much admired and inquired about during the time of the exhibition. The international jury granted this firm the high award of a gold medal.

Immediately opposite, the Record Foundry and Machine Co., of Moncton, exhibited their ranges and heating stoves, some of them entirely nickel plated. These really superior samples of heating and cooking appliances obtained a silver medal.

The Star Iron Co., of Montreal, exhibited their well known hot water furnace, which stands well on the markets. Having to compete with the full collections of the largest manufacturers, this single apparatus could hardly expect more than a bronze medal, which they received. Messrs. Chapleau & Son, of Montreal, and Butterworth & Co., of Ottawa, also obtained bronze medals under the same circumstances. Taken altogether, our heating and cooking appliances were certainly most interesting and reflected credit on our manufacturers.

GROUP XIII.

THREAD, YARN, TEXTILE FABRICS, CLOTHING.

This important group included most of the manufacturing industries of Canada. It occupied a large number of show cases in the galleries of the Canadian pavilion. Many of our Canadian visitors declared themselves much surprised and gratified at the display made by Canada, which was altogether beyond their expectations. It is a fact, much to be regretted, that there exists amongst our own people a disposition to belittle the manufactures of their own country, and that in consequence manufacturers find themselves compelled to disguise their best productions as of foreign make in order to secure the custom of home consumers. The Canadian display at the Paris exhibition should do much to remove this evil. It has there been shown that our goods, in several lines, can stand competition with the best that Europe produces, and that in Canada, European goods at high prices are not necessarily better than Canadian goods at lower ones. We have immense advantages in natural productions, water power, &c., and should, therefore, be able to do better for the consumer than European competitors.

Class 80 (Cotton Thread and Fabrics)—First and foremost in the textile group were the large show cases of cotton fabrics exhibited by the Montreal Cotton Co., the Dominion Cotton Mills Co., and the Canadian Coloured Cotton Mills Co., also of Montreal. The whole collection was remarkable and the international jury, composed of the greatest manufacturers of the world, were much surprised at Canada having attained such excellence at such low price of production. The Montreal Cotton Co.'s exhibit especially, with its Italian cloths, canton flannels, brocades, cashmerettes, lappet muslins, sateens, damasks and cotton moire antiques, elicited great praise, resulting in the firm receiving the highest award, a grand prize, for its collection of coloured cotton goods.

The Dominion Cotton Co., which has mills at Montreal, Magog, Moncton, Halifax, Kingston and Brantford, made a great display of cottons, bleached and unbleached sheetings, grain bags, canton flannels, ducks, towelling, quilts, hosiery, printed calicoes, flannelettes and many other lines of cottons. The whole collection, well displayed, could not have been easily surpassed. Numerous inquiries were made as to the possibility of dealing in these goods on fair terms, and there is no doubt that, if the home market does not absorb the whole production, an important foreign trade may be secured in consequence of this exhibit. Inquiries were made also as to the Montreal Cotton Co.'s grand prize goods, but in this case the company could not even supply the home demand and were not anxious for foreign trade.

The Dominion Cotton Co. was awarded a gold medal, and the Canadian Coloured Cotton Mills, of which D. Morrice Sons & Co. are agents in Montreal, were granted a silver medal for their fine display of cotton goods. They consisted of denims, tickings and awnings, gingham and dress goods, saxonys and flannelettes, damasks, shirtings, galatea stripes and Oxford shirtings, all of superior design and workmanship. The two large show cases which they filled attracted considerable attention and inquiry, and will probably result in new demand for these lines of goods.

The Yarmouth Duck Yarn Co. exhibited an important collection of sail and other lines of duck. Inquires were made by and samples furnished to the French War Department, with a view to the use of these goods in the French army. These were the four exhibits in Class 80.

In Class 82 (Woollen Yarns and Fabrics) the Paton Manufacturing Co., important wool manufacturers of Sherbrooke, exhibited two large show cases of fancy tweeds, worsted suitings, Canadian homespuns, dress goods, overcoatings, beaver and military fabrics. This collection elicited high commendation and secured the award of a gold medal For the better display of textile exhibits the Canadian Commission obtained the services of the window dressers of the Printemps, one of the largest Paris departmental stores. The result was that the Canadian show cases were models of elegance in their general arrangement and contributed largely to the great success which was achieved.

The Rosamond Woollen Mills of Almonte had also a fine exhibit of worsted and woollen yarns, which obtained a silver medal. The Richelieu Woollen Mills of Chambly were granted a bronze medal for their case of ladies' dress goods, serges and flannels of superior quality. Taken altogether our woollen exhibit plainly showed that the home market could be supplied with a full line of merchandise of excellent material and workmanship, equal, if not superior, to the imported article.

The Merchants Dyeing and Finishing Co., of Toronto, exhibited, in Class 78, samples of dyeing and finishing of dress goods, Japanese silks imported from England, France, Germany and Japan as they came from the looms. Being dyed and finished in Canada they are given the shades required by fashion. This interesting exhibit obtained a bronze medal.

In Class 83 (Silks and Silk Fabrics) the Corticelli Silk Co., of St. Johns, filled one of the large show cases with a brilliant and artistic collection of spool silks, gilt edge machine twist of the highest standard, knitting and embroidery silk, sewings and twist for tailors' use, and numerous varieties of this class of silks. All these goods were artistically displayed, so that the Corticelli show case was certainly one of the brilliant and attractive ones of the Canadian Pavilion. When examined by the international jury, the Corticelli silks were declared equal, if not superior, to any on the grounds, and obtained a gold medal, as a very high award, for their general excellence, great strength and exquisite colouring.

Furs.—From time immemorial the Hudson Bay and other fur companies have, by their annual sales of North American furs, created a world wide reputation for the fur trade of Canada. As a consequence every visitor to the Canadian pavilion was looking anxiously for our display of fur garments and they were not disappointed.

The two well known houses of Senator Paquet, of Quebec, and Chas. Desjardins, of Montreal, vied with each other to show with what perfection the furriers of Canada can supply the demand of their customers. Already these houses have an extensive foreign trade with the United States especially, travellers and tourists from thence annually making large purchases of Canadian furs. The exhibits comprised a full collection of fur garments which were much admired and elicited many inquiries as to cost, &c. The collection comprised garments of nearly all the furs indigenous to Canada, as used both by ladies and gentlemen. As a recognition of this remarkable exhibit the international jury awarded a gold medal to Senator Paquet, and another to Mr. Chas. Desjardins. Mr. Miller, of Toronto, obtained a silver medal for his collection.

In Class 85 (Tailoring, Dressmaking and Clothing for Men, Women and Children) Messrs. Boucher & Mercier, of Montreal, exhibited a case of men's clothing, including police and firemen's garments, &c., and were awarded a silver medal for superior finish. Senator Paquet was also awarded a silver medal, and Mr. Chas. Desjardins a bronze medal for their exhibits.

In Class 86 (Various Trades connected with Clothing) Senator Paquet exhibited a remarkable collection of prepared skins for gloves of excellent material and workmanship, much admired by the international jury, who awarded him a gold medal. The peculiar merit of this exhibit was that Senator Paquet not only manufactured the gloves but also dressed the skins employed in their manufacture in his factory in Quebec.

In the same industry, the Balcer Glove Manufacturing Co., at Three Rivers, had a fine exhibit, filling a large case of their specialties for winter and summer wear, and some three hundred samples varying from the finest kid to the workingman's heavy winter mit. The display did great credit to Canada. A gold medal was the high award granted to this enterprising and successful house.

Close by stood another equally large and remarkable glove exhibit, made by Mr. Frederic Galibert, of Montreal, who also manufactures a full line of excellent goods well patronized by the trade, and much admired by the visitors at the Canadian pavilion. Mr. Galibert also dresses the skins employed in his glove factory, and produces several hundred different samples for the Canadian trade. A silver medal was awarded for this exhibit.

In the boot and shoe industry, Canada is able to compete with the world, having many advantages in her favour for the manufacture of these articles at low prices.

First and foremost in the Canadian exhibit stood the two large show cases of Messrs. Marsh & Co., of Quebec, filled with a complete display of boot and shoe wear for men, women and children. For elegance, workmanship and price combined they were not excelled by any exhibit of their class on the grounds, and were awarded a gold medal. Messrs. J. D. King & Co., of Toronto, also obtained a gold medal for their superior exhibit. This firm give special attention to their export trade all over the world. Their equipment places at their disposal the best facilities for quick and cheap production.

The Slater Shoe Co., of Montreal, has acquired a world wide reputation for its specialty of fine foot wear made by the Goodyear Welt process. They are made to retail at standard advertised prices stamped on the soles. The samples exhibited were for men only and for this reason, although a very superior article, were awarded only a silver medal. Messrs. H. Lamontagne & Co., of Montreal, completed this very creditable Canadian collection with various samples of moccasins for bushmen, miners and farmers, and also a complete assortment of elegant and tiny infant soft sole shoes, of artistic design and colouring.

In connection with the boot and shoe trade, the Duplessis Pegging and Sewing Co., of St. Hyacinthe, exhibited in class 79, appliances used in sewing and making wearing apparel, two excellent machines, which were awarded a silver medal by the international jury. They were surprised to find that the Duplessis Pegging Machine made its own pegs, works without lasts, in the same operation cutting the pegs automatically inside

the shoes and leaving a smooth inner sole, and performs its work at a high rate of speed.

The finishing soles machine also works automatically, with a flexible shaping roller. They were both put in operation and attracted great attention. Orders were taken for several foreign countries and the company has every prospect of a flourishing trade.

Mr. Louis Coté, of St. Hyacinthe, exhibited in operation, an ingenious improved pantograph of his invention, outlining and cutting patterns of boots and shoes, and garments of all descriptions, for which a silver medal was awarded. Mr. Coté had no difficulty in selling his patent rights in France.

In the same class Mr. Peyry, of Montreal exhibited an appliance for fitting ladies and gentlemen's garments by a new method. A collection of samples was exhibited, including seamless jackets and mantles, very interesting to ladies. For this a bronze medal was awarded.

In Class 84 (Lace, Embroidery and Trimmings) a large show case was filled with a brilliant display of ladies' work, including lace, embroidery, crochet work, priest's vestments, artistic paintings on silk, and other interesting specimens. The collection was admired by lady visitors who stated that Canada's exhibit included some of the finest ladies' work on the exhibition grounds.

In Class 86 was also to be found probably one of the most attractive show-cases of the whole pavilion. It consisted of four very handsome and elegant wax figures, exhibiting the goods of the Dominion Corset Co., of Quebec. This establishment, which now largely supplies the home market, is fully equipped with every modern improvement, so as to compete for the home and foreign trade. The office and workshops are situated in the midst of the best adapted working population for the manufacture of this special line of goods. Three hundred sewing machines, some of them with eight needles, are put in motion by the hydraulic power of the Montmorency Falls. For design, material, workmanship and price, the machine-made Dominion corsets have no superior in their own class of goods for the home market. The international jury, after full examination, awarded a silver medal to the Dominion Corset Co., in competition with the best Parisian makers, who are well known specialists in this costly and artistic line of special goods.

In hats and caps the Union Hat Works, of St. Johns, exhibited in Class 86 a full collection of fur felt hats in assorted colours, which find a ready market in Canada, and were considered, in material and workmanship, worthy of a silver medal.

Senator Paquet, of Quebec, also exhibited a collection of straw hats, which were much admired and were equal to anything in that line of goods. These straw works, recently established, will no doubt soon supply the home market and successfully compete with the most popular imported article.

The Standard Shirt Co., of Montreal, having one of the largest factories of its kind, exhibited over one hundred and fifty samples of their work. They completely filled two large show-cases with some of the very best goods in the Canadian pavilion. The exhibit was remarkable for variety of design, elegance, material, workmanship and price, and was granted a silver medal. This house supplies not only the home market but exports to Australia and South Africa.

The Dominion Umbrella Factory, of Montreal, also exhibited a dozen samples of their excellent work, an elegant collection of fancy umbrellas, which obtained a bronze medal from the international jury.

GROUP XIV.

CHEMICAL INDUSTRIES.

In this group Canada takes a prominent position in some lines, but in others is only starting work, with the prospect, however, of supplying the local demand in the near future. Thus the great house of Lyman Bros. Co., of Toronto, has initiated, with much success, the manufacture of chemical and pharmaceutical preparations. They had

a complete exhibit in Paris, for which they obtained a silver medal, in competition with the largest chemical works of the world.

In Class 90 (Perfumery), Messrs. Lyman Sons & Co., of Montreal, exhibited a very attractive show case. It comprised high class perfumery of their own manufacture, floral extracts, Cologne and Lavender waters of various grades, sachet and toilet powders, tooth powders and pastes. This new industry is prospering in the Canadian market, and is likely to develop a large trade. Messrs. Lyman Sons & Co. were awarded a silver medal, and Kattini Malouf Brothers, of Montreal, an honourable mention for their perfume exhibit.

In toilet soaps and powders, the firm of Alfred Savage & Sons., of Montreal, filled a large show case with a fine assortment of soap and other perfumed toilet articles, including their baby soap, which has acquired a reputation for its superior quality. This exhibit was attractive and was awarded a silver medal by the international jury. The American Dressing Co., of Montreal, exhibited their Diamond finish dressing, and other polish combinations, for leather and shoes of all kinds and colours. The international jury, after examining this collection, granted them a bronze medal, the highest award for this class of goods. The Canada Paint Co. was equally successful.

Class 88 (Manufacture of Paper). When the immense and daily increasing paper consumption of the world is taken into consideration, with the illimitable sources of supply to be found in our northern forests, and our immense water power scattered all over the Dominion, it is beyond question that Canada should speedily become the chief paper producer of the world.

With this prospect in view, the Canadian Commission desired to make a full display in Paris of our paper industry. This was done with great success and Canada secured the highest award, a grand prize, for the best manufactured article, although in competition with the world ; and two gold medals for newspaper, pulp and pulp wood.

The Rolland Paper Co., of Montreal, exhibited an ample collection of their commercial cardboard and paper, which enjoys a high reputation for commercial purposes. This firm, having invested several hundred thousand dollars in their large paper manufactory at St. Jérôme, fully equipped with the most modern and improved machinery and processes in paper making, made a specialty of the highest class of stationery. Both the Federal and the Provincial Governments, our banking and Railway corporations, are now being supplied by this firm, the home-made articles being considered equal, if not superior, to the imported merchandise. This opinion was largely confirmed by the international jury, who granted the Rolland Paper Co., in Class 88, the highest award, a grand prize, for their collection of superior commercial standard papers. A gold medal was also awarded in Class 92, for their collection of stationery, including note paper, envelopes, pads and boxes of various and elegant designs, sizes and prices for all purposes. This triumph of Canadian paper making will be appreciated when it is considered that the Rolland Paper Co. have alone, on the whole continent of America, taken a grand prize for paper making, and that in the whole British Empire the firm of Henry Proude, of London, is the only other firm receiving equal recognition.

The Laurentide Pulp Co., of Grand'Mere, were awarded a gold medal for their exhibit of pulp and newspaper (Class 88). This consisted of an exhibition of pulp material from the initial log to the finished article, showing the process in its various stages, culminating in large rolls of newspaper, some of them eight feet wide. The whole exhibit was without a rival of its kind on the exhibition grounds. It largely contributed to impress the international jury and visiting public with the unbounded resources of the Dominion of Canada as a great paper making country.

The Chicoutimi Pulp Co. also had an exhibit of several bales of wood pulp, surmounted by a large photograph of their extensive works at Chicoutimi, and by another large photographic view of the first steamer leaving their seaport with a 5,000 tons cargo of pulp for Great Britain. This Company also was awarded a gold medal. The perfect Mucilage Bottle Co., of Paris, Ont., obtained a bronze medal in the same class.

In Class 89 (Leather and Skins) the Dominion of Canada exhibited a complete collection, from the heavy sole leather to the finest calf skins, and obtained the high award of a gold medal, besides silver and bronze. The leather manufacturing industry

of Canada is a large one, fully up-to-date in equipment and processes, supplying the home and foreign markets. The advantage of using the hemlock bark for tanning purposes has given the Canadian manufacturer a decided advantage. But the very latest processes have also been adopted, as demonstrated by the firm of C. Galibert & Sons, of Montreal, who were granted a gold medal for their superior Chrome tanned calf skins. French calf pelts can now be imported into Canada in the rough, manufactured in Montreal, and re-exported to the French market, and compete successfully with the French made article. Messrs. Galibert not only supply the Canadian demand, but the foreign market also. The international jury was somewhat surprised at these facts and awarded Messrs. Galibert & Sons' exhibit a gold medal.

The firm of Bickell & Wicket, of Toronto, exhibited an excellent collection of every variety of leather in general use. It consisted of bag and trunk leathers, bookbinders' leathers, fancy goods leather, book and show leathers and saddlers leathers, in all some hundred distinct samples of excellent merchandise, with which they supply the home market. This collection attracted much attention. They were awarded a silver medal.

The same may be said of the Breithaupt Leather Co., of Berlin, who made a special exhibit of their hemlock tanned sole leather. Some fifty full size leather sides were hung on a hemlock frame, showing this exhibit to the best advantage. It consisted of Eagle, Penetang and Listowel tannages made from dry hides and a full collection of cut soles and heels of all sizes and designs. This valuable exhibit found a ready sale and no doubt might have been several times duplicated. A bronze medal was awarded by the international jury.

In Class 91 (Manufacture of Tobacco and Matches) the Dominion of Canada obtained a gold medal for an exhibit of tobacco leaf, cigars and cigarettes, contributed by Canadian manufacturers and growers. The large show case, in which they were kept under lock and seal, according to the French government regulations, presented an imposing appearance. Hundreds of boxes and packages of the best brands, manufactured by Houde & Co., Quebec, Tassé Cigar Co. of Montreal, Arthur Guay of Montmorency, Hilda Cigar Factory of Toronto, and others, made a grand pyramidical display, relieved by photographic views of their works. After a thorough examination of the collection and testing a certain number of samples, the international jury declared themselves thoroughly satisfied with the superior quality of the Canadian leaf and manufactured article, and granted to the collection the high award of a gold medal.

GROUP XV.

VARIOUS INDUSTRIES.

The most important exhibitor in this group was the Canadian Rubber Co., of Montreal, which stands in the front rank of rubber manufacturers in the world for excellence of workmanship. A large show case of boots and shoes was the special feature of their exhibit, although other rubber goods, including druggist sundries, hot water bottles, &c., added considerably to the importance and interest of the collection.

In Canada, where rubber boots and shoes are generally used, the company finds a ready market. Not so in Europe, where rubber shoes are only occasionally used. Still, a quantity of Canadian goods are being introduced in the British and other markets, and the Rubber Company's exhibit will no doubt result in an increased demand. The international jury were highly interested in the whole collection, and granted this Montreal firm the high award of a gold medal.

In Class 98 (Brushes, Leather Articles, Fancy Articles and Basket Work) the firm of H. Lamontagne & Co., of Montreal, exhibited a fine collection of leather travelling sacks and bags, which filled the largest show case in the Canadian pavilion. This firm, who are large manufacturers of leather trunks, valises, mail bags and other articles, have filled several military contracts for both the Canadian and Imperial Governments in saddlery and other goods, and these have been declared highly satisfactory. They were awarded a silver medal.

In Class 95 (Jewellery and Precious Stones) Messrs. Ambrose Kent & Sons, of Toronto, exhibited the most ornamental exhibit of the whole Canadian pavilion. It consisted of Foresters' presentation jewels, society charms, pins and buttons, souvenir spoons, society uniforms, paraphernalia and regalia, as manufactured by them for the Independent Order of Foresters and other kindred societies. They were awarded a bronze medal.

In Class 98 Mr. H. F. Coombs, of St. John, had a full show case of Indian basket-ware and beadwork, wooden canoes and other fancy articles, which were much admired by the international jury, as exhibiting the native Indian taste and ability in executing these elegant articles. The inquiries about them were numerous, and will probably result in a demand for this fancy work. A silver medal was granted for the collection. Mr. Coombs was also awarded a bronze medal for samples of snowshoes, as was Senator Paquet for a toboggan and snowshoe exhibit. The Bailey Cutlery Co., of Brantford, also obtained a bronze medal for a valuable exhibit of steel patent shears for all purposes.

GROUP XVI.

SOCIAL ECONOMY, HYGIENE, PUBLIC CHARITABLE RELIEF.

This exhibit attracted much attention during the whole of the exhibition, and more especially during the Universal Congress of Mutual Societies. The international jury were so favourably impressed by it, that the high award of a gold medal was granted to the Independent Order of Foresters, Toronto, and a silver medal to their eminent representative in Paris, Mr. P. N. Breton, of Montreal, as collaborateur.

In Class 112 (Public Charitable Relief) both the institutions for the deaf and dumb, and for the blind of Ontario received gold medals for the work performed by these benevolent organizations, large photographic views of which were on view. Reports of the methods of teaching and practical work were consulted, statistics of the results obtained produced, to the satisfaction of the international jury, who freely admitted Canada's advanced position in philanthropic work.

CLOSING OF THE EXHIBITION.

After nearly seven months of uninterrupted exhibition, with the exception of the Canadian department, which was closed on Sundays, the closing ceremonies took place on November 12, amidst an immense concourse of people.

Being anxious to finish their work as soon as possible, the Canadian Commission had prepared weeks in advance to begin closing operations as soon as possible and carry them through with all possible dispatch. A large force was put to work, and by the end of November most of the department had been carefully packed and was ready for shipment to the Glasgow Exhibition, or to Canada, according to instructions.

The show cases which were to be installed at the International Exhibition at Glasgow were carefully assorted, and the large size double and plate glass packed by experts, so as to secure their safe transportation. In the general hurry and bustle in shipping and transportation of such an immense exhibition, there was the greatest difficulty in procuring teams and cars and, as a consequence, the month of December had closed before the last package could be safely shipped. Eventually they arrived safely both in Glasgow and in Canada via Antwerp, and were shipped directly to each exhibitor.

Since their return to Ottawa, the Commissioners have paid by cheque to the exhibitors the amounts received at the close of the exhibition for the large quantity of goods sold for them.

CONCLUSION.

In closing their operations the Canadian Commissioners feel that they have used their best efforts towards the accomplishment of the important duties entrusted to them: and in doing this they observed strict economy, sometimes under difficult circumstances.

If the sum of $77,000 paid for space and colonial building is deducted from the general expenditure, $315,000, it will be found that compared with the amounts paid at previous International Exhibitions, at Chicago and the Colonial Exhibition in London, the cost of the Paris Exhibition is not excessive, especially if the character of the display made by the Dominion of Canada in every department is taken into consideration. It should also be remembered that most of the collections will be exhibited in Glasgow in 1901, thus serving a double purpose.

The Canadian Commissioners cannot close their operations without thanking most heartily the hundreds of exhibitors who have so kindly, at considerable sacrifice of both valuable time and money, given their much needed support in carrying out the Paris Exhibition. It has been stated by parties badly informed that the Paris Universal Exhibition had been a failure, financially and otherwise. Thousands of our own citizens who had seen for themselves the marvellous display made in 1900 by the most advanced nations of the world, can testify to the great success of this colossal undertaking. But a testimony still more valuable is the declaration made by the High Commissioner of Germany, which certainly cannot have been dictated by any partiality to the French Republic.

On November 22, 1900, the Foreign Commissioners at the Paris Exhibition, before leaving for their homes, offered a farewell banquet to the French Government and officials at which D. Kickter, High Commissioner of the German Empire, as President of the banquet, had the great honour of proposing the toast of the evening in the following words :—

'The Universal Exposition of 1900 has closed its gates. The grandest manifestation of human activity in all the domains of intellectual and material life is now a thing of the past. The object in view, cherished by the men who had given it life, that of presenting to the world, in a given space, all the acquisitions of the human brain, the infinite complexity of modern life, has been realized in the most brilliant manner. All the nations in the world have ardently and jealously rivalled with each other to gather the most precious and remarkable treasures of ancient and modern times.

'There is not the least doubt that the Universal Exposition of 1900, by its general disposition, as well as by the high value and perfection of objects exhibited, is by far superior to all those that have previously taken place in Europe or elsewhere.

'The Palaces of the Universal Exhibition will disappear, the great City of Paris, of which we have been the enchanted guests for many months, will resume its ordinary life, but the personal relations we have been fortunate enough to inaugurate during the whole of this time will be for ever lasting.

'The names of the men who have given to the Universal Exhibition the imprint of their character will live for ever in our memory. We look with admiration at Mr. Alfred Picard who has accomplished a work of universal peace, such as the world will have never seen for its grandeur and impressiveness.'

Such is the unbiassed appreciation of the Paris Exhibition which has just closed, in which the Dominion of Canada has taken such a prominent part. Notwithstanding the hostile reports, circulated by a certain press, there can be no doubt that the world has never seen a more splendid manifestation of man's labour and genius, a more complete success in every section of this unparalleled exhibition. The enormous attendance of 48 millions of visitors was beyond all expectations. The festivities by night and day elicited universal praise, and the daily hospitalities, tendered by the French Government and people to their foreign guests, could not be surpassed. The Canadian Commissioners feel highly grateful, for the very kind manner in which they have been uniformly received and entertained, as the representatives of Canada. They feel that no greater opportunity could have presented itself to fully advertise before the world, the products and resources of Canada, and, as a consequence, a great impetus will necessarily be given to the extension of our commercial relations with foreign countries. The object of the Government has, therefore, been fully attained, and the Dominion of Canada has every reason to congratulate itself on the very great success which has attended its participation in the Paris Universal Exhibition of 1900.

REPORT

OF THE

COMMISSIONER FOR CANADA

TO THE

PAN-AMERICAN EXPOSITION

Buffalo, New York May 1 to November 2 1901

REPORT OF THE COMMISSIONER FOR CANADA TO THE PAN-AMERICAN EXPOSITION

OTTAWA, ONT., December 20, 1901.

To Hon. SYDNEY FISHER,
Minister of Agriculture,
Ottawa.

SIR,—I have the honour to submit the accompanying report of my work, as Commissioner for Canada to the Pan-American Exposition, held at Buffalo, N.Y., from May 1 to November 2, 1901.

I have the honour to be, sir,

Your obedient servant,

WM. HUTCHISON,
Commissioner for Canada to the Pan-American Exposition.

The idea of an exposition to illustrate the progress of the people of the Western Hemisphere, and to promote social and commercial interests among the states and countries of the western world, was conceived at Atlanta, Georgia, in 1897.

On June 25 of that year, a company was formed and incorporated under the name of the Pan-American Exposition Company. Owing to the Spanish-American war, in which the United States was at that time engaged, it was thought best to postpone the exposition for a time.

In 1899 an Act of Congress was passed, officially approving the holding of the exposition at Buffalo, and appropriating the sum of five hundred thousand dollars ($500,000), for the purpose of erecting a government building, and for making an exhibit of the various departments of the public service.

Under this Act, the Pan-American Exposition Company was authorized to issue to the different countries and states of the Western Hemisphere, invitations to co-operate in this Pan-American Exposition, to be held in Buffalo from May 1 to November 1, 1901.

The formal invitation asking that the Dominion of Canada be represented at this exposition was accepted, but not until January 7, 1901, and a Commission was appointed on January 15.

Although many of the buildings were in an unfinished state and but few of the exhibits installed, the exposition was formally opened on May 1, 1901, and formally dedicated on the 20th of that month, Vice-President Roosevelt officiating at the dedication ceremonies. His Excellency, the Governor General of Canada, was invited to be present, but was unfortunately unable to be there.

The Dominion of Canada was already engaged in making preparations for a large exhibition at Glasgow, the date of which was concurrent with that of the Pan-American Exposition. Glasgow enjoyed a decided advantage, inasmuch as nearly all Canadian exhibits, shown at the Paris Exposition, were removed intact to Glasgow. Our manufacturers preferred making an exhibit at Glasgow, considering Great Britain a better field, owing to more favourable tariff conditions. This accounts for the meagre display of machinery and manufactures at the Pan-American Exposition. Despite these circumstances, however, the industries of Canada were not entirely unrepresented, creditable exhibits being made in each of the different divisions, many of these obtaining high awards.

The Pan-American Exposition Company had placed certain space in the different buildings at the disposal of the Canadian Government. It was arranged, however, that the Dominion Government would not make an exhibit in any of these departments, but would erect a suitable executive building, and make a special feature of the agricultural and live stock exhibits.

The different spaces originally allotted to the Dominion Government by the Pan-American Exposition Company were placed at the disposal of the different provinces. Of the provinces, Ontario and Manitoba accepted; Ontario making highly commendable displays in mines, ethnology, forestry, horticulture and dairying, while the province of Manitoba occupied a large and conspicuous place in the agricultural building, making a very fine display of grains, grasses, &c., illustrating the fertility of the soil in that province, and otherwise disseminating information concerning the progress and attractions of the prairie province.

The province of Nova Scotia, later in the season, showed a very creditable collection of fruit in the Horticultural building.

In October the North-west Territories made a special display of western range cattle and sheep, in an open corral, which was the subject of much favourable comment. These cattle had been selected from herds out on the range, and a notice was prominently exhibited over the corral stating that these cattle had never been fed by hand nor sheltered in the winter. Great astonishment was expressed by American cattlemen at the fact of such animals being raised under the circumstances mentioned, in a country which they had imagined to be under snow for several months in the year.

Previous to the appointment of a Commission, the Hon. Sydney Fisher, Minister of Agriculture, visited Buffalo for the purpose of conferring with the Pan-American officials, as to the location of the Canada building. He chose for it a site in close proximity to the Agriculture building, Dairy building and Stock barns. The Dominion Government's participation in this exposition, as distinguished from that of the provinces, and private exhibitors, being almost entirely in agriculture and live stock, it was thought desirable to have the Canada building in the vicinity of these buildings. On selecting this site Mr. Buchanan stated to the Minister of Agriculture that an exhibit of some kind would have to be made in this building, as said space was within the limits set for exhibit buildings, and a building could not be put there merely for executive purposes. By arranging to make an agricultural display in connection with the Executive building this prominent and favourable location was secured.

The selection of this site was the subject of a little criticism at first, but the decision of the Minister was afterwards fully vindicated by the crowds of people who daily visited the building, as the visitors' register (though indicating only a percentage of the visitors) will tend to show, the attendance being greatly in excess of any of the state or other foreign buildings. In fact our location being close to one of the principal gates, and at the entrance of the Stadium, was the cause of a little jealousy on the part of the other Foreign and State Commissions, who considered their own locations as anything but convenient. In this connection I might mention that at a meeting of the Foreign and State Commissioners called to hear an address on the plan and scope of the St. Louis World's Fair in 1903, the Commissioners present, prompted by the situation of the Canada Building at the Pan-American Exposition, were much concerned as to the location to be given the Executive buildings at the St. Louis Fair.

The Dominion of Canada having formally accepted the invitation to co-operate in the Pan-American Exposition, and a Commission having been appointed, plans for a suitable building were made, and accepted and contracts called for. The lowest tenders were accepted and work was commenced at once. The Pan-American Exposition Company experienced many difficulties and tedious delays through trouble with the different labour organizations. This necessarily affected the work on the Canada Building as the contractors for it were in several cases employed on the buildings being erected by the exposition. This fact coupled with unfavourable weather had the effect of delaying the work on the Canada Building, which was, however, ready and occupied early in June and was formally dedicated on Dominion Day, July 1. The Hon. F. W. Borden, Minister of Militia, was chosen to represent the Cabinet at the exposition on this occa-

sion, and was accompanied by the 48th Highlanders of Toronto, as an honorary escort. The dedication exercises took place in the Temple of Music, and were participated in by the mayor of Buffalo and the principals of the exposition, and attended by a large gathering of Canadians and Americans.

It might appear that we were late in the completion and opening of our building, but it should be borne in mind that very few of the state and foreign were completed until some time after ours. In fact the road leading to the Canadabuildin g and the grounds about the building were hardly passable until June 23, which will convey some idea of how far behind the Pan-American Exposition Company were w ith their work.

The Canada building at the Pan-American Exposition was a structure 70 x 108 feet in dimensions, and two stories high. The style of architecture was Elizabethean, the exterior being finished in staff. The roof was shingled and stained a bronze green. A wing extended from each side of the main building, these being connected by a broad verandah and balcony, the north wing being topped by an octagonal tower. Each wing was constructed with large bay and overhanging gable in half timber style, the timbers finished in dark chesnut colour, and the staff throughout in an ivory tint.

The main building consisted of a large exhibition room, 34 x 54 feet. In this was installed an extensive decorative exhibit of grains, grasses and honey furnished by the Central Experimental Farm, Ottawa, combined with numerous fine specimens of moose, caribou, deer and buffalo heads. The wall space was utilized for this exhibit, the different specimens of grains and grasses being each labelled, and the whole encased in shallow cabinets behind plate glass. Immediately fronting the main entrance stood a handsome specimen of buffalo in a glass case, and on either side of this large oak trophies held exhibits of grain, pease, beans and corn in glass receptacles, one trophy being surmounted by a wapiti and the other by a musk ox. An immense map, showing by means of measurements and figures the growth of Canada's export trade in the last ten years, was placed on one of the walls. The great contrast between 1891 and 1900 gave rise to much remark and questioning on the part of American visitors, who seemed to have some difficulty in believing that a country on their borders could have been progressing with such leaps without their knowing anything about it.

The grains and grasses in this exhibit elicited the special admiration of the farmers of the United States, and many inquiries were made at the office re the procuring of seed.

A large annex was added to the building for the purpose of accommodating the Intercolonial Railway, which exhibited a varied and extensive collection of game and fish, their object being to attract tourists and sportsmen. This exhibit was in charge of a representative of the railway, who did much good work by giving information and distributing literature descriptive of the many beauties and attractions afforded by the country contiguous to their road. The management of the Intercolonial Railway may be congratulated on their foresight in securing this location in the Canada building, for the stream of visitors who daily visited the building and their exhibit obtained definite information concerning the attractions offered by the railway to tourists that could hardly have been acquired in a small side line stall in the transportation building.

In the north wing were the ladies' reception rooms, a general sitting room, reading and writing rooms and lavatories. These rooms were comfortably and artistically furnished, the ladies' parlour being equipped with a fine upright piano of elegant tone and workmanship, loaned by the Gerhard Heintzman Company of Toronto. A visitor's register was a conspicuous feature of the general sitting room, and in the reading and writing room were to be found on file the leading newspapers of the Dominion of Canada and the city of Buffalo, also writing materials and accommodations.

The building was handsomely furnished throughout by the Canada Furniture Manufacturers, they placing their representative at our service to oversee the shipping and unpacking of the furniture, and the artistic and suitable arrangement of same. These furnishings were of a uniform fine quality throughout, and besides affording a comfortable resting place for our visitors were much admired for their richness and quality. This furniture was installed under a special arrangement with the Canada Furniture Manufacturers, the cost of same amounting to a merely nominal charge for wear and tear.

The south wing was taken up by the offices of the Commissioner and staff, the office of the representative of the Department of Interior, and of the Live Stock Department. In the general office in this wing visitors were given all information, and a postal system was of great convenience, many visitors taking advantage of it.

Attendants were stationed in the exhibition rooms to give all required information and render service to visitors, and a ladies' maid was in attendance in the ladies' parlour and lavatory.

About forty thousand people (40,000) registered in the visitor's register in the building, a large number of these being Americans. Of course, this number was merely a percentage of those who visited the building. From the remarks made to one another, as well as from the opinions they were pleased to express to myself and other officials, they appeared to have been agreeably surprised at what they had seen and learned.

Arrangements were made with the Canadian railways for the transportation of goods to Buffalo, by way of International Bridge and Black Rock at a single rate. The Canadian roads assisted the exposition in every possible manner, giving reduced transportation charges on shipments of all kinds, as well as reduced rates to Buffalo from all points, the result being a steady stream of Canadian visitors at the exposition throughout the entire season. American visitors complained that their roads were not giving them the accommodations they had expected.

During the course of the exposition a large number of books and pamphlets pertaining to the resources of our country were distributed judiciously among the visitors to the Canada building. All of these were highly instructive, and were greatly sought after by thousands of people who became deeply interested in the subject. There is little doubt that by this means we have interested a large number of people who will eventually come to Canada, either to take up lands in our Canadian North-west and Manitoba, or help to develop the immense mineral and forest industries which are as yet still in their infancy. Particulars regarding the number and names of said publications are given below, viz:—

MEMORANDUM of books, pamphlets and other literature distributed at Canada building, Pan-American Exposition, Buffalo, N.Y.

Title and Description.	No. of Copies.
Hand Book, Dominion of Canada	950
Economic Minerals of Canada	4,900
Horticulture of Canada	4,900
Pulpwood of Canada	4,900
Forest Wealth of Canada	4,900
Agriculture of Canada	4,900
Food Products of Canada	4,900
Women of Canada	1,000
Statistical Year Book of Canada, 1900	252
Canadian Trade Index	250
Export Trade of Canada	5,000
IMMIGRATION LITERATURE.	
Copies of folder map entitled:—	
'The Investor, The Homeseeker, The Artisan	30,000
Copies 'Hard Wheat Belt' newspaper	7,200
Manitoba Free Press—crop edition	5,000
Folder map entitled 'Ranching'	10,000
Atlas of Canada, copies furnished through Chicago	3,000
Atlas of Canada	5,900
Western Canada Pamphlet	1,500
Delegates Reports	400
The Columbus, Ohio, office was requested to ship to the representatives of the Department of Interior at Buffalo, all the Atlases, Western Canada, &c., that could be spared, estimated at	5,000

As stated in a previous part of my report, the manufacturers of Canada put forth their greatest efforts to make a good exhibition at Glasgow, and for this reason were not largely represented at Buffalo. However, taking into consideration this fact there was a good representation, and in competition with the manufactures of other countries and states, the awards obtained were most satisfactory. During the period of the exposition, numerous inquiries were made at the general office for information regarding trade in Canada, customs duties, &c. All of these were either attended to at once, or referred to the associations or firms interested. Copies of the Canadian Trade Index were supplied by the Canadian Manufacturers Association of Toronto, for distribution, and were referred to by many who were seeking information as to the manufacturers of Canada.

HONEY.

The Ontario Beekeepers' Association had a fine exhibit of honey installed in the northern gallery of the agricultural building. This exhibit was arranged and well looked after by a representative of the association, and was very favourably commented upon by visitors, it excelling any other exhibit of honey made at the exposition.

CANNED GOODS.

An exhibit of Canadian canned goods was made in the northern gallery of the agricultural building. This exhibit which was undertaken and arranged by the Department of Agriculture, consisted of canned meats, fish, fruit and vegetables, in the ordinary commercial packages, tastefully arranged in pyramids, and attracted favourable comment.

DAIRYING.

A special building was devoted to dairy products and dairy machinery. In this building the Western Ontario Dairymen's Association installed a fine exhibit of cheese and butter, a very small percentage of which failed to reach the prize standard.

LIVE STOCK.

The officials of the live stock department performed their work in a highly satisfactory manner. For further details of this work see special report on live stock and the model dairy test, which will be found highly creditable to Canadian production.

IMMIGRATION.

One of the many instructions given to the Commission when leaving for Buffalo was to pay special attention to immigration. The work done by the representatives of the Department of the Interior, was of great importance, especially in securing immigration to our North-west Territories and Manitoba. A tastefully arranged notice was posted in a prominent part of the building to the effect that settlers could obtain one hundred and sixty acres free in Western Canada, and in response to this thousands of inquiries were made by farmers and others who were furnished with all desired information and literature on all matters pertaining to our western lands and the many benefits to be derived from settling thereon. The atlas published under the direction of the Minister of the Interior was of great value, and we had many inquiries for them both in person and by letter. We had many requests for maps of Canada and books pertaining to Canada from the school teachers of the United States, some of these arriving even after the exposition had closed. These teachers tell us that they are now teaching

more about Canada in their schools than ever before, remarking that they were delighted to secure such good maps of this western country, as they hitherto had been unable to do so.

A great deal might be said about the inquiries at our office at the Pan-American Exposition by those intending to leave their homes with the object of settling elsewhere, and of the probable influx of immigrants into the newer districts of Canada. A few of these were Canadians desirous of returning to their own country, but the main body of them were Americans composed of those who have found agriculture in the United States unprofitable, and others who leaving their homes to engage in their life's work are unable to get good land in the United States at prices within their reach. Many had heard in a desultory way of Americans who had gone north and found a fine country. Many others had a little more definite knowledge derived from letters written by the pioneer settlers referred to, and in the case of those who desired to acquire cattle ranches, the information supplied them has been more definite as to localities and possibilities. The people seeking information as to cattle lands seemed to be men of more ambitious aims than those who were attracted by the offer of free farms in Western Canada. But it was quite clear that the movement setting in towards Western Canada is prompted by self interest and necessity and not, as has been frequently stated, due chiefly to the sentiment of returning Canadians. A somewhat analogous movement occurred in Canada about twenty-five years ago, when the farmers of Ontario left in large numbers for the United States North-west.

Take for instance the farmers of the middle and eastern states—they tell us they have a very poor crop this year (they sow winter wheat), but even when they have a good crop the millers will only pay a very low price for it. The millers claim that they are obliged to mix hard wheat with it to produce a good family flour, costing them more money, and state that the products of hard wheat are more in demand every day. These farmers feel that the only thing for them to do is to move to the district in which the hard wheat is grown, just as the Ontario farmers sought relief by emigrating to the north-western states.

It would be well perhaps to look back and note the change that has taken place in the milling business of the United States, and the effect the milling of hard wheat has had on the trade. Thirty-five years ago Oswego, New York, had a milling capacity of say eight thousand (8,000) barrels per day, grinding soft spring and winter wheat; to-day it has no mills. Rochester, N. Y., had about the same capacity, grinding principally winter wheat; now very few of these mills are left. Those that are left are grinding hard wheat from the United States North-west. New York City and vicinity had a capacity of ten thousand (10,000) barrels per day, grinding soft spring and winter wheat. To-day the output is not one-half that amount, and the mills are using all hard wheat instead of soft. Ten years ago bakers in New York were using flour from soft wheat and mixing it with hard. To-day all hard wheat flour is used for bread baking. This change has been working gradually, but effectually in favour of the hard wheat product. In Great Britain the market reports of forty years ago give us this information; Irish, Scotch, English and American wheats were quoted about the same value, whilst Baltic or Russian was very much higher. (This wheat was of the hard variety). This condition of affairs existed until about 1883, when the Russian receded in value, and the hard wheat of the American continent came to the front, taking the top price which it still holds. (On the Glasgow market Manitoba hard and Duluth No. 1 hard wheat, are to-day quoted at the top price). The Russian wheat has lost its value, (showing that the Russians are raising the soft variety) and to-day this wheat is among the cheap wheats offered.

In flour the same competition in Great Britain comes from the millers of Minneapolis and those Canadian millers who are milling hard wheat, the British miller having either to mill more hard wheat or go out of business. In Canada we find the same thing has taken place, with this difference—that is to say, thirty-five (35) years ago, when the millers of the United States were grinding soft spring and winter wheat, the millers of Ontario were grinding hard and winter wheat; the hard wheat raised in Ontario at that day has not since been excelled in the North-west or Manitoba. This

Ontario Red Fife spring or hard wheat was taken into Minnesota by some Ontario farmers, and from there to the Dakotas, and subsequently to Manitoba, while through constant cropping of the land Ontario lost the qualities essential to producing hard wheat, and the quantity became less to the acre, and the soft wheat was then sown, producing more to the acre. This had the effect of inducing farmers to sow nothing but soft wheat. The bakers ceased using the product of such wheat, and about this time the importation of Minnesota flour began. The farmers of Ontario then moved in large numbers to the United States North-west. Later the Manitoba wheat and flour came on the market, taking the place of the Minnesota product.

Ontario millers who mixed hard wheat with the local soft spring and winter wheat, producing a good family flour, find that to-day, to keep up the strength of the flour for bread baking, they are obliged to mix in more hard wheat.

It is acknowledged in the United States and Canada that the hard wheat millers have control of the best trade. It is also known to the farmers of the United States where the hard wheat is grown, but they know the land will cost them from $35 to $45 per acre in the United States, and in addition to this the taxes are not only on the land but on everything they possess.

Through the energy and business methods of the Minister of the Interior, the Immigration Department has been and is doing a good work, explaining to the farmers of the United States the great benefits they will derive by going to the Canadian North-west and Manitoba, offering as an inducement to settlers one hundred and sixty acres free, and land adjoining, or in the vicinity can be purchased from private corporations at from three dollars to seven dollars per acre, the taxes on said land being quite inconsiderable. This information amounting to a business proposition is the element working to the benefit of our western lands; it is not sentiment but self interest that is drawing immigration from the United States. Raising wheat is to the farmer what gold mining is to the miner.

There is one very important factor in the future of this western country. When we have the winning hand let us guard against the introduction of soft spring wheat, which is only the product of worn out soil, a soil which no matter how well it may be fertilized and tilled will not produce hard wheat successfully. While the land in eastern Canada retained its power of producing hard wheat continuously for almost twenty years, the lands in many parts of the North-west are said by competent authority to be capable of producing the same wheat almost indefinitely. This being so, it would be a mischievous mistake to encourage the raising of soft wheat while our hard wheat is quoted on the principal markets of the world, on an average of fifteen cents per bushel more than soft. For years past Minnesota has taken the lead in the production of hard wheat. What do we find today? In the older settled portions of this state, they have had to adopt mixed farming, the land refusing to grow the hard wheat profitably, the Dakotas being the only states left in the union which can do so. I am informed by those well versed in the present state of the grain trade that it is almost impossible for the inspectors at Duluth to keep the grade of No. 1 hard wheat up owing to the farmers sowing so much soft wheat. A few years ago soft wheat was introduced into our North-west, in the belief that it would ripen early and be free from frost. It was found, however, to be comparatively speaking valueless, and was condemned. On the other hand the Canadian Pacific Railway management deserves the greatest amount of credit for its business foresight in counteracting the soft wheat movement, by bringing into Manitoba, free of freight charges, the best hard seed wheat that could be bought in Dakota. The farmers of Manitoba and the North-west are now reaping the benefit of this action.

It, therefore, behooves the farmers of the North-west and Manitoba, when the eyes of the whole world have been drawn to their country as being about the only one left to rely on, to see that they sow nothing but hard wheat, and guard against the fate that befell the Russian farmer.

In conclusion, I may say that the Pan-American Exposition has been, not only of present benefit to Canada, but the parent of advantages that will steadily continue and increase. While questions of every kind concerning Canada were asked and answered on the spot, and information dealing with all branches of trade and commerce dissemin-

ated to visitors from every state in the union, the presence and superiority of Canada's exhibits incited both business men and important newspapers in the United States to ask why trade with a country of such resources was not more thoroughly exploited, and why if barriers existed to freer communication, some effort was not made to remove same. It revealed to many thousands the commercial existence of a country they had heretofore known only as a geographical expression, and while hundreds expressed their intention of taking advantage of the generous land offers made by the government of Canada, it became quite clear that these were but illustrations of what will happen wherever a knowledge of Canada becomes general.

The Canadian building was opened from June 20 to November 2, from eight o'clock in the morning to eleven in the evening, on week days. On Sunday it was closed.

I have much pleasure in testifying to the attention and zeal of all the officials employed in connection with the building, in the sometimes trying duty of giving due care to the demands and inquiries of the crowds of people who visited the building.

All of which is respectfully submitted,

W. HUTCHISON,

Commissioner for Canada to the Pan-American Exposition.

REPORT

OF THE

COMMISSIONERS FOR CANADA

AT THE

GLASGOW INTERNATIONAL EXHIBITION

1901

GLASGOW INTERNATIONAL EXHIBITION, 1901

To the Honourable SYDNEY FISHER,
Minister of Agriculture.

SIR,—Having been appointed by Order in Council to act as Commissioners for Canada at the International Exhibition, to be held at Glasgow in 1901, your Commissioners have now the honour to present their report.

Before entering upon their special duty of reporting upon the part taken by Canada in this great exhibition, your Commissioners propose to give a sketch of the exhibition as a whole; its inception and the objects for which it was undertaken, the buildings and general arrangements, the collection in the art gallery, the products shown by foreign countries and by British colonial possessions, which have relation to the business interests of Canada; and the principal features of the exhibits from the United Kingdom.

Encouraged by the success which attended the exhibition held in the year 1888, the people of Glasgow resolved to commence the new century with an exhibition on a much larger scale, representing the manufactures, products, industries and material resources of all nations, and of the machinery and appliances relating thereto and articles illustrative of science and art, including ethnology and archæology. In particular it was intended that the exhibition should present a full illustration of the British Empire, its dependencies, dominions and colonies, and the progress in industry, science and art of all nationalities during the nineteenth century. In the year 1897 the proposal took formal shape, and at a meeting held in that year the initial steps were taken, and the work entered upon with that happy combination of public spirit and business capacity which characterizes the people of Glasgow in all their undertakings. The corporation, the citizens generally and a number outside of the city who, for various reasons, felt an interest in the success of the scheme, joined heartily in promoting it. A guarantee fund of £508,916 was speedily subscribed. Committees were formed, including all the leading men of the city and neighbourhood, as well as a number of influential men in London and elsewhere. A site was selected and plans and estimates for building were prepared. By deputation and correspondence, communication was had with the governments and commercial bodies of all the civilized countries in the world, including the colonial possessions of the Empire. Few of these held aloof, and the title 'international' was fully justified by the result of this appeal. So the work went on with the determination that, so far as it was within the control of the executive committee, all should be in readiness for the opening, which was fixed for May 2, 1901.

The site selected, a portion of Kelvingrove Park, about 100 acres in extent, was admirably suited for the purpose, not only for convenience, but also for the beauty of the surroundings. On the south-west of the ground the main buildings were erected, direct access to them being had both for passenger traffic and for the delivery of goods. In front of these buildings was ample space for all the other buildings required for exhibition purposes, for refreshment rooms, for the music hall and for the accommodation of the expected visitors. And yet, large as was the space provided, the attendance was at times so great that it was inconveniently crowded.

The buildings consisted first of the industrial hall, a very handsome erection in the style of the Spanish Renaissance, 700 feet in length, 360 feet in width, and covering nearly six acres and surmounted by a dome rising 200 feet from the ground. Four towers rose to a height of about 180 feet, and running round, 100 feet up, there was a balcony 400 feet in circumference, and averaging 25 feet wide, designed to form a promenade, from which an excellent view of the exhibition and its surroundings could be

obtained. This balcony was reached by lifts and spacious staircases in the towers. Under the dome was the grand entrance, approached by an extensive piazza, with a peristyle or colonnade 200 feet long by about 80 feet wide. At each corner of the building, and on the north and south fronts towards the centre were pavilions, about 35 feet square, having four lofty minarets at the angles, terminating in domed roofs. From the industrial hall, a covered avenue 900 feet long by 75 feet wide, led to the machinery hall by a bridge over a public thoroughfare, and thus a continuous covered connection between the two buildings was obtained. The machinery hall was 500 feet long, 340 feet wide, and covered an area of five acres. It was intersected by galleries 15 feet wide, from which the machinery in motion on the floor could be viewed. Its construction was similar to that of the industrial hall. In the grounds outside of main buildings was the grand concert hall. This building was designed in the Venetian style of architecture, circular in shape, and covered by an immense domed roof of steel, which rose in the centre to a height of 80 feet. The internal diameter was 143 feet, and a circular gallery carried on cantilevers, so as to obviate columns in the area, ran around the building which accommodated 4,000 persons.

At the end of the industrial hall, and in a line with its front, and connected by a covered way, stands the new art gallery and museum, which is to be the future home of the art and science collections of the corporation of Glasgow.

During the exhibition it was devoted to the purposes of this section, which aimed at reviewing the art of the nineteenth century by means of a loan collection, embracing the following divisions :—

1. Oil paintings of the 19th century.
2. Water colour paintings, pastels and miniatures of the 19th century.
3. Sculpture and architecture.
4. Works in black and white.
5. Photography.
6. Art objects.
7. Scottish archæology and history.

This collection gathered from the choicest treasures of art to be found in the United Kingdom which were fully placed at the disposal of the executive committee, and selected by men thoroughly competent for the task, was admitted to be the finest ever got together in the British Islands, and formed one of the most attractive features of the whole exhibition. The art gallery itself is worthy of notice. A noble building of vast extent with a central hall open to the roof and richly decorated, and with rooms giving more than space for the collection of 3,000 works of art ranged upon the walls, besides the statuary which occupied the courts and galleries, it is one of the sights of the city, and a monument to the public spirit and business capacity of the citizens. Its history, too, is instructive. The exhibition of 1888 closed with a surplus of £54,000. To this sum was added £70,000 private subscription, and with this amount in hand the building was commenced. Subsequently the work was taken over by the corporation, and completed at a total cost of about £250,000. Besides this a number of pictures have been obtained as the foundation of a collection, but these did not appear in the exhibition.

The buildings outside referred to were the concert hall, six Russian buildings, the Japanese building, the Canadian pavilion, the Irish pavilion, the Scottish agricultural building, the French annex, five large restaurants and tea houses, four smaller ones and several other buildings of minor importance. In the grounds were also the switchback railway and the water chute supplied by the Kelvin river, which runs through the park.

The articles to be shown in these buildings were classified as follows :—

1. Raw material—agricultural and mining.
2. Industrial design and manufactures.
3. Machinery, motive power, electricity and labour-saving appliances in motion.
4. Locomotion and transport.
5. Marine engineering and shipbuilding.
6. Lighting and heating.

7. Science and scientific instruments, education and music.
8. Sports and sporting appliances.
9. The women's section.
10. Fine art, Scottish history and archæology section.

This classification, however, did not require that all the articles of one class should be shown together. Each country exhibiting was at liberty to arrange its own exhibits as it thought proper, though in general the scheme above laid down was adhered to, and was strictly carried out as far as the exhibits from the United Kingdom were concerned. The foreign countries which took part in the exhibition were Russia, France, Japan, Austria, Denmark, Persia and Morocco. The British possessions represented were Canada, Queensland, Western Australia, Rhodesia, India and Ceylon.

Of the products shown by foreign countries those of Russia alone correspond to or enter into competition with the productions of Canada. The agricultural productions of Russia, grown over an enormous extent of territory extending from the Baltic to the Caspian, and stretching eastward to the China seas, embracing every variety of climate, from the frost of Archangel to the mild temperature of the Caucasian provinces, are of the most varied character and are capable of almost unlimited expansion. The development of these enormous regions, slow though it is, must have an important bearing upon the future food supply of the civilized world. Grain of all kinds, flax and hemp, cattle and sheep are the chief agricultural productions, and great efforts are now being made in the southern provinces of European Russia to develop a trade in dairy products. Chief also among the resources of Russia are those of her forests. The timber of Russia is in general identical with that of Canada, and is handled with very much the same methods as those which prevail in Canada. The exhibit of Russian timber was very complete, and occupied the whole of one of the six large buildings erected by the Russian government.

Among other products of Russia shown in the agricultural buildings was an extensive and varied display of wool, flax and hemp. Cotton grown in Asiatic Russia was also shown, and of wines made in the southern provinces there was a large display. The mineral exhibit, which is very complete, contains an assortment of the petroleum in all its forms, produced in the oil wells on the south of the Black Sea. As is well known the refined oils from this region enter in the European markets into direct competition with those from America.

In the French court was an excellent collection of grain and other agricultural products, but in other respects the exhibits from this and other foreign countries mentioned are of no special interest to the people of Canada.

The display from India and Ceylon was confined to teas, in which the trade is being vigorously pushed, especially by the government of Ceylon, and to minor articles of ornament, the work of the natives of these countries.

The only colonies represented besides Canada were Western Australia, Queensland and Rhodesia. Their minerals, chiefly gold, were the principal feature of the exhibit of the Australian colonies as well as of Rhodesia. Western Australia had in addition, a very good showing of grain, and wool of the finest quality. The wheat in particular was very fine, the grains being remarkable for size and colour. The barley also was very plump and especially good as regards colour. The specimens of timber from Western Australia, though not of great variety, and not entering into competition with Canadian timber, were very beautiful, resembling mahogany in appearance, durable and capable of receiving a high degree of polish both for furniture and house finishings.

The articles of British manufacture shown in this exhibition, though not as numerous as might have been expected, were fully representative of the various industries carried on in the British Islands, and of the excellence by which their products are distinguished. The extent to which machinery is taking the place of hand labour was also very discernable. To enter into even a general description of these exhibits would be beyond the scope of this report, but there are two portions of the British exhibit to which reference should be made, viz.:—The machinery hall, and the collection of

models of steamships. The machinery hall, the size of which has already been given, was crowded to its fullest extent with machines of every description, showing the perfection to which labour saving machinery in every trade has been carried. A great deal of space was given to electrical works, both for the production of electric power, and for its application to various uses of lighting, heating and driving machinery, steam engines, locomotives, shipbuilding gear, including every contrivance for cutting, moulding and fitting the great plates and frames used in the construction of modern ships; casemates for batteries both on sea and land, with the great guns to be used in them; enormous shafts and cranks for marine engines, and huge castings of such size and weight that it was a wonder how they were got into the building; printing machines from the simplest to the most complicated; these and many of like nature were side by side with others of more homely character, such as looms, and various contrivances for the saving of labour in the production of articles of domestic use.

Next in interest to the machinery hall came the collection of models of British built steamships, all of recent construction and representing every type of vessel from a steam launch to the largest battle ship. Marvellous skill and ingenuity were shown in these models, which were exact in all their details. The latest examples were of the large cargo carrying description, of moderate speed, requiring but small consumption of coal, but with ample passenger accommodation, and especially remarkable for the comforts provided not only for second class, but also steerage passengers. Of ships of this class, the *Saxonia* of the Cunard Line and the *Tunisian* of the Allan Line may be mentioned as examples.

One remarkable feature of this exhibition was the encouragement given to what are called 'Home Industries.' To this the women's section is specially devoted. In it were found specimens of the various kinds of work in which women can find suitable and profitable employment. Among these may be mentioned all kinds of needle work, lace making, embroidery, knitting, spinning, enamelling, painting on china, &c. To the promotion of these industries many societies, not only in the British Islands, but in foreign countries contributed, and the exhibition as a whole was very extensive and very interesting.

The Irish pavilion, which was a thatched cottage or farmhouse, was mainly devoted to these home industries. The exhibits there showed how much can be done in this direction, and the laces and embroidery made in the homes of the peasantry prove the aptitude of the people for work of this kind. Hand loom weaving of the most elaborate patterns of damask and of home spun cloth was shown here in actual operation. Tweeds also of excellent finish, quality and durability, made in the factories which are springing up in the country were also exhibited, and showing how much is being done by the government to promote the industrial welfare of the people.

Returning now to the Canadian part of the exhibition, your Commissioners report as follows:—

The government of Canada having been invited to take part in the exhibition, and an appropriation to provide for the necessary expenditure having been made by Parliament, the preliminary steps towards carrying out the undertaking were immediately adopted. Correspondence as to space and other particulars was entered into with the executive committee of the exhibition. Mr. W. D. Scott, who was one of the Commissioners at the Paris Exhibition, was deputed to visit Glasgow and carry on the arrangements with the exhibition authorities. It being found that the space available in the main building was altogether inadequate for the intended Canadian exhibit, it was decided to erect a building suitable for the purpose, which would give the necessary additional space. Plans were prepared by Messrs. Walker & Ramsay, of Glasgow, and having been approved of, the contract for the building was let, and in the month of December the work was begun and carried on under the supervision of the architects. This building 180 feet in length and 50 feet in width with proportionate height, and of a style of architecture in keeping with the other buildings of the exhibition, was erected at a cost of $10,706.66, but from this must be deducted the sum of $2,044, which was the price agreed upon to be given for the materials used in the building, and handed over to the contractors, Messrs G. & D. Newton, at the close of the exhibition.

In the meantime while all this preliminary work was being done, all available means were being adopted to bring the exhibition to the notice of those who might be supposed to be interested or likely to take part in it as exhibitors. By means of the Manufacturers' Association, and through the Boards of Trade, communication was held with all the leading manufacturers throughout the Dominion. Circulars were also issued in reply to inquiries, special attention being directed to those branches of manufacture in which a profitable export business might be done. Not only was all necessary information thus afforded, but very liberal terms of assistance were offered by the government to intending exhibitors. The principal rules relating to exhibitors will be found in Appendix A.

A large portion of what may be called the government exhibits were brought direct from the Paris Exhibition as were also the cases, furniture and decorations which had been used there, thus largely reducing the labour and cost of preparing for the present exhibition. Besides thus providing for individual exhibitors, the Department of Agriculture was preparing exhibits of the chief productions of Canada, representing the country as a whole. First and most important of these was the agricultural exhibit in which were shown specimens of all the grains, grasses and horticultural productions grown in the Dominion. Next in importance came the mineral exhibit, containing specimens of all the ores and minerals to be found from the Atlantic to the Pacific, and lastly the forestry exhibit, showing every variety of timber which the country produces.

Fuller reference to these exhibits will be made in the reports of the gentlemen in charge of the different exhibits.

As the time approached for the opening of the exhibition, the staff was completed as follows:—

W. D. Scott, Esq., Lt.-Col. W. E. O'Brien, } Commissioners.
Hon. A. Boyer, H. M. Murray, Esq., } Honorary Commissioners.
James Brodie, Esq., secretary.
A. K. Stewart, Esq., mineral curator.
Robert Hamilton, Esq., in charge of fruit products.
J. D. Stewart, Esq., in charge of food products.
C. W. Thomas, general clerk.
J. Edgar, foreman.

As finally arranged the disposition of the exhibits was as follows:—

Minerals.—In the Canadian court in the main building was the section of economic minerals under the charge of Mr. A. K. Stewart. This exhibit was a very large and complete one, embracing every variety of economic minerals found in the Dominion, including the valuable display of alluvial gold from the Yukon, from British Columbia, Northern Ontario and other gold-bearing districts occupying nearly one-half of the available space. A full report of this will be found in the appendix.

Food products.—The number of inquiries made by importers regarding our food products was enormous. Already our cheese was well and favourably known on the British market, and during the latter part of the exhibition, we distributed fifty choice Canadian cheddars in small boxes of about three ounces each.

Canadian cheese occupies a foremost place in the markets of Great Britain on account of its uniformly choice quality. The position of Canadian butter has improved very much during the past few years. Better transportation facilities, including cold storage on the steamers, has made it possible to place the butter on the British markets without the deterioration which formerly resulted when the butter was sent as ordinary cargo. There is still some irregularity in the quality, which shows that Canadian buttermakers can still further improve their product by adopting more uniform methods of manufacture. The appearance of the butter as regards package and branding is sometimes not as good as it might be. Manufacturers and shippers of butter should give greater attention to this matter in order to have the butter landed

with a more attractive appearance. The practice of putting white canvas sacks over the boxes is highly commended, and should be generally adopted. There seems to be plenty of room for expansion in the Canadian butter trade, and if the buttermakers succeed in bringing their product up to the high standard which has been reached by the Canadian cheese, they can depend on a very large market.

In canned meats, fruits, vegetables, &c., we believe that there is a bright future in the British markets if the necessary care be taken in the selection, cooking and general style of packing and get-up. In canned fruits the greatest care should be taken by packers in the picking of the fruit at the exact degree of ripening, so that when the tins are opened on this side, the natural flavour of the fruit will be found. Apples, apricots, pears and peaches form the principal articles of consumption in the Glasgow market in this line of goods. Very often the tins are roughly made and the labels are of the cheapest kinds, making it harder to sell than an inferior article put up in attractive form. Canned vegetables are very little known here yet. Instructions as to how to prepare them should be on each package. The market for canned meats, especially for corned beef, mutton, ox tongues and lunch tongues, is always large. Speaking generally Canadian food products hold a very high place with British importers, and the output could be very largely increased if the goods exported were always kept up to the highest possible standard, and put up in attractive form.

Forestry.—Canada, on account of its large supply of hard timbers, is in a position to compete with the world in furniture, interior decorations, sanitary wooden ware, musical instruments, &c. Care should, however, be taken to ascertain what the market demands in the matter of styles and mode of finish. Articles suitable to Canadian trade are not suitable for the British markets either in style or finish. Great care however, should be exercised in the manufacture of furniture, desks, &c., and unless the wood is thoroughly aged and seasoned, the natural dampness of this climate always causes considerable difficulty in the working of different parts, such as drawers, &c.

Musical instruments.—The exhibit in this line was large and attractive, Canadian manufactures of this class of goods already having a firm footing in this country, where their production is well and favourably known.

Boots and Shoes.—This exhibit attracted considerable attention not only from the public but from the trade as well, almost all the goods shown having been bought by the trade, besides which agents were appointed and sample orders booked, which it is hoped will lead to a large increase in the export of these goods.

Leather also came in for its due share of inspection, and all the sole stock shown was sold for export to a large South African house, who expressed a strong hope that it would turn out sufficiently satisfactory to enable them to open up permanent connections with our largest tanners, the purchasers remarking that all things being equal we would certainly get the preference as the feeling towards anything of Canadian production is particularly strong in the market just now. This is a point which should be borne in mind by firms entering into business in this new section, and an endeavour made to give entire satisfaction, especially at the start, as these houses are all being catered to from Britain where their wants are well known and carefully studied.

Carriages.—Our exhibit of vehicles was particularly commented upon, and what specially seemed to strike inquirers was the lightness of construction, together with the strength which had not been sacrificed with a view to this lightening. A number of sales were made, and towards the close we received some very satisfactory letters from those who had purchased early in the season. There is no doubt that a large business can be worked up in this line, provided the matter is taken up in a thorough manner by some large representative house. A few slight alterations would have to be made in some particulars, but these would not amount to much. It would, however, be quite useless to attempt to do any business without having permanent show rooms in the larger centres of the districts to be canvassed. The general appearance of the vehicles seems to please, and the prices are looked upon as remarkably reasonable as compared to those ruling here.

Wheels.—Our exhibit of wheels, hubs, spokes, &c., was also considerably and closely examined by carriage builders and wheelwrights, with the result that a number of orders were sent forward, and most dealers complained that these materials which they had been procuring from the United States were not giving satisfaction, and it appeared as if they were getting nothing but the culls, and being charged the price of first-class material.

Canoes.—A very comprehensive exhibit of canoes was shown in the Canadian pavilion by three of the principal manufacturers in Canada.

Agricultural Machinery.—One-half of the Canadian pavilion was devoted to agricultural implements, which were shown in great variety by the principal manufacturers of these articles. Already the Canadian manufacturers have an established market for this line of goods in Great Britain. In connection with the agricultural machinery were shown in the grounds two large exhibits of windmills and pumps.

Timber.—Along one side of the Canadian building were the different specimens of Canada timber, both in the polished state and in the rough. It was very complete and attracted a good deal of attention, especially amongst builders and manufacturers of furniture.

Natural History.—Alongside of the timber was shown an exhibit of natural history, which consisted of mounted specimens of the fish and game of Canada.

Wood Pulp.—In connection with the timber exhibit were shown wood pulp and paper, woodenware and wood specialties.

In the centre of the Canadian pavilion a very complete exhibit of the agriculture and horticulture of Canada was shown. The agricultural exhibit was arranged by Mr. W. H. Hay, of the Experimental Farm. In it were specimens of all the grains and grasses grown in the Dominion, both in the straw and in the grass. Immediately alongside of the forestry exhibit was a display of fresh fruit on a table 36 feet long by 5 feet wide, and by arranging the fruit with the contrasting sizes and colours we were able to make a good show. Many of these were examined under the impression that each of the 170 plates represented a distinct variety. Mr. Hamilton's report on the fruit exhibit should be read with a good deal of interest by fruit growers and shippers.

In addition to the different exhibits enumerated a great variety of heating appliances and other Canadian manufactures were shown, all of which attracted more or less attention.

From an emigration point of view there can be no doubt that the Canadian exhibit will have most beneficial results.

The exhibit of cereals and fruits and also forestry have been an eye-opener to the British farmer in connection with the agricultural and horticultural exhibits, and emigration agents were constantly on hand for the distribution of pamphlets on different subjects. The Ontario department had a constant supply of pamphlets on hand, referring more particularly to the advantages of Canada as a home for settlers, and we issued special pamphlets on horticulture, agriculture, forestry, minerals, manufactures and wood pulp, and in addition to these had a cloth bound book giving trade statistics, &c., regarding Canada. These volumes were very much sought after by the business people of Great Britain. During the course of the exhibition nearly 300,000 emigration pamphlets were judiciously disposed of by the agents of the department of the Interior. Many interesting interviews with agriculturists and others have been held, from which good results may confidently be hoped for. On the whole we are convinced that this exhibition should do much to dissipate the old idea that Canada is situated in the Arctic Regions—a country of frost and snow—which has hitherto been more or less present in the minds of the British public, and should materially assist the efforts of the government agents in sending to Canada an increasing number of desirable emigrants.

It may be here interesting to note the space occupied in the exhibition generally by the different countries exhibiting. The figures are as follows :—

The exhibition buildings and grounds covered almost 100 acres, and the exhibiting area, after making the necessary allowances for avenues and passages, amounted approximately, to 437,590 square feet, distributed as follows :—

	Sq. feet.	
Industrial and machinery halls		227,314
Outside buildings—		
Agricultural hall	4,737	
Heating and lighting hall	7,660	
Model farm	21,600	33,997
Outside space allotted to governments and individuals		96,279
Fine art Galleries (approx.)		80,000
Grand total exhibiting area		437,590

Excluding the Fine Art Galleries, which were reserved exclusively for the fine art and Scottish history and archaeology section, the exhibiting space in the building ran up to 357,590 sq. feet, which was apportioned as shown below :—

1. British exhibits	226,171
2. Colonial exhibits	49,875
3. Foreign exhibits	71,540
4. Women's industries	10,000
	357,590

To foreign and colonial exhibits the following allotments had been made :—

Colonial.	Inside sq. ft.	Outside sq. ft.
Canada	12,900	12,000
Queensland	8,050	
Western Australia	10,925	2,700
India	2,300	
British South Africa	1,000	
	35,175	14,700
		35,175
Total		49,875
Foreign.		
France	20,600	2,400
Russia	11,131	29,705
Japan		5,000
Morocco	900	
Austria	504	
Denmark	875	
Persia	425	
	34,435	37,105
		34,435
Total		71,540
Add Colonial		49,875
Grand Total and Foreign		121,415

The total receipts of the exhibition were	£ 408,237
Total expenditure	343,237
Leaving a profit of	£ 65,000

The formal opening of the exhibition took place on May 2, a week earlier than had been originally intended. The alteration of the date caused much inconvenience, and it was only by great efforts that the buildings and grosund were ready in time. Many of the exhibitors were altogether unprepared, but the Canadian Court and building were in readiness, though part of the goods intended for exhibition did not arrive till some time afterwards. The exhibition was opened by the Duchess of Fife, the eldest daughter of the King, who came in state accompanied by her husband. The Royal party afterwards went through the exhibition and showed particular interest in the Canadian portion.

During the summer a number of influential societies and associations held their meetings in Glasgow, and thus the exhibition was visited by many persons who might otherwise not have seen it. This has been of special advantage to Canada, as its products by these means have been brought to the notice of people whose opinions are of value, and who are able, as they also seem willing, to promote our interests in a variety of ways. Among the societies may be mentioned the International Societies of Naval Architects, of Engineers, of Architects, and the British Association for the advancement of science. The celebration of the four hundred and fiftieth anniversary of the founding of the University of Glasgow, which also took place early in the summer, brought to the city and to the exhibition, a great number of distinguished men from all parts of the world. The state visit of the Lord Mayor of London, whose name is enrolled among the visitors to the Canadian section, was another occasion on which a number of influential people were brought to the exhibition. In this connection mention should be made, among other distinguished visitors, of Lord Strathcona, High Commissioner for Canada, Sir Louis Davies, Minister of Marine and Fisheries, the Hon. Sidney Fisher, Minister of Agriculture, who was accompanied by Professor Robertson, the Hon. Mr. Blair, Minister of Railways, the Hon. Mr. Fielding, Minister of Finance, and the Hon. Mr. Mills, Minister of Justice. Lord Dufferin and Lord Aberdeen, two ex-Governors of Canada, were also visitors to the Canadian courts.

Having been treated with great hospitality and attention by the Corporation of Glasgow, the authorities and officials of the exhibition, by the Commissioners of several of the countries exhibiting, as well as by other public bodies, your Commissioners felt it their duty to make some return for the courtesies received. Prior also to the official opening, the exhibition was visited by a delegation representing the press of the United Kingdom, who made a careful survey of the exhibits as far as completed, and by the reports they subsequently published, attracted much attention to the undertaking, and particularly to the colonial products, those of Canada being specially commended. To these gentlemen on their visit to the Canadian section, light refreshments were offered, and a brief address was given by the Lord Provost. Subsequently advantage was taken of the presence of the Minister of Agriculture to give a reception in the Canadian pavilion, to which were invited the members of the corporation, the Commissioners of the exhibition, the officials, and a number of gentlemen interested in the trade of Canada.

We have the honour to be, sir,

Your obedient servants,

W. D. SCOTT,
W. E. O'BRIEN,
Commissioners.

APPENDIX A.

Opening and close of exhibition.—The exhibition will open on May 1 and close on October 31, 1901.

Applications for space.—Forms of application for space must be returned to the Canadian Commission, Department of Agriculture, Ottawa, as early as possible, and in any case not later than January 15, 1901. All applications will be considered by the Commission, but owing to the limited amount of space at their disposal they cannot undertake to allot the whole or any part of the space applied for—their object being to secure the best possible exhibition of Canadian goods in each group. There will be no charge for space to exhibitors.

Date of reception of exhibits.—Accepted exhibits, packed in strong cases, must be delivered, at the exhibitors' expense, at the seaboard, not later than March 15, 1901, to be shipped to Glasgow by the Canadian Commission free of charge.

Prohibition of transfer of space or substitution of exhibits.—No exhibitor will be permitted to transfer his allotment, or to allow any other than his own duly accepted exhibits to be placed thereon. All goods must be exhibited in the name of the person or firm who signed the form of application.

Forfeiture of allotted space.—Space not occupied 30 days previous to the opening of the exhibition will be forfeited, and allotted at the discretion of the Commission.

EXHIBITS.

Position of exhibits.—Exhibitors will be required to place their exhibits so as to contribute as much as possible to the general effect. The whole arrangement relating to show cases, signs, notices, and all similar matter, will be subject to instructions issued by the Commission.

Maximum height of stands.—No stand, including signboard, may exceed 12 feet in height, without special permission.

Uniformity of decoration.—In order to insure uniformity of decoration and general effect, no exhibitor will be allowed to put up flags, banners, or any other kind of decoration, without special permission from the Commission.

Railing off exhibits.—Exhibitors may place railings around their stands, subject to approval. In every instance the railings must be within the space allotted.

Partitions.—No partitions may be erected between stands without permission from the Commission, nor anything put up to interfere with the sight of adjoining stands, or to impede the general view in all directions throughout the building.

Sign and name boards.—No sign or name board may be placed in such a manner as to interfere with the vista, or otherwise than parallel with the front of the stand. All signs placed over show cases or stands must be uniform in style. Instructions upon this will be issued later, and the maximum dimensions will be specified.

Conveyance expenses.—The Commission will bear the cost of transportation of all exhibits from the ports of Montreal, Quebec, Halifax, St. John and Portland direct to Glasgow by steamer.

Supervision of arrival, installation and departure of exhibits.—In the absence of the exhibitor or his accredited representative, the Commission will receive, unpack and install the exhibits in Glasgow, provide the necessary platforms, counters and other

fixtures, and show cases where in their opinion the nature of the exhibit requires these. Where carpets are considered necessary they will be charged by the Commission and charged to the exhibitor according to the space occupied. The Commission will also repack and return, free of charge, to the above mentioned ports such exhibits as are not disposed of in Glasgow. Exhibitors are expected to dispose in Glasgow of their exhibits when these have a commercial value, only valuable collections or objects of special character being granted free return transportation.

Pricing goods.—Exhibitors are particularly requested to mark their goods with the home selling prices, for the information of the public.

Placards and handbills.—No printed or written placards, handbills, or descriptions may be displayed or distributed without the permission of the Commission. Such permission may be withdrawn at any time.

Dangerous and unhealthy exhibits.—Dangerous articles, especially those of an explosive nature, are excluded. Percussion caps, fireworks, matches and similar articles will only be accepted in the form of imitations, and on condition that they contain no inflammable matter.

Exhibitors of unhealthy products, or of products which may cause inconvenience, must conform at all times to any measures which may be prescribed by the Commission in the interest of public health and safety.

Spirits of alcohols, oils and essences, corrosive substances, and such as are liable to injure other exhibits or inconvenience the public, will only be accepted provided they are contained in such vessels of convenient size, shape and material as may be approved by the Commission.

Unsuitable exhibits.—The Commission reserve the right to remove at any time any article which they may deem objectionable or unsuitable for exhibition.

Opening and closing exhibits.—All show cases, machinery and exhibits generally, must be uncovered and properly cleaned each day previous to the hour at which the exhibition is open to the public. They must not be again covered until the closing of the building.

Attendance of exhibitors.—All exhibits must be viewed on every day on which the exhibition is open. If exhibitors or their representatives do not wish to be in attendance at the exhibition, the Commission will be prepared to undertake the superintendance of the exhibits, but in that event the Commission will not be responsible for any loss, damage, or accident, however occasioned.

Removal of exhibits. No exhibit may be removed before the close of the exposition without special permission.

CASES.

Labels. All cases containing goods for exhibition must bear special labels, inside as well as outside, which will be supplied to exhibitors in due course.

Unpacking of cases. All cases must be unpacked on arrival. Any cases remaining unpacked fifteen days prior to the opening of the exhibition will be liable to the custom house, but the Commission will not be responsible for any damage which may arise, or any expense which may be incurred in consequence of such removal.

Storage of empties. The Commission will make arrangements for the collection, storage, and re-delivery of cases. Cases must be distinctly marked by the exhibitor for the purpose of identification.

GENERAL.

Freight and duties. Information regarding any reduction of freight charges, duties, &c., will be issued by the commission from time to time.

Customs' duties, forwarding of goods. The buildings of the exhibition will be treated as bonded warehouses. Exhibitors not taking advantage of the Commission's shipment may transit their goods through any forwarding agent, or direct to the exhibition at their own expense. Goods will be dealt with according to the ordinary regulations in force in bonded warehouses, by a special customs service connected with the exhibition. Goods for exhibition only will not be liable to duty, but on goods removed from bond the usual rates will have to be paid by the purchaser.

Copyright. No work of art or object exhibited in the buildings or grounds may be drawn, copied, or reproduced in any form whatsoever, without the exhibitor's written permission.

The Commission may, however, allow general views to be taken and reproduced.

Compliance with instructions. Exhibitors, their representatives and workmen must comply with all instructions issued by the Commission.

Protection of exhibits. The Commission will take all precautions for the protection of exhibits, but the Commission will not be held responsible for loss or damage however caused. It is left to the exhibitor to insure their goods should they desire to do so.

Liability of exhibitors. Every exhibitor shows at his own risk as respects wear and tear, damage from exposure, breakage, accident in packing, transportation, or from any other cause, and it is a condition that he hold the Commission harmless, and indemnify it against any legal proceedings arising from any injury or accident caused or occasioned by his machinery or other article exhibited by him, or from any action which it may be necessary to take in enforcing compliance with the regulations. The above rule applies to companies and firms as well as to individual exhibitors.

Co-operation of exhibitors regarding regulations. As the above regulations are laid down solely in the interests of the general body of exhibitors, and to insure the satisfactory working of the Canadian section, the Commission trust that the exhibitors generally will co-operate in carrying them into effect.

Alteration of regulations. These regulations are subject to alteration and amplification from time to time.

Infringement of regulations. The infringement of any of the above regulations, or any of the regulations of the Glasgow International Exhibition Association will subject the exhibitor to the forfeiture of his space, and to the removal of his goods from the building, without any liability attaching to the executive, or to the Commissiom, or to their representative, in any way whatsoever, in consequence of such removal. The question whether any such regulations have been infringed, and whether the exhibitors' space has been forfeited, and whether his goods shall be removed, is to be determined according to the sole discretion of the Commission.

APPENDIX B.

The following is a list of the chief officers and chairmen of Committees by whom the affairs of the exhibition were carried on :—

President :—The Right Hon. The Lord Blythswood of Blythswood.

Vice Presidents :—Sir James King, Bart., Sir John Muir, Bart., Sir James Bell, Bart., and Hon. Sir David Richmond.

Chairman of the Executive Council :—The Hon. The Lord Provost of Glasgow (Samuel Chisholm, Esq.)

Vice Chairmen of the Executive Council :—Mr. John Shearer and Mr. James Hunter Dickson.

Honorary Secretary of the Association :—Sir James D. Marwick, LL.D., Town Clerk, City Chambers, Glasgow.

General Manager and Secretary :—Mr. H. W. Hedley, 36 St. Vincent St.

Architect :—Mr. James Miller, I.A.

Engineer and Electrician :—Mr. Thos. Young, M.I.C.E.

London Honorary Consultative Committee :—

Chairman :—The Right Hon. The Lord Mayor.

Vice Chairman :—Sir George Hayter Chubb.

Honorary Secretaries :—Mr. W. J. Soulsby, C.B., and Mr. G. Gaskell Exton, M.I. M.E. The Mansion House, London.

Fine Art, Scottish History and Archaeology Section :—

President :—The Right Hon. The Lord Balfour of Burleigh, P.C.

The Women's Section :—

President and Convener :—The Right Hon. The Lady Blythswood of Blythswood.

REPORT ON THE MINERAL SECTION AT THE GLASGOW INTERNATIONAL EXHIBITION.

The Canadian Mineral exhibit shown at the Glasgow Exhibition (with the exception of a few additions) being the same as that sent to Paris last year, it is unnecessary to describe the collection itself. Apart from a few unimportant breakages the exhibits reached Glasgow in good condition, and were all placed ready for public inspection by the day of the opening ceremony. The work of labelling the specimens took considerable time, as it was impossible to continue it when many visitors were in the court, but it was completed by the first of June, and the checking was continued whenever possible. The final result was gratifying, considering the complex nature of the collection, only one specimen of importance, a large pulpstone, having been lost in transit from Paris. Notes on the exhibits will be found in the official catalogue used as a check-list. As to the arrangement, the same was made to follow the system adopted at Paris in almost every detail. Larger and higher open stands were, however, erected, so as to make a more attractive display of the big specimens of gold, silver, copper and iron ores, and of building-stones, and the space being favourable it was possible to follow the order of the catalogue very closely. It was also found possible to display several new exhibits sent from Canada, and some sent by people in Scotland interested in the Canadian mining industry. Owing to lack of wall space it was not feasible to display all the maps and

photographs, but an effort was made to give an attractive appearance to the exhibit both as regarded detailed arrangement and general effect.

Regarding the interest taken in the exhibit by the general public, it can only be stated that it was unabated during the whole course of the exhibition. So much was this the case that on many days it was quite impossible to keep pace with inquiries made and attend to routine work as well. The most gratifying feature of this, however, was that (not counting the undoubted interest taken by all classes, and the good impression of the resources of Canada imprinted on the mind of casual visitors) a large percentage of the inquiries made came from business people genuinely anxious to establish trade with the Dominion if at all possible for them to do so. I append a list of some of these. While great interest was taken in all the exhibits, the following attracted the most attention from that class of visitor, and will probably prove to have been of the most practical value :—

Corundum.—No exhibit was perhaps inquired into as much as this, the only one represented by a special agent. From the continual visits made by users of abrasive materials in factories of all kinds, and the information to be gleaned from them, it appears evident that Canadian corundum and manufactures of corundum need only systematic advertisement in order to find a ready and rapidly increasing market. At works in which emery was formerly extensively used, it is to a very great extent being replaced by the carborundum manufactured at Niagara, N. Y. It should, however, be be possible to supply genuine Canadian corundum at a lower figure. In the Scotch granite trade alone a large business might be done. The centre of this is at Aberdeen, where emery for polishing purposes sells at about 18s. per cwt., but where it is now little used since the introduction of carborundum from the United States some three years ago. The latter sells at 6½d. per lb. Emery is still used extensively at engineering works of all kinds, though carborundum is rapidly replacing it. At the present time many works are testing Canada corundum wheels and grit, and should the Canadian producers only push their article extensively, they have every prospect of eventually capturing the British market. As carborundum is, however, well advertised, and its competition is sure to be keen, they would do well to see that no inferior grades of wheels are put on the market as 'Canada Corundum.'

Infusorial Earth.—The producing firms in the Maritime provinces would find it worth while to study the increasing market for this in the United Kingdom. Deposits are mined in Scotland and Ireland, but large quantities are imported from Germany, and a small but increasing amount from Australia. Its use for the manufacture of dynamites is not on the increase, but it is in great demand for insulating purposes of all kinds, boiler covering, refrigerating chambers, firebricks for steamers, &c. New uses for it are being continually found. The demand is for a white colour, light weight and absorbent properties.

Mica.—Canadian mica firms might find it to their interest to look into the market for mica lamp chimneys and other manufactures of mica used in Great Britain. One London firm alone imports from seven to eight million lamp chimneys annually from Germany. Two of these 6-in. chimneys have a weight of 75 grains, 412,160 going to the ton. The importing firm purchase at a cost of £721 per ton, and resell at £1,201 per ton. It may be added that the demand for mica products of this kind is rapidly increasing. The Board of Trade returns for the past five years show that Madras and Bengal lead in the shipments of mica to the United Kingdom ; while the United States and Ceylon rank before Canada, both as regards shipments of sheet mica, ground mica, and mica pulp. The importation from other countries is small. The chief market is for electrical purposes.

Gypsum.—The market for this appears to be principally for the pure variety, selenite. Owners of deposits in Nova Scotia and New Brunswick would do well to make trial shipments to Scotland, as large orders could be obtained if large quantities could be supplied regularly.

Talc.—There is an increasing demand for this in the waterproofing and similar trades. The imports at present come from France, Italy and Austria (ground) though a small quantity is produced in Ireland.

Graphite.—The principal market for plumbago seems to be for making moulders' blacking and lubricants for heavy machinery. Only the purest product is imported, though it is often afterwards made up with infusorial earth. As the supply from Ceylon is on the decrease the Canadian graphite could now be pushed to advantage.

Coal.—It is interesting to note that the repeated inquiries made at the Paris Exhibition *re* the possibility of shipping coal from Nova Scotia to the continent in competition with British and Belgian coal were also frequent at Glasgow. Conversation with continental visitors lent colour to the belief that although the famine prices of last year cannot often be counted on still an important trade to France might be established if Nova Scotia coal owners wished to compete. The market in France is largely in the hands of middlemen of all kinds, who make large profits by supplying that country with what it cannot itself produce—coal in sufficient quantities to furnish the naval authorities and the industrial and domestic consumers—and who procure this deficiency from England, Wales and Belgium, and last year made several importations from the United States. This is a market which is bound to last, but Canadian shippers would have to be in a position to fill large orders at any season of the year.

Granite.—The exhibits of New Brunswick granite were very much admired by visiting architects and building contractors. There appears to be a possibility, (if the present freight could be slightly lowered) that competition with the Norwegian granite now finding a market in the United Kingdom might be feasible. Aberdeen alone imports from 12 to 13,000 tons annually from Norway, and the business is an established one, having a permanent head office in Glasgow. The freight rate from Norway to the Eastern sea-board is 10s. In the event of the New Brunswick granite competing it would have to be handled at Liverpool or Glasgow, whether in the rough or polished. A considerable quantity of United States granite found a market at Liverpool this year.

Molybdenite.—This mineral (owing to its coming into use in the manufacture of steel) is securing a wide market—which owners of deposits in Canada would do well to look into—both in Great Britain and in Germany.

Apart from the above, numerous inquiries were made as to possibility of securing shipments of Labradorite and sodalite (for ornamental and decorative purposes). mineral pigments, manganese ores and high grade mattes, silver ores and blende. In most cases existing transportation rates seem to render an export trade in any of these impossible at the present time.

Generally speaking, what seems to be the most needed, if exportable Canadian mineral products are to compete over here with similar products from other countries is that Canadian firms and mine owners should establish agencies in the several principal seaport towns ; which would be more advisable than a single agency for the British Isles. In many cases the sole difficulty of creating or increasing business (that of freight rates) might possibly be surmounted. British buyers purchase what they need in the markets of the world, and in order to compete the Canadian producers will have to be prepared to fill orders quickly the year round, and realize the opportunities which the British market opens to them. To send a sample to an exhibition is not all that is necessary, but the sample should be backed up by a statement showing at what price the product in question can be delivered at any principal port, who are the agents for same, and the quantities which can be contracted for. Many inquirers at the exhibition, who were placed in direct communication with owners of exhibits, complained that even after considerable correspondence they were not furnished by the latter with sufficient information of this character.

During the whole course of the exhibition the demands for specimens of all kinds were incessant. None of these could of course be complied with, but small collections of scraps from specimens broken in transit from Paris were made up for the office of the High Commissioner, London, and for the Canadian Agencies at Glasgow and Cardiff.

Small samples of corundum grit, infusorial earth, &c., were given to business people for the purpose of making tests, when the quantity exhibited by any one firm rendered this possible. A great many more samples could have been similarly utilized. It would not be possible to draw on any of the present exhibits any more for this purpose, but extra samples, if sent to any future exhibition would prove of value to both importing firms in Great Britain and interested parties in Canada.

Generally speaking, the literature on hand for distribution at the Canadian court was acknowledged by all visitors to be the most detailed and useful of that of any country at the exhibition. In this respect Canada can without any doubt be considered as having scored first place. However attention might be drawn to the fact that in order to make known the undoubted progress of the mining industry in Canada, in such a way as to attract the investing classes, a more up to date system of collecting statistics will have to be adopted. All other British possessions publish monthly (not yearly) statements of their mineral outport, which statements are cabled to the British press, and are read by people who invest in mining companies, but have no time to study mining literature. There is little room for doubt that publishing monthly statements of this kind would lead to much more British capital finding its way to Canada.

The exhibits of gold, silver, copper and iron ores attracted a great deal of attention from people interested in mining operations, the immense quantity and variety of specimens being greatly commented on. Particular interest was taken in the iron ores on account of shipments of pig iron from Cape Breton having reached the Glasgow market. A study of the collection led to several people going out to Canada either to represent capital or to settle. Among those two mining engineers were sent out by British syndicates—Mr. F. B. Stuart to investigate the lead situation in British Columbia, and the opening for a lead smelter and refinery; and Mr. G. L. Mackenzie to look into the possibilities of copper production in the various provinces.

The exhibits of placer gold and rich free gold quartz drew large crowds around the gold cases, and undoubtedly caused many visitors to study other parts of the collection which they would otherwise have passed over. As gold exhibits are a great attraction to all classes, it would be well to rather increase this portion of the exhibit if the collection is to be shown again at an exhibition. New exhibits of coal would also be needed, and it would be well to procure specimens from new mining districts not at present represented. A complete new set of labels would also be required, also of index maps, and all specimens would need renumbering, as frequent transit causes obliteration. By taking each class of mineral separately a simpler system of enumeration might be devised than that of the catalogue.

The packing up of the collection was completed by December 12, and (with the exception of two exhibits) all the cases were shipped to London for storage at the Imperial Institute or the Marylebone Goods Yard. Owing to the fine collection of transparencies having arrived at Glasgow either completely broken or badly cracked, it was found impossible to re-ship even the ones the least damaged, and they were presented to the University of Glasgow.

List of principal business visitors (correspondence with whom might lead to direct business with Canadian firms):—

CORUNDUM.

R. Luke (Luke & Spencer Ltd., emery wheel manfrs.) Broadheath, Lancas.
Messrs. Stevenson, contractors for the art galleries, Glasgow.
J. Hastie, jr., Dumbarton, N.B.
J. H. Whiteman, representative at Glasgow of the 'London Mining Journal.'
Thos. Rugely, Bury, Lancashire.
D. Patrick, bee hive spindle works, Glasgow.
T. S. Peckett, tower works, Lancaster St., Sheffield.
Wm. McGregor, Scottish steel grit works, Airdrie, Nr. Glasgow.
Berg & Sons, Ltd., 22 Billiter St., London, E.C.
J. Strutters, 128 Lister St., Glasgow.

J. Rust, 31 Mount St., Aberdeen.
J. B. Hardman (Garnes, Telford & Hardman) Cobden St., Pendleton, Nr. Manc.
J. Mitchell, Craven House, Drury Lane, London.
W. Brand, Cairnhill, Busby.
Stewart & Henderson, Murrayfield, N.B.
W. H. Finlay, 6 Landscape Terrace, Coleraine.
D. Gallaher (Smith & Coventry) Ordsal Lane, Manchester.
John Kennedy & Sons, Coleraine.
J. Wood (Lancashire Watch Co., Ltd.) Prescot, Lancashire.
W. Gibson (W. Gibson & Co.) Jordan Lane, Morningside, Edinburgh.
J. Sloan, 11 Maitland Avenue, Langside, Glasgow.
W. H. Gibson, 53 Hollins Lane, Sowerby Bridge.
E. R. Canning, Gt. Hampton Street, Birmingham.

INFUSORIAL EARTH.

J. B. Nelson (Nelson & Co.) 5 Ainsworth Avenue, Belfast.
D. A. MacCallum, Managing Director British Diatomite Co., Ltd., 93 Hope St., Glasgow.
Wm. Watson, 5 Royal Exchange Square, Glasgow.
Geo. Semple, 34 S. Kinning Place, Glasgow.
J. C. Macraith, Liffey Chemical Works, Mid Abbey Street, Dublin.
Berg & Sons, Ltd., 22 Billiter Street, London, E.C.

ALSO THE FOLLOWING.

J. B. Mercer, Broughton Copper Co., Ltd., Manchester (copper ores, copper matte, &c.)
J. A. Sutherland, Drysalter, 59 Renfield St., Glasgow (mineral pigments, salt and brines).
H. Stanley Atherton, 7 Brazenose St., Manchester, (mercury ores).
J. Wood, 18 Percy St., Bellahouston, Glasgow, (graphite).
W. Christie, Pipe Manufacturer, Leith, (gypsum).
I. Clarkson, Clarkson & Co., Effingham Memorial Works, Rotherham, (granite and marble).
A. Boissiere, Ingenieur des Mines, Cie Parisienne du Gaz, 124 Boulevard Magenta, Paris (Coal Importation from N.S.)
Thos. Burrel of Pickerings, Ltd., Stockton on Tees (asbestos),
A. Martin, 14 Dobbie's Loan, Glasgow, (granite and marbel)
R. Corsi, C.A., 62a St. Vincent St., Glasgow, (mineral pigments, selenite, infusoral earth, mica—general agencies).
E. S. Dally, 62 Albion St., Brook Lane, Manchester, (dolomite gypsum, talc, baryta).
W. Fyfe, Prevost Blaikie's Quay, Aberdeen, (granite and Labradorite).
A. W. R. Bell, 7 Abington St., Glasgow, " "
C. J. Lake, F.S.L., 25 Bucklersbury, London, E.C., (Granite and Labraborite.)
F. H. Smith, 46 Cambridge Rd., Seaforth, Liverpool, (British Mining Machinery for Canadian mines).
C. Cottis, Archminedean Iron Works, Epping, Essex, (Importation of Canadian pig iron),
Geo. Lawson, contractor for New Glasgow Water Works, lighthouses, docks, &c. (Importation of St. George, N.B., granite).
Wm. Tennant, of the Coal Exchange, Manchester, (Importation of Canadian pig iron).
T. Tenureh, 19 Bridge St., Sydney, N.S.W., (Pacific Coast coal for transpacific steamship trade).
Wm. Watson, 5 Royal Exchange Sq., Glasgow, (mica and asbestos).

G. Semple, 34 S. Kinning Place, Glasgow (talc).

G. Lister, Sutcliffe, Architect, Stone Slack, Manchester (granite, Labradorite and sodalite).

D. Colville, director of Dalzell Iron and Steel Works, Motherwell, Glasgow, (Importation of N.S. pig iron).

Geo. Walton & Co.: Ltd., 35 Bucelish St., Glasgow, (mica).

D. Young, 168 Grovebank Place, Glasgow, (mineral paints).

J. W. Learmworth, 15 Port Hopetown, Edinburgh, (graphite)

J. B. Nelson & Co., 5 Ainsworth Avenue, Belfast, (talc, mica and asbestos).

C. Harrison, Drysalter, Show Lane, London, E.C. (mineral paints, brines).

W. B. Carrick, A.M.I.E.E., Paisley, (Asbestos, mica, talc and tripolite).

Johnson & Sons, Smelting Works, Ltd., Finsbury, London, (Importation of high grades ores and matte).

G. Smith, Faludhouse St., Glasgow, (graphite).

W. F. McMaster, Ardeer Iron Works, (Importation of N.S. pig iron).

R. Sanderson, builder, Mt. Florida, Glasgow, (N.B. granite).

Capt. H. Cock, Dashwood House, New Bond St., London, (Molybdenite).

T. R. Breckon, 32 Norfolk St., Sunderland, (gypsum).

Wm. Muir, Beith, N.B., (New Brunswick granite).

R. Tholfall, F.R.S., of Albright & Wilson, Phosphorous and Chemical Works, Oldbury, Nr. Birmingham, (Importation of high grade blende ores).

(Selected from a list of over 300 names).

(Sgd.) A. K. STUART.

REPORT OF CANADIAN FRUIT EXHIBIT AT THE GLASGOW INTERNATIONAL EXHIBITION.

Now that the Glasgow International Exhibition has come to an end, I may say without exaggeration, that our exhibit was a decided success. The praise accorded by the public was warm and unstinted, and there can be no reasonable doubt, that it was genuine and well merited. This is true, especially of fruit display. It was frequently renewed, and thus was continually kept fresh and bright, and it undoubtedly served to dispel many of the ill-founded notions, as to the climate of Canada. Whether we will allow it or not, the fact is that there is nothing produced in Canada that so well serves to give a true idea of its fine wholesome climate as its fruits. Its magnificent mineralogical display, together with its grain and dairy products might have been produced in such a climate as so many of the visitors to the Glasgow Exhibition believe it to be, but its grapes, peaches, pears, quinces, plums and apples told another story. 'I would not have believed it'. 'It can't be possible that these were grown in Canada'. 'They must have been grown in hothouses or on walls'. These and similar expressions were repeated hundreds of times daily, and had to be met, combatted and overthrown. It will be news to many in Canada, perhaps even amongst fruit growers, that our fine Canadian fruit, is still sold in most of the shops that sell fruit as 'American' notwithstanding the energetic efforts of the Canadian fruit and produce inspector in Glasgow.

The well-maintained display of Canadian fruit at the Glasgow Exhibition has certainly done much to set Canada right, at all events as far as its climate is concerned, in the minds of the eleven million visitors, almost all of whom examined the fruit.

Many of the more important visitors, landed proprietors, fruit growers, fruit dealers, and others, declared that they had never seen a better display of apples anywhere than the Canadian exhibit.

There was no break in the interest from the beginning to the close, and when it is known that from morning till night, there was a never failing stream of inquirers de-

siring information about the different kinds of apples, the localities where they were grown, the growers, the character and condition of the soil, the manner of growing, pruning, combatting insects and other enemies, it will be felt that the position of the superintendent was no sinecure. Fruit dealers, as well as fruit consumers, observing the cleanness of the fruit and its freedom from bruises, were anxious to know how it was, and experimental farms and their work, government encouragement, spraying, better methods of packing, cold storage and kindred subjects were explained. Fruit dealers, both importers and the more extensive retailers were interested in the various fruit packages. The fine condition in which the Canadian fruit turned out was surprising, especially when compared with the best barrelled apples, and naturally led to a desire to examine the cases and discuss the merits of different methods of packing. A few cases of fruit were in consequence kept in hand for inspection, and also for sampling. This was necessary, inasmuch as there was a general feeling that Canadian apples were not as good as American apples of the same variety. Tasting convinced the most prejudiced persons. Besides this small lots were presented to several parties of importance, who all highly appreciated the compliment. Some of the most complimentary remarks made by visitors, were on the remarkable keeping quality of many of the varieties of apples. It is needless to say that while much was due to the careful handling of the fruit, gathering, packing, &c., very much was due to the admirable system of cold storage in which the apples were kept.

Three points were especially noted, and commented on, viz., gathering before the fruit was over ripe, careful handling to avoid bruising, and packing so as to avoid contact of the fruit. These, together with the perfect cold storage seem to make it possible to keep apples of sufficiently firm character indefinitely, at all events for over twelve months, so that many householders who used apples in considerable quantity were constrained to say that there seemed to be no good reason why they should not be supplied with fine apples up to July at least.

The number of varieties of Canadian apples that are well known in Great Britain is very limited. There are ten or twelve well known sorts, and perhaps ten or twelve more known to a few dealers and consumers, so that it is not surprising that the sixty-three sorts on exhibition appeared to be quite a large collection. Of the sixty-three varieties placed on the tables at the opening, there remained over thirty at the close. Some of them were comparatively new with us. The Central Experimental Farm sent two that attracted a good deal of attention. The 'Malinda' a yellow apple of medium size and quality, retained its quality to the last, so did the 'Lawyer' and the 'Salome'. The 'Lawyer' faded a little so as to resemble in colour a bright red tomato. It was better in quality than 'Malinda'. 'Salome' kept its colour well and was thought by many to be better in quality than either of the two just mentioned. Two very bright seedlings sent by Louis Woolverton proved to be remarkable keepers, and were of good quality. Their only drawback was, that they are small. There were some very good ones, of several kinds, sent from Nova Scotia, unnamed, that were unknown to me. These had probably been exhibited at one of the fall shows, and had then been carefully packed and sent on for the Glasgow Exhibition. The names were all placed together in an envelope.

Mr. Cecil Newman, Lachine Rapids, sent some very nice seedlings, besides some well known sorts. Miss Fraser, King's Port Farm, Lachine Rapids, and Mr. Dunn, of the same address, sent the 'La Salle,' a beautiful apple of good size and fine keeping quality, that was in perfect condition at the close of the exhibition.

Amongst the soft fine fleshed apples that kept till the close was the 'Blenheim Orange,' and curiously the 'Wealthy,' held till within a few days of the close. Among sorts that are little known on this side was one sent by R. W. Shepherd, Montreal, viz., the so-called 'Winter St. Lawrence, in reality the 'Rambour Barré' of the French and well known under this name in St. Helaire. This was perhaps the handsomest apple shown. It was white fleshed, crisp and juicy, besides being well flavoured and was among the last on the table.

The variety that the Scotch people spoke most highly of was the Newton Pippin. The English spoke of and praised the 'Cox's Orange' and the 'Blenheim Orange,'

though some seemed to think the 'Old Ribston' the best of all apples. It is perhaps worthy of remark that when allowed to sample five or six varieties without the names, neither one nor the other recognized their favourites, and frequently gave the preference to the 'Northern Spy.'

Other things being equal, the almost universal preference is given to a firm, rather hard apple, and except amongst a limited number of retailers, for a medium sized apple. A glowing tint is the next attractive feature like the colour of the King of Tomkins Co. for instance, but handsome fruit of fair quality and without bruises or other blemish will almost always sell well here.

People never ceased to admire the fine condition and handsome appearance of the Canadian apples, and to ask 'why can't we always have apples like these?'

In barrelled apples not one escapes—they are all bruised from top to bottom. Householders, many of them declare that they rarely are able to use more than half the apples in a barrel. The bruised fruit has already begun to rot when received, and in spite of all their care, they often lose up to the half and over. This is a serious matter for them.

Given a moderate sized package, say 40 lbs. of perfectly sound fruit of fair quality, and the consumption may be indefinitely increased. The Wilson ventilated case, made in London, Ont., seems to about fill the bill.

The fruit was examined and praised by many illustrious visitors, amongst others, first comes our own Princess Louise, Duchess of Fife, the King's most charming daughter, and her husband. We had also the Empress Eugenie, besides many others of exalted rank, many of whom signed our register and expressed the pleasure the exhibit gave them.

To sum up—the Canadian fruit exhibit at Glasgow has done more to place our country in a favourable light before the British public than any other part of the exhibition or the whole of it combined. It has dispelled many false notions regarding its climate and capabilities, and has given birth to truer ideas. It has become a more attractive place to those seeking to make homes for themselves. To the capitalist it has become a more desirable place to invest his money in. To the mere sojourner, who hopes that after spending a few years abroad, mining or manufacturing, or to otherwise employ his talents and means and return to his own land to enjoy his ease; it has been deprived of all its terrors, and has become a place where a man may even end his days with pleasure and credit and honour.

ROBERT HAMILTON,

Superintendent of Canadian Fruit Exhibit at the Glasgow International Exhibition.

COMMISSIONER'S REPORT

ROYAL EXCHANGE COLONIAL EXHIBITION

LONDON, ENGLAND, 1902

ROYAL EXCHANGE COLONIAL EXHIBITION, 1902

I have the honour to report regarding the representation of Canada at the Colonial Exhibition held at the Royal Exchange, London, between March 10, and May 3, 1902.

The project had its inception in the action of colonial agents general and others, who were strongly of the opinion that a display of some of the principal exhibits which had been at the Glasgow Exhibition at such an important centre as the Royal Exchange would tend to further increase the growing interest manifested in the colonies and their products, and would afford a practical illustration, as far as space would permit, of the capabilities of the colonies in the matter of producing food supplies, and of their richness in mineral, forest and river wealth. The Royal Exchange occupies perhaps the most prominent site in the 'City' of London. It is a building of considerable historical interest and of fine architectural attractions. It is in close proximity to the Bank of England, to the Mansion House (the official residence of the Lord Mayor) and only a few hundred yards distant from the Guildhall, the historic headquarters of the 'City's' municipal life. Such well known streets as Cheapside, Cannon Street, Lombard Street, Cornhill, King William Street, and other financial and business centres are close by, while prominent among the banking institutions of the vicinity are the Bank of Montreal and the Canadian Bank of Commerce. After preliminary negotiations in regard to securing the use of the Royal Exchange for the proposed exhibition, what is known as the Gresham Committee made a favourable report, its action being encouraged by the reception of a strong petition from leading merchants, members of the exchange, and from a prevailing sentiment in favour of the exhibition. Agreeably with the report of the Gresham Committee, the chairman of the 'City' side, Sir Robert H. Rogers, Deputy, and John Horsley Palmer, Esquire, the Master of the Mercers' Company, and Chairman of the Mercers' side of the committee, undertook to meet the agents general with a view to granting them the space required. The action of the Grand Joint Gresham Committee was approved at a meeting of the common council of the City of London, the recommendation in favour of the report having been moved by Alderman Sir William P. Treloar, who took a strong personal interest in the scheme. At a meeting of the Joint Grand Committee held at the Mercers' Hall, it was learned that the following colonies were desirous of being represented at the exhibition; the Dominion of Canada, Western Australia, Rhodesia, British North Borneo, and, subsequently, the West Indies, India, New Zealand, New South Wales, Victoria, Queensland, South Australia, Tasmania and the Cape of Good Hope were likewise invited to participate in the exhibition, but, owing to uncontrollable circumstances, it was found impracticable for them to do so. Applications from private firms were made to be allowed to take part in the exhibition, but they were not entertained, as the use of the Royal Exchange was granted only to the governments represented at the Glasgow Exhibition.

The allotment of space was made in proportion to the extent of the various colonial sections at the Glasgow Exhibition. The Dominion of Canada occupied the entire side of the exchange, representing 5,252 square feet, being the largest section; Western Australia, 3,488 square feet; Rhodesia and British North Borneo representing 1,118 and 200 square feet respectively. The West Indies were subsequently given 150 square feet.

All preliminaries were satisfactorily completed, and no time was lost in preparing the Exchange for the reception of exhibits; and influential committees were appointed for carrying out the Exhibition scheme to a successful consummation. The Lord Mayor of London (the Right Honourable Sir J. C. Dimsdale, M.P.) was chosen President of the Exhibition: Vice-Presidents, the Duke of Argyll, an ex-Governor General of Canada; the Duke of Abercorn, the Marquis of Lansdowne, an ex-Governor General of Canada;

the Right Honourable Lord Strathcona and Mount Royal, High Commissioner for Canada; the Earl of Aberdeen, an ex-Governor General of Canada; Chairman, the master of the Mercers' Company, Mr. John Horsley Palmer, vice-chairman Sir Robert Rogers, chairman of the Gresham Committee. The membership of the General Committee included Lord Strathcona, the Governor of the Bank of England, Honourable Alban Gibbs, M. P., Ald. Sir Wm. P. Treloar, Honourable H. B. Lefray, agent general for Western Australia, Honourable H. W. Venn, commissioner for Western Australia; Mr. John Howard, agent general for Nova Scotia; Mr. C. A. Duff-Miller, agent general for New Brunswick; Hon. J. H. Turner, agent general for British Columbia; Sir George Hayter Chubb, Bart., Honourable Sir John Cockburn; Mr. E. T. Doxat, president of the Australian Chamber of Commerce in London; Sir Robert G. W. Herbert, chairman of the executive committee of the British Empire League; and, besides others, the Canadian commissioner, Mr. E. Jerome Dyer proved a valuable honorary secretary and Walter Bates, of the Guildhall Staff an indefatigable and obliging secretary. Your commissioner had also the honour of serving on the executive committee, composed of nine members of which Lord Strathcona was chairman. And here I may step for a moment from the path of narrative, to refer to the increasing interest which Lord Strathcona manifested in the exhibition from the day the project was first mooted to him to the day of its closing. His enthusiasm for Canada is proverbial at all times and under all circumstances, and it was certainly displayed in connection with the Colonial exhibition at the Royal Exchange.

For the opening of the exhibition a large number of invitations were issued. The unique event was made the occasion of a civic function, which was characterized by dignified formalities. The Lord Mayor, the Lady Mayoress, the sheriffs and leading members of the committees occupied prominent positions on a raised dais, on which were placed palms and flowers, and a number of chairs for the use of the Civic party and distinguished guests. Lord Strathcona, in inviting the Lord Mayor to declare the exhibition open, gave a brief description of some of the principal exhibits, and dwelt upon the importance of the exhibition as an object lesson in Colonial productiveness, and explaining the circumstances under which the exhibits had been brought from Glasgow to London. His Lordship anticipated far-reaching results from the colonial display in the Royal Exchange, a centre of London's commerce and wealth. He also referred to the unique character of the occasion the first time the historic Royal Exchange had been granted for such a purpose, and, consequently, the significant concession of the Joint Grand Gresham Committee was all the more highly appreciated. The Lord Mayor, in his remarks, preliminary to declaring the exhibition open, said he wondered what Sir Thomas Gresham, of many centuries ago, the founder of the Royal Exchange, would think if permitted to be present and to look upon the interesting and valuable colonial display. The City of London gladly welcomed the opportunity of having such a display in its midst, as it was only right and proper that the foremost centre in the commerce of the world, should afford the occasion for a display of the products and energies of Greater Britain beyond the seas. Telegrams regretting their absence were read from the Duke of Argyll and the Earl of Aberdeen. After the formal opening proceedings, the guests inspected the various exhibits, Lord Strathcona, in person conducting a large party over the Canadian section. A luncheon was subsequently given at the Mercers' Hall, a magnificent old building, rich in its internal appointments and fittings. The Lord Mayor presided and Lord Strathcona made one of the most important speeches of the afternoon.

The best possible advantage was taken of the space devoted to the Canadian section of the exhibition, and the display was made with a view to make each class of exhibits as attractive as the surroundings would permit. The official catalogue of the exhibition consisted of 130 pages, of which over 40 were devoted to Canada. In view of the fact that many thousands of this catalogue were likely to be sold (the price being sixpence) the Canadian portion of it was so arranged as to include not merely a list of the exhibits, but chapters on Canadian geography, history (from the discovery and exploration of Canada down to confederation—1867) climate, industries, agriculture, fisheries, timber industry, mining and manufactures. In addition to the official catalogue sold by the

exhibition authorities, thousands of 'up-to-date' Canadian pamphlets were distributed gratuitously and were eagerly sought after. From 20,000 to 25,000 persons visited the exhibition daily during the hours it was open, so an estimate may be conjectured regarding the number of pamphlets distributed. Besides, the Canadian Pacific Railway Company distributed thousands of pamphlets daily. The company made a fine display of views of Canadian scenery, &c., both in oil and photographs.

As stated in the Canadian portion of the official catalogue, 'after giving the matter due consideration, the Canadian Commissioner decided that instead of cataloguing the exhibits (which in itself would fill a volume), it would be much better to give such general information about the Dominion as would be useful both to the student and the general public.' The exhibit was so arranged that there was no difficulty in classifying the various sections, for on entering by the western door the minerals were all placed on stands in the following order :—

1. Iron and nickel ores; 2. Corundum and corundum wheels; 3. Gold copper ores, milling gold ores; 4. Nickel and nickel products; 5. Various gold ores from different provinces; 6. Section of Klondike gravel; 7. Copper ores, silver copper ores, silver lead ores, native silver ores; 8. Petroleum, graphite, coal; 9. Silver-lead ores; 10. Iron and steel exhibits; 11. Mica, asbestos, manganese, antimony, molybdenite, cinnabar, mineral paints; 12. Copper ores; 13. Bricks and clays; 14. Infusorial earth, talc, lime, gypsum, fire clay, apatite, soap stone, salts and brines; 15. Pacific Coast coal; 16. British Columbia, Nova Scotia, North-west and New Brunswick coals, peat, maltha, tar sands; 17. Ornamental and building stones, granites and marbles.

Agriculture was represented by a display of bottled grain in pyramid form consisting principally of wheat, barley, oats, rye, clover, corn, (maize) buckwheat, peas and beans; food products comprised a considerable portion of the exhibit. Among the contents of these cases, attractively displayed were condensed milk, cream and cocoa; cereals in packages, such as wheat, oatmeal, &c., 'Ovo', a preparation of desiccated eggs; tinned fruit and vegetables, including apples, pears, peaches, apricots, strawberries, plums, peas, beans, corn and tomatoes; 'Radnor' mineral water; various brands of canned salmon, from British Columbia, now extensively used in Great Britain; Canadian cured bacon; canned lobsters and other food products were also displayed. Apples in their natural state were shown in great variety, as well as a large and varied assortment in bottles preserved in antiseptics, comprising pears, peaches, plums, grapes, cherries, &c., as well as vegetables such as peas, beans, tomatoes, all of these attracted considerable attention.

The forestry section was in a most conspicuous location and advantage was taken of this fact to make the display as striking as possible, specimens being shown in the log, square-finished and polished. There were also shown the photographs of trees indigenous to Canada, each photograph being framed in the wood of the tree represented. Photographs of lumbering operations were also in this section.

The wisdom which dictated a favourable view by your department to the proposal to have Canada represented at the exhibition was fully demonstrated from day to day: for such expressions as 'Canada must be a great country', 'Canada's resources must be enormous', 'what an extensive country it is', and the like, were heard on every hand; while many prominent Canadian visitors were heard to say, —'this is one of the best advertisements the Dominion has ever had'. The daily attendance included prominent business men, capitalists, shipping merchants, bankers, and many persons anxious to get all the information possible about Canada and its resources. Many inquiries were made of a specific nature, more especially with reference to corundum, granite, roofing slate, graphite, mercury, molybdenite, marble, infusorial earth, fluorite, food products, fruit, timber, and its manufactures and even Caraquet oysters. In each case all possible information was given, and where practicable samples were made use of. In many instances inquirers were put in direct communication with Canadian manufacturers, exporters or their local representatives.

I desire to give expression to my appreciation of the services of my staff, consisting of Mr. James Brodie, secretary; Mr. A. K. Stuart, mineral curator, and Mr. John Edgar, foreman, also of the uniform friendliness of the members of the committees on

which I had the honour of serving, and of the continuous courtesy of all the officials, who spared no effort in rendering such assistance as was desirable in completing the details for making the Canadian exhibit attractive, and to the extent possible in the limited space, worthy the Dominion.

After the close of the exhibition, a very successful dinner was tendered by the commissioners of the exhibiting colonies to the Right Honourable Lord Mayor, Sir J. C. Dimsdale, the Sheriffs and Aldermen of the 'City', also the members of the Joint Grand Gresham Committee.

I append hereto a few of the remarks taken from the official report of the chairman and the deputy chairman of the exhibition :—

'The work of organizing this exhibition has been justified by results.'

'It was impossible for us to ascertain the actual number of persons who visited the exhibition, but the marked success of the exhibition was apparent throughout, from the fact that an aggregate of over a million visitors attended, most gratifying testimony to this effect has been received by us.'

'The executive committee spared neither time nor pains to contribute to this success, on which, in our opinion, one and all are to be congratulated.'

'As an agency for calling attention to the commercial and particularly to the mining, resources of the Empire, it has proved a distinct success.'

'It seemed designed to convey a definite idea of the resources of the British Empire at a glance.'

'The exhibition is the first of the kind ever held in the 'City' of London, and we are of opinion that as regards unqualified success and public popularity it would be impossible to surpass it.'

'The exhibition, we have no doubt, will be the means of cementing still closer the feeling of amity and mutual respect of the Colonies with the Mother Country.'

W. D. SCOTT.
Commissioner.

COMMISSIONER'S REPORT

CORK INTERNATIONAL EXHIBITION

CORK, IRELAND, 1902.

CORK INTERNATIONAL EXHIBITION, 1902

I have the honour to report with reference to the Cork International Exhibition (and Canada's exhibit thereof) held at Cork, Ireland, May 1, to November 1, 1902.

The credit of the inception of the exhibition is due to the Rt. Hon. Edward Fitzgerald, Lord Mayor of Cork, who mentioned the project at a meeting of the Municipal Council in February, 1901. A public meeting was subsequently held when the scheme was taken up with great enthusiasm, which was not confined to Cork but received the hearty support of all the leading centres in Ireland, notably Dublin and Belfast, which not only entered into the scheme with ardour but subscribed liberally to its support. It was originally intended to hold the exhibition in rear of the municipal buildings on the site of the one held in 1883, but the project grew so rapidly and was so successful that the space available was found totally inadequate and a larger area had to be procured; this was found on the western road, between the Mardyke and the historic River Lee and a more picturesque or ideal spot could not have been found anywhere, nature having endowed the locality with untold advantages and beauties.

His Excellency Earl Cadogan, K. G., Lord Lieutenant of Ireland, extended his patronage to the project. The Rt. Hon. the Earl of Bandon, K. P., was president and the Rt. Hon. Edward Fitzgerald, Lord Mayor of Cork, acted as chairman of executive.

The Rt. Hon. the Earl of Bandon formally opened the exhibition on May 1, being assisted by the lord mayors of Cork, Dublin and Belfast; it was however some considerable time after that before the various installations and even the buildings themselves were completed, and the paths and grounds in proper condition.

The principal buildings were the industrial hall with a floor space of 170,000 square feet; the machinery hall with 20,000 square feet, concert hall, Canadian pavilion, art gallery, president's pavilion, executive officers, besides numerous restaurants, tea rooms and other small buildings; a large portion of the grounds was devoted to practical agriculture, &c.

The Industrial Hall contained a large number of Irish industrial exhibits, also many of a similar class from England and Scotland, besides those from France, Austria, Russia and Japan; but by far the most instructive and practical exhibit in this building was that of the Department of Agriculture and Technical Instruction for Ireland, which comprised specimens of all the mineral and raw materials produced in Ireland, as well as working exhibits of the manufacture of carpet, hosiery, straw hats, and many other industries, which this department is endeavouring to establish in the country, the educational and technical instruction branches were also in this section.

The Machinery Hall contained the boiler-house, from which the power for driving the machinery and for generating the electric light was obtained; here were also desplayed many exhibits in motion consisting principally of engines, iron and wood working machinery, dynamos, motors and a model working bakery and confectionery.

The Art Gallery contained a very nice though small collection of works loaned from various corporations and individuals, two of them being loaned by His Majesty the King from Buckingham Palace, a special feature was the Irish Gallery devoted to the works of Irish artists past and present.

Apart from the exhibit in the Industrial Hall, the Department of Agriculture and Technical Instruction for Ireland, had a number of small buildings, such as a model dairy, byre, fruit canning and preserving factory, creamery, glass blowing furnace, and model labourer's cottage and plot, besides fruit and vegetable school gardens, poultry runs, incubators, working apiary, and fish ponds, aquarium and fish hatching apparatus.

The Canadian Pavilion had a floor space of 5,000 square feet, and was one of the most striking and beautiful buildings on the grounds. It was certainly on the choicest

site, being about the centre of the exhibition and facing the River Lee. This building was rectangular in form, flanked by two towers, at each end, which gave it a very imposing and dignified effect, their proportions and symmetry being particularly striking. The main entrance was very effectively dealt with by a massive arch, in fibrous plaster over which appeared, in plain block letters, the word *Canada*.

The first object to claim attention on entering was an immense case containing a great variety of the leading brands of Canadian food products, consisting of meat, fruit and vegetables, such as chicken, turkey, goose, duck, corned beef, pigs' feet, ox tongues, potted meats, sausage, roast meats, &c., apples, raspberries, strawberries, cherries, Damson plums, green gages, egg plums, currents, Bartlett pears, Crawford peaches, &c., wax string beans, tomatoes, sweet corn, cauliflower, beets, baked beans, tomato catsup, &c., these cases also contained pyramids of Radnor mineral water and 'Canadian Club' whiskey, as well as Imperial and Paragon cheese, honey, Beaver oats and Swiss food. Immediately behind this case was a smaller one containing flour, oatmeal, peas, barley, &c.

The whole of the eastern side of the building was devoted to agriculture, which was very striking on account of the effective display, both of grain in straw, and in bottles, the former elaborately set up in arches, pyramids, sheaves and bunches being festooned and wreathed in many varied and artistic forms; on the wall, framed in grain in straw, were a series of paintings showing such scenes as seed-time, harvesting and threshing operations in the Canadian North-west. Between these paintings on small stands erected for the purpose, as well as around each pillar, were hundreds of bottles of all shapes and sizes, containing specimens of wheat, oats, barley, rye, Indian corn, peas, flax, millet, and in fact all the leading varieties of grain, grasses, and fodder plants which grow in Canada. The collection contained thousands of samples comprising over five hundred different varieties, and the exhibit was admitted to be the best of its kind ever seen in Ireland.

In this section an attendant was placed whose duty it was to give all possible information in connection therewith and attend to the distribution of literature, which was much sought for and many thousands of pamphlets were distributed by him in a judicious manner, the great bulk being on agriculture.

In the centre of the building was the display of fruit, natural and in antiseptics; the former consisted altogether of apples picked in 1901, there were about 35 varieties on some 100 plates distributed around a large table 27 ft. x 6 ft. along the centre of which were the numerous bottles containing grapes, plums, peaches, pears, currants, strawberries, raspberries, gooseberries, blueberries, cherries, &c.; also peas, string beans, windsor beans, tomatoes, &c. Adjoining this was the cold storage chamber which was kept at a temperature of about 34°; and in which were kept white and coloured cheese, butter, eggs, apples in cases, dressed poultry, maple products, honey, &c.

The western side was devoted to timber and minerals. The timber exhibit comprised all the leading varieties of woods, especially those most suitable for export, such as pine, (white, yellow and red) spruce, birch, oak, elm, and numerous other varieties which it is needless for us to mention here; this section was very much enhanced by the display of photographs showing the various trees indigenous to Canada, each photo being framed in the wood of the tree represented; here was also a set of photographs illustrating lumbering operations, and on the outer wall another set of paintings representing scenes in forest and mine.

In the minerals there were specimens of almost all Canada can produce placed in cases and on stands, including an exhibit of Klondike nuggets which attracted much attention.

Statistical information was prominently displayed at both ends of the building, showing the large increases in production and export of all the leading products of the country

Many inquiries were made of a practical nature with reference to almost all our exhibits, more especially in connection with oats and barley both for seeding and feeding purposes, our 4 and 6 rowed barley being especially interesting to the farmers, this being their principal product which is used for brewing and distilling purposes but

in Ireland only two rowed is grown. Hay is another article about which numerous inquiries were made, also fruit and food products; all of these inquiries were given careful attention and in each case inquirers were put in communication with the Canadian manufacturers, producers, exporters or their local agents. The wholesale and retail grocery trade were called upon with a view to inducing them to handle Canadian products, with very satisfactory results, and all the food products on exhibit were disposed of to them at the close of the exhibition.

During the course of the exhibition it was visited by numerous notables, including the Duke and Duchess of Devonshire, His Excellency Earl Cadogan, K. G., Lord Lieutenant of Ireland and Countess Cadogan, Right Hon. Richard Seddon, Premier of New Zealand, His Eminence Cardinal Moran of Sydney, Australia. The Admiral and officers commanding the Japanese fleet which took part in the Coronation Naval Review, the Earl and Countess of Aberdeen, and His Excellency the Earl of Dudley, Lord Lieutenant of Ireland and the Countess of Dudley, numerous Canadians also visited the exhibition, among others, Hon. Wm. Paterson, Minister of Customs, Hon. Senator McSweeny, Messrs. D. C. Fraser and H. J. Logan. All were unanimous in their expressions of admiration of the Canadian exhibit. Local opinion can better be expressed by quoting a few of the remarks made in the register:

August 2, 1902.

'During my stay in Cork I was particularly struck with the Canadian section of the exhibition. The pavilion is very picturesque, the exhibits various, and convey to the mind of the visitor the great agricultural wealth of the Dominion. Courtesy and kindness to all is the motto of the attendants.

REV. J. M. CARROLL,
Waterford.

July 9, 1902.

'I have visited the Canadian pavilion, and was greatly pleased with the variety and beauty of the exhibits from the Dominion, and consider it to be one of the most interesting and remarkable portions of the exhibiton.

W. E. MEADE, D.D.,
Lord Bishop of Cork, Cloyne & Ross (C. of I.)

July 17, 1902.

'When I visited the Canadian pavilion as an Irish farmer I was thunder struck with the quality of grain. It is a great credit to the country and it is a lesson to us Irish farmers.

MICHAEL RONAYNE,
Castlemartyr, Co. Cork, prominent farmer.

July 18, 1902.

'I admire very much the splendid presentation of Canadian exhibits. They are set out with much taste. The affability of the promoters and attendants deserves praise.

J. F. X. O'BRIEN, M.P., *Cork.*
Junior Member for Cork.

July 22, 1902.

'The Canadian pavilion seems to me to be deserving of high commendation. I thank the secretary for his courtesy and his valuable information regarding Canada and its agricultural products which he gave us.

ROBERT BROWN.
Bishop of Cloyne, R.C.

July 24, 1902.

'I have examined samples of barley on exhibition in this pavilion, and consider the quality of the grain submitted to be better by far than the average of our Irish grown barley. The Canadian samples are nearly, if not similar to our best quality of Chevalier. The manner in which the exhibits are displayed is highly creditable to those responsible for adding such an interesting feature to the Cork Exhibition.

ROBERT McINTOSH.

(Grain expert representing the Castlebedingham & Drogheda Breweries, Limited.)

July 23, 1902.

'I cannot sufficiently express my admiration for the admirable exhibit which illustrates in every possible way the growth of Canadian export and of all the resources of Canada in the present and future.

GEO. COLTHURST, *Bart.*
Proprietor of Blarney Castle.

July 28, 1902.

'I have been much pleased with samples of barley &c., shown in Canadian section at Cork Exhibition.

NEIL A. GALWAY,
(Brewer Messrs. Allman, Dowden & Co. Bandon, Leading Brewers.

August 23, 1902.

'Whether in admirable and picturesque arrangement, interest and excellence of the products of Canada or in practical utility, this department seems to me to be second to nothing in the whole exhibition.

W. LANE, J.P.
(Ex-President Cork Chamber of Commerce and Shipping.)

September 4, 1902.

'In my opinion the Canadian pavilion is one of the chief attractions at the Cork Exhibition.

CAPT. A. DONELAN.
M.P. for East Cork.

W. D. SCOTT.
Commissioner.

COMMISSIONER'S REPORT

WOLVERHAMPTON ART AND INDUSTRIAL EXHIBITION

ENGLAND, 1902.

WOLVERHAMPTON ART AND INDUSTRIAL EXHIBITION, ENG., 1902

LOCATION.

The Wolverhampton Art and Industrial Exhibition was held from May 1, to November 8, 1902, and was centrally and conveniently located in a portion of the West Park, belonging to the corporation, and on land loaned by Lord Barnard. It was supported by the corporation of the town and also by private guarantors to the extent of £30,000.

OPENING.

The exhibition was formally opened by Their Royal Highnesses The Duke and Duchess of Connaught on May 1, Lord Strathcona and Mount Royal, the High Commissioner for Canada, was also present and received their Royal Highnesses at the Canadian pavilion and showed them the Canadian exhibits.

OFFICERS.

President, The Earl of Dartmouth, Lord-Lieutenant of the county of Stafford.
Chairman of the Executive Committee, Thomas Graham, J. P.
Chairman of the Finance Committee, C. T. Mander, M. A., J. P.
Director and General Manager, H. A. Hedley.
Acting Manager, J. H. Cundall.
Secretary, Stephen Watkins, Assoc. M. Inst., C. E.

SCOPE.

The prospectus stated that 'the scope of the exhibition will include a full illustration of the Engineering Industries and Industrial and Scientific Products of the British Empire, and foreign countries, &c.'

BUILDINGS AND EXHIBITS.

The architects for the buildings were Messrs. Walker and Ramsay of Glasgow. The chief buildings and their contents were as follows:—

THE INDUSTRIAL HALL, 377 FT. X 72 FT.

Containing silverwork, musical instruments, upholstery, iron, brass and glass work, hardware, coaches, cycles and automobiles. Dress goods (looms in operation), house furnishings, art productions, sewing machines, typewriters, &c. Also goods on sale from Japan, India and Denmark.

THE MACHINERY HALL, 350 FT. X 150 FT.

Containing boilers, electric generating machinery, steam and gas engines, printing, engraving and typesetting machinery in operation, iron and wood working tools and machines, &c.

CONCERT HALL, 164 FT. X 74 FT.

Accommodation for 2,000 people. Used for entertainments.

CANADIAN PAVILION, 100 FT. X 80 FT.

This building, which contained 8,500 feet of floor space, was the only specimen of strictly classical architecture included in the general scheme. It had a colonade front surmounted by a finely proportioned dome. The architects were Messrs. Walker and Ramsay of Glasgow, who also designed the Canadian Building of Glasgow (1901) Exhibition, and the Canadian Coronation Arch in Whitehall, London.

The Canadian pavilion occupied a prominent position between the industrial hall and machinery hall, and was so located that the great majority of visitors could not overlook or pass it by, and throughout the entire term of the exhibition was the centre of interest.

Contents.—An agricultural trophy occupied the dome at main entrance to the building. The trophy was 40 ft. in circumference, and was decorated with grains and grasses in the straw festooned and wreathed about the pillars, arches and dome. Within and beneath the trophy was shown grain in bottles, arranged in tiers on a circular stand as follows:—Oats, 107 varieties; barley (two-rowed), 30; barley (six-rowed), 38; fall wheat, 22; spring wheat, 117; peas, 61; Indian corn, 37; millet, 9; also soja and horse beans, flax and hops.

The Wm. Davies Co., Toronto, displayed canned meat products and bacon; cheese, butter and eggs were shown by the Anglo-Canadian Produce Co., Liverpool and by Messrs. A. Clement & Sons, Glasgow and Manchester; "Canadian Club" whiskey by Hiram Walker & Sons, Ltd., Walkerville, Ontario; canned goods, (milk, fruit, meat and vegetables) as follows:—

Truro Condensed Milk & Canning Co., Truro, N.S., milk, cream, &c.
Leslie Hart & Co., Halifax N.S., lobster.
Aylmer Canning Co., Aylmer, Ont., fruits and vegetables.
The Simcoe Canning Co., Simcoe, Ont., fruits, vegetables and meats.
The Laing Packing Co., Montreal, Que., meats.
Wm. Clark, Montreal, Que., meats.
The Kent Canning Co., Chatham, Ont., fruits and vegetables.
Miller & Co., Trenton, Ont., fruits and vegetables.
The A. F. Maclaren Imperial Cheese Co., Ltd., Toronto, Ont., cheese (potted).
The T. D. Miller Cheese Co., Ingersoll, Ont.
Trappist Monastry, Oka, Que., cheese.
Wm. Johnston, Glanworth, Ont., cheese.
Canada Maple Exchange, Dunham, Que., maple sugar and syrup.
Ontario Bee-Keepers Association, honey (comb and extracted).
Radnor Mineral Water Co., Radnor, Que., mineral waters.
The Ovo Co. Ltd., Stratford, Ont., and Winnipeg, Man., desiccated eggs (ovo).
P. MacIntosh & Son, Toronto, rolled oats (Beaver brand) and Swiss food.
The Ogilvie Milling Co., Winnipeg, Man., flour and grain products.
The Huron & Manitoba Milling Co., Goderich, flour and grain products.
The Lake of the Woods Milling Co., Keewatin, " "
The Tilson Co., Tilsonburg, Ont., " "
Walter Thompson, London, Ont., " "
John Mackay, Bowmanville, Ont., " "
Archibald Campbell, Toronto Junction, Ont. " "
A. Clement & Sons, Ltd., Manchester, tinned salmon (Parsley brand).
W. H. Dwyer, Ottawa, hay (pressed).
The Canada Furniture Mnfrs., Ltd., Toronto and London, Eng., furniture.
Gilmour & Co., Trenton, Ont., veneered doors.
Mica Boiler Covering Co., Ltd., Montreal and London, Eng., mica products.
The Metallic Roofing Co., Ltd., Toronto, embossed metal for ceilings and walls.
Aptus Veneer Co., Ltd., London, Eng., wood veneers.
Canadian Pacific Railway Co., views of Canada.
Quebec and Lake St. John Railway Co., views of Canada.

Canadian stuffed birds and animals and mounted heads, were kindly loaned by Rt. Hon. A. Staveley Hill, K.C., Oxley Manor, Wolverhampton, Eng., and white owl by W. H. Thompson, Bushbury, Wolverhampton, Eng.

Three stuffed specimens of caribou and deer, loaned by the Quebec Government.

MINERALS.

Eight large cases were filled with specimens of native gold, gold and silver quartz, and specimens of all the minerals common to Canada.

FORESTRY.

This exhibit included samples of native woods cut in boards, also logs of different trees with the bark on, photographs of all the prominent trees were shown, and the frames were made of the wood of the tree photographed.

FRUIT.

Four hexagonal stands were filled with tiers of bottles containing the various varieties of fruits grown in Canada, preserved in antiseptic fluid.

Throughout the entire season apples of 1901 growth were exhibited, and the surplus sold late in October. New fruits, chiefly apples, began to arrive early in September, and besides those shown, a number of cases were sold in order to made Canadian apples better known and more generally sought for.

CANNED GOODS, ETC.

A considerable quantity of canned fruits, vegetables and meats, also maple sugar and confections, and clover honey were sold in small quantities to educate people to seek and use them in future. Mr. J. H. Moore was in charge of this work and a considerable business was done.

SAMPLES OF CHEESE.

Thirty thousand small samples of September, 1901, Canadian Cheddar cheese were distributed, and a demand was in this way created for a first class quality cheese.

COLD STORAGE DEPT.

A feature of great practical interest was the cold storage plant and room. The plant was installed by the Linde British Refrigeration Co., of Montreal, and attracted a great deal of attention. The room was kept well filled with apples, cheese, eggs, butter, &c., throughout the season.

STAFF.

Commissioner :—W. D. Scott, Ottawa, Ont.
Secretary :—Henry Yeigh, Brantford, Ont.
Horiculturist :—A. McD. Allan, Goderich, Eng.
Foreman :—John Edgar, Ottawa, Ont.
Stenographer :—A. E. Homer, Wolverhampton, Eng.
In charge of stand for sale of canned goods :—J. H. Moore, London, Eng. (formerly of Hamilton, Ont.)

Large quantities of pamphlets and copy books were distributed to visitors, and much more was sent through the mail to school teachers, intending settlers, and others interested who applied for literature. Copies of The Trade Index furnished by the Manufacturers' Association of Canada were carefully distributed to business men likely to use them to advantage. Several hundred people desiring to settle in Canada were advised at the pavilion in person, or by correspondence, and as result a number have already gone to Canada, and a much larger number say they will go next spring, and the thought of going has been started in the minds of many more.

Men interested in manufacturing were advised where to purchase material needed, and others wishing to handle natural products, or manufactured goods from Canada were assisted in every possible way.

Canned goods were advertised thoroughly, and many people led to purchase and use them, with the result that a large demand has been created, and local dealers have decided to carry Canadian canned goods in stock in future. Cheese also was made well known.

Articles were prepared, on Canada and its products, for the English press and published in prominent papers such as the *Mark Lane Express*, *Birmingham Post*, *Express & Star*, Wolverhampton, and others.

W. D. SCOTT,
Commissioner.

No. 54.

IMPORTATION OF DOGS INTO GREAT BRITAIN FROM ABROAD.

Circular.

DOWNING STREET, December 28, 1901.

SIR,—With reference to my circular dispatch of August 25, 1900, inclosing copies of a memorandum issued by the Board of Agriculture relating to the importation into Great Britain of dogs brought from abroad, I have the honour to acquaint you that the Board have informed me that, in view of the fact that rabies, whilst very prevalent abroad, is believed to have been finally eradicated in the United Kingdom, they have considered it a favourable opportunity to issue regulations which, although not differing in character from those at present in force in so far as they require all dogs landed from abroad to undergo a period of quarantine, yet lay down more specific and stringent rules on the subject, and I accordingly transmit to you for such publication in the colony under your Government as you may think desirable, copies of the Importation of Dogs Order of 1901 and of a memorandum thereon.

2. The Board have observed that the new Order will not have full effect prior to March 15 next, and that in the meantime the landing of dogs other than performing dogs intended to be kept in this country will be authorized on conditions substantially the same as those which have hitherto obtained.

I have the honour to be, sir,

Your most obedient, humble servant,

J. CHAMBERLAIN.

The Officer administering
The Government of Canada.

DISEASES OF ANIMALS ACTS, 1894 AND 1896.

IMPORTATION OF DOGS INTO GREAT BRITAIN.

On and after the 1st day of January, 1902, the landing in Great Britain of dogs from abroad will only be permitted subject to the provisions of the Importation of Dogs Order of 1901, which in effect requires that after March 15 next, every imported dog shall be detained and isolated at the expense of its owner upon premises in the occupation or under the control of a Veterinary Surgeon for a period of six calendar months from the date of landing.

Until March 15 next, dogs will be allowed to land upon conditions substantially the same as at present.

The disease of rabies having ceased to exist both in Great Britain and in Ireland, it has become of the utmost importance that the most effective steps should be taken to prevent its re-introduction from abroad, and the Board have felt it incumbent upon them, in the interest of dog owners in this country, to amend their regulations in the manner above described, and to warn persons who may propose to travel, that after the

aboved mentioned date the isolation and detention of dogs on the private premises of their owners can no longer be sanctioned.

By the dogs (landing from Ireland) Revocation Order of 1901, the restrictions on the movement of dogs between Ireland and Great Britain have been removed.

T. H. ELLIOTT, *Secretary.*

Board of Agriculture,
4, Whitehall Place,
London, S. W.,
December, 1901.

Circular.

DOWNING STREET, March 11, 1902.

SIR,—With reference to my Circular despatch of December 28 last relative to the importation into Great Britain of dogs brought from abroad, I have the honour to transmit to you, for the information of your Government, a copy of a letter from the Board of Agriculture inclosing a copy of a further notice which has been issued to the Press in this country on the subject, and calling attention to the desirability of giving wide publicity in the Colonies to their Order of December 12, 1901, and Memorandum A 214a, further copies of which are herewith transmitted.

I have the honour to be, sir,

Your most obedient, humble servant,

J. CHAMBERLAIN.

The officer administering
The Government of Canada.

Inclosure 1.

(No. A. 6663, 1902.)

BOARD OF AGRICULTURE,
4, WHITEHALL PLACE, LONDON, S.W., March 1, 1902.

SIR,—I am directed by the Board of Agriculture to advert to Mr. Graham's letter of December 31 last acquainting the Board, in reply to their communication of December 12, that copies of the Importation of Dogs Order of 1901 and of the Memorandum thereon would be forwarded, as on previous occasions, to the various representatives of the Colonies in this Country and abroad, and I am to say that notwithstanding the wide publicity which has already been given to the requirements of the Order, the Board have issued to the Press a further notice, copies of which are inclosed, as a reminder to the public that the 15th inst. is the date upon which imported dogs will become subject to detention under quarantine for a period of six months at a veterinary establishment approved for the purpose. By this means the Board hope to minimise the inconvenience which may be caused by the movement of dogs out of Great Britain by persons imperfectly acquainted with the regulations, but they think that a greater service might be rendered to those concerned if the order and its requirements could be published more widely abroad, and this would appear to be specially desirable in the case of the colonies.

I am, therefore, desired to ask you to be so good as to move the Secretary of State to cause copies of the press notice, and of the order and of the memorandum $A^{2}_{A}{}^{14}$ to be again sent to the Governors of colonies, the High Commissioner for Canada, and the

agents general and other colonial representatives to whom copies of the order and the memorandum have already been forwarded, with a request that steps may be taken to disseminate the information in their respective countries as widely as possible.

The Board feel it their duty to omit no step which may have the result of mitigating the effect of an order, the enforcement of which, unfortunately, must at first be expected to interfere very considerably with the convenience of a section of the travelling public, and it is upon these grounds that they seek the co-operation and assistance of your Department and of the various authorities representing the colonies.

I am, sir,

Your obedient servant,

T. H. ELLIOTT,
Secretary.

The Under Secretary of State for the Colonies,
Downing Street, S.W.

Inclosure 2.

IMPORTATION OF DOGS.

The Board of Agriculture again desire to draw the special attention of the public to the fact that after March 15, next the landing in Great Britain of dogs brought from any country except Ireland, the Channel Islands and the Isle of Man, will be subject to article 2 of the Importation of Dogs Order of 1901, which expressly provides that every imported dog must be detained and isolated at the expense of its owner upon premises in the occupation or under the control of a veterinary surgeon, which shall have been previously approved in writing by the Board for that purpose, for a period of six calendar months, during which period the dog may not be moved from the place of detention except as provided in that article. This article does not apply in the case of an imported dog, which is intended to be exported from Great Britain within forty-eight hours, or of a performing dog, with regard to the detention and isolation of which special conditions will be imposed by the licence authorizing its landing.

The memorandum $A\frac{60}{1}$ as to the importation of dogs into Great Britain from abroad, dated August 8, 1900, will cease to have effect when article 2 of this order comes into operation.

T. H. ELLIOTT,
Secretary.

4, Whitehall Place, London, S.W.,
February 26, 1902.

(6396)

ORDER OF THE BOARD OF AGRICULTURE.

(Dated December 12, 1901.)

IMPORTATION OF DOGS ORDER OF 1901.

The Board of Agriculture, by virtue and in exercise of the powers in them vested under the Diseases of Animals Acts, 1894 and 1896, and of every other power enabling them in this behalf, do order, and it is hereby ordered, as follows :—

Restriction on Importation of Dogs.

1. An imported dog, that is to say, a dog brought to Great Britain from any other country, except Ireland, the Channel Islands and the Isle of Man, shall not be landed in Great Britain unless its landing is authorized by a license of the board previously obtained, and when landed it shall be subject to the provisions of this order, and to the conditions inserted in any license authorizing its landing.

Detention and Isolation of Imported Dogs.

2.—(1.) An imported dog shall, for a period of six calendar months after its landing, be detained and isolated at the expense of its owner upon premises in the occupation, or under the control, of a veterinary surgeon, which shall have been previously approved in writing by the board for that purpose, and such premises are in this order referred to as the 'place of detention.'

(2.) During the said period the dog shall not be moved from the place of detention except to another place of detention or to a vessel for exportation, and in either case only with a license of the board authorizing such movement.

(3.) This article shall not apply to *(a)* an imported dog which is shown to the satisfaction of the board to be a bonâ fide performing dog ; or *(b)* to an imported dog which is intended to be exported from Great Britain within forty-eight hours after its landing ; but every such dog shall be subject to the other articles of this order.

(4.) This article shall come into operation on the fifteenth day of March, one thousand nine hundred and two.

Conditions of License.

3. The board may insert in any license granted by them under this order authorizing the landing of an imported dog such conditions as they think necessary or desirable for the following purposes :—

(i.) for prescribing and regulating the detention and isolation of the dog so far as the same is not prescribed and regulated by this order ;

(ii.) for prescribing the person by whom and the premises on which the dog shall be detained and isolated ;

(iii.) for regulating the movement of the dog to the place of detention, or vessel for exportation, and for prohibiting or regulating its movement during a period of six calendar months after its landing, or until its exportation, as the case may be ;

(iv.) for prescribing the confinement of the dog in a suitable hamper, crate, box, or other receptacle during the movement of the dog by railway, or along a highway or thoroughfare ;

(v.) for prescribing the mode of isolation of the dog:

(vi.) for prescribing the muzzling of the dog;

(vii.) for prescribing the notice to be given of the death or loss of the dog, or of any matter arising in connection with the movement, detention, or isolation of the dog and the persons by whom and to whom the notice is to be given; and

(viii.) for prescribing the production of a license for inspection by an officer of the board, or constable, or officer of customs.

Notice of Detention in case of Illegal Landing.

4.—(1.) Where an imported dog has been landed in contravention of this order or of any order hereby revoked, the board, or an inspector of the board, may give notice to the owner or person in charge of the dog requiring that, within a time specified in such notice, the dog shall be moved *(a)* to a vessel for exportation, or *(b)* to a place of detention for the purpose of detention and isolation in accordance with the provisions of such notice.

(2.) Such provisions may be inserted in the notice as the board may think necessary or desirable for any of the purposes mentioned in the preceding article.

(3.) A notice under this article may, subject to any instructions issued by the board, be given by an inspector of the local authority.

(4.) If the owner or person in charge of the dog, after receipt of such notice, fails to move the dog as required by the notice, he shall be deemed guilty of an offence against the Act of 1894.

Withdrawal of License in cases of Default.

5.—(1.) If the owner or person in charge of an imported dog is convicted of an offence under this order in relation to the dog, the board, or an inspector of the board, may give notice to such owner or person in charge, requiring him to move the dog to a vessel for exportation within a time specified in such notice.

(2.) If the owner or person in charge of the dog, after receipt of such notice, fails to move the dog as required by the notice, he shall be deemed guilty of an offence against the Act of 1894.

Relanding prohibited of Imported Dogs moved to Vessels for Exportation.

6. An imported dog which has been moved to a vessel for exportation in accordance with a license or notice under this order shall not be relanded in Great Britain without a license of the board authorizing such landing.

Seizure of Dogs in case of Default.

7.—(1.) If an imported dog is not detained and isolated as required by this order or by the conditions or provisions of any license or notice thereunder, an inspector of the board may seize the dog, and thereupon the board shall detain and isolate it at the place of detention specified in the license or notice, or any other place of detention selected by them, in accordance with the requirements of this order or the said conditions or provisions.

(2.) If the owner of the dog does not, within ten days after the expiration of the period of detention specified in this order or in the license or notice, claim the said dog from the board, and pay to them their expenses of detaining and isolating the dog, the board may destroy or otherwise dispose of the dog as they think expedient.

Proceedings under Customs Acts for Unlawful Landing.

8.—(1.) If any person lands or attempts to land a dog in contravention of this order, he shall be liable, under and according to the Customs Acts, to the penalties imposed on persons importing or attempting to import goods the importation whereof is

prohibited by or under the Customs Acts, without prejudice to any proceedings against him under the Act of 1894 for an offence against that Act.

(2.) The dog in respect whereof the offence is committed shall be forfeited under and according to the Customs Acts in like manner as goods the importation whereof is prohibited by or under the Customs Acts.

Detention of Dogs on Vessels in Port.

9.—(1.) Every dog to which this article applies shall at all times while on board a vessel in any port in Great Britain be—

(a) secured to some part of the vessel by a collar and chain and muzzled with a wire cage muzzle so constructed as to render it impossible for such dog while wearing the same to bite any person or animal, but not so as to prevent such dog from breathing freely or lapping water; or

(b) confined in an inclosed part of the vessel from which the dog cannot escape.

(2.) If any dog to which this article applies shall die, or be lost from a vessel, in any port in Great Britain, the person in charge of the dog shall forthwith give notice of such death or loss to the board.

(3.) The provisions of this article shall apply to every imported dog which is not accompanied by a license issued by the board authorizing the landing of such dog in Great Britain.

Extension of certain Sections of Diseases of Animals Act, 1894.

10. Dogs shall be animals, and rabies shall be a disease, for the purposes of the following sections of the Act of 1894, namely:—

Section forty-three (powers of police);

Section forty-four (powers of inspectors);

Section fifty-six (unlawful landing);

and also for the purposes of all other sections of the said Act containing provisions relative to or consequent on the provisions of those sections and this order, including such sections as relate to offences and legal proceedings.

Local Authority to enforce Order.

11. The provisions of this order, except where it is otherwise provided, shall be executed and enforced by the local authority.

Offences.

12.—(1.) If a dog is landed in contravention of this order, the owner and the charterer and the master of the vessel from which it is landed, and the owner of the dog, and the person for the time being in charge thereof, and the person causing, directing, or permitting the landing, and the person landing the same, and the consignee or other person receiving or keeping it knowing it to have been landed in contravention as aforesaid, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894.

(2.) If a dog is moved in contravention of this order, or of the conditions or provisions of a license or notice thereunder, the owner of the dog, and the person for the time being in charge thereof, and the person causing, directing, or permitting the movement, and the person moving the dog, and the consignee or other person receiving or keeping it knowing it to have been moved in contravention as aforesaid, and the occupier of the place from which the dog is moved, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894.

(3.) If a dog is not kept isolated as required by this order, or by the conditions or provisions of a license or notice thereunder, the owner of the dog, and the person for the time being in charge thereof, and the occupier of the place where such dog is

detained, and the person failing or neglecting to isolate the dog, shall, each according to and in respect of his own acts, defaults or omissions, be deemed guilty of an offence against the Act of 1894.

(4.) If a dog is not secured, muzzled, or confined as required by this order, or by the conditions or provisions of a license or notice thereunder, the owner of the dog, and the person for the time being in charge thereof, and the master of any vessel on board which the dog is or has been carried to Great Britain, shall, each according to and in respect of his own acts and defaults, be deemed guilty of an offence against the Act of 1894.

(5.) If a person with a view to unlawfully evade or defeat the operation of this order, or of the conditions or provisions of a license or notice thereunder, allows a dog to stray, he shall be deemed guilty of an offence against the Act of 1894.

(6.) If the owner or person in charge of a dog fails to give, produce, or do any notice, license, or thing which by this order, or by the conditions or provisions of a license or notice thereunder, he is required to give, produce, or do, he shall be deemed guilty of an offence against the Act of 1894.

Revocation of Orders.

13.—(1.) The orders described in the schedule to this order are hereby from and after the commencement of this order revoked: Provided that such revocation shall not invalidate or make unlawful anything done under any order hereby revoked, or affect any license or authority granted, or any right, title, obligation, or liability accrued thereunder before the commencement of this order, or interfere with the institution or prosecution of any proceeding in respect of any offence committed against, or any penalty incurred under, any order hereby revoked before the commencement of this order.

(2.) A license granted under any order hereby revoked shall, from and after the commencement of this order, have effect as if it had been granted under this order, and may be enforced accordingly.

Interpretation.

14. In this order, unless the context otherwise requires,—

'The board' means the Board of Agriculture:
'The Act of 1894' means the Diseases of Animals Act, 1894:
'Master' includes a person having the charge or command of a vessel:

Other terms have the same meaning as in the Act of 1894.

Extent.

15. Except where otherwise expressed this order extends to Great Britain.

Commencement.

16. This order (except article 2 thereof) shall come into operation on the first day of January, one thousand nine hundred and two.

Short Title.

17. This order may be cited as the 'Importation of Dogs Order of 1901.'

In witness whereof the Board of Agriculture have hereunto set their official seal this twelfth day of December, one thousand nine hundred and one.

[L.S.] T. H. ELLIOTT,
Secretary.

SCHEDULE.

Orders Revoked.

No.	Date.	Short Title.
5611	May 7, 1897.....	The importation of Dogs Order of 1897.
5810	June 14, 1898.....	The importation of Dogs (amendment) Order of 1898.
6194	December 5, 1900	The importation of Dogs (amendment) Order of 1900.

BOARD OF AGRICULTURE.

IMPORTATION OF DOGS ORDER OF 1901.

The Board of Agriculture desire to draw the attention of local authorities and of the public generally to the provisions of this order, which regulates the landing in Great Britain of dogs brought from any country except Ireland, the Channel Islands, or the Isle of Man.

This order, which consolidates and amends the Importation of Dogs Order of 1897 and the orders amending it, takes effect from January 1, 1902, except as to Article 2, which is particularly referred to hereafter. It will be observed that no imported dog is allowed to be landed in Great Britain without a license of the Board of Agriculture obtained previous to landing.

Until March 15 next, the landing of dogs will be authorized under substantially the same conditions as to detention and isolation as have hitherto obtained. After March 15 the landing of dogs will be subject to article 2 of the order, which expressly provides that every imported dog must be detained and isolated at the expense of its owner upon premises in the occupation or under the control of a veterinary surgeon, which shall have been previously approved in writing by the board for that purpose, for a period of six calendar months, during which period the dog may not be moved from the place of detention except as provided in that article. This article does not apply in the case of an imported dog which is intended to be exported from Great Britain within forty-eight hours, or of a performing dog, with regard to the detention and isolation, of which special conditions will be imposed by the license authorizing its landing.

Condition of Licenses.

The board may insert in any license granted by them authorizing the landing of an imported dog, such further conditions as they think necessary or desirable for prescribing and regulating the detention and isolation of the dog, upon the place of detention authorized in the license, or for any of the purposes set forth in article 3 of the order.

Every dog which is brought to Great Britain from any other country except Ireland, the Channel Islands, or the Isle of Man, and which is not accompanied by a license issued by the Board of Agriculture authorizing the landing of the dog in Great Britain must at all times while on board a vessel in any port in Great Britain be (*a*) secured to some part of the vessel by a collar and chain and muzzled with a wire cage muzzle so constructed as to render it impossible for such dog while wearing the same to bite any person or animal, but not so as to prevent such dog from breathing freely or

lapping water; or (*b*) confined in an inclosed part of the vessel from which the dog cannot escape. And if any such dog die, or be lost from such a vessel, the person in charge of the dog is required forthwith to give notice of such death or loss to the board.

The memorandum A 160/A as to the importation of dogs into Great Britain from abroad, dated August 8, 1900, will cease to have effect when article 2 of this order comes into operation.

In order that as little inconvenience as possible may be caused in the enforcement of the order, the board trust that local authorities will assist them by taking steps to make its contents known as widely as possible in their districts.

T. H. ELLIOTT, *Secretary.*

4, Whitehall Place,
London, S.W.,
Dec. 12, 1901.

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HEALTH OF ANIMALS.

PAGE.

MISCELLANEOUS.

APPENDIX TO THE REPORT OF THE MINISTER OF AGRICULTURE

EXPERIMENTAL FARMS

REPORTS

OF THE

DIRECTOR	WM. SAUNDERS, LL.D.
AGRICULTURIST	J. H. GRISDALE, B. AGR.
HORTICULTURIST	W. T. MACOUN
CHEMIST	F. T. SHUTT, M.A.
ENTOMOLOGIST AND BOTANIST	JAS. FLETCHER, LL.D.
POULTRY MANAGER	A. G. GILBERT
SUPT. EXPERIMENTAL FARM, NAPPAN, N.S.	R. ROBERTSON
HORTICULTURIST " " "	W. S. BLAIR
SUPT. EXPERIMENTAL FARM, BRANDON, MAN.	S. A. BEDFORD
" " " INDIAN HEAD, N.W.T.	ANGUS MACKAY
" " " AGASSIZ, B.C.	THOS. A. SHARPE

FOR

1902

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1903

[No. 16—1903.]

APPENDIX

TO THE

REPORT OF THE MINISTER OF AGRICULTURE

ON

EXPERIMENTAL FARMS

OTTAWA, December 1, 1902.

SIR,—I beg to submit for your approval the sixteenth annual report of the work done, and in progress, at the several experimental farms.

In addition to my report, you will find appended, reports from the following officers of the Central Experimental Farm: From the Agriculturist, Mr. J. H. Grisdale; from the Horticulturist, Mr. W. T. Macoun; from the Chemist, Mr. Frank T. Shutt, and from the Entomologist and Botanist, Dr. James Fletcher. A report is also submitted from the Poultry Manager, Mr. A. G. Gilbert.

From the Branch Experimental Farms there are reports from Mr. R. Robertson, Superintendent, and from Mr. W. S. Blair, Horticulturist of the Experimental Farm for the Maritime Provinces, at Nappan, Nova Scotia; from Mr. S. A. Bedford, Superintendent of the Experimental Farm for Manitoba, at Brandon; from Mr. Angus Mackay, Superintendent of the Experimental Farm for the North-west Territories, at Indian Head, and from Mr. Thos. A. Sharpe, Superintendent of the Experimental Farm for British Columbia, at Agassiz.

In these reports there will be found the results of many important and carefully conducted experiments in agriculture, horticulture and arboriculture, the outcome of practical work in the fields, barns, dairy and poultry buildings, orchards and plantations at the several experimental farms; also of scientific investigations in the chemical laboratory and of information gained from the careful study of the life histories and habits of injurious insects and the methods by which noxious weeds are propagated and spread, together with the most practical and economical measures for their destruction. In the report of the Entomologist and Botanist will also be found particulars of the experiments and observations which have been made during the past year in connection with the Apiary.

The large and constantly increasing demand by the farmers of the Dominion for the publications issued from the experimental farms and the rapidly extending correspondence is a gratifying evidence of the desire for information among this class of the community, also of the high esteem in which the records of the work of the farms are held. It is hoped that the facts brought together in the present issue will be found of much practical value to the Canadian farmer and fruit-grower and that they may assist in advancing agriculture and horticulture in this country.

I have the honour to be, sir,

Your obedient servant,

WM. SAUNDERS,

Director of Experimental Farms.

To the Honourable

The Minister of Agriculture,

Ottawa.

ANNUAL REPORT

ON THE

EXPERIMENTAL FARMS.

REPORT OF THE DIRECTOR, WM. SAUNDERS, LL.D., F.R.S.C., F.L.S.

The farmers of the Dominion of Canada have good reason to be satisfied with the results of the harvest of 1902. Seldom have the crops been so generally good. Both from the east and the west have come gratifying reports of the exceptionally good character of the harvest.

In Ontario the yield of hay has been excellent, and oats—now much the largest of the grain crops—have given the heaviest returns on record, averaging from 20 to 25 per cent above past years, and the grain is unusally good. Ontario also rejoices in a heavy crop of winter wheat much above the average, a crop almost free this year from insect injury and but little affected by rust. Spring wheat and barley have also given gratifying returns.

In the benefits arising from abundant crops of these important cereals, Quebec, the Maritime Provinces and the Western Provinces and Territories have largely shared; indeed it is doubtful if the farmers of Canada have ever experienced a season so generally satisfactory as that of 1902. In addition to the abundant crops of grain and hay the pastures have been excellent, and thus the dairy and stock industries have also prospered. In the Eastern Provinces and in British Columbia the yield of field roots has been satisfactory, and potatoes which in some districts have suffered from rot have on the whole yielded well.

Pease have been much injured in many localities by the curculio or pea weevil, and the crops of Indian corn owing to the cool summer have not matured as well as usual but these are comparatively small items in the products of the country, and present no serious offset to the abundant crops of cereals and grasses.

It is gratifying to note the rapid improvement going on in all lines of agriculture in Canada. Farmers are paying more attention to the thorough cultivation of the soil, to the proper care and use of barn-yard manure, to the enriching of their land by the ploughing under of clover, also to the selection of the most productive sorts of grain for sowing. The unusually large crop of the past season, while due no doubt in part to favourable weather is also due in part to better conditions brought about by more intelligent farming.

For sixteen years past the Dominion Experimental Farms have enlisted the co-operation of a great host of farmers from the Atlantic to the Pacific in a genera experimental testing of promising varieties of grain and other important farm crops, with the view of ascertaining which are best adapted to the varying climates and soils found in different parts of this country. During the past seven years an average of more than thirty thousand Canadian farmers have thus associated themselves each year with the Experimental Farms. Seven years' experience with such an army of workers, backed as it has been by continued and helpful tests at the experimental farms and the distribution of much information on the subject, has resulted in the introduction almost everywhere of better and more productive sorts of cereals, and this has doubtless been an important factor in the large harvest of 1902. Where difficulties present themselves in farm work, the farmer can consult the publications he receives from the experimental farms and if these do not give him all the information he needs he can write the officers of the farms whose large experience is at his command and from whom he will receive advice suited to his conditions. By the free use of such timely aid, always available, together with the other helpful measures devised both by the Dominion and Provincial Governments the farmers of this country are advancing rapidly in intelligence and experience, and the outlook for much greater progress in agricultural affairs is very bright.

The accompanying annual report, the sixteenth of the series, will be found to contain a large amount of practical information which it is hoped will be helpful to farmers in every part of Canada.

EXPERIMENTAL WORK

CONDUCTED AT THE CENTRAL EXPERIMENTAL FARM OTTAWA, ONTARIO.

EXPERIMENTS WITH OATS.

Ninety-seven varieties of oats have been under trial at the Central Experimental Farm during 1902, for the purpose of ascertaining which are the most productive, and which are the earliest in ripening. The soil on which these oats were sown was very uniform in character, a clay loam of good quality more or less mixed with sandy loam. The previous crop was field roots. The land received a dressing during the winter of 1900-1901 of about twelve tons of fresh barn-yard manure per acre, which was placed on the frozen ground in small heaps of about one-third of a cart load each, and spread and ploughed under in the spring. No manure has been applied since. In the autumn of 1901 after the roots were gathered, the land was ploughed about seven inches deep and left in that condition until the following spring, when it was cultivated twice with a two-horse cultivator and harrowed twice with the smoothing harrow before the oats were sown.

Seventy-one of these varieties were sown on April 18, the remainder on April 22 on plots of one-fortieth of an acre each. The seed used in each case was in the proportion of two bushels per acre.

By consulting the following table it will be seen that oats have given above an average crop this year. Forbes, one of the new cross-bred sorts introduced last year, a cross of Giant Cluster with Prize Cluster, stands second on the list at Ottawa with a yield of 85 bushels 30 lbs. per acre.

OATS—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
1	Improved American.	Aug. 14	118	54—56	Stiff.....	8½—10	Branching	90	20	33	Slightly.
2	Forbes	" 25	125	56—58	Medium..	9½—11	Sided.....	85	30	32½	Badly.
3	Sensation.....	" 12	116	56—58	Weak ...	8¾—10	Branching	83	18	34	"
4	White Russian. ...	" 13	117	50—52	Medium..	8 — 9½	"	83	18	33	"
5	Siberian.....	" 14	118	52—54	Stiff.....	10 —11	"	82	12	30½	Considerably.
6	Atlantic.....	" 12	112	47—49	Medium..	8 — 9½	"	82	12	33	Badly.
7	Banner	" 10	114	51—53	" ..	8½— 9½	"	81	6	30	"
8	Columbus..... .	" 12	116	50—52	Weak	7 — 8½	"	81	6	30½	"
9	Flying Scotchman...	" 13	117	50—52	Medium..	8½—10	"	80	—	32	"
10	Salzer's Big Four....	" 14	118	52—54	Stiff.....	8½—10	"	78	28	31½	Slightly.
11	New Zealand..	" 19	123	58—60	"	12½—13½	Sided. ...	77	22	35	Considerably.
12	White Giant.....	" 13	117	56—58	"	9½—10½	Branching	77	22	29½	"
13	Holstein Prolific	" 13	117	52—54	Medium..	8½—10	"	77	22	30½	"
14	Early Golden Prolific	" 13	117	48—50	Weak	9½—11	"	77	22	28½	Badly.
15	Virginia White Abundance.	" 11	111	46—48	"	8 — 9½	"	77	22	32½	"
16	Probstey	" 12	112	52—54	Stiff.....	9½—10½	"	77	22	34	"
17	Golden Beauty.....	" 9	113	50—52	"	8½—10	"	76	16	32½	"
18	Newmarket	" 7	111	48—50	Medium..	8 — 9½	"	76	16	33	"
19	Hazlett's Seizure....	" 14	118	55—57	Stiff.....	10 —11½	"	75	10	33½	Slightly.
20	Danish Island .. .	" 12	116	51—53	Medium..	8½—10	"	75	10	29	Badly.
21	Buckbee's Illinois...	" 12	116	53—55	" ..	8 — 9½	"	75	10	35	Considerably.
22	Anderbecker..	" 12	112	48—50	" ..	8½—10	"	75	10	32½	Badly.
23	20th Century	" 13	117	50—52	Stiff.....	9½—10½	"	72	32	31	Considerably.
24	Mennonite.....	" 14	118	50—52	Weak	9 —10½	"	72	31	30	Badly.
25	Waverley	" 12	116	58—60	Stiff.....	9 —10½	"	71	26	31½	"
26	Bestehorn's Abund'ce	" 13	113	48—50	Medium..	8 — 9½	.	71	26	30	"
27	Australian	" 22	122	50—52	Stiff.....	10 —11½	Sided.....	71	26	33½	Slightly.
28	White Schonen.....	" 13	117	50—52	"	8½—10	Branching	70	20	32	Considerably.
29	Joanette	" 11	115	44—46	Medium.	8 — 9½	"	70	20	35	"
30	Brandon	" 14	118	58—60	Weak	10½—12	Half sided	70	20	30½	"
31	Cream Egyptian	" 12	116	56—58	Stiff.....	9 —10½	"	70	20	31½	Badly.
32	American Beauty....	" 7	111	50—52	"	8½—10	Branching	69	14	35½	"
33	Irish Victor.....	" 13	117	50—52	" ...	8 — 9½	"	69	14	33	Considerably.
34	Scottish Chief.	" 10	110	48—50	Medium..	8½—10	"	69	14	34	Badly.
35	Wide Awake.....	" 12	116	49—51	Stiff.....	9 —10½	"	68	8	31	"
36	Early Gothland.	" 12	116	47—49	Medium..	10 —11½	Half sided	68	8	28	"
37	American Triumph..	" 13	117	52—54	Stiff.....	8 — 9½	Branching	68	8	30	"
38	Abundance..	" 13	117	49—51	"	8½—10	"	67	2	31	Considerably.
39	Improved Ligowo...	" 10	114	44—46	"	7 — 8½	"	67	2	36½	Badly.
40	Goldfinder.....	" 14	118	46—48	"	8 — 9½	Half sided	65	30	28	"
41	Lincoln.....	" 13	117	53—55	"	8½— 9½	Branching	65	30	31½	"
42	Selchower	" 14	114	56—58	"	9½—11	Sided.....	65	30	31	"
43	Great Northern.. ..	" 14	114	53—55	Medium..	8½—10	Branching	65	30	28	"
44	Bavarian..	" 13	117	52—54	Stiff.....	8½—10	"	64	24	31	"
45	Black Beauty.....	" 13	117	50—52	Medium..	8½—10	"	64	24	31	Considerably.
46	Kendal Black.....	" 13	117	56—58	Stiff.....	9 —10½	Half sided	64	24	35	Badly.
47	Salines	" 19	123	61—63	Medium..	9½—11	Branching	64	24	30	Considerably.
48	Holland.....	" 19	123	57—59	" ..	11 —12½	Sided. ..	64	24	27	Badly.
49	Pense White.....	" 13	113	48—50	" ..	8 — 9½	Half sided	63	18	30	"
50	Prolific Black Tartarian	" 13	117	52—54	Stiff.....	8½—10	Sided. ...	63	18	33	"
51	Wallis.....	" 7	111	52—54	Medium..	9 —11	Branching	63	18	34	"
52	Early Maine.....	" 13	117	50—52	Stiff.....	9 —10½	"	62	12	30	"
53	Olive, Black..	" 13	117	57—59	Medium..	10 —11½	Half sided	62	12	33½	"
54	Pense, Black.....	" 12	116	58—60	Stiff.....	10 —11½	"	62	12	35	"
55	Master	" 14	118	50—52	Medium..	10 —11½	"	62	12	30	"
56	Russell, Half Sided..	" 13	113	55—57	" ..	10½—12	"	62	12	30	"
57	Duppaner Summer, No. 5	" 16	116	49—51	Stiff.....	9 —10½	Branching	62	12	33	Considerably.
58	Thousand Dollar....	" 13	117	50—52	"	8½—10	"	61	6	33	Badly.
59	Golden Tartarian....	" 19	123	59—61	"	12 —13½	Sided.....	61	6	29	"
60	Bayonet	" 16	116	48—50	Medium..	8½—10	Branching	61	6	30	Considerably.

OATS—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
61	Golden Giant.	Aug. 18	122	54—56	Stiff	10 —11½	Sided	61	6	28½	Considerably.
62	Bonanza	" 7	111	49—51	Weak	10 —11½	Branching	60	—	32½	Badly.
63	Milford, Black	" 13	117	51—53	Stiff	9 —11	Half sided	60	—	34½	"
64	Early Blossom	" 15	119	54—56	Medium	9½—11	"	60	—	27	"
65	Milford, White	" 15	119	53—55	Stiff	9½—10½	"	60	—	33	"
66	Uberfluss	" 14	114	50—52	"	9½—10½	Branching	60	—	32	Considerably.
67	Russell, Branching	" 18	118	53—55	Medium	11 —12½	"	60	—	32	"
68	Leutenwitzer	" 12	116	51—53	"	10 —11½	"	60	—	30½	Badly.
69	Oderbruch	" 14	118	56—58	"	9½—11	Half sided	58	28	29	"
70	Black Mesdag	" 2	106	47—49	"	9 —10	Branching	58	28	30½	"
71	Tartar King	" 10	114	53—55	Stiff	10 —11½	Sided	56	16	36	"
72	Abyssinia	" 13	117	53—55	Medium	8½—10	Half sided	56	16	33½	"
73	California Prolific, Black	" 14	118	52—54	Stiff	10 —11½	Sided	56	16	32	"
74	Sorgenfrei	" 12	112	46—48	Weak	8½—10	Branching	56	16	35	"
75	Swedish Select No. 2788	" 19	119	48—50	Medium	8½— 9½	"	56	16	34	Considerably.
76	Oxford	" 13	117	54—56	Weak	11 —12	Half sided	56	16	31½	"
77	King	" 13	117	50—52	Stiff	9 —10½	Branching	56	16	28½	"
78	Aitken Black	" 14	118	53—55	Weak	11½—13½	"	56	16	30	Badly.
79	Black No. 6 Sumner	" 14	114	58—60	Stiff	9½—10	Sided	55	10	26½	"
80	Rosedale	" 13	117	51—53	"	9 —10½	Half sided	55	10	31½	"
81	Early Archangel	" 14	118	53—55	"	11 —12½	Branching	54	4	35½	"
82	Olive, White	" 16	116	56—58	Medium	9 —10½	Half sided	54	4	30	Considerably.
83	Rennie's Prize White	" 14	114	44—46	Stiff	8 — 9½	Branching	54	4	34	Badly.
84	Cromwell	" 14	118	53—55	"	11½—13	Half sided	54	4	33	"
85	Pioneer	" 10	114	44—46	"	9 —10½	Branching	54	4	33	"
86	Miller	" 13	117	51—53	Medium	8½—10	"	54	4	30	"
87	Beseler	" 13	117	56—58	Stiff	10½—12	"	52	32	32	"
88	Russell	" 14	118	56—58	Weak	10½—12	"	52	32	33½	"
89	Victoria Prize	" 7	111	46—48	"	9½—10½	"	52	32	33	"
90	Dixon	" 15	115	58—60	Stiff	9½—10½	Sided	50	20	32½	"
91	Kendal White	" 16	116	50—52	"	9½—10½	Half sided	50	20	34	Considerably.
92	Zhelanni, No. 2963	" 13	113	51—53	Weak	10 —11½	Branching	50	20	26½	Badly.
93	Eureka	" 18	118	44—46	Medium	8½—10	"	48	8	32	Considerably.
94	Liberty	" 20	120	51—53	"	9½—11	"	45	30	29	"
95	Tobolsk No. 2800	" 13	117	54—56	Weak	10 —11½	"	45	30	31½	Badly.
96	Scotch Potato.	" 17	121	58—60	"	9½—10½	"	36	16	28	Considerably.
97	Longhoughton	" 16	120	53—55	"	11 —12½	"	31	26	33	Badly.

EXPERIMENTS WITH BARLEY.

Seventy-three different sorts of barley have been tested in the trial plots at the Central Experimental Farm during 1902. Thirty-one of these have been two-rowed sorts and forty-two six-rowed. The land on which the barley was sown, was adjoining that used for oats and was of the same character and quality and had similar manuring and preparation. The size of the plots was one-fortieth of an acre each, fifty of them were sown on April 17, the remainder on April 21. The two-rowed sorts were sown at the rate of two bushels per acre, and the six-rowed at the rate of one and three-quarter bushels per acre.

It will be seen that both the two-rowed and six-rowed sorts have given larger crops than usual.

TWO-ROWED BARLEY—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre. Bush.	Yield per Acre. Lbs.	Weight per Bushel.	Rusted.
				Inches.		Inches.			Lbs	
1	French Chevalier	Aug. 4	109	47—49	Medium	2¾—3¼	68	16	53	Slightly.
2	Danish Chevalier	" 4	109	49—51	"	4½—5	64	8	50	"
3	Canadian Thorpe	" 4	109	46—48	Stiff	2½—3	62	24	53½	No rust.
4	Fichtel Mountain	" 5	106	40—42	Medium	4 —4½	60	40	53	Slightly.
5	Kinver Chevalier	" 3	108	50—52	Weak	4½—5	60	..	50½	"
6	Duck-bill	" 9	110	40—42	Stiff	3½—4	56	32	49	"
7	Gordon	" 4	109	50—52	Medium	2½—3¼	55	40	51	"
8	Fulton	" 3	108	53—55	"	2¾—3¼	55	..	52	"
9	Logan	" 4	109	56—58	"	4 —4½	54	8	50½	"
10	Bolton	July 31	105	50—52	"	4 —4½	53	16	53	"
11	Dunham	Aug. 4	109	52—54	"	3¾—4¼	53	16	51	"
12	Beaver	July 31	105	52—54	"	3½—4¼	52	24	51½	"
13	Pelham	Aug. 1	102	41—43	Stiff	3¾—4¼	52	24	52½	"
14	Newton	" 6	111	47—49	"	3 —3¾	50	40	54½	"
15	Standwell	" 5	110	46—48	"	3 —3½	50	..	51½	"
16	Victor	July 31	105	50—52	"	4 —4½	48	16	52½	"
17	Harvey	Aug. 4	109	52—54	"	3½—4¼	48	16	51½	"
18	Pacer	" 1	102	48—50	Medium	3½—4	48	16	52½	"
19	Sidney	" 3	108	49—51	Weak	3¼—4	46	32	52	"
20	Prize Prolific	" 7	112	43—45	"	4 —4½	46	32	49½	"
21	Monck	" 12	113	47—49	Medium	3 —3½	46	32	50½	Considerably.
22	Nepean	July 31	105	46—48	Stiff	3 —3¼	46	32	53	Slightly.
23	Clifford	" 31	105	55—57	"	3 —3½	46	32	53	"
24	Invincible	Aug. 6	111	44—46	"	3 —3¾	45	40	54	"
25	Oregon	" 12	113	41—43	Medium	4½—5	45	40	48	Badly.
26	Jarvis	" 2	107	54—56	Stiff	4 —4½	45	..	51	Slightly.
27	Plumage from Norway	" 12	113	40—42	"	3 —3¾	41	32	52	"
28	Bestehorn's Kaiser	" 21	122	44—46	Medium	3½—3¾	41	32	51	"
29	Leslie	" 4	109	47—49	Stiff	4 —4½	39	8	52	"
30	Improved Thanet	" 19	120	32—34	Medium	4¼—4¾	24	8	47½	"
31	Rigid	" 19	120	39—41	"	3¾—4½	22	24	50½	"

SIX-ROWED BARLEY—TEST OF VARIETIES.

1	Blue Long Head	Aug. 3	108	38—40	Medium	2½—3	74	8	46	Slightly.
2	Yale	July 31	105	50—52	Weak	2¾—2¾	73	16	51	"
3	Trooper	" 29	103	51—53	Medium	3¼—3¾	65	40	51½	"
4	Stella	" 31	105	46—48	"	2½—3	65	40	51½	"
5	Odessa	" 30	104	54—56	Stiff	3¼—3¾	65	..	51	"
6	Mensury	" 31	105	52—54	Medium	3¼—4	64	8	50	"
7	Hulless Black	" 30	104	36—38	Weak	2 —2¼	63	16	61½	"
8	Surprise	" 30	104	46—48	Medium	2¼—2¾	63	16	52	"
9	Nugent	Aug. 1	106	50—52	"	3 —3½	60	40	48	"
10	Brome	" 2	107	49—51	Weak	3½—4	60	40	51	"
11	Pioneer	" 2	107	49—51	Stiff	3¾—4	60	..	49	"
12	Princess Sialof	" 9	110	38—40	"	4 —4½	58	16	51	Considerably.
13	Hulless White	July 26	100	39—41	Medium	2½—3	57	24	61	Slightly.
14	Salzer's Silver King	Aug. 1	102	44—46	Weak	3 —3½	55	40	50	"
15	Garfield	July 30	104	49—51	Medium	2¼—2¾	55	..	51½	"
16	Petschora	Aug. 1	106	43—45	Weak	2¾—3¼	53	16	47½	"
17	Oderbruch	July 30	104	44—46	Stiff	2½—3	52	24	52½	"
18	Argyle	Aug. 4	109	49—51	Weak	2½—3	51	32	50	"
19	Success	July 27	101	40—42	Medium	2½—3	50	40	47½	"
20	Sisolsk Spring No. 2562	" 30	100	44—46	"	3 —3½	50	40	48½	"
21	Common	" 30	104	40—42	"	2½—3	50	40	52	"
22	Munro	" 30	100	38—40	"	2½—3	50	40	51	"
23	Vanguard	" 29	103	45—47	"	3¾—4¼	50	40	50½	"
24	Rennie's Improved	" 30	104	46—48	Weak	2¼—2¾	49	8	51	"
25	Lytton	" 31	101	39—41	"	3 —3½	49	8	50½	Considerably.
26	Excelsior	" 27	101	50—52	Stiff	3¼—3¾	48	16	45	Slightly.
27	Royal	" 29	103	45—47	"	3¾—4¼	47	24	51½	"
28	Albert	" 30	104	45—47	Medium	3 —3½	47	24	52¾	"
29	Summit	" 29	103	47—49	Stiff	3½—4	47	24	51½	"

SIX-ROWED BARLEY—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.	Bush.	Lbs.	Lbs	
30	Mansfield	Aug. 4	109	46—48	Medium	3 —3½	46	32	50½	Slightly.
31	Empire	" 1	106	44—46	"	2¾—3¼	46	32	51	"
32	Champion	July 27	101	50—52	Stiff	3 —3½	45	40	46	"
33	Parkin	Aug. 1	102	40—42	Weak	2¾—3¼	45	40	45	"
34	No. 8 from Norway	" 1	102	40—42	"	2¾—3¼	45	..	49	"
35	Beardless from Salzer	July 27	97	44—46	Medium	2¾—3	44	8	45½	"
36	Chinese Hulless	Aug. 3	104	37—39	Weak	2¼—2¾	40	..	61	"
37	Hordeum Chousk (Hulless)	July 28	98	24—26	"	2¼—2¾	40	..	57	"
38	Claude	" 31	105	45—47	Stiff	2¾—3¼	37	24	50½	"
39	Turkestan	" 28	98	22—24	Weak	2¾—3¼	36	32	55½	"
40	Phoenix	" 29	103	42—44	Medium	2¾—2¾	36	32	52	"
41	Baxter	" 29	103	45—47	"	2¾—3¼	35	..	51½	"
42	Blue Short Head	Aug. 16	117	28—30	Stiff	2 —2½	27	24	41	Considerably.

EXPERIMENTS WITH SPRING WHEAT.

One hundred and nineteen varieties of this grain were under trial during 1902. The soil was adjoining that on which the oats were grown, was similar in character and quality and received the same treatment and preparation. Most of the varieties were sown on April 15, the remainder on April 21. The size of the plots was one-fortieth of an acre each and the grain was sown in the proportion of 1½ bushels per acre.

SPRING WHEAT—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bush.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
1	Pringle's Champlain	Aug. 8	115	54—56	Medium	2½—3¼	Bearded.	46	—	61½	Badly.
2	Dawson	" 15	122	58—60	Stiff	4½—5½	Beardless.	44	40	61	Slightly.
3	Rio Grande	" 13	120	58—60	"	4¾—5½	Bearded.	44	—	63½	"
4	Preston	" 8	115	55—57	"	3½—4½	"	43	20	63	"
5	Huron	" 15	122	54—56	"	4¾—5¼	"	42	40	62	"
6	Red Fern	" 15	122	52—54	"	4 —4½	"	42	40	62½	"
7	Roumanian	" 17	124	56—58	Medium	2¾—3¼	"	42	40	64	"
8	White Russian	" 16	123	54—56	Stiff	4 —4½	Beardless.	42	—	60½	"
9	Herisson Bearded	" 16	123	49—51	Medium	2¼—2¾	Bearded.	42	—	63½	"
10	Admiral	" 15	122	58—60	"	4½—5	Beardless.	42	—	60½	"
11	Blenheim	" 14	121	59—61	Stiff	3½—4¼	Bearded.	42	—	61	"
12	Hungarian	" 14	121	55—57	Medium	3¾—4¼	"	40	40	62½	Considerably.
13	Dawn	" 8	115	56—58	Stiff	3½—4	Beardless.	40	40	63½	Slightly.
14	Crown	" 11	118	58—60	"	4 —4½	Bearded.	40	40	60½	"
15	Crawford	" 8	115	53—55	"	3 —3¾	Beardless.	40	40	62	"
16	Laurel	" 13	120	58—60	"	4¾—5½	"	40	40	60½	"
17	Bishop	" 8	115	51—53	"	3½—4¼	"	40	40	61	Considerably.
18	Percy	" 8	115	58—60	"	3¾—4¼	"	40	—	62	"
19	Countess	" 11	118	53—55	"	3 —3½	"	40	—	61	"
20	Monarch	" 16	123	54—56	"	3½—4¼	"	39	20	61	Slightly.

SPRING WHEAT—TEST OF VARIETIES—*Continued.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
21	Plumper	Aug. 13	120	53—55	Weak	3½—4¼	Bearded.	39	20	62	Slightly.
22	Ebert	" 3	110	50—54	Stiff	3 —3¾	Beardless.	39	20	61	"
23	Red Fife	" 14	121	53—55	"	4 —4½	"	38	40	61	"
24	White Fife	" 15	122	56—58	"	4 —4½	"	38	40	61	"
25	Dion's	" 14	121	56—58	"	3¾—4¼	Bearded.	38	40	63	"
26	Vernon	" 16	123	54—56	Medium	3¾—4½	"	38	40	61	Considerably.
27	Campbell's White Chaff	" 14	121	54—56	Stiff	3½—4¼	Beardless.	38	—	62	Slightly.
28	Benton	" 15	122	55—57	Weak	3¾—4¼	"	38	—	61½	"
29	Byron	" 15	122	52—54	Medium	4 —4½	Bearded.	38	—	62½	"
30	Clyde	" 17	124	58—60	"	4 —4¾	Beardless.	38	—	61	Considerably.
31	Essex	" 18	125	57—59	"	3¾—4½	"	38	—	62½	Slightly.
32	Prospect	" 14	121	53—55	Weak	3½—4¼	"	38	—	62½	"
33	Minnesota No. 149	" 16	123	48—50	Stiff	4 —4¾	"	38	—	62	"
34	Australian No. 19	" 16	123	51—53	"	4¾—5¼	"	38	—	61	"
35	White Connell	" 15	122	48—50	"	3¾—4¼	"	37	20	61½	"
36	Japanese	" 12	119	50—52	"	2½—3¼	Bearded.	37	20	61½	"
37	Robin's Rust Proof	" 15	122	58—60	Medium.	3¾—4¼	Beardless.	37	20	62½	"
38	Minnesota No. 181	" 15	122	54—56	Stiff	4½—5¼	"	37	20	60	"
39	Australian No. 13	" 17	124	50—52	"	4¾—4¾	"	37	20	60½	"
40	Colorado	" 11	118	55—58	Medium	3 —3½	Bearded.	36	40	62½	Badly.
41	Hastings	" 7	114	57—59	Stiff	3¾—4¼	Beardless.	36	40	62½	Considerably.
42	Rideau	" 6	113	49—51	Weak	3 —3¾	"	36	40	60	Badly.
43	Advance	" 14	121	56—58	Stiff	4 —4½	Bearded.	36	40	61½	Slightly.
44	Progress	" 15	122	58—60	"	4½—5¼	Beardless.	36	40	60½	"
45	Nixon	" 15	122	56—58	Medium	4 —4¾	"	36	40	61	"
46	Minnesota No. 169	" 15	122	51—53	Stiff	4 —4½	"	36	40	61	"
47	Minnesota No. 163	" 16	123	53—55	"	4½—5¼	"	36	40	61	"
48	Mason	" 13	120	55—57	Medium	3½—4¼	"	36	—	63	Considerably.
49	Lakefield	" 14	121	58—60	Stiff	4 —4½	"	36	—	60	Slightly.
50	Beaudry	" 11	118	52—54	Medium	3 —3½	Bearded.	35	20	62	"
51	Fraser	" 1	108	48—50	Stiff	2¾—3¼	"	35	20	61	"
52	Norval	" 7	114	55—57	"	3 —3¾	"	35	20	62	Badly.
53	Morley	" 15	122	58—60	"	3¼—4¼	Beardless.	35	20	62	Slightly.
54	Harper	" 15	12	55—57	"	3¾—4¼	"	35	20	60	"
55	Wellman's Fife	" 15	122	52—54	"	4¾—5¼	"	34	40	61½	"
56	Harold	" 3	110	48—50	Weak	2½—3¼	Bearded.	34	40	61½	Considerably.
57	Blair	" 8	115	44—46	Stiff	2½—3	Beardless.	34	40	62	Slightly.
58	Red Swedish	" 12	119	57—59	"	4½—5¼	Bearded.	34	—	62½	"
59	Gehun	" 6	113	47—49	Weak	2½—3	"	34	—	59	"
60	Captor	" 11	118	55—57	Stiff	3½—4	Beardless.	34	—	60½	"
61	Robson	" 13	120	57—59	"	5½—6½	"	34	—	59	"
62	Orleans	" 15	122	58—60	"	4¾—5¼	"	34	—	61½	"
63	Markham	" 16	123	57—59	"	4½—5¼	"	34	—	60½	Considerably.
64	Ladoga	" 11	118	55—57	"	3½—4½	Bearded.	33	20	61	"
65	Beauty	" 15	122	57—59	"	4½—5¼	Beardless.	33	20	59½	Slightly.
66	Florence	" 14	121	54—56	"	3 —3¾	"	33	20	61	Considerably.
67	Felbrig Australian No. 7	" 16	123	55—57	"	4¾—5¼	"	33	20	59	Slightly.
68	Australian H	" 19	120	52—54	Medium	4½—5	"	33	20	60½	Considerably.
69	Emporium	" 16	123	57—59	Stiff	5 —5½	Bearded.	32	40	62	Slightly.
70	Alpha	" 16	123	54—56	"	4¾—5	Beardless.	32	40	61	"
71	Weldon	" 15	122	59—61	Medium	4½—5¼	"	32	4	60	"
72	Tracey	" 18	119	54—56	Stiff	4½—5	"	32	40	61	"
73	Boyle	" 15	122	60—62	"	4 —4¾	"	32	40	61	"
74	Australian No 33	" 15	122	57—59	"	3¼—4	"	32	—	60	"
75	Oxbow	" 16	117	46—48	"	3¾—4½	"	32	—	60	"
76	Chester	" 14	121	50—52	"	3½—4¼	"	31	20	63½	"
77	Stanley	" 14	121	56—58	"	4½—5¼	"	30	40	62	"
78	Dayton	" 8	115	56—58	Weak	2¾—3½	Bearded.	30	40	59	Considerably.
79	Newdale	" 16	123	53—55	Stiff	3½—4½	Beardless.	30	40	62½	"
80	Australian No. 1	" 14	115	50—52	"	4 —4¾	"	30	40	60½	Slightly.
81	Australian No. 12	" 18	119	50—52	Medium	4¼—5	"	30	40	60½	"
82	Australian No. 28	" 15	116	51—53	Stiff	4 —4¾	"	30	40	61	"

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
								Bush.	Lbs.	Lbs.	
				Inches.		Inches.					
83	Australian No. 9....	Aug. 16	123	52—54	Stiff....	4¼—5	Bearded..	30	40	60½	Considerably.
84	Cartier	" 15	122	49—51	"	3½—4¼	" ..	30	—	62½	Slightly.
85	Speltz.....	" 14	121	48—50	"	2¼—3	" ..	30	—	38	"
86	Early Riga.....	" 7	114	50—52	" .. .	2½—3	Beardless.	29	20	60	Considerably.
87	Australian No. 15...	" 16	117	45—47	"	3¾—4½	" ..	29	20	60	"
88	Australian No. 27...	" 16	123	56—58	"	4½—5¼	" ..	29	20	60	Slightly.
89	Angus.....	" 13	120	55—57	Medium..	4 —4¾	" ..	28	40	63	"
90	Australian No. 25...	" 16	123	53—55	Stiff	4¾—5¼	" ..	28	40	60	"
91	Steinmedal fr. Victoria, Aust.....	" 16	117	46—48	"	3½—4¼	" ..	28	40	59	Badly.
92	Dufferin.....	" 13	120	53—55	Medium .	3½—4¼	Bearded..	28	—	61½	Considerably.
93	Australian No. 18...	" 16	117	47—49	Stiff.....	4 —4½	Beardless.	28	—	60½	Slightly.
94	Australian No. 10...	" 16	123	47—49	"	4 —4¾	" —	27	20	62	"
95	Goose.	" 15	122	53—55	"	2¾—3¼	Bearded. .	26	—	62½	"
96	Spence.....	" 11	112	50—52	"	2¾—3¼	" ..	24	40	62½	"
97	Cassel.....	" 15	122	57—59	"	4¼—5	Beardless.	24	—	61	"
98	Washington No. 2959	" 16	117	44—46	Medium..	3 —3½	Bearded. .	24	—	29½	"
99	Washington No. 5643	" 16	117	50—52	Medium..	3¾—4¼	" ..	23	20	60¾	"
100	Washington No. 5646	" 17	118	43—45	" ..	2½—3	" ..	22	40	63	"
101	Grant	" 16	117	48—50	Weak	4 —4¾	" ..	22	—	60	"
102	Washington No. 5645	" 16	121	48—50	S'iff. ...	2¾—3½	" ..	22	—	60	Considerably.
103	Australian No. 21...	" 11	112	42—44	"	3 —3½	Beardless.	20	40	53½	"
104	Australian No. 14...	" 12	113	46—48	"	3½—4	" ..	19	20	58	Badly.
105	Washington No. 5642	" 16	117	53—55	Medium..	2½—3	Bearded. .	19	20	60	"
106	Washington No. 5644	" 16	117	50—52	Stiff.....	2¾—3½	" ..	19	20	58	Considerably.
107	Australian No. 11...	" 16	117	48—50	"	4 —4¾	Beardless.	18	—	58	"
108	Leutewitzer Sand...	" 9	110	40—42	"	3 —3½	Bearded. .	18	—	54	Badly.
109	Strubes.....	" 16	117	49—51	"	4 —4¾	" ..	17	20	60	Considerably.
110	Perron (Les Eboulements)	" 11	112	44—46	"	3 —3½	Beardless.	16	40	57	Badly.
111	Powell.....	" 12	113	43—45	"	3 —3½	" ..	14	40	57½	Slightly.
112	Washington No. 5639	" 19	120	41—43	Weak	3 —3½	Bearded. .	14	40	58	"
113	Washington No. 5800	" 16	117	49—51	Medium..	2½—3¼	" ..	14	40	56	Badly.
114	Kingsford	" 12	113	46—48	Stiff.....	3 —3¾	Beardless.	13	20	57	"
115	Redpath.	" 17	118	45—47	"	4¼—4¾	" ..	12	40	59	Slightly.
116	Australian No. 2...	" 16	117	48—59	Weak . ..	3¾—4½	" ..	10	40	54	Considerably.
117	Washington No. 5799	" 16	117	44—46	Medium..	5½—6¼	Bearded. .	10	40	54	Badly,
118	Polonian....	" 18	119	40—42	Stiff.....	6 —6¾	" ..	8	40	52½	"

EXPERIMENTS WITH FALL WHEAT.

Twenty varieties of fall wheat were under trial last season. They were sown on September 6, 1901, on a sandy loam of good quality in plots of one-fortieth of an acre each. The grain was sown at the rate of 1¾ bushels per acre.

All the varieties wintered well, made a strong and even growth and produced good crops.

FALL WHEAT—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre. Bush.	Yield per Acre. Lbs.	Weight per Bushel. Lbs.	Rusted.
				Inches.		Inches.					
1	Dawson's Golden Chaff	July 25	322	55—57	Stiff.....	3½—4	Beardless.	53	20	60	Considerably.
2	Imperial Amber	" 26	323	58—69	Medium..	3 —3½	Bearded..	46	..	62½	Slightly.
3	Egyptian Amber.....	" 28	325	53—55	Stiff.....	2¾—3¼	" ..	45	20	61½	"
4	Surprise.	" 28	325	57—59	"	3 —3½	Beardless.	44	..	60	"
5	Jones' Winter Fife...	" 27	324	49—51	"	3 —3½	" ..	42	40	61	Considerably.
6	Reliable.....	" 27	324	48—50	"	3¼—3¾	Bearded..	41	20	62	Slightly.
7	Red Velvet Chaff....	" 27	324	57—59	"	3¼—3¾	Beardless.	41	20	61½	"
8	Gold Coin	" 26	323	50—52	"	2½—3¼	" ..	40	40	61	Considerably.
9	Poole.....	" 28	325	49—51	"	3½—4	" ..	40	..	60½	Slightly.
10	Velvet Chaff.....	" 25	322	53—55	"	2¼—3	Bearded..	40	..	62½	"
11	Buda Pesth.....	" 26	323	50—52	Medium..	2¾—3¼	" ..	40	..	61½	Considerably.
12	Golden Cross	" 29	326	43—45	Stiff.....	2 —2½	" ..	39	20	62	Badly.
13	Treadwell	" 29	326	50—52	"	2½—3	" ..	36	..	61½	Slightly.
14	Early Red Clawson ..	" 28	325	49—51	"	3¼—3¾	Beardless.	36	..	60	"
15	Long Berry Red.....	" 26	323	50—52	Weak ...	2½—3¼	Bearded..	36	..	61½	Badly.
16	Tasmania Red	" 26	323	49—51	Medium..	2¾—3¼	" ..	35	20	62	Considerably.
17	Turkey Red	" 27	324	45—47	" ..	3 —3½	" ..	34	40	62½	Slightly.
18	Pride of Illinois.. ...	" 26	323	49—51	Stiff.....	3¼—3¾	Beardless.	34	..	61½	Badly
19	Bonnell...	" 28	325	58—60	"	3¼—3¾	" ..	33	20	61	Slightly.
20	American Bronze	" 28	325	48—50	"	3¼—4	" ..	28	40	61	Considerably.

GRAIN SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY AND CLAY LOAM.

These experiments were all conducted on plots of one-fortieth acre each on both sandy loam and clay loam. It will be noticed that the crops are heaviest on the clay loam in every instance while those on the sandy loam are very variable probably owing to unevenness in the quality of the land.

WHEAT SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.
(Sown in 1902, May 3; ripe, August 18.)

Name of Variety.	1901. No. of Days Maturing.	1901. Yield per Acre. Bush.	1901. Yield per Acre. Lbs.	1902. No. of Days Maturing.	1902. Yield per Acre. Bush.	1902. Yield per Acre. Lbs.
Preston 1 bush. per acre.... ...	100	10	20	108	24	—
" 1¼ "	100	15	—	108	20	40
" 1½ "	100	19	40	108	15	20
" 2 "	100	20	20	108	10	40
" 2½ "	100	21	—	108	20	40
" 3 "	100	19	40	108	17	20

WHEAT SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.
(Sown in 1902, April 24; ripe, August 10.)

Preston 1 bush. per acre.	97	28	20	108	24	40
" 1¼ "	97	28	20	108	24	40
" 1½ "	97	29	—	108	29	20
" 2 "	97	26	20	108	28	—
" 2½ "	97	26	20	108	30	—
" 3 "	97	25	—	108	24	40

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OATS SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.

(Sown in 1902, May 3; ripe, August 17.)

Name of Variety.	1901.			1902.		
	No. of Days Maturing.	Yield per Acre. Bush.	Lbs.	No. of Days Maturing.	Yield per Acre. Bush.	Lbs.
Banner 1½ bush. per acre	96	41	6	107	60	—
" 2 "	96	59	14	107	45	30
" 2½ "	96	57	2	107	52	32
" 3 "	96	43	18	107	50	20
" 3½ "	96	31	26	107	50	20
" 4 "	96	35	10	107	54	4

OATS SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.

(Sown in 1902, April 24; ripe, August 13.)

Banner 1½ bush. per acre	92	58	28	111	63	18
" 2 "	92	65	30	111	62	12
" 2½ "	92	67	2	111	72	32
" 3 "	92	64	24	111	67	2
" 3½ "	92	61	6	111	70	20
" 4 "	92	57	22	111	67	2

BARLEY SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.

(Sown in 1902, May 3; ripe, August 5.)

Mensury 1½ bush. per acre	84	35	35	95	40	40
" 2 "	84	37	19	95	28	16
" 2½ "	84	43	11	95	27	24
" 3 "	84	42	19	95	37	24
" 3½ "	84	39	23	95	26	32
" 4 "	84	43	11	95	45	—

BARLEY SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.

(Sown in 1902, April 24; ripe, August 1.)

Mensury 1½ bush. per acre	83	37	—	99	64	8
" 2 "	83	40	35	99	70	40
" 2½ "	83	44	3	99	68	16
" 3 "	83	45	35	99	69	8
" 3½ "	83	45	35	99	65	—
" 4 "	83	44	3	99	62	24

EXPERIMENTS WITH PEASE.

Sixty-one varieties were included in the uniform trial plots during the season of 1902. The soil on which they were sown was a mixed clay and sandy loam, in some parts the clay predominated, in others it was more sandy. The previous crop was experimental plots of wheat. The land received a dressing of fresh barn-yard manure of about twelve tons per acre during the winter of 1899-1900, which was put on the frozen ground in small heaps of about one-third of a cart load each, and spread and ploughed under in the spring. No manure has been applied since. In the autumn of 1901 after the wheat was harvested the land was ploughed shallow to start shed grain and weed seeds, and ploughed again later about seven inches deep and left in that condition until the following spring, when it was cultivated twice with the two-horse cultivator and harrowed twice with the smoothing harrow before the pease were sown.

The size of the plots was one-fortieth of an acre each and the pease were sown on April 23 at the rate of two to three bushels per acre, depending on the size of the pea.

PEASE—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Yield per Acre.		Weight per Bushel.
					Inches.	Inches.	Bush.	Lbs.	Lbs.
1	Cooper	Aug. 21..	120	Medium	65—70	1¾—2¼	48	40	63
2	Mackay	" 22..	121	Strong	70—75	2¼—2⅝	46	40	62
3	Pride	" 23..	122	Medium	45—50	2¼—2¾	46	..	61
4	Nelson	" 18..	117	"	45—50	2 —2¼	46	..	63
5	Pearl	" 21..	120	Strong	70—75	2 —2½	45	20	61
6	Paragon	" 19..	118	Medium	30—35	2 —2¾	45	20	63
7	Arthur	" 18..	117	Strong	55—60	2 —2½	44	40	63
8	Fenton	" 23..	122	"	60—65	2¼—2½	44	40	62
9	Harrison's Glory	" 23..	122	"	70—75	1¾—2¼	44	40	63
10	Crown	" 22..	121	"	60—65	1¾—2¼	43	20	63
11	Canadian Beauty	" 22..	121	"	65—70	2¼—2¾	43	20	62½
12	Field Gray	" 18..	117	Medium	60—65	1½—2	42	40	62½
13	Prince Albert	" 23..	122	Strong	75—80	2¼—3	42	40	61½
14	Alma	" 22..	121	"	55—60	2¼—3	42	..	61
15	Kent	" 22..	121	"	55—60	2½—3	42	..	61½
16	Prince	" 24..	123	"	70—75	2¼—2⅝	42	..	62
17	Early Britain	" 23..	122	"	45—50	2¼—2⅝	41	20	61½
18	Daniel O'Rourke	" 23..	122	"	70—75	1¾—2¼	40	40	63½
19	Golden Vine	" 21..	120	"	60—65	1¾—2¼	40	..	63
20	White Wonder	" 20..	119	Medium	30—35	2 —2¼	39	20	63
21	English Gray	" 24..	123	Strong	60—65	2¼—2⅝	38	40	62½
22	Prussian Blue	" 21..	120	"	70—75	2¼—2⅝	38	..	63
23	Black Eyed Marrowfat	" 26..	125	"	70 -75	2⅝—3¼	37	20	62
24	Multiplier	" 29..	128	"	70—75	2¼—2⅝	37	20	63½
25	Chancellor	" 18..	117	"	70—75	1¾—2¼	37	20	62⅝
26	King	" 23..	122	Medium	45—50	2 —2¼	37	20	63⅛
27	Duke	" 22..	121	Strong	60—65	2¼—2⅝	37	20	62½
28	Carleton	" 25..	124	"	75—80	2¼—2⅝	36	..	62
29	Elliot	" 26..	125	"	75—80	2 —2¾	35	20	61¾
30	New Potter	" 27..	126	"	55—60	2¼—2⅝	35	20	62
31	Trilby	" 23..	122	"	70—75	2 —2¼	34	40	62½
32	Creeper	" 21..	120	"	60—65	1¾—2¼	34	40	63
33	Agnes	" 21..	120	"	70—75	1¾—2¼	34	40	63½
34	Vincent	" 24..	123	Medium	60—65	1½—2¼	34	..	62½
35	Fergus	" 30..	129	"	65—70	2 —2⅝	34	..	63
36	Dover	" 27..	126	Strong	70—75	2¼—2⅝	34	..	62½
37	Macoun	" 27..	126	"	75—80	2¼—2⅝	34	..	63
38	Wisconsin Blue	" 23..	122	"	70—75	2 —2¼	34	..	63½
39	Archer	" 25..	124	"	70—75	2 —2½	33	20	62
40	Elephant Blue	" 23..	122	Medium	55—60	2¼—2⅝	32	40	62½
41	Bruce	" 22..	121	Strong	60—65	2¾—3	32	..	62½
42	Oddfellow	" 19..	118	Medium	48—54	2 —2½	32	..	65
43	Large White Marrowfat	" 23..	122	Strong	65—70	2⅝—3¼	31	20	63
44	Gray (Pisum Arvense, No. 13 from Norway)	" 20..	119	"	65—70	1½—2	31	20	64
45	Gregory	" 26..	125	"	75—80	2⅝—2¾	31	20	62
46	Maple	" 29..	128	"	70—75	1¾—2¼	31	20	63
47	Victoria	" 28..	127	"	75—80	2 —2½	30	40	62½
48	Centennial	" 27..	126	"	70—75	2¼—2⅝	30	40	61½
49	Mummy	" 24..	123	"	55—60	1¾—2¼	30	40	63
50	French Canner	" 20..	119	Medium	50—55	1⅝—2¼	30	..	62½
51	Perth	" 23..	122	Strong	60—65	2½—3	30	..	62½
52	Bright	" 25..	124	"	75—80	2¼—2⅝	29	20	63½
53	Bedford	" 27..	126	"	70—75	1¾—2¼	29	20	63
54	Picton	" 22..	121	"	50—55	2 —2¼	29	20	63½
55	Lanark	" 28..	127	"	75—80	1¾—2¼	28	40	63½
56	German White	" 22..	121	Medium	55—60	2 —2½	28	40	63
57	Elder	" 29..	128	Strong	80—85	1¾—2¼	27	20	63
58	Herald	" 29..	128	"	75—80	2 —2½	26	40	62½
59	Chelsea	" 26..	125	"	70—75	1¾—2¼	26	..	63
60	Grass Pea	Sept. 4..	133	"	60—65	1 —1½	23	20	59
61	Marrowfat (fr. Norway)	Aug. 15.	114	"	40—45	2¾—3¼	20	40	60

Experimental Plots of Grain, Photographed before Heading, Central Farm, Ottawa.

EXPERIMENTS WITH INDIAN CORN.

Thirty-eight varieties of Indian corn were tested during the season of 1902, side by side on fairly uniform land. The soil was a sandy loam of good quality, which received a dressing of barn-yard manure about 12 tons to the acre, during the winter of 1901-2. This was placed on the frozen land, fresh from the barn yard in small heaps of about one third of a cart load each and spread and ploughed under in the spring. The previous crop was experimental plots of oats and wheat. The land was gang-ploughed shallow shortly after harvest to start shed grain and weed seeds and ploughed again late in the autumn about seven inches deep. In the spring of 1902 after the manure was ploughed under the land was harrowed twice with the smoothing harrow before sowing. The corn was sown with the seed drill in rows thirty-five inches apart, also in hills thirty-five inches apart each way. When the plants were from five to seven inches high they were thinned so as to leave them from six to eight inches apart in the rows, and from four to five plants in each hill. The varieties were all sown May 27 and were cut for ensilage September 24. The yield per acre has been calculated from the weight of the crop cut from two rows each 66 feet long.

INDIAN CORN—TEST OF VARIETIES.

Number.	Name of Variety.	Character of Growth.	Height.	Leafiness.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
			Inches.			Tons.	Lbs.	Tons.	Lbs.
1	Eureka	Very strong	125--130	Leafy	Early milk..	32	460	22	..
2	North Dakota Yellow	"	95—100	"	" ..	31	1,800	31	920
3	Salzer's All Gold	"	95—100	"	" ..	30	60	27	1,440
4	King Philip	Strong	90— 95	Medium..	" ..	28	320	25	1,040
5	Early Butler	"	95—105	Leafy	Late milk...	26	1,020	23	420
6	Thoro'bred White Flint	Very strong	105—110	Very leafy	Early milk..	26	360	32	240
7	Mamm. Eight-rowed Flint.	Strong	100—105	Leafy	" ..	26	140	22	440
8	Amber Rice	Medium	85— 90	"	Doughy	26	140	22	1,540
9	Country Gentleman	"	80— 90	Very leafy	"	25	1,700	20	920
10	Superior Fodder	Strong	85— 90	"	Early milk..	25	300	16	560
11	White Cap Yellow Dent	Very strong.	100—105	Leafy	" ..	24	1,500	20	700
12	Sanford	Strong	80— 85	Very leafy	Late milk...	24	1,280	27	1,440
13	North Dakota White	Very strong.	100—105	Leafy	Early milk..	24	840	23	200
14	Compton's Early	Strong	95—105	Very leafy	Late milk...	24	400	23	1,520
15	Giant Prolific Ensilage	Very strong.	90—100	Leafy	Early milk..	24	400	17	1,860
16	Pearce's Prolific	Strong	90— 95	Medium..	Doughy	24	400	28	1,640
17	Pride of the North	"	90— 95	Leafy	" ..	23	1,520	23	1,520
18	Selected Leaming	Very strong.	100—105	"	Late milk...	23	1,300	17	980
19	White Pearl Pop	Strong	100—105	Medium..	Early milk..	22	1,320	25	1,260
20	Mammoth Cuban	Very strong.	100—105	Leafy	Late milk...	22	1,320	17	1,640
21	Red Cob Ensilage	"	100—105	Medium..	" ..	22	1,100	24	1,280
22	Early Golden Surprise	"	115—120	Leafy	" ..	22	..	21	1,340
23	King of the Earliest	Strong	85— 95	"	" ..	20	920	18	300
24	Champion White Pearl	"	90—100	"	" ..	20	700	20	920
25	Longfellow	"	85— 90	"	Doughy	20	700	20	260
26	Angel of Midnight	"	90—100	"	Late milk...	20	..	22	1,100
27	Black Mexican	Medium	75— 80	"	Early milk..	20	..	18	520
28	Yellow Six Weeks	"	60— 65	"	Late milk...	19	1,160	12	1,740
29	Evergreen Sugar	"	80— 90	Very leafy	Early milk..	18	1,840	14	160
30	Early Yellow Long Eared	"	80— 90	Leafy	Doughy	18	1,620	23	1,960
31	Cloud's Early Yellow	Very strong.	105—115	Very leafy	Late milk...	18	960	18	1,460
32	Canada White Flint	Strong	95—105	Leafy	" ..	17	760	18	1,460
33	Early Mastodon	"	90—100	"	Early milk..	17	760	14	1,920
34	Mitchell's Early	Medium	65— 70	"	Doughy	17	760	12	1,960
35	Salzer's Earliest Ripe	"	60— 65	Medium..	"	17	100	11	1,160
36	Extra Early Huron	Strong	85— 95	Leafy	"	16	1,220	12	1,960
37	Kendall's Early Giant	Medium	65— 75	"	Late milk...	14	1,920	11	880
38	Early August	Short & weak	25— 30	"	Ripe	3	1,920	1	1,740

INDIAN CORN PLANTED AT DIFFERENT DISTANCES.

Three varieties were chosen for this test, the Champion White Pearl, Selected Leaming and Longfellow. They were sown in rows at different distances apart. The soil was alongside of that used for the test of varieties, and its treatment and preparation were the same. The corn was sown with the seed drill on May 27, and was cut for ensilage September 24. Four rows were sown in each case, and the yield per acre has been calculated from the weight of crop obtained from the two inside rows, each 66 feet long.

Name of Variety.	Width of Row.	Character of Growth.	Height when Cut.	Condition when Cut.	Weight per Acre.	
	In.		In.		Tons.	Lbs.
Champion White Pearl	21	Strong	95—100	Late milk	22	472
" "	28	"	95—100	"	25	1,183
" "	35	Very strong.	98—102	"	29	1,770
" "	42	"	98—102	"	25	341
Selected Leaming	21	Strong	105—110	"	22	181
"	28	"	105—110	"	22	820
"	35	Very strong.	108—114	"	20	752
"	42	"	108—114	"	21	1,393
Longfellow	21	Strong	90— 95	"	23	507
"	28	"	90— 95	"	24	970
"	35	Very strong.	95—100	"	23	638
"	42	"	95—100	"	19	676

EXPERIMENTS WITH TURNIPS.

Thirty varieties of turnips were under test in 1902, all sown side by side on similar land. This land was adjoining that on which the Indian corn was sown ; it was similar in character, and its treatment and preparation were the same. Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller, which flattened the drills nearly one-half, leaving a firm seed bed. The seed was sown at the rate of three pounds per acre. Two sowings were made of each sort, the first on May 12, the second on May 26. They were also pulled on two different dates, the first on October 14, the 2nd on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet in length.

Number.	Name of Variety.	Yield per Acre from 1st Sowing. 1st Pulling Oct. 14.		Yield per Acre from 2nd Sowing. 1st Pulling Oct. 14.		Yield per Acre from 1st Sowing 2nd Pulling Oct. 28.		Yield per Acre from 2nd Sowing. 2nd Pulling Oct. 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	East Lothian	53	1,910	34	1,960	48	30	39	1,530
2	Good Luck	52	280	29	740	55	550	34	1,300
3	Halewood's Bronze Top	49	670	30	1,710	46	1,390	25	1,480
4	Jumbo	48	360	22	880	53	260	28	100
5	Hall's Westbury	46	1,720	28	1,420	47	1,700	24	1,170
6	Imperial Swede	46	1,720	28	1,090	46	730	26	1,790
7	Emperor Swede	46	1,590	36	1,260	43	1,780	27	1,770
8	Magnum Bonum	46	730	33	660	51	1,620	33	330
9	Giant King	46	460	30	60	45	750	26	140
10	Elephant's Master	45	1,740	25	490	45	90	19	1,930
11	New Century	45	750	21	1,560	56	1,190	26	1,130
12	Bangholm Selected	44	1,430	33	660	43	790	30	1,050
13	Mammoth Clyde	44	770	26	470	46	1,060	23	530
14	Prize Winner	44	770	29	1,460	51	960	29	1,460
15	Champion Purple Top	44	110	31	1,690	44	770	24	1,830
16	Shamrock Purple Top	44	110	29	1,730	52	610	33	660
17	Drummond Purple Top	43	1,120	27	1,110	54	1,890	27	1,110
18	Perfection Swede	43	790	25	820	53	260	37	1,900
19	Prize Purple Top	42	810	26	1,130	51	1,950	34	640
20	Kangaroo	42	480	28	100	56	860	31	40
21	Skirvings	39	1,860	19	940	49	340	25	490
22	Selected Purple Top	39	1,530	29	80	51	6 0	33	
23	Marquis of Lorne	39	1,200	24	1,830	45	1,740	27	480
24	Monarch	38	1,880	25	1,150	51	300	26	1,130
25	Carter's Elephant	37	910	21	1,230	35	1,610	24	180
26	New Arctic	36	930	27	1,440	45	1,740	33	1,650
27	West Norfolk Red Top	35	1,610	19	610	37	1,240	23	200
28	Selected Champion	28	1,420	24	1,170	36	1,590	20	1,910
29	Sutton's Champion	22	1,540	21	1,890	33	1,320	31	1,030
30	Webb's New Renown	20	1,580	20	260	29	1,730	20	920

	Tons.	Lbs.
The average from the 1st sowing 1st pulling was	42	84
The average from the 2nd sowing 1st pulling was	37	318
The average from the 1st sowing 2nd pulling was	47	783
The average from the 2nd sowing 2nd pulling was	28	794

EXPERIMENTS WITH MANGELS.

Twenty-eight varieties of mangels were under test in 1902. They were all sown side by side adjoining the Indian corn. The land was similar in character and its treatment and preparation were the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort—the first on May 12, the second on May 26. They were also pulled on two different dates. The first pulling was on October 14, the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

Number.	Name of Variety.	Yield per acre from 1st Sowing 1st Pulling October 14.		Yield per acre from 2nd Sowing 1st Pulling. October 14.		Yield per acre from 1st Sowing 2nd Pulling October 28.		Yield per acre from 2nd Sowing 2nd Pulling October 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Mammoth Long Red	55	550	35	1,940	46	1,390	32	350
2	Norbiton Giant	52	280	30	720	46	1,720	34	640
3	Triumph Yellow Globe	51	1,950	36	930	45	750	39	540
4	Mammoth Yellow Intermediate	51	300	37	1,240	44	110	34	970
5	Lion Yellow Intermediate	50	1,970	36	600	48	690	29	1,400
6	Mammoth Oval Shaped	49	1,000	32	680	44	1,760	31	1,690
7	Prize Winner Yellow Globe	47	50	32	20	41	170	34	640
8	Yellow Intermediate	46	1,060	35	1,280	44	1,100	30	1,050
9	Leviathan Long Red	44	1,760	35	620	55	550	32	20
10	Selected Mammoth Long Red	44	440	30	1,710	38	1,220	27	780
11	Prize Mammoth Long Red	43	1,450	25	1,150	39	540	25	1,150
12	Warden Orange Globe	43	1,120	30	390	44	440	38	1,880
13	Canadian Giant	42	1,470	30	1,380	37	580	31	40
14	Gate Post	41	1,820	31	700	42	150	32	1,010
15	Giant Yellow Globe	41	830	27	1,110	42	480	28	1,090
16	Ward's Large Oval Shaped	40	850	26	1,130	45	1,080	25	490
17	Selected Yellow Globe	39	540	26	1,460	38	560	23	1,190
18	Half Long Sugar White	39	210	29	740	44	110	37	580
19	Champion Yellow Globe	38	1,880	30	1,050	38	1,880	27	1,110
20	Giant Sugar Mangel	38	230	31	700	32	680	28	1,420
21	Gate Post Yellow	36	270	33	660	32	1,010	31	40
22	Half Long Sugar Rosy	35	1,610	25	820	30	60	22	1,540
23	Elvethan	34	1,630	23	1,190	27	1,440	26	1,790
24	Yellow Fleshed Tankard	33	1,930	25	1,810	38	1,880	25	490
25	Giant Yellow Half Long	32	1,340	20	590	39	1,840	28	100
26	Giant Yellow Intermediate	25	1,150	20	920	41	170	37	580
27	Golden Fleshed Tankard	23	200	21	900	41	560	31	1,030
28	Red Fleshed Tankard	22	1,540	20	1,580	28	1,750	25	490

	Tons.	Lbs.
The average from the 1st sowing 1st pulling was	40	1,982
The average from the 2nd sowing 1st pulling was	29	841
The average from the 1st sowing 2nd pulling was	40	1,450
The average from the 2nd sowing 2nd pulling was	30	932

EXPERIMENTS WITH CARROTS.

Twenty varieties were under trial in 1902. They were all sown side by side adjoining the turnips and mangels. The land was similar in character, and its treatment and preparation were the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort, the first on May 12, the second on May 26. The roots were pulled on two different dates, the first pulling was on October 14, the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

Name of Variety.	Yield per acre from 1st Sowing 1st Pulling Oct. 14.		Yield per acre from 2nd Sowing 1st Pulling Oct. 14.		Yield per acre from 1st Sowing 2nd Pulling Oct. 28.		Yield per acre from 2nd Sowing 2nd Pulling Oct. 28.	
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1. Carter's Orange Giant	39	1,200	21	960	27	780	20	1,250
2. Mammoth White Intermediate	35	1,610	28	160	37	1,240	28	1,750
3. Half Long White	35	620	26	800	34	640	25	820
4. Improved Short White	33	990	28	760	38	1,220	31	40
5. Iverson's Champion	33	990	29	1,730	36	1,590	27	1,770
6. Giant White Vosges	33	330	27	1,770	38	560	29	410
7. Green Top White Orthe	31	1,360	24	1,500	35	620	29	1,400
8. Half Long Chantenay	31	1,030	27	780	30	1,380	25	1,810
9. Ontario Champion	31	1,030	24	1,830	39	1,530	30	1,710
10. New White Intermediate	30	1,380	26	800	36	270	32	680
11. Long Yellow Stump Rooted	27	1,440	21	1,890	29	1,070	25	490
12. Guerande or Ox-heart	26	1,130	26	470	25	1,480	28	1,420
13. White Vosges Large Short	24	1,830	20	260	27	1,770	22	1,540
14. White Belgian	24	180	20	920	33	1,650	24	1,830
15. Yellow Intermediate	24	180	17	980	26	470	18	1,620
16. Long Scarlet Altringham	23	1,520	15	30	26	800	18	300
17. Early Gem	22	1,210	22	880	26	1,790	22	1,870
18. Long Orange or Surrey	17	1,640	14	1,700	17	650	17	980
19. Scarlet Intermediate	16	1,000	15	690	23	1,190	20	1,580
20. Scarlet Nantes	14	1,040	11	1,100	18	1,950	15	690

	Tons.	Lbs.
The average from the 1st sowing, 1st pulling was	32	1,382
The average from the 2nd sowing, 1st pulling was	25	1,150
The average from the 1st sowing, 2nd pulling was	29	1,854
The average from the 2nd sowing, 2nd pulling was	23	489

EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were tested in 1902. These were sown side by side on land adjoining the turnips and mangels. The land was similar in character and its treatment and preparation were the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort the first on May 12 the second on May 26. They were also pulled on two different dates, the first pulling was on October 14, the second on October 28. The yield per acre has been calculated from the weight of roots gathered from one row 66 feet long.

Number.	Name of Variety.	Yield per Acre from 1st Sowing. — 1st Pulling Oct. 14.		Yield per Acre from 2nd Sowing. — 1st Pulling Oct. 14.		Yield per Acre from 1st Sowing. — 2nd Pulling Oct. 28.		Yield per Acre from 2nd Sowing. — 2nd Pulling Oct. 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Royal Giant	38	1,880	28	1,750	36	1,920	26	140
2	Danish Improved	37	1,570	30	720	43	460	30	1,380
3	Danish Red Top	37	1,570	33	....	35	1,610	30	1,710
4	Red Top Sugar	35	1,940	25	1,150	36	1,260	26	1,730
5	Improved Imperial	31	760	27	450	23	1,850	21	570
6	Wanzleben	28	1,420	21	930	21	1,560	20	1,580
7	Vilmorin's Improved	27	780	20	1,580	24	1,170	17	320
8	French "Very Rich"	23	1,190	17	650	16	1,000	12	420

	Tons.	Lbs.
The average from the 1st sowing, 1st pulling was	27	1,885
The average from the 2nd sowing, 1st pulling was.....	22	1,094
The average from the 1st sowing, 2nd pulling was.....	30	1,133
The average from the 2nd sowing, 2nd pulling was.....	24	1,698

FIELD PLOTS OF POTATOES EACH ABOUT ¼ ACRE.

The following field plots of potatoes were included in the area devoted to experimental purposes. The land on which these potatoes were planted was similar throughout, and the preparation and treatment were the same for all. The soil was a sandy loam. The previous crop was experimental plots of wheat. After the wheat crop was cut the land was gang-ploughed shallow to start into growth any shed grain or weed seeds lying on the surface; later in the autumn it was again ploughed seven to eight inches deep. During the winter of 1901 and 1902 it received a dressing of about 12 tons of fresh barn-yard manure per acre, which was placed during the winter on the frozen ground in small piles of about a third of a cart load each to prevent fermentation. This was spread in the spring, ploughed under about six inches deep, and harrowed with the smoothing harrow, then made into drills two and a half feet a part and six inches deep for planting. The sets were put from 12 to 15 inches apart. They were all planted May 22, and dug October 6.

Number.	Name of Variety.	Yield per Acre.	
		Bush.	Lbs.
1	Sir Walter Raleigh	355	50
2	Uncle Sam	334	35
3	Honeoye Rose	304	3
4	Wonder of the World	258	20
5	New Queen	256	40
6	American Wonder	244	40
7	Early Harvest	244	30
8	Vigorosa	238	8
9	Canadian Beauty	236	40
10	Rochester Rose	228	40
11	Everett	224	11
12	Early White Prize	204	12

The following plots of potatoes, of about one-quarter of an acre each, were planted on similar soil to those last mentioned and received a similar dressing of manure; but this land was in oats in 1901 with which clover was sown. Much of this clover was destroyed by a severe frost in the spring, shortly after the young plants started. These plots had the advantage of a very light crop of clover ploughed under in addition to the manure.

Number.	Name of Variety.	Yield per Acre.	
		Bush.	Lbs.
1	Carman No 1	321	2
2	Early Sunrise	269	35
3	Bovee	245	20
4	Prize Taker	240	20
5	Early Andes	203	00

EXPERIMENTS WITH FLAX.

Seed sown on sandy loam on plots of one fortieth of an acre each, to gain information as to the best time for sowing and the quantity of seed required to give the best results.

FIRST SOWING.

Plot 1.—Forty pounds of seed per acre. Sown April 30, came up May 15 and was ripe August 8. Made a strong and even growth; all standing well.

Weight of straw per acre ..... 3,440 pounds.
Yield of seed per acre ..... 8 bush. 40 lbs.

Plot 2.—Eighty pounds of seed per acre. Sown April 30, came up May 15 and was ripe August 8. Made a strong and even growth; all standing well.

Weight of straw per acre ..... 4,720 pounds.
Yield of seed per acre ..... 9 bush. 20 lbs.

SECOND SOWING.

Plot 3.—Forty pounds of seed per acre. Sown May 7, came up May 20 and was ripe August 10. Made a strong and even growth; all standing well.

Weight of straw per acre ..... 5,520 pounds.
Yield of seed per acre ..... 8 bush.

Plot 4.—Eighty pounds of seed per acre. Sown May 7, came up May 20 and was ripe August 10. Made a strong and even growth; all standing well.

Weight of straw per acre ..... 5,760 pounds.
Yield of seed per acre ..... 6 bush. 40 lbs.

THIRD SOWING.

Plot 5.—Forty pounds of seed per acre. Sown May 14, came up May 28 and was ripe August 15. Made a strong and even growth; all standing well.

Weight of straw per acre ..... 5,680 pounds.
Yield of seed per acre ..... 8 bush.

Plot 6.—Eighty pounds of seed per acre. Sown May 14, came up May 28 and was ripe August 15. Made a strong growth; but was considerably lodged.

Weight of straw per acre ..... 5,920 pounds.
Yield of seed per acre ..... 5 bush. 20 lbs.

FOURTH SOWING.

Plot 7.—Forty pounds of seed per acre. Sown May 21, came up May 31 and was ripe August 17. Made a strong growth, but was partly lodged.

Weight of straw per acre ..... 5,600 pounds.
Yield of seed per acre ..... 8 bush.

Plot 8.—Eighty pounds of seed per acre. Sown May 21, came up May 31 and was ripe August 17. Made a strong growth, but was considerably lodged.

Weight of straw per acre ..... 6,440 pounds.
Yield of seed per acre ..... 8 bush. 40 lbs.

EXPERIMENTS WITH SOJA BEANS.

Three plots of one-fortieth acre each were sown in rows at different distances apart, viz.: 21, 28 and 35 inches, to gain information as to the best distance for sowing to secure the heaviest crops. The soil was a light sandy loam, which received a dressing of barn-yard manure during the winter of 1899 and 1900 of about 12 tons per acre. The previous crop was millet. After the millet was cut, the land was ploughed late in the autumn to the depth of about seven or eight inches, and left in that condition until the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow. The beans were sown with a seed drill on May 14, and cut on September 24.

Plot 1.—Sown in rows 21 inches apart; growth strong and even, leafy; average height 30 to 35 inches. The pods were well formed, but the beans were soft when the crop was cut. Total yield of green crop 9 tons 80 lbs. per acre. Yield of beans 12 bushels per acre.

Plot 2.—Sown in rows 28 inches apart; growth strong and leafy; average height 30 to 35 inches. Plot all standing, stalks considerably stiffer than in plot No. 1. The pods were well formed, but the beans were soft when cut. Total yield of green crop 10 tons 1,200 lbs. per acre. Yield of beans 14 bushels 40 lbs. per acre.

Plot 3.—Sown in rows 35 inches apart; growth strong and even, leafy; stems hard and woody; average height 35 to 39 inches. The plants were better podded than those in plots 1 or 2, and the beans were harder when cut, but the plant was less valuable for fodder. Total yield of green crop 9 tons 1,840 lbs. per acre. Yield of beans 10 bushels 40 lbs. per acre.

EXPERIMENTS WITH HORSE BEANS.

Three plots of one-fortieth acre each were sown in rows 21, 28 and 35 inches apart to gain information as to the best distance for sowing to secure the heaviest crop. The land was adjoining that used for soja beans, was similar in quality and received the same treatment. The previous crop was millet. The beans were sown with the seed drill. All the plots were sown on May 14, and cut on September 22.

Plot 1.—Sown in rows 21 inches apart; growth strong, well podded; height 48 to 52 inches, crop all standing. The beans were nearly ripe when cut. Total yield 7 tons 800 lbs. per acre. Yield of beans 37 bushels 20 lbs. per acre.

Plot 2.—Sown in rows 28 inches apart; growth very strong and well podded; height 49 to 53 inches, crop all standing, stalks considerably stiffer than in plot No. 1. The beans were nearly ripe when cut. Total yield 8 tons 160 lbs. per acre. Yield of beans 34 bushels 40 lbs. per acre.

Plot 3.—Sown in rows 35 inches apart; growth strong, medium and well podded; height 49 to 53 inches, crop all standing, stalks stiff. The beans nearly ripe when cut. Total yield 7 tons 1,600 lbs. per acre. Yield of beans 30 bushels 40 lbs.

EXPERIMENTS WITH MILLETS.

Nine varieties of millet were sown on plots of one-fortieth acre each in drills seven inches apart. The soil was a light sandy loam. The previous crop was soja beans. The land received a dressing of barn-yard manure during the winter of 1899 and 1900 of about twelve tons per acre. After the beans were cut the land was ploughed to the depth of seven or eight inches, and left in that condition until the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow before sowing. The seed was sown with a Planet Junior seed drill, and all the varieties were sown on May 14. These were all cut when the seed was in the doughy state.

MILLETS—TEST OF VARIETIES.

Number.	Name of Variety.	Date Cut.	Length of Straw.	Character of Growth.	Weight per Acre Green.		Weight per Acre Dry.	
			Inches.		Tons.	Lbs.	Tons.	Lbs.
1	Algerian	Sept. 4	50—55	Strong	17	560	8	800
2	Japanese	" 4	50—53	"	17	240	8	1920
3	Pearl, late or Cat-tail	" 14	50—53	Medium	16	320	8	....
4	German or Golden	" 6	48—51	Strong	14	800	6	320
5	Italian or Indian	" 6	49—52	"	13	1360	4	800
6	White Round Extra French	Aug. 30	63—65	"	12	....	5	1840
7	Moha Hungarian	" 30	48—50	"	9	1200	5	1520
8	No. 5648 (Dept. Agr., Wash., U.S.A.)	Sept. 4	25—28	Weak	5	1520	2	1440
9	No. 5647 " "	" 4	30—33	Medium	3	1360	2	....

EXPERIMENTS WITH MIXED ROOTS AND WITH MIXED ROOTS AND VEGETABLES.

This experiment, first tried last year, has been repeated during the past season. Five rows were sown about 100 feet long and two feet apart. The seed was put in about the usual thickness and the plants subsequently thinned. They were sown on May 12. The vegetables were gathered about the middle of September and the roots pulled late in October. It is evident that any farmer may supply his household with an assortment of vegetables with very little labour or expense by the adoption of this simple method.

Mixed Roots and Roots and Vegetables.			Yield per acre.	
			Tons.	Lbs.
Plot 1—Mangels and turnips			46	730
" 2—Mangels, carrots and turnips			42	480
" 3—Carrots and turnips			36	1,260
" 4—Mangels and carrots			33	1,980
Carrots, turnips, cabbage, tomatoes and parsnips—	Tons.	Lbs.		
Plot 5—Yield per acre of cabbage	14	1,535		
" " tomatoes	5	1,880		
" " turnips	5	230		
" " carrots	4	1,405		
" " parsnips		1,650	31	700

SPECIAL EXPERIMENTS WITH FERTILIZERS.

In the annual report of the Experimental Farms for 1893, details were given on pages 8 to 24 of the results of a series of tests which were carried on during the previous five or six years with the object of gaining information regarding the effects which follow the application of certain fertilizers and combinations of fertilizers on the more important farm crops. The particulars there given covered the results of six years' experience with crops of wheat and Indian corn and five years' experience with crops of oats, barley, turnips and mangels. The results of similar tests conducted for three years with carrots and one year with sugar beets were also given.

These experiments have been continued, and a summary of the results obtained has been given each year, taking the average yield of crops from the beginning adding the results for the current year, and then giving the average yield for the full time. These tests were undertaken on virgin soil, on a piece of land which was cleared for the purpose. For particulars regarding the clearing and preparing of the land for crop in 1887–88 and its subsequent treatment the reader is referred to the earlier issues of this report.

OBJECT IN VIEW IN CONDUCTING THESE EXPERIMENTS.

In establishing and conducting this series of experiments, the object in view has been to gain information as to the effects produced by certain fertilizers and combinations of fertilizers on particular crops. They were never intended to serve as model test plots such as farmers could copy with advantage in their general practice. On the contrary, to gain the information desired, it has been found necessary to use some fertilizers in unusual quantities, and in other instances to more or less exhaust the soil by a succession of crops of the same sort, practices which in ordinary farming would be extravagant or detrimental. From this long conducted series of tests much useful information has been gained, which appeals to the mind with greater force as experience accumulates from year to year.

VALUABLE INFORMATION GAINED.

These trials, have shown that barn-yard manure can be most economically used in the fresh or unrotted condition; that fresh manure is equal, ton for ton, in crop-producing power to rotted manure, which, other experiments have shown, loses during the process of rotting about 60 per cent of its weight. In view of the vast importance of making the best possible use of barn-yard manure, it is difficult to estimate the value of this one item of information.

When these experiments were planned, the opinion was very generally held that untreated mineral phosphate, if very finely ground, was a valuable fertilizer, which gradually gave up its phosphoric acid for the promotion of plant growth. Ten years' experience has shown that mineral phosphate, untreated, is of no value as a fertilizer.

The use of sulphate of iron, which at the time these tests were begun, was highly recommended, as a means of producing increased crops, has also been proven to be almost useless for this purpose.

Common salt, which has long had a reputation with many farmers for its value as a fertilizer for barley, while others disbelieved in its efficacy, has been shown to be a most valuable agent for producing an increased crop of that grain, while it is of much less use when applied to crops of spring wheat or oats. Land plaster or gypsum has also proven to be of some value as a fertilizer for barley, while of very little service for wheat or oats. Some light has also been thrown on the relative usefulness of single and combined fertilizers.

CHANGES MADE IN THE EXPERIMENTS.

After ten years' experience had demonstrated that finely-ground, untreated mineral phosphate was of no value as a fertilizer, its use was discontinued in 1898. Prior to this it had been used in each set of plots in Nos. 4, 5, 6, 7 and in No. 8 also, in all the different series of plots, excepting roots. In 1898 and 1899, similar weights of the Thomas' phosphate were used in place of the mineral phosphate, excepting in plot 6 in each series. In this plot the Thomas' phosphate was used in 1898 only.

After constant cropping for ten or eleven years, it was found that the soil on those plots to which no barn-yard manure had been applied was much depleted of humus, and hence its power of holding moisture had been lessened, and the conditions for plant growth, apart from the question of plant food, had on this account become less favourable. In 1899 the experiments were modified and an effort made to restore some

proportion of the humus and at the same time gain further information as to the value of clover as a collector of plant food. In the spring of that year ten pounds of red clover seed per acre was sown with the grain on all the plots of wheat, barley and oats. The clover seed germinated well, and after the grain was cut the young clover plants made rapid growth, and by the middle of October there was a thick mat of foliage varying in height and density on the different plots, which was ploughed under. The growing of carrots and potatoes on one half of the cereal plots has been discontinued since 1898, and each plot of the wheat, barley and oats have occupied the full tenth of an acre.

In 1900, 1901 and 1902 clover was again sown on all the grain plots, and was ploughed under in October. In 1900 and 1901 a good growth of clover was obtained, but in 1902 a severe frost in the spring destroyed a large proportion of the young plants so that the crop available for ploughing under in the autumn was very light.

APPLICATION OF FERTILIZERS DISCONTINUED.

Another direction in which information was sought was in reference to the length of time which a liberal application of barn-yard manure would continue to affect subsequent crops, and in 1899 on plots 1, 2 and 6 the barn-yard manure, which had been used for ten or eleven years in succession, was discontinued. The phosphate fertilizer was also omitted on plot 6 in each series.

In 1900 all the fertilizers on all the plots were discontinued, and it is proposed to continue to grow the same crops on all these plots from year to year without fertilizers for some years, sowing clover with the grain each season. In this way it is expected that much information will be gained as to the value of clover as a collector of plant food, and also as to the unexhausted values of the different fertilizers which have been used on these plots since the experiments were begun.

SPECIAL TREATMENT OF PLOTS OF INDIAN CORN AND ROOTS.

As it was not practicable to sow clover to advantage on the Indian corn and root plots, the sowing of these latter crops was discontinued in the spring of 1900 and clover sown in their place in the proportion of 12 pounds per acre, and no fertilizers were applied. The clover on these plots made strong growth, so strong as to necessitate twice cutting during the season, the cut clover being left on the ground in each case to decay and add to the fertility of the soil, and the clover left over for further growth in the spring of 1901, and ploughed under for the roots about May 10, and for corn about the middle of that month. Then roots and Indian corn were again sown. This course will be continued for some years, growing Indian corn and roots every second year alternating these crops with clover. No fertilizers were applied in 1900 or 1901, and it is proposed to discontinue their use entirely for some years, so that the effect on these crops of the ploughing under of clover may be carefully studied under the varying conditions presented by these more or less exhausted plots.

WHEAT PLOTS.

The seed sown on each of these plots from the beginning has been in the proportion of 1½ bushels per acre, excepting in 1894; and the varieties used were as follows:—In 1888-89-90 and 1891, White Russian, and in 1892-3, Campbell's White Chaff. In 1894, the Rio Grande wheat was used, when, owing to lack of germinating power in the seed, a larger quantity was required. In 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902 Red Fife wheat was used in the usual quantity of 1½ bushels per acre. In 1902, the Red Fife was sown April 30, came up May 8, and was ripe from August 10 to 12.

The season of 1902 has been favourable for the growing of spring wheat at Ottawa, and all the plots have increased in yield notwithstanding that the fertilizers have been discontinued for the past three years. This shows that the ploughing under of the green clover is having a beneficial effect. On the check plots which have been unmanured from the beginning the increase both in grain and straw is remarkable.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{15}$TH ACRE EACH.

No. of Plot.	Fertilizers applied each Year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Fourteen Years.		15th Season, 1902, Variety Red Fife.		Average Yield for Fifteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then	21 49 9/14	4,065	30 5	3,885	22 22 1/15	4,053
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then	22 14 13/14	4,099	29 40	3,865	22 44 8/15	4,083
3	Unmanured from the beginning	11 2 12/14	1,908	16 50	2,650	11 26	1,957
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the Thomas' Phosphate was used. No fertilizers have been applied since then	11 17 2/14	2,081	19 45	2,270	11 51	2,094
5	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	12 36 11/14	2,853	14 10	2,420	12 43	2,824
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	19 6 4/14	3 371	24 40	3,115	19 28 8/15	3,354
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	13 4	2,608	17 5	3,035	13 20 1/15	2,636
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	11 5 8/14	2,154	15 30	2,770	11 23 3/15	2,195
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	11 55 13/14	1,923	16 25	2,480	12 13 13/15	1,965
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	13 1 7/14	3,009	14 55	2,135	13 8 12/15	2,951

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{10}$TH ACRE EACH—*Continued.*

No. of plot.	Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	Average Yield for Fourteen Years.		15th Season, 1902. Variety, Red Fife.		Average Yield for Fifteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. No fertilizers have been applied since then.....	14 23 $\frac{13}{14}$	2,887	14 40	3,220	14 25	2,969
12	Unmanured from the beginning.....	10 10	1,931	14	2,065	10 25 $\frac{5}{15}$	1,940
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.	12 18 $\frac{11}{14}$	2,021	15 55	2,550	12 33 $\frac{3}{15}$	2,056
14	Bone, finely ground, 500 lbs.; wood ashes unleached, 1,500 lbs. per acre; used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	15 7 $\frac{2}{14}$	2,573	18 20	3,700	15 20	2,648
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 48 $\frac{6}{14}$	2,395	16 55	3,395	14 1	2,462
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	15 30 $\frac{3}{14}$	2,187	19 5	2,985	15 44 $\frac{8}{15}$	2,240
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12 38 $\frac{10}{14}$	2,370	17 15	2,865	12 57 $\frac{0}{15}$	2,403
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12 35 $\frac{6}{14}$	1,932	16 30	3,060	12 51 $\frac{5}{15}$	2,007
19	Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	13 36	1,560	17 30	2,755	13 51 $\frac{4}{15}$	1,640
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	12 37	1,908	16	2,940	12 50 $\frac{8}{15}$	1,977
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been used since then.....	13 6	1,904	14 15	2,875	13 10 $\frac{9}{15}$	1,969

BARLEY PLOTS.

The quantity of seed sown per acre on the barley plots was 2 bushels in 1889, 1890 and 1891, 1½ bushels in 1892 and 1893, and 2 bushels in 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902. Two-rowed barley has been used for seed throughout until 1902 when Mensury a six-rowed sort was tried. The varieties used were as follows: 1889, 1890, and 1891, Saale; 1892, Goldthorpe; 1893, Duck-bill; and in 1894, 1895, 1896, 1897, 1898, 1899, 1900 and 1901, Canadian Thorpe, a selected form of the Duck-bill. In 1902 the Mensury was sown on April 16, came up May 1, and was harvested from July 27 to 29.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{10}$TH ACRE EACH.

No. of plot.	Fertilizers applied each year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	Average Yield for Thirteen Years.		14th Season, 1902. Variety, Mensury.		Average Yield for Fourteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then.....	34 $23\frac{7}{13}$	3,021	43 6	3,930	35 $5\frac{2}{14}$	3,086
2	Barn-yard manure, fresh, 15 tons per acre, each year to 1898, inclusive. No manure has been applied since then.....	34 $35\frac{6}{13}$	3,195	40 45	4,010	35 $8\frac{7}{14}$	3,253
3	Unmanured from the beginning.....	12 $42\frac{11}{13}$	1,482	27 4	2,330	13 $43\frac{7}{14}$	1,543
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used, no fertilizers have been applied since then.....	14 $7\frac{11}{13}$	1,446	29 28	2,270	15 $12\frac{9}{14}$	1,505
5	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	20 $16\frac{9}{13}$	2,205	29 13	2,410	20 $47\frac{4}{14}$	2,220
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	27 $19\frac{12}{13}$	2,394	40 10	2,525	28 $15\frac{11}{14}$	2,403
7	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	24 $32\frac{6}{13}$	2,355	42 34	2,700	25 $46\frac{4}{14}$	2,380
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	19 $29\frac{2}{13}$	1,729	40 ..	3,010	21 $3\frac{1}{14}$	1,821
9	Mineral superphosphate, No. 1, 500 lbs. per acre used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.....	20 $4\frac{8}{13}$	1,753	35 15	1,805	21 $8\frac{11}{14}$	1,757
10	Mineral superphosphate, No. 1, 350 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.....	27 $23\frac{8}{13}$	2,388	35 25	2,125	28 $3\frac{2}{14}$	2,369

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{15}$ ACRE EACH.

No. of plot.	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	Average Yield for Thirteen Years.		14th Season, 1902. Variety, Mensury.		Average Yield for Fourteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	25 32 4/15	2,484	41 42	2,545	26 39 12/14	2,488
12	Unmanured from the beginning.....	12 33 8/15	1,237	26 12	1,050	13 32 1/14	1,224
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13 37 7/15	1,430	26 47	1,220	14 34 11/14	1,415
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	22 26 4/15	2,051	41 2	2,370	23 41 12/14	2,074
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	21 28 2/15	2,334	30 20	1,640	22 10 6/14	2,284
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	22 7/15	1,843	33 41	2,695	22 41 2/14	1,861
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	18 22 7/15	1,949	30 25	1,860	19 15 12/14	1,943
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	17 30 2/15	1,680	33 16	1,585	18 36	1,673
19	Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	27 4 5/15	1,846	36 22	2,530	27 36 7/14	1,895
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.....	19 27 8/15	1,582	29 38	1,910	20 14 9/14	1,605
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	19 46 1/15	1,746	34 8	2,265	20 46 11/14	1,783

OAT PLOTS.

The quantity of seed sown per acre on the oat plots, was 2 bushels in 1889 and 1890; 1½ bushels in 1891, 1892 and 1893, and 2 bushels in 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902. The varieties used were as follows: In 1889, Early English; in 1890, 1891, 1892, 1893, Prize Cluster; and in 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901 and 1902, Banner. In 1902 the Banner was sown April 16, came up May 1, and the plots were harvested from August 2 to 4.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS, $\frac{1}{10}$ ACRE EACH.

Number of Plot.	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	Average Yield for Thirteen Years.		14th Season, 1902. Variety, Banner.		Average Yield for Fourteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then	50 $31\frac{2}{15}$	3,216	57 17	3,565	51 $13\frac{2}{14}$	3,241
2	Barn-yard manure, fresh, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then	55 $13\frac{6}{15}$	3,405	59 4	3,740	55 $22\frac{7}{14}$	3,422
3	Unmanured from the beginning	33 $7\frac{5}{15}$	1,609	46 11	2,725	34 $5\frac{1}{14}$	1,689
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then	32 $33\frac{6}{15}$	1,763	50 5	2,725	34 $7\frac{2}{14}$	1,832
5	Mineral phosphate, untreated, finely ground, 500 lbs. nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	49 $5\frac{3}{15}$	2,673	52 22	2,590	49 $13\frac{10}{14}$	2,667
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898, 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	47 $24\frac{9}{15}$	2,688	57 32	3,130	48 $15\frac{7}{14}$	2,720
7	Mineral phosphate, untreated, finely ground, 500 lbs; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	48 $19\frac{5}{15}$	3,170	57 27	2,915	49 $7\frac{11}{14}$	3,152
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	42 $7\frac{5}{15}$	2,432	55 5	2,955	43 $4\frac{11}{14}$	2,469
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been used since then	36 $29\frac{6}{15}$	1,947	45 20	2,300	37 $16\frac{9}{14}$	1,972
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizer have been applied since then	47 $3\frac{7}{15}$	2,721	52 32	2,330	47 $17\frac{10}{14}$	2,693
11	Mineral superphosphate, No. 1, 350 lbs. nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. No fertilizers have been applied since then	37 $31\frac{5}{15}$	2,410	51 6	2,490	38 $29\frac{3}{14}$	2,416
12	Unmanured from the beginning	22 $14\frac{4}{15}$	1,431	32 12	970	23 $4\frac{6}{14}$	1,398
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then	34 $13\frac{8}{15}$	2,034	39 24	2,050	34 $26\frac{7}{14}$	2,035

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS $\frac{1}{16}$ ACRE EACH—*Continued.*

No. of Plot.	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn.	Average Yield for Thirteen Years.		14th Season, 1902. Variety, Banner.		Average Yield for Fourteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	40 $19\frac{8}{13}$	2,241	50 25	2,695	41 $10\frac{4}{14}$	2,273
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.....	47 22	2,736	47 27	3,055	47 $22\frac{5}{14}$	2,759
16	Muriate of potash, 150 lbs. per acre, used each year from 1898 to 1899 inclusive. No fertilizers have been applied since then..	37 $23\frac{7}{13}$	2,162	52 27	2,790	38 $26\frac{3}{14}$	2,207
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then...	44 $27\frac{6}{13}$	2,859	52 12	2,320	45 $11\frac{11}{14}$	2,820
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	37 $5\frac{7}{13}$	2,023	54 9	1,955	38 $13\frac{1}{14}$	2,018
19	Common salt (Sodium chloride) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then	36 $26\frac{5}{13}$	1,941	50 10	2,150	37 $25\frac{2}{14}$	1,956
20	Land plaster or gypsum (Calcium sulphate) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.....	33 $29\frac{12}{13}$	1,957	46 1	1,985	34 $25\frac{6}{14}$	1,959
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then.....	31 $33\frac{8}{13}$	1,854	43 3	2,015	35 19	1,869

INDIAN CORN PLOTS.

The experiments with the plots of Indian corn have been conducted with the object of obtaining the largest weight of well matured green fodder for the silo, and to have the corn so far advanced when cut, that the ears shall be as far as is practicable in the the late milk, or glazed condition. Each plot has been divided from the outset into two equal parts, on one of which—known as No. 1—one of the stronger growing and somewhat later ripening sorts has been tried, and on the other, marked No. 2, one of the earlier maturing varieties. During the first four years one of the Dent varieties was tested under No. 1. The Mammoth Southern Sweet was tried in 1888, 1889 and 1890. In 1891 the Red Cob Ensilage was used, and in 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1901 and 1902 a free growing Flint variety, the Rural Thoroughbred White Flint, was tested. On the other half of the plot (No. 2) the Canada Yellow Flint was used in 1888, 1889 and 1890, the Thoroughbred White Flint in 1891, Pearce's Prolific in 1892, 1893 and 1894, and the Mammoth Eight Rowed Flint in 1895, 1896, 1897, 1898, 1899, 1901 and 1902. For the first four years the No. 1 series was planted in drills 3 feet apart, using about 24 pounds of seed to the acre and thinning the plants, when up, to 6 or 8 inches, and the No. 2 in hills 3 feet apart each way and 4 or 5 kernels in a hill. During the past seven years both sorts have been grown in hills.

In 1900 no crop of Indian corn was grown on these plots, but clover was sown in its place on May 5 in the proportion of twelve pounds per acre. This made a strong growth was cut twice during the season and left on the ground to decay so that when ploughed under the land might get the full benefit of the clover crop. The clover was allowed to remain growing until May 20, 1901, by which time it had made a very heavy growth. It was then ploughed under about six inches deep, and harrowed well before the corn was planted. The corn in both series of plots was planted in 1902, on May 26, and cut for ensilage on September 25.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF INDIAN CORN, $\frac{1}{15}$TH ACRE EACH, CUT GREEN FOR ENSILAGE.

No. of Plot.	Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the corn and ploughed under in May, 1901, before the corn was planted.	Average Yield for Thirteen Years.		14th Season, 1902.				Average Yield for Fourteen Years.	
		½ Plot No. 1—weight of green fodder	½ Plot No. 2—weight of green fodder	½ Plot No. 1—Thoroughbd White Flint weight of green fodder		½ Plot No. 2—Mam. 8 rowed, weight of green fodder		½ Plot No. 1—weight of green fodder	½ Plot No. 2—weight of green fodder
		Per acre.	Per acre	Per acre.		Per acre		Per acre.	Per acre
		Tons lbs.	Tons lbs	Tons	lbs.	Tons	lbs	Tons lbs.	Tons lbs
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre, each year from 1888 to 1898 inclusive. No manure has been applied since then..	16 508	12 1,521	18		17	560	16 757	13 167
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre each year from 1888 to 1898 inclusive. No manure has been applied since then.....	16 1,383	11 860	11	800	12		16 627	11 941
3	Unmanured from the beginning.	7 646	5 672	3		2	200	7 28	5 209
4	Mineral phosphate, untreated, finely ground, 800 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then.....	7 1,668	5 75	9	800	3	840	7 1,749	4 1,844
5	Mineral phosphate, untreated, finely ground, 800 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899, 800 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	11 714	9 664	11	560	3	1,600	11 703	8 1,874
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then..	16 1,017	12 112	12	1,680	10	600	16 493	11 1,861
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	15 1,014	11 752	11	1,800	8	1,200	15 499	11 355

EXPERIMENTS WITH FERTILIZERS, ON PLOTS OF INDIAN CORN—*Concluded.*

No. of plot.	Fertilizers applied each year, from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the corn and ploughed under in May, 1901, before the corn was planted.	Average Yield for Thirteen Years.				14th Season, 1902.				Average Yield for Fourteen Years.			
		½ Plot No. 1—weight of green fodder		½ Plot No. 2—weight of green fodder		½ Plot No. 1—Thoroughbd White Flint, weight of green fodder		½ Plot No. 2—Mam. Sweet, weight of green fodder		½ Plot No. 1—weight of green fodder		½ Plot No. 2—weight of green fodder	
		Per acre.		Per acre		Per acre.		Per acre.		Per acre.		Per acre	
		Tons.	lbs.	Tons.	lbs	Tons.	lbs.	Tons.	lbs	Tons.	lbs.	Tons.	lbs
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	12	300	9	701	11	200	8	1,800	12	150	9	637
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	11	828	8	1,678	9	..	6	600	11	483	8	1,315
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	13	1,713	10	1,667	9	1,200	6	800	13	1,105	10	1,034
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	16	1,010	12	1,005	13	240	9	1,520	16	526	12	613
12	Unmanured from the beginning	11	233	9	215	9	560	7	920	10	1,970	8	1,979
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	12	360	9	1,011	12	520	7	1,840	12	371	9	784
14	Bone, finely ground 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	12	1,482	9	1,583	14	400	11	....	12	1,690	9	1,755
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	13	3	10	7	8	400	5	1,600	12	1,317	9	1,406
16	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	13	662	10	859	10	1,840	5	1,320	13	317	10	178
17	Mineral superphosphate, No. 1, 600 lbs.; muriate of potash, 200 lbs.: sulphate of ammonia, 150 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then	13	1,320	9	1,953	11	1,800	9	1,660	13	1,069	9	1,927
18	Muriate of potash, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then	9	1,762	6	1,951	10	800	8	1,600	9	1,836	7	211
19	Double sulphate of potash and magnesia, 300 lbs. per acre in 1889 and '90; (muriate of potash, 200 lbs., substituted each year since); dried blood, 300 lbs.; mineral superphosphate, No. 1. 500 lbs., per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then	12	717	8	1,665	11	640	9	....	12	569	8	1,689
20	Wood ashes, unleached, 1,900 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then	10	1,615	8	276	11	1,360	8	1,400	10	1,739	8	356
21	Bone, finely ground, 500 lbs.; sulphate of ammonia, 200 lbs.; muriate of potash, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then	12	1,955	7	1,011	8	1,440	8	1,760	12	1,347	7	1,207

PLOTS OF MANGELS AND TURNIPS.

In conducting these experiments the roots only have been taken from the land, the tops have always been cut off and left on the ground to be ploughed under, so that the plant food they have taken from the soil may be returned to it. One-half of each one-tenth acre plot in the series has been devoted to the growth of mangels, and the other half to turnips, and these crops have been alternated from year to year. The preparation of the land has been the same for both these roots. It was ploughed in the autumn after the crop was gathered, gang-ploughed deeply in the spring after the barn-yard manure had been spread on plots 1, 2 and 6, and after gang-ploughing, the other fertilizers were spread by scattering them evenly over the surface, after which it was all harrowed with the smoothing harrow, then made in ridges 2 feet apart, rolled and sown.

In 1889, the variety of mangel used was the Mammoth Long Red. In 1890, three varieties were sown: 15 rows of Mammoth Long Red, 6 of Mammoth Long Yellow, and 6 of Golden Intermediate on each plot. In 1891, each plot again had three varieties: 18 rows of Mammoth Long Red, 3 of Yellow Fleshed Tankard, and 6 of Golden Tankard. In 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1901 and 1902, one variety only was used, namely, the Mammoth Long Red. About 4 pounds of seed were sown per acre each year.

Two varieties of turnips were sown on the half plots devoted to these roots in 1889; 25 rows of Carter's Prize Winner, and 2 rows of Carter's Queen of Swedes, and in 1890, a single variety, Carter's Elephant Swede. In 1891, six varieties were sown: 6 rows of Lord Derby Swede, 4 of New Giant King, 3 of Imperial Swede, 6 of Champion Swede, 4 of Purple Top Swede, and 4 of East Lothian Swede. In 1892 the Improved Purple Top Swede only was sown, in 1893 and 1894 the Prize Purple Top Swede, in 1895 the Imperial Swede, and in 1896, 1897, 1898, 1899, 1901 and 1902 the Prize Purple Top Swede. The land used for the turnips, which are usually sown later than the mangels, was prepared in the same manner and the fertilizers spread on it at the same time as for the mangels. It was then allowed to stand until the day before sowing, when it was gang-ploughed shallow or cultivated to kill weeds and loosen the soil, ridged, rolled and sown. About three pounds of seed were sown per acre,

In 1900 no crops of mangels and turnips were grown, but clover was sown in their place on May 5 in the proportion of twelve pounds per acre. This made a strong growth, and was cut twice during the season, and left on the ground to decay so that when ploughed under, the land might get the full benefit of the clover crop. The clover was allowed to remain growing until May 10, 1901, by which time it had made a very heavy growth. It was then ploughed under about six inches deep and harrowed well, then made up into ridges two feet apart. These were rolled with a hand roller, which flattened the ridges considerably and made a firm, even seed bed. It is proposed to alternate the crops of clover and roots in this way for some years, for the purpose of gaining information as to the fertilizing effect of crops of green clover ploughed under on land to be used for growing roots.

In 1902 the mangels were sown on May 12, and pulled on October 14; the turnips were sown May 12, and pulled October 14. The yield per acre has been calculated in each case from the weight of roots gathered from two rows, each 66 feet long.

EXPERIMENTS WITH FERTILIZERS ON ROOTS: PLOTS OF MANGELS AND TURNIPS $\frac{1}{20}$TH ACRE EACH.

No. of Plot.	Fertilizers applied each year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the roots and ploughed under in May, 1901, before the roots were sown.	Average Yield for Twelve Years.		13th Season, 1902. Varieties.		Average Yield for Thirteen Years.	
				West Half Plot.	East Half Plot.		
		Mangels, Weight of Roots.	Turnips, Weight of Roots.	Mangels, Mammoth Long Red: Weight of Roots.	Turnips, Purple Top Swede: Weight of Roots.	Mangels, Weight of Roots.	Turnips, Weight of Roots.
		Per Acre.	Per Acre.	Per Acre.	Per Acre.	Per Acre.	Per Acre.
		Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.	Tons. lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 20 tons per acre each year from 1889 to 1898 inclusive. No manure has been applied since then..... ...	22 1,089	15 1,194	23 1,460	16 920	22 1,267	15 1,327
2	Barn-yard manure (mixed horse and cow manure) fresh, 20 tons per acre each year from 1889 to 1898 inclusive. No manure has been applied since then.....	21 1,041	15 1,522	19 1,800	15 1,520	21 792	15 1,522
3	Unmanured from the beginning.....	8 1,756	7 859	11 520	7 920	9 122	7 864
4	Mineral phosphate, untreated, finely ground, 1,000 lbs. per acre, used each year from 1889 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then.....	8 835	7 1,837	13 480	8 769	8 1,577	7 1,998
5	Mineral phosphate, untreated, finely ground, 1,000 lbs., nitrate of soda, 250 lbs. wood ashes, unleached, 1,000 lbs. per acre, used each year from 1889 to 1897 inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	14 617	10 77	19 840	9 400	14 1,403	9 1,948
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate untreated, finely ground, 1,000 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1889 to 1897 inclusive. In 1898 1,000 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then..	18 264	13 308	16 1,520	10 1,640	18 53	12 1,949
7	Mineral phosphate, untreated, finely ground, 1,000 lbs.; sulphate of potash, 200 lbs. in 1889 and 1890 (substituted by muriate of potash, 250 lbs. in 1891 and subsequent years); nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1897 inclusive. In 1898 and 1899 1,000 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	11 386	9 1,232	16 1,640	8 600	11 1,252	9 1,030
8	Mineral superphosphate, No. 1, 500 lbs.; sulphate of potash, 200 lbs. in 1889 and 1890 (substituted by muriate of potash, 250 lbs. in 1891 and subsequent years); nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then	13 1,649	12 396	17 280	7 280	14 159	11 1,618

EXPERIMENTS WITH FERTILIZERS ON ROOTS; PLOTS OF MANGELS AND TURNIPS—*Concluded.*

No. of plot.	Fertilizers applied each Year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the roots and ploughed under in May, 1901, before the roots were sown.	Average Yield for Twelve Years.				13th Season, 1902, Varieties.				Average Yield for Thirteen Years.			
		Mangels, Weight of Roots.		Turnips, Weight of Roots.		West Half Plot. Mangels, Mammoth Long Red: Weight of Roots.		East Half Plot. Turnips, PurpleTop Swede: Weight of Roots.		Mangels, Weight of Roots.		Turnips, Weight of Roots.	
		Per Acre.		Per Acre.		Per Acre.		Per Acre.		Per Acre.		Per Acre.	
		Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	9	341	9	481	15	1,480	8	640	9	1,306	9	339
10	Nitrate of soda, 300 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then.....	14	328	9	1,181	17	760	7	1,760	14	823	9	918
11	Sulphate of ammonia, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12	538	10	1,715	13	1,200	11	760	12	743	10	1,795
12	Unmanured from the beginning.....	7	449	7	482	10	240	8	600	7	894	7	645
13	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12	675	8	1,469	13	840	11	960	12	842	8	1,891
14	Wood ashes, unleached, 2,000 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	10	1,886	8	103	12	360	9	880	11	76	8	317
15	Common salt (Sodium chloride) 400 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	9	1,437	7	927	9	1,240	6	1,600	9	1,422	7	825
16	Mineral superphosphate, No. 1, 500 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	13	173	10	1,908	13		9	1,000	13	139	10	1,896
17	Mineral superphosphate, No. 1, 350 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	12	1,624	9	1,919	22	1,840	15		13	1,179	10	694
18	Mineral superphosphate, No. 1, 500 lbs.; muriate of potash, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	12	1,552	10	1,425	15	1,160	16	6 0	12	1,98	11	285
19	Double sulphate of potash and magnesia, 300 lbs. per acre in 1889 and 1890 (muriate of potash, 200 lbs., substituted each year since); dried blood, 250 lbs.; mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then....	14	342	11	1,838	17	560	16	480	14	820	12	503
20	Wood ashes, unleached, 1,500 lbs.; common salt (Sodium chloride), 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	14	1,244	10	1,712	21	1,280	9	1,760	15	324	10	1,562
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	14	1,482	11	51	18	840	12	1,400	15	48	11	369

RESULTS OBTAINED FROM THE PLOUGHING UNDER OF CLOVER.

In 1900 and 1901 further experiments were undertaken to demonstrate the usefulness of the ploughing under of clover to add fertility to the soil. The following tests were made with oats, Indian corn and potatoes showing the effect on these crops in 1902, of clover ploughed under in 1901.

In the second series of tables the effect from the ploughing under of clover in 1900 is shown on the two succeeding crops, those of 1901 and 1902. These experiments were all made on plots of one eightieth of an acre each.

EFFECTS of the Ploughing-under of Green Clover, in 1901, as a Fertilizer for Oats in 1902.

Variety.	Length of Straw.	Length of Head.	Yield of Oats Per Acre.	Weight of Straw Per Acre.
(Banner Oats grown after).	Inches.	Inches.	Bush. Lbs.	Lbs.
Wheat, 1901, no clover	49 — 51	9 — 10½	63 18	3,280
" 1901, with "	51 — 53	9 — 10½	72 32	5,280
Barley, 1901, no "	49 — 51	9 — 10½	61 6	2,720
" 1901, with "	51 — 53	9 — 10½	70 20	4,960
Oats, 1901, no "	49 — 51	9 — 10½	58 28	3,120
" 1901, with "	51 — 53	9 — 10½	70 20	4,720

EFFECTS of the Ploughing-under of Green Clover, in 1901, as a Fertilizer for Indian Corn in 1902.

Variety.	Height.	Leafiness.	Condition When Cut.	Weight of Green Fodder Per Acre.
(Selected Leaming grown after).	Inches.			Tons. Lbs.
Wheat, 1901, no clover	85 — 95	Medium	Late milk	16 800
" 1901, with "	110 — 120	Very leafy	"	22 1,600
Barley, 1901, no "	85 — 95	Medium	"	17 720
" 1901, with "	110 — 120	Very leafy	"	23 1,200
Oats, 1901, no "	85 — 95	Medium	"	15 —
" 1901, with "	110 — 120	Very leafy	"	20 800

EFFECTS of the Ploughing-under of Green Clover in 1901, as a Fertilizer for Potatoes in 1902.

Variety.	Yield Per Acre.
(Everett after grown).	Bush. Lbs.
Wheat, 1901, no clover	353 20
" 1901, with "	396 —
Barley, 1901, no "	346 40
" 1901, with "	386 20
Oats, 1901, no "	358 —
" 1901, with "	392 40

SECOND Series of Plots showing effect of Clover one and two years after Ploughing-under.

Crop Sown in 1900.	1901. Banner Oats. Yield of Oats Per Acre.		1901. Banner Oats. Weight of Straw Per Acre.	1902. Everett Potatoes.	
	Bush.	Lbs.	Lbs.	Bush.	Lbs.
Wheat, no clover	47	2	2,480	274	40
" with "	49	14	3,440	293	20
Barley, no "	37	22	1,920	270	40
" with "	42	12	2,640	272	—
Oats, no "	35	10	2,240	333	20
" with "	40	—	3,040	353	20

Crop Sown in 1900.	1901. Everett Potatoes.		1902. Corn, Selected Leaming.	
	Bush.	Lbs.	Tons.	Lbs.
Wheat, Preston, no clover	396	40	16	1,600
" " with "	440	—	19	—
Barley, Mensury, no "	396	—	15	880
" " with "	420	—	16	640
Oats, Banner, no "	381	20	16	1,600
" " with "	411	20	20	200

Crop Sown in 1900.	1901. Corn, Selected Leaming.		1902. Banner Oats. Yield of Oats Per Acre.		1902. Banner Oats. Weight of Straw Per Acre.
	Tons.	Lbs.	Bush.	Lbs.	Lbs.
Wheat, Preston, no clover	19	1,280	51	26	2,320
" " with "	27	1,760	75	10	4,160
Barley, Mensury, no "	15	1,600	47	2	2,600
" " with "	27	880	70	20	3,920
Oats, Banner, no "	20	160	58	28	3,120
" " with "	25	1,600	70	20	3,840

EFFECTS OF FERTILIZERS ON SPRING WHEAT, OATS AND AWNLESS BROME GRASS.

During the season of 1900 four series consisting in each case of nine one-eightieth acre plots, were laid out, seven of which were treated with different fertilizers, and the remaining two left as check plots which received no fertilizer.

One set of these plots was sown with spring wheat (Preston), one with oats (Improved Ligowo), a third with Awnless Brome grass *Bromus inermis*, and a fourth with common red clover.

The object in view in these tests is to gain information as to the effects on crops sown on land in a fair average condition of fertility, of superphosphate of lime and

Thomas' phosphate, both used singly, also of superphosphate of lime with kainit and nitrate of soda, and of Thomas' phosphate with kainit and nitrate of soda.

The land chosen was in a fairly good condition of tilth. The soil was a sandy loam which has been under cultivation since 1887, has been cropped each year with a suitable rotation of crops and has received a dressing of barn-yard manure about once in four years. The last application of manure was in 1897 when it received about 12 tons per acre.

It is proposed to grow the same crops on this land for a series of years, using the same fertilizers in the quantities mentioned every second year. The fertilizers were applied in the spring of 1900 and again in the spring of 1902.

A large proportion of the plants in the plots of common red clover died during the winter of 1901-2, and it was thought best to plough them under and resow in the spring of 1902. Most of the plants from the first sowing were destroyed by a severe spring frost, after which the plots were again sown and the plants had made a medium growth before the close of the season. The first sowing of clover was on May 3, the second on May 23, sown in each instance at the rate of 12 lbs. per acre. The second application of fertilizers was made to these plots before the clover seed was sown in the spring.

RESULTS OF THE APPLICATION OF FERTILIZERS TO SPRING WHEAT.

Sown April 29, ripe August 15.

No. of Plot.	Name of Variety, Preston.	Yield of grain per acre.		Yield of straw per acre.
		Bush.	Lbs.	Lbs.
1	Superphosphate, 400 lbs. per acre	24	—	3,920
2	Thomas' phosphate, 400 lbs. per acre	24	—	3,760
3	Thomas' phosphate, 800 lbs. per acre	28	—	4,240
4	Check	28	—	3,840
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre	26	40	3,520
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	25	20	3,360
7	Check	26	40	3,760
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	30	40	4,560
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	28	—	4,320

RESULTS OF THE APPLICATION OF FERTILIZERS TO OATS.

Sown April 29, ripe August 21.

No. of Plot.	Name of Variety, Improved Ligowo.	Yield of grain per acre.		Yield of straw per acre.
		Bush.	Lbs.	Lbs.
1	Superphosphate, 400 lbs. per acre	60	—	3,800
2	Thomas' phosphate, 400 lbs. per acre	75	10	4,960
3	Thomas' phosphate, 800 lbs. per acre	70	20	4,560
4	Check	75	10	2,480
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre	68	8	3,680
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	68	8	4,400
7	Check	72	32	4,720
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	72	32	4,640
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	63	18	5,680

RESULTS OF THE APPLICATION OF FERTILIZERS TO AWNLESS BROME GRASS.

No. of Plot.	Awnless Brome Grass (Bromus inermis).	Length of Brome Grass.	Yield per Acre, Green.		Yield per Acre, Cured.	
		Inches.	Tons.	Lbs.	Tons.	Lbs.
1	Superphosphate, 400 lbs. per acre	45—50	7	160	3	1,360
2	Thomas' phosphate, 400 lbs. per acre	45—50	6	1,520	3	1,200
3	Thomas' phosphate, 800 lbs. per acre	43—45	5	480	2	1,440
4	Check	43—45	4	800	2	800
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre	43—45	5	1,200	2	1,360
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	43—45	5	880	2	1,200
7	Check	45—47	6	..	3	1,360
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	45—50	7	440	3	400
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	45—50	8	320	3	1,200

DISTRIBUTION OF SAMPLES OF SEED GRAIN TO FARMERS FOR TRIAL.

A further distribution was made in the spring of 1902, of samples of the most promising sorts of oats, spring wheat, barley, pease, Indian corn and potatoes. By the careful growing of one of these samples, which weigh three pounds each, the farmer can soon provide himself with seed of one of the best sorts sufficient for a large area at no cost beyond that of his own labour. From the many appreciative letters received from farmers who have had these samples and have grown from them the seed grain they are now using on their farms, it is evident that this branch of the work of the experimental farms is doing much good and is rapidly accomplishing the object for which it was begun, that of the general introduction among farmers throughout the Dominion of the best and most productive sorts of these important farm crops. Another proof of the appreciation in which this work is held, is the very large demand each year for samples.

The samples sent out from the Central Experimental Farm during the early months of 1902 were distributed as follows:—

Name of Grain.	Prince Edward Island.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	North-west Territories.	British Columbia.
Oats	781	1,421	1,202	5,021	4,272	1,144	583	143
Barley	118	365	163	1,186	539	159	133	63
Wheat	256	474	691	2,102	776	307	295	54
Pease	57	321	274	845	354	265	151	55
Indian corn	39	179	184	649	568	92	55	15
Potatoes	167	866	847	3,329	2,170	684	530	198
Total	1,418	3,626	3,361	13,123	8,679	2,651	1,747	528

Total number of samples distributed..... 35,133
Number of applicants supplied..... 35,077

The following list shows the number of three pound packages of the different varieties which have been sent out :—

Name of Variety.	Number of Packages.
Oats.	
Improved Ligowo	3,021
Banner	2,088
Tartar King	1,848
Waverley	1,812
Abundance	1,154
Wide Awake	803
Bavarian	755
Goldfinder	711
New Zealand	626
Thousand Dollar	574
Black Beauty	305
American Beauty	236
Golden Beauty	207
Early Archangel	104
Lincoln	103
Joanette	86
Siberian	76
Pioneer	58
Total	14,567
Barley.	
Six-rowed.	
Mensury	1,189
Odessa	465
Trooper	333
Royal	119
Two-rowed.	
Sidney	339
Beaver	174
Invincible	107
Total	2,726
Wheat.	
Preston	1,172
Red Fife	515
Percy	469
Stanley	459
Wellman's Fife	425
White Fife	413
Huron	316
Monarch	289
Red Fern	286
White Russian	277
White Connell	272
Speltz	61
Goose	1
Total	4,955
Pease.	
Large White Marrowfat	465
Golden Vine	451
Arthur	294
Prussian Blue	165
Grass Pea	122
Canadian Beauty	115
Pease—*Con.*	
French Canner	75
Creeper	59
Prince Albert	57
New Potter	38
Black Eyed Marrowfat	34
Crown	29
Alma	29
Kirby	28
Daniel O'Rourke	28
Mummy	27
Paragon	27
Cooper	26
Prince	26
Duke	26
King	25
Fergus	25
Archer	24
Elephant Blue	24
German White	24
Vincent	22
Bedford	20
Bright	20
Bruce	17
Total	2,322
Indian Corn.	
Selected Leaming	674
Longfellow	345
Early Butler	159
Mitchell's Early	137
Mammoth Cuban	133
Angel of Midnight	132
Pearce's Prolific	50
White Cap Yellow Dent	47
Compton's Early	42
King of the Earliest	31
Champion White Pearl	21
Canada White Flint	1
Total	1,772
Potatoes.	
Wonder of the World	1,255
Early Sunrise	1,205
Early Harvest	725
Carman No. 1	716
Early Andes	597
Everett	541
Late Puritan	448
Bovee	399
Rochester Rose	393
Vigorosa	336
Prize Taker	253
New Queen	215
Early White Prize	203
American Wonder	201
Beauty of Hebron	191
Canadian Beauty	190
Sir Walter Raleigh	168
Honeoye Rose	149
Queen of the Valley	109

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
POTATOES—*Con.*			
Maggie Murphy	102	Total number of packages distributed—	
Uncle Sam	33	Wheat	4,955
Enormous	27	Oats	14,567
Seattle	21	Barley	2,726
With smaller quantities, sent in response to special requests, of 24 other varieties, in all	314	Pease	2,322
		Corn	1,772
		Potatoes	8,791
Total	8,791	Total	35,133

DISTRIBUTION OF SAMPLES OF GRAIN SUFFICIENT FOR ONE-TENTH OF AN ACRE.

The distribution of grain in larger samples sufficient in each case for a one tenth acre plot which was begun in 1899 has been continued. These samples have been sent to a special list of farmers selected from among those who have shown a particular interest in this work, and the samples have been so distributed that no part of the Dominion has been overlooked.

DISTRIBUTION of samples sufficient for one-tenth of an acre.

Name of Grain.	P. E. I.	N. S.	N. B.	Quebec.	Ontario.	Man.	N.W.T.	B. C.
Oats	40	104	130	237	591	125	99	14
Spring Wheat	36	30	84	280	31	58	63	14
Barley	11	42	20	87	116	38	22	3
Total	87	176	234	604	738	221	184	31

The following list shows the number of these larger packages of the different varieties which have been sent out:—

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
OATS.		BARLEY.	
Banner	343		
Tartar King	232	Mensury	162
Improved Ligowo	214	Royal	44
Abundance	186	Beaver	44
Waverley	157	Odessa	41
Wide Awake	79	Sidney	17
American Beauty	77	Standwell	14
Goldfinder	52	Invincible	11
		Trooper	6
Total	1,340	Total	339
WHEAT.		SUMMARY.	
Red Fife	168		
Preston	144		
White Fife	128	Oats	1,340
Wellman's Fife	104	Wheat	596
Stanley	36	Barley	339
Percy	16		
Total	596	Total	2,275

DISTRIBUTION OF SAMPLES FROM THE BRANCH EXPERIMENTAL FARMS.

Samples of three pounds each were also distributed from the branch experimental farms as follows:—

Experimental Farm, Nappan, N.S.—		Experimental Farm, Brandon, Man.—	
Oats	208	Samples of grain of all sorts	401
Wheat	83	Potatoes	237
Barley	67	Total	638
Pease	40		
Buckwheat	16		
Winter Rye	6		
Potatoes	325		
Total	745		
Experimental Farm, Indian Head, N.W.T.—		Experimental Farm, Agassiz, B.C.—	
Oats	380	Oats	147
Barley	264	Barley	113
Wheat	265	Wheat	209
Pease	230	Pease	123
Flax, Rye, &c.	111	Potatoes	268
Potatoes	725	Total	860
Total	1,975		

These samples added to the number distributed by the Central Experimental Farm make a total of 41,626. It is gratifying to find so large an army of co-experimenters willing to engage in this good work.

TESTS OF THE VITALITY OF SEED GRAIN AND OTHER SEEDS FOR 1901-2

The number of samples of seed grain and other seeds tested during the season of 1901–2 to find out the proportion which would germinate was 1,830. These tests are continued from year to year so that farmers may have the opportunity of having any samples which may be of doubtful vitality, through injury in harvesting or storing, thoroughly tested so that their value for seed purposes may be known. Samples may be sent free through the mail, about one ounce is sufficient, and the work is done and reported on free of charge. The tests can usually be completed within a fortnight after the samples are received.

RESULTS OF TESTS OF SEEDS FOR VITALITY, 1901–2.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	584	100·0	3·0	83·9	4·1	88·0
Barley	395	100·0	0·0	82·3	7·4	89·7
Oats	620	100·0	6·0	83·6	5·7	89·4
Rye	2	76·0	56·0	64·5	1·5	66·0
Pease	176	100·0	40·0			89·3
Corn	8	100·0	2·0			66·2
Clover	10	92·0	12·0			73·3
Grass	7	97·0	7·0			74·4
Tares	2	78·0	3·0			40·5
Onion	2	52·0	52·0			52·0
Flax	8	61·0	26·0			52·3
Sunflower	3	88·0	72·0			78·6
Cucumber	4	16·0	2·0			9·0
Radish	3	76·0	15·0			40·3
Lettuce	1	18·0	18·0			18·0
Squash	1	6·0	6·0			6·0
Celery	1	78·0	78·0			78·0
Canary Seed	1	54·0	54·0			54·0
Amber Sugar Cane	1	4·0	4·0			4·0
Apple	1	0·0	0·0			0·0
Total number of samples tested, highest and lowest percentage.	1830	100·0	0·0			

(Signed) WILLIAM T. ELLIS.

TABLE showing the Results of Grain Tests for each Province.

ONTARIO.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	178	99·0	3·0	76·9	6·4	83·3
Barley	105	100·0	0·0	74·4	10·5	84·9
Oats	221	100·0	6·0	86·3	4·3	90·7

QUEBEC.

Wheat	49	100·0	63·0	86·4	4·8	91·3
Barley	63	100·0	83·0	92·4	4·1	96·5
Oats	55	100·0	33·0	84·5	3·6	88·2

MANITOBA.

Wheat	135	100·0	59·0	88·6	2·9	91·5
Barley	84	100·0	49·0	74·1	10·5	84·7
Oats	118	100·0	31·0	86·7	6·3	93·1

NORTH-WEST TERRITORIES.

Wheat	179	100·0	44·0	80·3	3·1	83·4
Barley	65	100·0	61·0	84·0	5·4	89·5
Oats	121	100·0	6·0	69·8	10·4	80·3

NOVA SCOTIA.

Wheat	24	99·0	84·0	91·8	2·7	94·6
Barley	38	100·0	74·0	89·8	5·2	95·0
Oats	32	100·0	50·0	90·2	3·4	93·6

NEW BRUNSWICK.

Wheat	55	100·0	74·0	91·2	2·5	93·8
Barley	22	100·0	89·0	93·8	3·4	97·2
Oats	32	100·0	77·0	90·1	3·5	93·6

PRINCE EDWARD ISLAND.

Wheat	23	100·0	80·0	94·3	1·7	96·0
Barley	16	100·0	86·0	94·5	3·1	97·7
Oats	31	100·0	76·0	89·6	4·0	93·7

BRITISH COLUMBIA.

Wheat	1	84·0	84·0	81·0	3·0	84·0
Barley	2	97·0	92·0	91·0	3·5	94·5
Oats	10	100·0	62·0	87·4	5·0	92·4

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METEOROLOGICAL OBSERVATIONS.

Table of Meteorological Observations taken at the Central Experimental Farm, Ottawa, 1902; maximum and minimum temperatures, with date of occurrence, and mean temperature for each month, also rainfall and snowfall and total precipitation.

Month.	Maximum.	Minimum.	Range.	Mean.	Highest.	Date.	Lowest.	Date.	Rainfall.	Snowfall.	Total Precipitation.	Number of days Precipitation.	Heaviest in 24 hours.	Date.
	F°	F°	F°	F°	F°		F°		in.	in.	in.		in.	
January...	20·54	1·32	19·21	10·92	37·0	3rd, 27th	−19·0	17th	0·79	40·00	4·79	15	2·09	22nd
February..	24·20	6·10	18·09	15·14	42·4	27th	−13 0	4th	0·07	21·75	2·24	10	0·79	2nd
March	41·68	25·74	15·94	33·71	58·8	28th	6·0	19th	3·50	1·25	3·62	12	0·96	29th
April.....	56·24	34·66	21·58	45·45	78·0	29th	25·0	5th	2·93	.....	2·93	13	1·09	30th
May.....	65·02	42·33	22·69	53·67	86·0	23rd	19·0	10th	1·62	....	1·62	13	0·42	24th
June	71·80	47·63	22·16	58·71	84·0	3rd	37·8	11th	4·19	.....	4·19	18	0·71	26th
July	80·32	57·07	23·25	68·69	92·0	8th	49·0	16th	4·03	.....	4·03	15	2·04	15th
August....	76·46	53·31	23·15	64·88	87·5	31st	41·9	17th	1·82	.....	1·82	12	1·08	21st
September.	70 90	50·05	20·85	60·47	81·3	21st	36·2	6th	1·79	.....	1·79	11	0·73	23rd
October....	52·02	34·32	17·69	43·16	66·2	13th	19·0	30th	3 08	1·00	3·18	16	0·58	6th
November.	44 80	29·44	15·36	37·12	61·2	6th	6·0	29th	1·45	5·00	1·95	12	0·75	12th
December..	22·75	4·98	17·77	13·86	38·5	19th	−25·2	9th	0·67	32·75	3 94	15	1·05	10th
									25·94	101·75	36·10	162		

Rain or snow fell on 162 days during the 12 months.

Heaviest rainfall in 24 hours, 2·04 inches on July 15.

Heaviest snowfall in 24 hours, 14 inches on January 22.

The highest temperature during the 12 months was 92·0° on July 8.

The lowest temperature during the 12 months was—25·2° on December 9.

During the growing season rain fell on 13 days in April, 13 days in May, 18 days in June, 15 days in July, 12 days in August, and 11 days in September.

February shows the lowest number of days with precipitation, viz., 10.

Total precipitation during the 12 months 36·10 inches, as compared with 38·91 inches during 1901.

RAINFALL, Snowfall and total Precipitation from 1890 to 1902, also the average annual amount that has fallen.

Year.	Rainfall.	Snowfall.	Total Precipitation.
	In inches.	In inches.	In inches.
1890.....	24·73	64·85	31·22
1891.....	30·19	73·50	37·54
1892.....	23·78	105·00	34·28
1893.....	31·79	72·50	39·04
1894.....	23·05	71·50	30·20
1895.....	27 01	87·50	35·76
1896.....	21·53	99·75	31·50
1897.....	24·18	89·00	33·08
1898.....	24·75	112·25	36·02
1899.....	33·86	77·25	41·63
1900.....	29·48	108·00	40·27
1901.....	29·21	97·25	38·91
1902.....	25·94	101·75	36·10
Yearly average for 13 years.....	26·88	89·23	35 81

RECORD of Sunshine at the Central Experimental Farm, Ottawa, for the Years 1899 to 1902.

Months.	1899.				1900.				1901.				1902.			
	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.	Number of days with Sunshine.	Number of days without Sunshine.	Total hours Sunshine	Average Sunshine per Day.
January....	18	13	91·2	2·94	18	13	76·4	2·46	20	11	94·6	3·05	21	10	97·2	3·13
February...	19	9	102·1	3·64	20	8	110·2	3·93	20	8	120·9	4·31	20	8	93·3	3·33
March.....	17	14	124·1	4·00	26	5	177·9	5·73	19	12	82·4	2·62	25	6	136·2	4·39
April.....	26	4	228·8	7·62	26	4	212·7	7·09	18	12	137·1	4·57	26	4	161·9	5·39
May.....	27	4	225·4	7·27	27	4	241·6	7·79	25	6	200·8	6 47	27	4	229·8	7·41
June.....	29	1	257·1	8·57	27	3	282·2	9·40	29	1	269·4	8·98	29	1	185·6	6·18
July.....	29	2	271·3	8·75	29	2	225·1	7·26	29	2	245·8	7·92	31	0	239·9	7·73
August....	31	0	271·2	8·74	30	1	270·7	8·73	29	2	226·1	7·29	31	0	252·0	8·12
September..	22	8	128·9	4·29	22	8	164·4	5·48	26	4	202 3	6·74	25	5	145·0	4·83
October....	23	8	120·4	3·88	26	5	148·7	4·79	27	4	126·3	4·07	24	7	99·2	3·20
November..	17	13	77·0	2·56	18	12	71·7	2·39	19	11	72·4	2·41	21	9	82·5	2·75
December..	17	14	50·1	1·61	16	15	34·0	1·09	16	15	45·4	1·46	16	15	58·4	1·88

(Signed) WILLIAM T. ELLIS,
Observer.

CORRESPONDENCE.

The large correspondence between Canadian farmers and the officers of the Experimental Farms has been well maintained during 1902. A large proportion of the letters received are from correspondents who seek information on all sorts of subjects relating to farm-work, stock raising, dairying, fruit growing, poultry management &c.

CENTRAL EXPERIMENTAL FARM.

The following is a summary of the letters received and sent out at the Central Experimental Farm from November 30, 1901 to November 30, 1902, also the number of reports, bulletins and circulars forwarded by mail during the same period.

	Letters received.	Letters sent.
Director	47,998	19,534
Agriculturist	3,251	2,815
Horticulturist	1,199	1,233
Chemist	1,163	1,147
Entomologist and Botanist	3,215	2,845
Poultry Manager	1,515	1,093
Accountant	1,100	1,128
	59,441	29,795

A large number of the letters received by the Director are applications for samples of grain or for the publications of the farms, a considerable proportion of which are answered

SAMPLE HEDGES, CENTRAL EXPERIMENTAL FARM, OTTAWA. —Photo. by C. E. Saunders.

by sending the correspondents the material asked for accompanied by circular letters. This will explain why the number of letters received so much exceeds the number sent out.

Circular letters, including circulars sent with samples of seed grain	45,485
Reports and bulletins mailed	220,426

BRANCH EXPERIMENTAL FARMS.

The correspondence with the Superintendents of the branch experimental farms is also large as is shown by the following figures :

	Letters received.	Letters sent.
Experimental Farm Nappan, N.S	1,616	1,336
Experimental Farm Brandon, Man	4,464	2,969
Experimental Farm Indian Head, N.W.T	5,210	5,357
Experimental Farm Agassiz, B.C	2,586	2,464

Much additional information has also been sent out from the branch farms in printed circulars.

By adding the correspondence at the branch farms to that of the central farm we find that 73,317 letters were received and 41,921 sent out during the year.

NOTES ON A JOURNEY WESTWARD.

On July 10, 1902, I left Ottawa for my annual tour of inspection of the western experimental farms and of agricultural operations in western Canada generally. From Ottawa to Pembroke many good farms were seen. The spring grain all looked well and the earlier sorts were heading. The hay harvest had begun and many of the fields gave promise of heavy returns. In the neighbourhood of Renfrew there were considerable quantities of pease all looking very well. Farming has improved much in most parts of this territory during the past few years. The advanced condition of the crops gave evidence that early sowing was more generally practised and their condition as a whole showed that better methods of cultivation and treatment were being followed. Cultivation, however, was not always sufficiently thorough to keep weeds in subjection, and fields were occasionally seen where daisies and wild mustard had made considerable headway, but these were exceptional. At several points along the route patches of the bright blue flowers of the common bugloss or blue weed, *Echium vulgare*, had shot up above the level of the grain, showing that this troublesome weed had become well established in some localities in that district. This is likely to spread unless efforts are made to check it.

In some parts of New Ontario many evidences were seen of increasing settlement, new homes were being established at different points and promising crops were seen here and there. A few years will no doubt effect great changes in that part of the country.

WINNIPEG.

Arriving in Winnipeg on the 12th a day was spent in inspecting the park system of that enterprising city, and considering the difficulties under which this work is conducted, the advancement which has been made is highly creditable. Eight parks in all have been established in different parts of the city, varying in size from three to ten acres each, including forty-three acres in all. These breathing spots for the people are greatly appreciated. They have been nicely laid out, and are being planted with trees

and shrubs and decorated with borders and beds of perennial and annual flowers, and thus made very attractive. Under the energetic management of the superintendent of parks, the planting of these parks as well as that of the boulevards along many of the city streets making rapid progress. The more general use of the American elm in the street planting at Winnipeg is to be highly commended. These trees are obtained by transplanting native specimens found growing along the banks of the Red and Assiniboine Rivers.

EXPERIMENTAL FARM, BRANDON.

The experimental farm at Brandon was reached on July 15. The farm had been much injured and the work disarranged by the flood which followed a remarkable 'cloud burst' on June 1, when over 4 inches of rain fell in forty minutes, and the rainfall of that day was 5½ inches. This unprecedented rain storm had flooded about 300 acres of land, but over the larger part of this area the flooding was not long continued. There were, however, about 62 acres of crop destroyed, including 12 acres of rotation plots and most of the uniform trial plots of pease. The plots of barley were also so much injured that no satisfactory comparisons of the yield of varieties could be made this season. Individual plots in the series of oats and wheat were also injured, and the value of this useful work at Brandon for 1902 interfered with. The additional crops destroyed were chiefly oats which had been sown for feed purposes. The other experimental plots and fields had been but slightly injured and these crops were looking well. The plantations of ornamental trees were not much damaged, and the orchards of cross-bred and seedling crab-apples being mostly on higher land had suffered but little and many of the trees were well laden with fruit. Under the energetic direction of the Superintendent, the injury caused by the flood was rapidly repaired, and at the time of my return to Brandon from the Pacific coast on September 1 the farm had almost resumed its usual appearance and everything was again in excellent order. The crops of grain harvested were above the average and the yield of hay was good, ranging from 2 to 2½ tons per acre.

VISIT TO SEWELL.

On July 16 a drive of 22 miles was taken from Brandon to Sewell to see the swamp where supplies of native white spruce and tamarac have been obtained for planting on the experimental farm. A large area of swampy land was found, much of it covered with good specimens of these trees of various sizes. White spruce and tamarac when carefully transplanted from this locality to Brandon have done remarkably well, and it was gratifying to find so large a number of young trees available there for future planting in different parts of Manitoba.

EXPERIMENTAL FARM AT INDIAN HEAD, N.W.T.

The Indian Head experimental farm was visited on the way west on July 18-20 and again on the journey eastward, August 20-21 and 26-28. The crops were exceedingly good and the yield of grain of all sorts very heavy. Brome grass was cut and in stook and had given a very satisfactory yield. The wheat crop on the experimental farm, also that all through the Indian Head district on summer fallowed land was remarkably even and heavy, the heads being plump and well filled. A large part of the crop in the North-west Territories is on summer fallow and the proportion is increasing from year to year. The demonstrations which have been annually made on the western experimental farms during the past 15 years of the great advantage arising from the summer fallowing of land, has induced farmers generally to adopt this profitable method of treatment of the soil.

The condition of the cattle and other stock on the Indian Head farm was quite satisfactory.

A new threshing outfit consisting of a gasoline engine and a thresher was purchased during the past season to serve the purposes of the branch experimental farms at Indian Head and Brandon. It is proposed each year to finish the threshing at one farm and then ship the engine and thresher by rail to the other. It will be a great convenience and save much loss of time to have a threshing outfit at command, as it has been very difficult for some years past to get this work done promptly. The experimental farm crops, consisting as they do of a number of varieties are more troublesome to thresh than those of the average farmer, hence it has been almost impossible to secure a thresher until towards the very end of the season.

While at Indian Head the editors of some of the leading newspapers of Great Britain, who were travelling in a party through Canada, were met, and a good opportunity given them of examining the several divisions of the work carried on at the Indian Head farm, and of travelling through portions of the Indian Head district where they were much impressed by the magnificent crops everywhere seen.

AMONG THE RANCHES.

Several days were spent among the ranches on the plains. The season has been a favourable one for stock. At Gull Lake, several large flocks of sheep were seen, at Crane Lake some large bands of pure bred Clydesdale horses and at Stair a herd of pure bred Galloway cattle numbering about 700. From Medicine Hat, Lethbridge and other points many train loads of fine beef cattle were being forwarded to Great Britain.

EXPERIMENTAL FARM, AGASSIZ.

Beginning with July 30 several days were spent at this farm. The crops were found to be generally good. Hay had yielded well and had been saved in good condition. Oats, wheat and barley were ripening fast and gave promise of satisfactory returns. Field roots and corn were making rapid growth.

STOCK.

The herd of cattle consisting of twelve animals, all Shorthorns are doing well. The pigs are of three breeds, Berkshires, Improved Large Yorkshires and Tamworths, all of which were thrifty and in good condition. The flock of Dorset Horned sheep consists of 13 females and several males, all healthy and vigorous. The fowl house is well filled with specimens of several breeds.

FRUIT.

The apple crop was scarcely an average one, but pears were yielding well and the crop of plums was good. Plum rot prevailed to a considerable extent which reduced the proportion of marketable fruit and interfered much with its keeping quality. The plums grown in the orchards on the sides of the mountain were almost or quite free from this disease.

The orchards are increasing in interest as the new varieties come into fruit. At the time of my arrival cherries were just about over, there were, however, several late sorts of which fair crops were still to be seen. The Planchoury is a fine late variety, large and of excellent quality, which was bearing abundantly and the fruit still in good condition. Plums were beginning to ripen. The Clayton was one of the earliest and was almost ripe, Peach plum and Saunders nearly ripe. These are all good early sorts. The plum and cherry trees in the valley orchards were looking well, but the apple trees in several parts of the orchard were suffering from "canker" and some trees had died from this disease. The trees on the mountain orchards are healthier than those in the valley, but even there the apple trees are not entirely free from canker.

GENERAL CROPS IN THE COAST CLIMATE OF BRITISH COLUMBIA.

The crops in the coast climate of British Columbia have been very satisfactory. The hay crop was particularly heavy. Oats and other grain also promised abundant returns, a promise which has since been fully realized.

KAMLOOPS TO VERNON.

On the return journey a two days' drive was taken across the country from Kamloops to Vernon. We proceeded first a few miles east towards Ducks, then south-west about 28 miles to Grand Prairie. All this part of the country was dry and no crops were grown without irrigation. Grand Prairie consists of about 8,000 to 10,000 acres of nearly level land, hemmed in by hills and mountain ridges with an abundant supply of water for irrigation. A large proportion of this land is under cultivation and the crops were very good. A large number of pigs are raised in this valley, which when sufficiently mature are driven to the nearest railway station and shipped to Vancouver.

Leaving this small but prosperous community the following morning, we reached Vernon in the evening. The road ran over many wooded hills and valleys where large herds of cattle found pasture. Approaching Vernon the grain crops were remarkably good. The scenery was very interesting and the drive one to be long remembered.

LORD ABERDEEN'S ORCHARD.

Five miles from Vernon we reach Coldstream, the estate of Lord Aberdeen, where there is one of the largest and best orchards in Canada. The trees number many thousand, are all well grown, and a large proportion of them were bearing fruit. The crop of apples this year was a very large one. At Coldstream there are also large plantations of plums, pears, cherries and small fruits and a very large field of hops.

CALGARY TO MACLEOD.

August 16.—Left Calgary at 7.45 a.m. for Macleod. From Calgary to Midnapore there were some crops and a few settlers, but most of the land is devoted to the grazing of horses. South of Midnapore the railway track had been submerged for some miles owing to the heavy rains. Some good fields of oats were seen near DeWinton, some of which were cut and in stook. Okotoks and High River are thriving towns on this line, many settlers have lately come into this district and a considerable area of land is under crop. South of this the country as far as Macleod is chiefly devoted to ranching.

From Macleod to Lethbridge the journey was made after dark. The district of which Lethbridge is the centre, is improving considerably, and since the new irrigation ditch has been constructed and put in operation, many new settlers have come in. The town also has improved much in appearance, the gardens are well supplied with water, and the large public square in the centre has been planted with rows of trees (Dakota cottonwood) which are growing well.

LETHBRIDGE TO MORMON SETTLEMENTS.

The Mormon settlements in this district are growing fast. A drive was taken to the town of Stirling also to Raymond. Stirling which is only three years old has now a population of 700 and the settlers have cropped 3,500 acres of land this year, about one-half of which was wheat. A considerable quantity of winter wheat is grown here. Raymond is about fifteen miles from Stirling. In my last annual report p. 84 I made some reference to this new town, which was then being founded. In September, 1902, when I first passed the site of this place, two or three tents were the only objects visible on the wide stretching prairie; but in August, 1903, after a lapse of eleven

months, a fine town had been built with a population of 600, and between 4,000 and 5,000 acres of land were under crop. The estimate for the wheat crop at that time in that district was from twenty-five to thirty bushels per acre.

REGINA TO SASKATOON.

On returning to Regina a trip was taken up the Prince Albert railway as far as Saskatoon. This section of country is being settled very rapidly within twenty-five miles on either side of the railway. Many visitors were met with going from point to point on the railway and in vehicles inspecting and purchasing lands. Some of these were from eastern Canada, but much the larger number were from the United States. These included farmers from Michigan, North and South Dakota, Iowa, Nebraska and Missouri. Among the visitors there were also the representatives of companies of capitalists who were investing largely in lands. One of these companies bought in April last, eleven hundred thousand acres and at the time of my visit six hundred thousand acres had been sold. Another company had bought two hundred thousand acres in that part of the country, and large purchases had been made in other localities

The number of entries for homesteads in the Dominion Land offices throughout the Territories has been very much larger than in any previous year, and the number available for settlers within convenient reach of the railways has been greatly reduced. There has been a considerable advance in the price of land and with this the demand seems to have largely increased.

REGINA TO MILESTONE AND PENSE.

A journey was also made across the country from Regina south to Milestone and thence north-west through Yellow Grass to Pense. Settlement was proceeding about as rapidly throughout this district as on the line to Saskatoon.

THE WESTERN HORTICULTURAL SOCIETY.

The return to Winnipeg was made in time to attend the meetings of the Western Horticultural Society on August 29-31, where I had the opportunity of examining a large collection of flowers, vegetables and fruits. The collections of flowers and vegetables were large and comprehensive and of excellent quality. The specimens of fruit although limited in number and variety, were for the most part very good. The principal exhibitor was Mr. A. P. Stevenson of Nelson, Man., who showed a good number of varieties of apples chiefly of Russian origin. Nelson is about six miles from Morden, Man., and Mr. Stevenson has a plantation exceptionally well sheltered, both by natural woods and artificial planting. The altitude also is low, 980 feet. A large proportion of the apples exhibited were grown on trees of Russian sorts sent to Mr. Stevenson, in 1891, from the Central Experimental Farm. Mr. Stevenson's favourable conditions enabled him to save most of the trees sent him. Larger numbers of the same varieties were sent at the same time to the experimental farms at Brandon and Indian Head, where they were planted under conditions as favourable as could then be had, but none of these have survived. It is hoped that other fruit growers will be found in the more favoured districts, who may be equally successful with Mr. Stevenson, but for the average farmer under average conditions the chance of reaching similar results is small.

The apples shown by Mr. Stevenson at the exhibition of the Western Horticultural Society included the following:—Blushed Calville, Hibernal, Stone Antonovka, Little Hat, Ostrakoff Glass, Sugar Sweet, Saccharine, Anisim, White Rubets, Krimskoe, Hare Pipka, Peerless, Simbirsk No. 9, Arabka, Cross, Simbirsk, No. 1, Grandmother, Volga Anis, Wealthy, Red Cheeked Borovinka, Yellow Transparent, Duchess and White Transparent. Among the smaller exhibitors of fruit were Mr. Thos. Frankland of

Stonewall, Man., and Miss E. Fowler of Headingly, Man. The whole exhibit was a credit to the society and to the province.

It has been my privilege, as official duties have permitted to attend other meetings of farmers and fruit growers during the year where I have had the pleasure of addressing the meetings, and taking part in the discussions and contributing, I trust some useful information.

EXPERIMENTAL FARM, NAPPAN, N.S.

A visit was paid to this farm in October, from the 8th to 11th. Every thing was found in good condition, although most of the crops had been harvested. This farm is improving much from year to year, the area of land under cultivation has been considerably enlarged and the quality of the soil improved by manuring, and the ploughing under of pease and clover. The field roots on the newer portions of the upland were an excellent crop.

Indian corn was being harvested at the time of my visit and was yielding a fair return notwithstanding the unfavourable season.

Oats had given an unusually heavy crop, so also had wheat and barley The hay had been well saved, the uplands having given excellent returns while the marsh land had scarcely given an average crop. The yields on the experimental farm were said to be fair indications of the crops in general throughout Nova Scotia, New Brunswick and Prince Edward Island which have been highly satisfactory.

Good progress is being made with the different sorts of stock kept on the farm and a good dairy herd has been built up. In swine, sheep and poultry some progress has also been made.

In the horticultural division, considerable advancement is noticeable. The orchard located on the main road is improving fast and most of the trees are making good growth. Many of the apple trees are bearing well and there were good crops on some of the older specimens. The smaller trees are making satisfactory increase in size but many of them are not yet old enough to bear fruit.

The orchard in the wooded inclosure is growing finely, the trees are vigorous and are developing evenly and a few of the older specimens were heavily laden with fruit, and some of the smaller trees, only four years planted, were bearing more or less. The general fruit crop in Nova Scotia was much lighter than usual and was estimated at less than half an ordinary crop.

The hedges and ornamental trees and shrubs have done well, making the lawns and grounds about the buildings very attractive. The various sorts of perennial and annual flowers grown here have furnished a succession of bloom throughout the season.

INTERNATIONAL CONFERENCE ON PLANT BREEDING.

On September 30, and October 1–2. I attended under your instruction a very important meeting in New York, held under the auspices of the Horticultural Society of that city, namely an 'International Conference on Plant Breeding and Hybridization' in company with Mr. W. T. Macoun, horticulturist and Dr. C. E. Saunders, experimentalist of the experimental farm. At this gathering we had the opportunity of meeting many eminent men engaged in these useful lines of work from different parts of the world. The sessions were most enjoyable and instructive and much information was gathered from the papers read and the discussions which followed. A paper was read by me on the 'Results of Hybridization and Plant Breeding in Canada,' illustrated by specimens, in which the work accomplished by different experimenters in Canada in this direction for the past 40 years was brought under notice. Prominence was also given to the work in plant breeding and hybridizing which has been done with cereals, fruits, &c., during the past 15 years, at the experimental farms. A paper was also presented by Mr. W. T. Macoun entitled 'Notes on the Breeding of Beans and Pease' and by Dr. C. E. Saunders, on a 'Study of the Variations in the Second Generation of Berberis

Hybrids'. These papers served to show that much useful and important work in plant breeding and hybridizing had been done in Canada.

This meeting created a widespread interest in the subject and much good will undoubtedly result therefrom. The papers presented are being published and will be widely circulated.

DISPLAY OF CANADIAN AGRICULTURAL AND HORTICULTURAL PRODUCTS AT THE EXHIBITIONS IN ENGLAND AND IRELAND.

A fine collection of Canadian cereals and fruits was prepared at the experimental farms and shown at the exhibitions held during 1902 at Wolverhampton and Cork. Assortments of the best of the cereals were shown in the straw put up in bunches of various sizes. Samples of some of the best of the grasses grown in this country for hay and pasture were also exhibited. These were largely used to decorate the Canadian courts. Many different varieties of agricultural products were also shown in glass jars of varying sizes, arranged on suitable stands. A good assortment of the more perishable summer fruits was prepared by the horticulturist at the central farm and preserved in suitable fluids. There was also a fine display of honey from the experimental farm apiary. These products were much admired for their beauty and high quality and were the subject of much favourable comment.

HEDGES.

On plate 2 in this report a very good representation is given of a portion of the sample hedges now growing at the Central Experimental Farm. Of these hedges there are now 103 varieties under trial, and most of the trees and shrubs tested have been found suitable for the purpose. These hedges are all fifty feet in length and ten feet apart and have been planted on a uniform method. Young trees or shrubs from one to two feet high have been selected, and these have been put in a single row fifteen inches apart, and after planting they have all been cut back to a uniform height of ten to twelve inches. When they are thus pruned when planted, they need no further clipping the first season, but after that, most deciduous trees and shrubs require clipping twice a year, the first time in the latter part of June, the second in August. These hedges are much admired. Among the deciduous trees and shrubs most satisfactory for hedge purposes the following deserve special mention: The Siberian Pea-tree (*Caragana arborescens*), Alder Buckthorn (*Rhamnus frangula*), Josika's Lilac (*Syringa Josikæa*), Guelder Rose (*Viburnum opulus*), Wayfaring Tree (*Viburnum Lantana*), Thunberg's Barberry (*Berberis Thunbergii*), Amur Privet (*Ligustrum amurense*), Sharp-leaved Cotoneaster (*Cotoneaster acutifolia*), and American Larch (*Larix pendula*). Among the evergreens the following are recommended: American Arbor-vitæ (*Thuya occidentalis*), Douglas Golden Arbor-vitæ (*Thuya occidentalis aurea Douglasii*), Rocky Mountain Blue Spruce (*Picea pungens glauca*), White Pine (*Pinus strobus*), Norway Spruce (*Picea excelsa*) and the White Spruce (*Picea alba*).

EXPERIMENTS IN TREE PLANTING ON SABLE ISLAND.

In the report of the director for 1901 an account was given of some experiments undertaken in May of that year in the planting of trees and shrubs on Sable Island, off the coast of Nova Scotia. There were included in this test 68,755 evergreens of 25 varieties and 12,590 deciduous sorts of 79 varieties, a total of 81,345. A list of these is given in the Annual Report of the Experimental Farms for 1901.

In that report some extracts were published from letters received from the superintendent of the island showing that the planting, which was begun on May 18, was finished on June 17. In subsequent letters received in July and November, he speaks of the difficulties the trees had to contend with owing to an unfavourable season, and of their condition at its close.

REPORTS FROM SABLE ISLAND IN 1902.

The first letter received in 1902 was written May 26. In this Mr. Boutellier says: 'I will give you the latest news of the trees. Our winter has been very mild; not much snow and not much frost. When a cold snap occurred it was followed by enough mild weather to take all the frost out of the ground. March was very mild; April was cold and windy, and that has continued up to a week ago. Many pines that seemed to stand the winter went red in March and April, and many that turned colour have recovered and are putting out new buds. Survivors of Austrian, Mountain and Maritime pines are the most promising, and those that are now doing well are the small specimens; nearly all the larger ones planted are killed. A few spruces of all kinds survive, but they are not promising. Of the arbor vitae only a few are living. Juniper of both kinds nearly all dead; perhaps four or five survivors.'

'Of the Maritime pines raised from the seed you brought, these were killed wherever they were scattered on the bare ground, but where they grew up among the grass they are growing finely in this shelter, and there are thousands now green and putting out new buds. When sowing these I put them in thick, and after they came up I thought that in spots they were too thick; but this was their salvation, as the winds subsequently killed those on the outside, while those in the middle of these bunches were protected and have remained green.'

'The deciduous trees were killed down from the top, some to the ground, others killed outright but there are no exceptions, all are killed at least half way down—Included in these are *Pyrus prunifolia*, *P. baccata*, *Caragana arborescens* and Silver Poplar. All these deciduous sorts put out leaves a month ago, but lately we have had very high winds and all the leaves are more or less blighted and some of the gooseberry and currant bushes are stripped. As I have mentioned before shelter is necessary here to success.'

'An exception I forgot. *Ampelopsis quinquefolia* which made vines three to six feet long, they laid on the ground and are alive to the tops. *Lycium Europeum* did well but it grows more upright and was partly killed. The strawberries came through well and look fine, roses with a few exceptions are growing, raspberries and blackberries killed down but are starting vigorously from the roots. After everything grows that will grow I will send you a more complete list of the casualties.'

'I kept about 10 lbs of the seed of the Maritime Pine sent last year and this I have planted this spring along with the seeds of other shrubs and trees you have sent me since, in rows in different places more or less sheltered. I also gave small lots to the three station keepers in other parts of the island. From the experience gained last year I think I shall be able to protect these seedlings next winter as well as other specimens; shelter from the winds is the main point here. Many Manitoba maple seedlings have leaved out and although they are killed from $\frac{1}{2}$ to $\frac{3}{4}$ down they are putting up a vigorous growth.'

'I have moved a few lilacs and Virginia-creeper to the edge of my platform at the house where I can train them over the rail this season. I have also given a few lilacs to the other stations, to whet their appetite for this kind of thing.'

'Speaking again of the need of shelter you will remember that there were three patches planted inside the home field in which the house stands. Two of these were long narrow strips which were ploughed before planting and subsequently cultivated. Of the trees planted on these plots there is not one survivor. In the front a plantation was made of about 1,000 trees in almost pure sand in which the sand binding grass was growing. When the grass grew up I had some of it cut out with a grass hook, and intended having it all cut, but more than half of it was left. Where the grass was left the trees are nearly all alive and thrifty, where the grass was cut 90 per cent are dead. In this grass are some nice specimens of *Pinus strobus*, White Pine, which did not stand exposure at all. About 300 trees are now growing in this plantation. Of the few sample bags of seed potatoes you brought me of 3 lbs. each I raised about five bushels nearly enough seed for my planting this spring.'

The next letter is dated September 18 in which the superintendent says 'I wrote you in the spring about the trees and I think on the whole it was encouraging. I am afraid that the facts I am to give you now will be less so. I mentioned that nearly all the deciduous trees had come through the winter, and although killed down somewhat had leaved out again and were making a promising start. The winds in the latter part of May were cruel to the trees sometimes running up to 40 miles an hour. In June we had a succession of windy days. On the 6th and 7th of that month the wind averaged for the 48 hours over 35 miles an hour and the maximum velocity was 52 miles with the thermometer ranging from 35° to 38° F. This storm stripped all the leaves of the deciduous trees and killed a large proportion of them, the rest have been struggling along feebly but at this time very few look promising. Pines have held on pretty well.'

'Strawberries lost many of their blossoms in the storm, yet we got a nice quantity of fruit off them, Buster being by far the best fruiter, but this may have been due to the protection of a fence. A few shoots sprung up again from the blackberries and raspberries which I am now protecting.'

'The Virginia creeper, matrimony vine and lilacs which I moved to the front of my house have lived, but have not made much growth, for as soon as buds and leaves would start they would be withered by a wind storm.'

'During July about 1,200 of the seedlings of the Maritime pine were transplanted into one of the larger plantations. I dug small clumps with one or two pines growing in each, with a hoe, and planted these irregularly about a foot apart so that if they grow they will protect each other. This work was carefully done and about 75 per cent are living. The seedlings in the bed look well, as do the pines planted last year that survived the winter. These are all protected by grass and may have grown hardier by the time they get above it. The remaining pines in the plantation in front of my house held their own during the summer. I left the grass around these also.'

'With reference to the use of fertilizers on the young trees, no difference could be noticed in the ground treated and untreated; the difference where any existed was where there was some natural protection from the wind. I am continuing the experiments with the pines growing on the plantation in front of my house where I shall be able to observe it if there be any difference. No fertilizer has been applied to this lot, and although the soil is pure sand, or nearly so, the pines that survived there, were quite equal in growth to any of those treated with fertilizers last year.

'In many cases where the tops of the seedlings of *Pinus Maritima* had turned red and were apparently dead, new shoots started just above the ground. It was a surprise to me to see conifers do this, and their roots are from 6 to 9 inches long, straight down.'

The latest communication received is under date of November 5, 1902, in which the superintendent says; 'Our autumn has been an improvement on the summer and last fall. Apple trees and shrubs protected with barrels are still growing as green as can be. The pines in Gourdeau park look fine and the fall rains have improved them very much. Our summer drouth affects the trees very seriously. Of the deciduous sorts planted in the park about fifty white birches have surprised me this fall, and they and the Scotch broom are about all that can be found there. These birches are still green and where the leaves did not get above the tall grass, are yet on the trees. We have had frost, but not enough to do injury in that direction.

'Pinks, chrysanthemums, snap dragons, petunias, asters, gladioli and roses are still blooming in a partly protected garden; of course they look a little ragged from fall winds.'

'I took from the ground about fifty bushels of potatoes, the produce of the few sample bags you brought here in 1901. They all turned out well, but I think Carman No. 1 gave the largest yield, and all are of excellent quality. Preston wheat, Early Riga wheat, Mensury barley, Ligowo oats and Bokhara clover were all sown side by side in a patch where potatoes had been raised two years. Except the clover all grew well, heads all formed well but did not fill, and the crop was cut for straw about August 15.

A list was received of the results of the planting of the smaller lots of trees and shrubs in the nursery, where the whole of the smaller lots and ten or twelve specimens only from each of the larger lots were put out, but no details have yet come to hand as to the number of survivors among the pines, spruces and the larger lots of the deciduous sorts which were put out in the larger plantations.

List of varieties which have survived in the nursery, showing the number planted and the proportion living on July 21, 1902 :—

—	Planted, May, 1901.	Living, July 21, 1902.	—	Planted, May, 1901.	Living, July 21, 1902.
Acer platanoides Schwedleri—Schwedlers Norway Maple	10	9	Pyrus prunifolia	48	40
Acer tataricum—Tartarian Maple	10	3	" baccata	75	56
Ampelopsis quinquefolia — Virginia Creeper	25	25	Prunus pumila—Sand Cherry	19	1
Aristolochia sipho—Dutchman's Pipe.	5	1	Prunus maritima—Beach Plum	13	8
Berberis vulgaris fol purpurea—Purple Barberry	24	8	Rhamnus frangula—Alder Buckthorn	10	6
Bignonia grandiflora—Trumpet Flower	10	1	Rhus cotinus—Smoke Tree	25	2
Caragana arborescens—Siberian Pea-tree	25	17	Roses—		
Catalpa Kempferi—Japanese Catalpa.	26	23	Etoile de Lyon	4	2
Chionanthus virginica—Fringe Tree	7	2	Paul Nabonnand	6	1
Cornus alba sibirica—Siberian Dog-wood	27	4	Francis Bennett	3	2
Crataegus oxyacantha—English Haw-thorn	17	12	Josephine Morell	5	2
Crataegus oxyacantha fl rosea plena —Double red-flowering English Hawthorn	10	2	Papa Gontier	4	2
Deutzia crenata—Crenate Deutzia	19	8	Sunset	4	1
Diervilla (Weigelia) rosea	26	8	Salix laurina—Laurel leaved Willow.	10	1
Elaeagnus argentea—Wolf Willow	6	4	Spiraea Van Houttei	26	8
" multiflora	12	6	Syringa Josikaea—Josika's Lilac	29	16
Fraxinus excelsior—European Ash	11	1	" vulgaris alba—White Lilac	27	5
Gleditschia triacanthos—Honey Locust	10	1	" v. Louis Chabet	3	2
Hippophae rhamnoides—Sea Buck-thorn	9	2	" v. de Marly	13	7
Ligustrum amurense—Amur Privet	9	7	" v. Mad. Lemoine	3	1
Lycium Europeum—Matrimony Vine.	10	10	" v. Leon Simon	3	2
Populus alba—Silver Poplar	10	7	" v. Emile Lemoine	3	1
" deltoides	10	7	Ulmus Americana—American Elm	10	10
" n. pyramidalis — Lombardy Poplar	10	5	Viburnum Lantana-Wayfaring Tree.	27	8
Ptelea trifoliata—Wafer Ash	10	3	Wistaria magnifica	9	3
Pyrus aucuparia—Mountain Ash	10	8	Dwarf Juneberry	23	2
			Currants, white	42	29
			" red, cherry	29	19
			" " Victoria	28	28
			" black, Lee's Prolific	36	6
			Blackberry Agawam	8	1
			" Snyder	7	1
			Raspberry Sarah	13	3
			Seedling Gooseberry 10-44	6	1
			Strawberries, 12 varieties	254	254

PUBLICATIONS ISSUED DURING THE YEAR.

During 1902, two bulletins have been published. The first, No. 39, dealt with the 'Results obtained in 1901 from Trial Plots of Grain, Fodder Corn, Field Roots and Potatoes.' This is the seventh Bulletin of a series dealing with that subject, prepared by the Director. While dealing primarily with the results of the crops of 1901, it contains also the average results which have been had from the growing of many different sorts of cereals and other important farm crops at all the experimental farms during the past seven years. The information thus given from year to year has been very useful to Canadian farmers, for it has shown what varieties have been most productive in the different climates found within the Dominion during this long period of trial.

The second Bulletin on 'Clover as a Fertilizer,' prepared jointly by the Director and Mr. F. T. Shutt, Chemist to the Experimental Farms, presents in a condensed and convenient form much information on the value of clover as a fertilizer when this crop is ploughed under. The enrichment of the soil by the addition of nitrogen obtained chiefly from the atmosphere, the increase in the store of available mineral plant food brought to the surface by the deep roots of the clover plant and the usefulness of the clover as a catch crop during the summer months, and in adding humus to the soil from the decay of the tops and roots, are all dwelt on. Particulars are also given of the results obtained in increased crops at the Central Experimental Farm from the ploughing under of clover during the past six years.

A very complete index has also been published of the 15 Annual Reports and 39 Bulletins which have appeared in connection with the experimental farm work during the past sixteen years. This has been compiled by the Rev. Dr. Bethune, of London, Ontario. It is a most useful and time saving document, and is so complete and well arranged that there is no difficulty in referring promptly to any subject treated of in the Reports or Bulletins and all the references are easily found. The officers of the farms who necessarily use these publications so much in connection with their work find this index invaluable.

ACKNOWLEDGMENTS.

I acknowledge gratefully my obligations to those who have rendered me special service during the past year. To the United States Department of Agriculture for much practical help, including samples of seed of cereals, fodder crops and vegetables for test from foreign countries. To the Director of the Royal Gardens, Kew, England, for seeds of many sorts of trees, shrubs and plants from different countries. To the Director of the Arnold Arboretum, Jamaica Plains, Mass., for seeds of many varieties of interesting and rare shrubs. I am also indebted to Prof. John Macoun, Naturalist of the Geological and Natural History Survey of Canada for samples of grain and seeds of trees and shrubs from the Yukon Territory, and to Mr. J. M. Macoun for seeds of rare Canadian plants.

I also tender my sincere thanks to the officers at the Central and Branch Experimental Farms for faithful services willingly rendered, and for their earnest co-operation in carrying out the work which has been planned.

Acknowledgments are also due to Dr. James Fletcher, who on several occasions during the year when official engagements necessitated my absence from home for considerable periods has assumed my duties and faithfully directed the work here, also to those members of the staff who have rendered me help in those branches of work of which I have had personal charge; to Mr. W. T. Macoun, who has supervised the labour given to the trees, shrubs and lawns on the experimental grounds; to Mr. John Fixter, the farm foreman, who has carefully watched the different branches of experimental work, has taken special charge of the tests made with fertilizers and taken notes thereon, who has also helped me much by practical suggestions; to Mr. George Fixter, who has managed the work in connection with the experimental plots of cereals, fodder crops and field roots, has taken records of the growth and yield of these, thus furnishing me with many of the particulars used in the preparation of this report, to him I am also indebted for careful management of the work connected with the distribution of samples of seed grain, and to Mr. Wm. Ellis, who has done much careful work in testing the vitality of seeds, in the management of the plants in the greenhouse and in the propagation of many useful species for out-door decoration. Mr. Ellis has also rendered useful service in the taking of the meteorological records.

I have also pleasure in bearing testimony to the faithful services of my secretary, Mr. Malcolm O'Hanley. The employees also of all the farms have my thanks for the commendable care with which they have discharged their respective duties.

WM. SAUNDERS,
Director of Experimental Farms.

REPORT OF THE AGRICULTURIST.

(J. H. Grisdale, B. Agr.)

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith reports on horse feeding, dairy herds, beef production, pork production, sheep, soil cultivation and farm crops.

Much of my time has been taken up in attending various agricultural and live stock meetings in different parts of Canada during the year.

I have to report a fairly successful year in the different branches of my division, and in this connection I wish to acknowledge my indebtedness for assistance and earnest co-operation in their various positions of the farm foreman, Mr. John Fixter, of Herdsman, Mr. C. T. Brettell, and of dairyman, Mr. J. Meilleur.

The clerical work in this division has been performed by Mr. J. F. Watson, to whom my hearty thanks are due for painstaking and interested co-operation in all correspondence and clerical work.

From December 1, 1901, to November 30, 1902, 3,251 letters were received by the agriculture division, and during the same period 2,815 letters were despatched.

I have the honour to be, sir,

Your obedient servant,

J. H. GRISDALE,
Agriculturist.

HORSES.

There are at present 17 horses in the main stables. These horses are expected to do the work in the various departments during the year. The work on the 200 acre farm is but a small part of their duties about 25 per cen They are expected, in addition, to do each year all the work in connection with the orchards, lawns, arboretum, nurseries, forest belts and experimental plots, as well as more or less road work, grading, messenger service and hauling of mail matter.

There are maintained on the farm during the year 19 horses, which consume an average of 6,225 lbs. of meal or grain and 5,500 lbs. of hay, an aggregate of 118,275 lbs. of grain and $52\frac{1}{4}$ tons of mixed hay. At current prices for feed during the past year this would make a net cost of $1,896.44 for horse feed. The average cost to feed one horse for the year was $99.80. The average cost to feed one horse one day was $27\frac{1}{3}$ cents. The care of the horses cost in addition nearly 8c. per head each day, and the driver receives $1.41\frac{2}{3}$ per day.

From the above data it will be seen that 10 hours work of team and driver cost during the last year $2.12. In estimating cost of horse labour further on in this report $2.50 per day is allowed. This leaves a margin of 38 cents per day for wear and tear on harness and for replacing horses as they grow old. Since the daily allowance of 19c. per horse amounts to $57 in the year of 300 working days, it is evident that all possible contingencies are amply provided for.

EXPERIMENTS WITH HORSES.

The horses are fed mixed hay cut into short lengths about half an inch. The hay is moistened slightly and the grain mixed with it. The grain is ground before being mixed with the hay.

To gain some information as to the best grain mixture to feed working horses it was decided to conduct a series of experiments with different ground grain mixtures.

During the months of April, May and June, 1902, the following experiments were conducted :—

Lot 1.—Horses fed on Ground Oats and Cut Hay.

Number of Horses in.	Number of Days Fed.	Average Daily grain Ration.	Average Weight to begin.	Average Weight to end.	Total grain fed one Horse during experiment.	Average Loss or Gain in Weight.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
7	91	17⅓	1,415	1,498	1,572	83 gain.
Lot 2.—Horses fed on Oats and Barley, equal parts, ground and Cut Hay.						
3	91	18	1,468	1,533	1,636	70 gain.
Lot 3.—Horses fed on Oats, 2 parts, Barley, 1 part, ground and Cut Hay.						
3	91	17	1,389	1,441	1,548	52 gain.

All the horses continued in good health during the experiment, and so far as could be judged any one of the grain or meal rations was as good as another.

CATTLE.

There are on the farm at present representatives of four breeds of cattle, viz.: Shorthorn, Ayrshire, Guernsey and Canadian. There are, besides, several grade animals of each kind.

PURE-BRED BREEDING CATTLE.

The pure-bred cattle are as follows :—

Shorthorns.

1 bull, Lord Dinsdale (imp.), 18 months old.
3 cows (imp.), 4, 6 and 9 years old.
1 cow, 13 years old.
2 heifers (imp.), 2 years old.
1 heifer (imp.), 16 months old.
2 heifer calves under 1 year.

Ayrshires.

1 bull, Twin Beauty (imp.), 3½ years old.
6 cows (imp.), 3 to 7 years old.
1 cow, 2 years old.
3 calves under 1 year.

Guernseys.

1 bull, Wedgewood, 8 years old.
4 cows (imp.), 4 to 7 years old.
1 cow, Canadian bred, 4 years old.
5 calves under 1 year.

Canadians.

1 cow, Zamora.

DAIRY CATTLE.

The herd of dairy cattle during 1902 consisted of 26 females, all told. They were:—

MILKING STOCK.

Shorthorns	4
Ayrshires	6
Guernseys	5
Canadians	1
Shorthorn grades	4
Ayrshire grades	3
Guernsey grades	2
Canadian grades	1

FEEDING THE DAIRY CATTLE.

The roughage ration fed to the dairy cows consisted of ensilage, mangels, clover hay and some chaff. The amount of roughage fed varies considerably, since the milch cows vary in weight from 800 lbs. to 1,400 lbs. The approximate roughage ration fed per 1,000 lbs. weight is 35 lbs. corn ensilage, 20 lbs. mangels, 5 lbs. clover hay, and a little chaff.

The meal or grain ration fed consisted of different mixtures at different times and to different cows. The meals or grains used were oats, barley, bran, pease, gluten and oil meal. Gluten meal formed the basis of the ration during the winter, while oat chop took its place in summer.

No very heavy grain ration was fed to any cow. A careful study was made of each cow's requirements, and she was fed accordingly.

SUMMER FEEDING.

The cows were, as usual, pastured during the first summer months on part of the fifth year of the rotation; that is, on land from which one year's hay had been cut. In August and September they were allowed to have part of the clover meadow aftermath of the fourth year of the rotation. In addition, some corn ensilage was fed, and some green corn. The meal ration in the summer was a light one. It consisted of oats and barley ground and fed night and morning during the milking hour. The meal was fed in proportion to the yield of milk, save in the case of heifers with first calves, when a somewhat heavier ration proportionately was fed.

COST OF FEEDING.

In estimating the cost of feeding, the following prices were charged for feed stuffs, being the average local market rates for the same period during 1902, save in the case of ensilage and roots, which are charged at the usual values affixed in experimental work:—

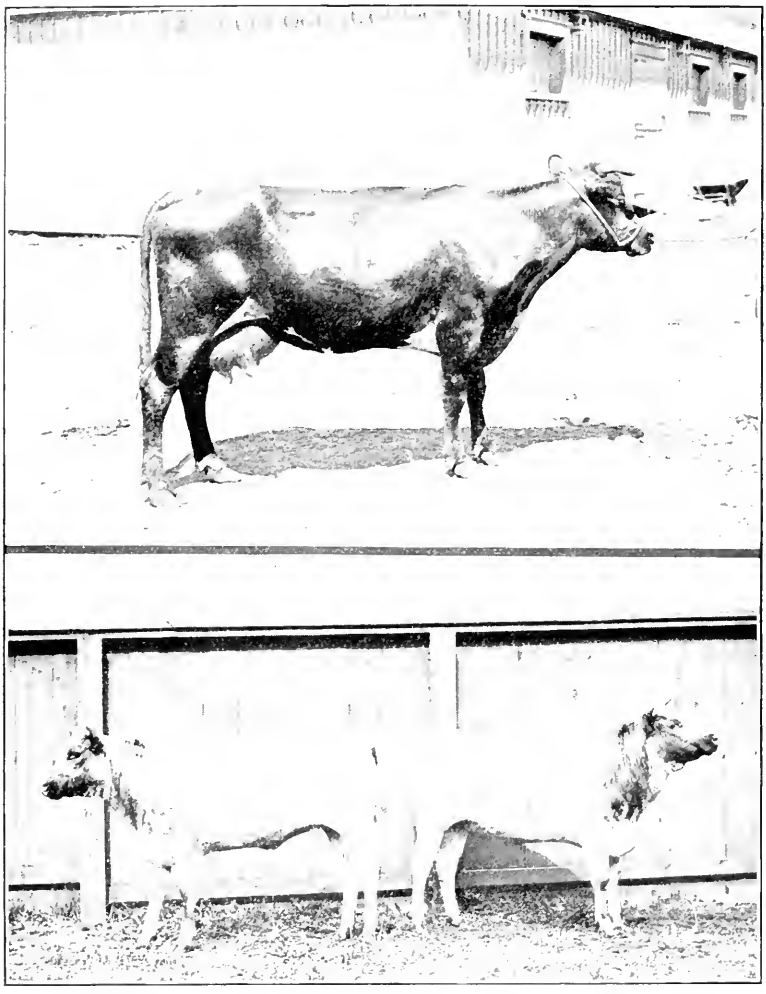
Pasture	$ 2 00 per cow per month.
Bran	16 00 per ton.
Oats, gluten meal and barley	25 00 per ton.
Clover hay	7 00 per ton.
Chaff	4 00 per ton.
Roots and ensilage	2 00 per ton.

In estimating the value of the product, 19 cents per pound is allowed for the butter, and 15 cents per hundred pounds for the skim milk and butter milk. The butter is manufactured in the farm dairy and sells on the market at from 22 cents to 30 cents per pound, an average of about 25 cents per pound during the year. This leaves about 6 cents per pound for cost of manufacture.

The following tables give in detail the particulars concerning each cow, herd statements for each of the pure-bred and grade herds, and monthly statements for all the herds combined.

The monthly statements for the whole milking herd show the total yield of milk for each month, its butter fat content, the amount of butter produced, the number of pounds of milk required for a pound of butter, and the average yield of milk per cow per diem. The highest per cent of fat was recorded in February, and the lowest in April. The average yield of milk for the herd during the year was 7,339 lbs., which produced an average of 368·41 lbs. butter for each cow during the year.

It will be noticed that at one time and another during the year 26 cows were in milk. In taking the average, two of these were neglected because their records extend over two months only or less. They were the Canadian cow Zamora purchased from the Ursuline Sisters, of Roberval, in September, and the grade Shorthorn heifer Sadie, that dropped her first calf in September, 1902.



SHORTHORN COW: Darlington Lass. SHORTHORN HEIFERS: Duchess and Janet.

—Photos. by C. E. Saunders.

GROUP OF SHORTHORN CATTLE AT CENTRAL EXP. FARM, OTTAWA.

MONTHLY STATEMENTS FOR WHOLE DAIRY HERD.

—	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	Totals.
No. of cows giving milk for month ...	14	18	17	19	22	23	23	22	21	25	25	25	21
Lbs. of milk in month ...	7,650	9,281	10,259	16,238	21,229	20,980	19,287	15,320	15,017	16,323	13,271	11,282	176,137
Average for 1 day.....	247	299	366	523	701	677	643	494	484	544	428	376	482·6
Daily average per cow.....	17·6	16·6	21·5	27·5	31·9	29·4	28·0	22·4	23·6	21·7	17·1	15·4	23
Per cent fat ...	4·33	4·25	4·84	4·28	4·05	4·21	4·17	4·17	4·11	4·31	4·49	4·37	4 26
Lbs. butter fat.	331·27	395·21	496 97	695·09	860·26	882·31	804·33	639·28	617·50	703·65	597·05	492·76	7515·59
Lbs. butter....	389·72	464·95	584·67	817·64	1012·07	1038·01	946·27	752·09	726·47	827·82	702·41	579·71	8841·83
Lbs. milk for 1 lb. butter ...	19·6	19·9	17·5	19·8	20·9	20·2	20·4	20·3	20·6	19·7	18·9	19·4	19.9

The following herd reports need but little comment. Since these are the first yearly reports issued and the herds are rather uneven as to age and numbers, it would evidently be unfair to draw any inferences as to the comparative merits or demerits of the different herds.

The Canadian herd is being increased. Three more cows have been secured and will be added to the herd in January. The Shorthorn herd contains several young animals which will soon be producing.

AYRSHIRES.

Names of Cows.	Age.	Date of dropping last calf.	Number of days in milk in 1902.	Daily average yield of milk.	Total milk for year.	Per cent of fat in milk.	Pounds butter produced in year.	Value of butter at 19 cts. per lb.	Value of skim milk at 15cts. per 100 lbs.	Total value of products.	Amount meal eaten valued at 14 cts. per lb.	Amount of roots and ensilage eaten valued at $2 per ton	Amount hay valued at $7 per ton.	Months on pasture at $2 per month.	Total cost of feed for year.	Cost to produce 100 lbs. milk.	Cost to produce 1 lb. butter, skim milk neglected.	Profit on 1 lb. butter, skim milk neglected.	Profit on cow during year, labour neglected.
	Yrs	1902.		Lbs.	Lbs.	p. c.	Lbs.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Mos.	$ cts.	Cts.	Cts.	Cts.	$ cts.
Jessie A	8	Feb. 12	320	34·4	11,008	3·54	458·83	87 19	15 82	103 01	1,786	13,335	626	4½	46 87	42·58	10·22	8·78	56 14
Maggie	6	Mar. 25	300	29·4	8,837	3 67	393·27	74 72	12 66	87 38	1,457	10,185	626	4½	39 89	45·14	10·12	8·88	47 49
Norah's Last	8	" 18	332	24·4	8,110	3·77	371·82	70 65	11 61	82 26	1,523	12,100	626	4½	42 33	52·18	11 39	7·61	39 93
Denty	3	" 31	220	27·8	6,120	4·00	288·70	54 85	8 73	63 58	968	9,839	603	4½	33 05	54·	11·45	7·55	30 53
Flecky	3	April 4	230	23·7	5,469	3·93	251·82	47 85	7 81	55 66	1,009	9,831	612	4½	33 47	61·3	13·29	5·71	22·19
Bloomer	3	" 27	210	25·0	5,250	3·92	241·22	45 83	7 36	53 19	866	9,974	603	4½	31 91	60·78	13·23	5·77	21 28
			268	28·0	7,496	3·78	334·28	63 52	10 67	74 18	....	.....	.....	.....	37 92	50·6	11·34	7·66	36 26

REMARKS.—Denty, Flecky and Bloomer are heifers with their first calves.

SHORTHORNS.

Names of Cows.	Age.	Date of dropping last calf.	Number of days in milk in 1902.	Daily average yield of milk.	Total milk for year.	Per cent of fat in milk.	Pounds butter produced in year.	Value of butter at 19 cts. per lb.	Value of skim milk at 15cts. per 100 lbs.	Total value of products.	Amount meal eaten valued at 1¼ cts. per lb.	Amount of roots and ensilage eaten valued at $2 per ton	Amount hay valued at $7 per ton.	Months on pasture at $2 per month.	Total cost of feed for year.	Cost to produce 100 lbs. milk.	Cost to produce 1 lb. butter, skim milk neglected.	Profit on 1 lb. butter, skim milk neglected.	Profit on cow during year, labour neglected.
	Yrs	1902.		Lbs.	Lbs.	p. c.	Lbs.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Mos.	$ cts.	Cts.	Cts.	Cts.	$ cts.
Darlington Lass	9	Jan. 16	290	33·3	9,657	3·84	435·56	82 76	13 83	96 59	1,959	13,735	618	4½	49 39	51·14	11·33	7·67	47 20
Miss Molly	12	Sept. 4	280	26·5	7,430	4·71	412·35	78 35	10 58	88 88	1,850	15,400	625	4½	49 72	67·05	12·05	6·95	39·16
Marchioness	8	Jan. 18	310	27·3	8,488	4 05	404·43	76 84	12 12	88 96	1,921	13,545	618	4½	48 72	57·40	12·04	6·96	40·24
Illuminata	3	Jan. 12	300	10·8	3,266	4·12	160·69	30 53	4 66	35 19	975	8,710	542	4½	31 80	97·36	19·79	0·79	3·39
			295	24·4	7,210	4·16	353·26	67 12	10 29	77 41	...	.....	.....	.....	44 91	62·15	12·68	6·32	32·50

REMARKS.—*Miss Molly* dropped a roan heifer calf in September, 1902. She had not previous to that time had a calf since April, 1901. The long interval between calves was due to her having been one of the cows in the Shorthorn Dairy Herd at the Pan-American Exposition in 1901.

Illuminata dropped a red and white bull calf in January, 1902. She proved to have only two milking teats, although the udder bore four apparently perfect teats before she calved.

GUERNSEYS.

Names of cows.	Age.	Date of dropping last calf.	No. of days in milk in 1902.	Daily average yield of milk.	Total milk for year.	Per cent of fat in milk.	Pounds butter produced in year.	Value of butter at 19 cents per lb.	Value of skim milk at 15cts. per 100 lbs.	Total value of products.	Amount of meal eaten. Valued at 1¼ cents per lb.	Amount roots and ensilage. Valued at $2 per ton.	Amount hay eaten. Valued at $7 per ton.	Months on pasture. Valued at $2 per month.	Total cost feed for year.	Cost to produce 100 pounds milk.	Cost to produce 1 lb. butter. Skim milk neglected.	Profit on 1 lb. butter. Skim milk neglected.	Profit on cow during year. Labour neglected.
	Yrs	1902.		Lbs.	Lbs.	p. c.	Lbs.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Mos.	$ cts.	Cts.	Cts.	Cts.	$ cts.
Lily of Alderney	5	April 6	280	26·5	7,129	4·77	418·95	79 60	10 52	90 12	1,320	9,530	610	4½	37 17	50·03	8·88	10·12	52 95
* Clatford Spot	8	Jan. 12	310	24·1	6,529	5·30	407·06	77 34	9 19	86 53	2,110	13,910	627	1	44 40	68	10·9	8·1	42 13
Deanie	5	July 18	320	19·0	6,061	5·13	366·01	69 54	8 54	78 08	1,456	9,835	619	4½	39 24	64·7	10·98	8·02	38 87
Ruby	5	Aug. 13	300	16·3	4,901	5·36	309·42	58 79	6 89	65 68	1,447	10,670	619	4½	39 55	80·7	12·13	6·87	26 13
Honoria	6	Sept. 18	300	19·0	5,733	4·35	293·68	55 80	8 16	63 96	1,297	10,215	612	4½	37 57	65·54	12·9	6·1	26 39
			363	20·2	6,130	4·97	359·02	68 21	8 66	76 87	.....	.....	.....	.....	39 58	64·57	11·02	7·98	37 29

CANADIANS PURE BRED AND GRADE.

Zamora	6	.....	80	23·3	1,866	5·10	109·94	20 89	2 62	23 51	355	2,620	90	2	11 38	61·53	10·35	8·65	12 13
Polly	7	Dec. 7	330	30·1	9,932	4·33	506·49	96 23	14 33	110 56	1,924	13,281	619	4½	46 33	46·64	9·15	9·85	64 23
			205	28·7	5,899	4·44	308·22	58 56	8 48	67 04	.....	.....	.....	.....	28 86	48·93	9·36	9·64	38 18

SHORTHORN GRADES.

Bloom	8	Feb. 26	320	28·2	9,029	3·88	412·75	78 42	12 92	91 34	1,669	11,325	626	4½	43 38	48·04	10·51	8·49	47 96
Rosy	3	Sept. 27	300	25·1	6,532	3·71	285·49	54 24	10 87	65 11	1,496	10,435	625	4½	40 33	61·74	16·5	2·5	24 78
Cherry	2	July 15	134	22·5	3,019	4·18	144·47	21 75	4 31	26 06	511	2,355	90	4½	18 07	59·85	12·5	6·5	7 99
Sadie	2	Sept. 5	80	21·2	1,698	4·01	80·33	15 27	2 42	17 69	355	2,125	90	4½	15 89	93·6	19·8	·8	1 80
			208	24·4	5,069	3·89	230·76	42 42	7 63	50 05	. . .	.....	.....	. . .	29 42	58·03	12·7	6·3	20 63

* Remarks :—Clatford Spot met with an accident in April which materially lessened her product.

AYRSHIRE GRADES.

Names of Cows.	Age.	Date of dropping last calf.	No. of days in milk in 1902.	Daily average yield of milk.	Total milk for year.	Per cent of fat in milk.	Pounds butter produced in year.	Value of butter at 19 cents per lb.	Value of skim milk at 15 cts. per 100 lbs.	Total value of products.	Amount of meal eaten. Valued at 1¼ cents per lb.	Amount roots and ensilage. Valued at $2 per ton.	Amount hay eaten. Valued at $7 per ton.	Months on pasture. Valued at $2 per Month.	Total cost feed for year.	Cost to produce 100 pounds milk.	Cost to produce 1 lb. butter. Skim milk neglected.	Profit on 1 lb. butter. Skim milk neglected.	Profit on cow during year. Labour neglected.
	Yrs	1902.		Lbs.	Lbs.	p. c.	Lbs.	$ cts.	$ cts.	$ cts.	Lbs.	Lbs.	Lbs.	Mos.	Lbs.	Cts.	Cts.	Cts.	$ cts.
Laura	5	Nov. 10	300	32·4	9,736	3·75	430·23	81 74	13 96	95 70	2,087	14,435	619	4½	51 69	53·09	12·02	6·98	44 07
Countess	4	Feb. 16	285	30·1	8,586	4·21	425·17	80 78	12 24	93 02	1,750	13,820	626	4½	46 89	54·61	11·03	6·97	46 13
Dora	10	" 24	270	29·4	7,950	3·13	292·53	55 58	11 47	67 05	1,508	11,380	555	4½	41 17	51·8	14·08	4·92	25 88
			285	30·7	8,757	3·71	382·64	72 70	12 56	85 25	1,782	13,212	600	4½	46 58	53·19	12·19	6·81	38 67

GUERNSEY GRADES.

Queenie	4	Feb. 9	290	23·3	6,764	7·46	504·89	95 93	9 37	105 30	1,547	9,340	609	4½	39 81	58·85	7·88	11·12	65 49
Bellflower	4	Jan. 23	300	21·6	6,496	5·43	352·65	52 90	9 21	62 11	1,889	13,003	613	4½	47 76	72·3	13·55	5·45	14 35
			295	22·5	6,630	6·46	428·77	74 42	9 29	83 71	.....	.....	.....	.....	43 79	66·05	10·2	8·8	39 92

MILKING EXPERIMENTS.

A summary is here presented of four experiments recently conducted to gain some information as to the effect of milking cows at unequal intervals upon the quantity and quality of the milk produced.

In each case, each part of each experiment, characterized as 'Irregular' or 'Regular', lasted some 10 days or more longer than indicated in the tables. Any sudden change in the hours of milking appeared to excite some cows and affect temporarily the quantity and quality of milk yielded in the day. To avoid the possibility of such temporary variations being allowed to affect the results, about 10 days was allowed for the subsidence of any excitement due the suddenness of the change in hours of milking.

Experiment I, was conducted in the fall; Experiment II, in the spring and Experiments III, and IV, in the summer.

The experiments appear to indicate that :—

1. Slight inequalities in the intervals between milkings do not affect (a) the average per cent of fat in the daily yield of milk, nor, (b) the average daily yield of milk.

2. Very considerable inequalities in the intervals between milkings would appear to affect slightly both the quantity and quality of the milk produced; the quantity being reduced, and the quality somewhat inferior. The amount of butter-fat in 100 lbs. of milk seemed to be reduced by about 3½ per cent.

3. Very considerable inequalities in the intervals between milkings affected the amount of milk and the per cent of fat in the milk at the different milkings. The amount of milk after the long interval was much greater than that yielded after the short interval, but the percentage of butter-fat in the milk after the long period was much lower than the per cent of fat in the milk after the short interval.

4. On the whole, it would appear that inequalities in the intervals between milkings need arouse no anxiety as to their effect upon the quantity or quality of the product, provided no considerable sudden changes are made.

Period.	Hours of Milking.	Number of days.	Number of cows.	Average yield of milk per cow in morning.	Average yield of milk per cow in evening.	Average per cent fat in morning milk.	Average per cent fat in evening milk.	Average daily yield per cow.	Average per cent fat in milk per day per cow.	Average weight of fat per cow daily.
Experiment No. 1—										
Irregular	6 a.m. and 6 p.m.	10	4	1 15	9·75	3·8	4·11	21·25	3·95	·8394
Regular	6 a.m. and 4.30 p.m.	10	4	9·15	8·85	4·8	4·75	18·	4·78	·8604
Experiment No. 2—										
Irregular	6 a.m. and 4.30 p.m.	10	6	.....	.....	3·75	3·87	27·1	3·81	1·0005
Regular	6 a.m. and 6 p.m.	14	6	.....	.....	3·8	3·8	24·96	3·81	·923
Experiment No. 3—										
Irregular	6 a.m. and 4.30 p.m.	10	6	.....	.....	3·76	4·06	25·16	3·91	·896
Regular	6 a.m. and 6 p.m.	14	6	.....	.....	4·	3·98	25·15	3·99	·9796
Experiment No. 4—										
Irregular	5.30 a.m. and 1.30 p.m.	25	7	20·4	11·15	3·3	5·7	31·54	4·19	1·309
Regular	6 a.m. and 4.30 p.m.	20	7	19·6	12·52	3·6	4·6	32·12	4·34	1·282

DAIRY RECORDS.

The effort to interest dairymen in the returns from their individual cows has been continued, and very many farmers seem to be awakening to a knowledge of the fact that

the improvement of the whole herd demands the study of the unit: that is, a close acquaintance with the expenditure upon the individual cow and the returns from the same.

This can be determined in no other way than by keeping an exact record of the daily milk yield and the daily food consumption.

Forms, similar to the following, for keeping a record of the milk yield are supplied free on application, as indicated on the form.

DAILY MILK RECORD.

Herd belonging to..... .....
Post Office.....
Record for week ending..... .. ..

(This form supplied free by Live Stock Division, Central Experimental Farm, Ottawa, Ont.

COWS.

Day.	Time.																		Total for day.
Sunday.....	Morning.....																		
	Evening.....																		
Monday.....	Morning.....																		
	Evening ...																		
Tuesday.....	Morning.....																		
	Evening.....																		
Wednesday..	Morning.....																		
	Evening ...																		
Thursday.....	Morning.. ...																		
	Evening																		
Friday.....	Morning.....																		
	Evening.....																		
Saturday.....	Morning.. ...																		
	Evening																		
Total.....	Week																		

Remarks:

CENTRAL EXPERIMENTAL FARM.

WM. SAUNDERS, *Director.* J. H. GRISDALE, *Live Stock and Agriculture.*

MILK RECORDS.

1. The profitable dairy cow must give over 5,000 pounds of milk each year. To know the value of a cow her total annual yield of milk must be known. The only way to know this is to keep a record of her daily milk yield.

2. The form on the other side of this sheet is intended to help progressive dairy farmers by supplying them with simple and convenient sheet for the keeping of the milk records of their individual cows. A study of such records will soon indicate which cows should go to the butche.. We would be pleased to receive a summary of your record. If you have no summary forms write us.

3. Such records are being kept by hundreds of successful dairymen to-day. Many of these men attribute their success to the keeping of such records. Why not give the thing a trial if you are a dairyman? It will increase your milk product. It will lighten your labour, since your interest will be increased in you ork and 'interest lightens labour.' It will show you the unprofitable cow the 'boarder.' You cannot get rid of her too quickly.

4. For weighing the milk a simple legal spring balance may be secured for from one to three dollars. If your local dealer cannot supply you, write the undersigned for part-

iculars. A small platform scale is fairly convenient, but we find the spring balance preferable.

5. Many farmers keep records of the amount of food fed to individual cows. If you would like to do so, sample forms would be sent free on writing J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa, Ont.

BEEF PRODUCTION.

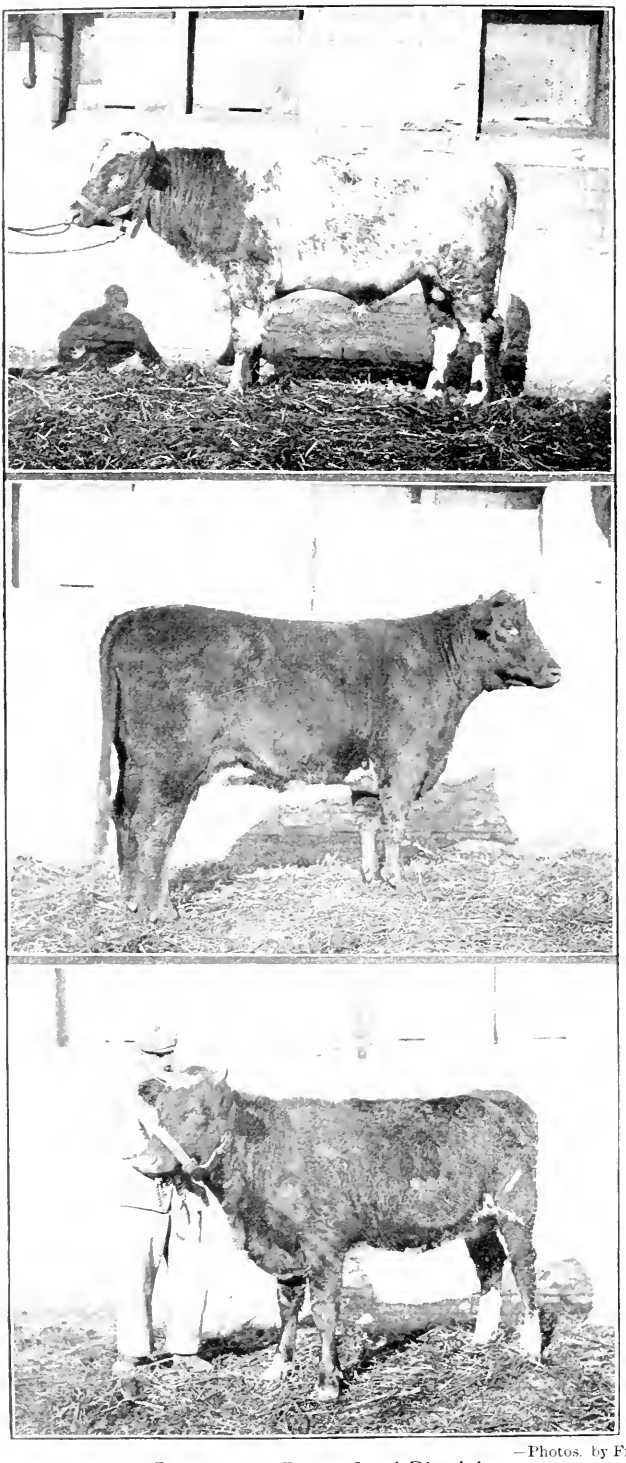
In the usual course of affairs in Canada, steers are bought in by the feeder a shorter or longer time before winter feeding begins, and fed through the season for the Easter or later spring market. It is evident, therefore, that the feeder to be successful from a financial standpoint, must also be a fairly good business man. A cent or fraction thereof per pound too low or too high may quite easily spoil all chances of a profitable operation. Supposing the autumn seller to know his business, the buyer may make a great mistake by investing in cheap feeders, much more easily than he may err in securing feeders too nearly finished, or of too high a quality for his prospective market. Examples of too good a class of cattle being fed are of, course, exceedingly rare, but such lots are met with once in a while. The great danger and the common mistake made is in securing too common a class at too high a price per pound, even though the price paid sounds ridiculously low when contrasted with quotation for good feeders or prime finished beeves. It is seldom indeed that the poor steer can be bought cheap enough to make the feeding profitable. The choice feeder, however, at a reasonable price frequently leaves a small balance as profit.

To select the good feeder requires much experience, a good eye and some courage. Experience is necessary that the buyer may know the general characteristics, the indescribable peculiarities which go to indicate the profitable feeder, which point out almost unmistakably the 'good doer', the steer with the hearty appetite, and the power to use his food profitably; that is, convert it into the right sort of meat in the right place.

A good eye is necessary that the buyer may select only such steers as have the right shape for the beef producing animal. It is easy for almost any one who knows anything about beef cattle to decide after a leisurely examination that a certain individual conforms fairly well to the requirements of the ideal steer. It is difficult for any but an expert or one with an eye well trained to see properly at a glance, (in spite of surroundings) to go into a 'bunch' of feeders and thence select such animals as are best suited for feeding purposes: because such selection must include only broad-backed, straight-topped, deep-bodied, long, deep and square quartered, wide-chested, short-necked, quiet and clear-eyed, broad and clean headed, short and rather fine limbed, soft, mossy-haired and mellow handling, medium thick skinned animals, with a fair paunch development, a good spring of rib, a rather straight underline, and a well filled twist. Such animals always feed well, and, what is equally important, always sell well.

But now comes the moment for a display of courage, in the eyes of many feeders such cattle are, if they carry any flesh at all, always fit for the butcher. Many feeders think they cannot put a sufficient weight on a steer in good condition, to pay for the feeding. In this judgment the most powerful argument is fear, fear that the steer is already fat, or fear that the choice steer next spring will not bring any more than the medium steer last spring (on which the profits were exceeding small if not minus) experience of the best feeders has shown over and over again that it is the good steer pays, and pays well. It is therefore always wise to select the good steer and feed him well. Little fear need be entertained for the outcome since for every one mistake or loss with good steers there are dozens with inferior steers.

The steer once selected and the stabling period on, the feeder must exercise great care in making all arrangements. Every comfort provided pays, and pays well; every precaution against loss on every individual steer is a guard against failure on the whole lot. If steers have been friendly during the pasture period, let them be together to feed. If feeding loose, putting one or two small or weak steers with a number of large, strong animals is a mistake. Draughts should be guarded against because they cost extra feed,



—Photos. by Frank T. Shutt.

1. SHORTHORN BULL: Lord Dinsdale.

2. SHORTHORN COW: Illuminata. 3. SHORTHORN HEIFER: Jessica Elmhurst.

and often mean sick animals; warm quarters should be secured; they save much meal. Ventilation should be provided; fresh air means health, and health means pounds of beef.

EARLY FALL FEEDING.

A period of change in feeding beef animals is a period of loss. The measure of loss in changing from pasture to stall feed is the amount of change in the quality of the ration. The more nearly the first stall ration resembles the last pasture ration, the less will be the loss. It is evident, therefore, that the first few weeks stall feeding rations should be as nearly like grass in succulence and composition as possible. Roots and clover hay come as near filling these requirements as it is possible to get. As much roots as the animal can safely eat and all the clover hay he wants will make a fairly well balanced and an entirely satisfactory ration. As the feeding period advances, straw, if so desired, may be gradually introduced into the ration and meal added. The amount of either should be small at first, and all increases or changes should be made slowly. If corn ensilage is to form the basis of the ration for feeding it should be given sparingly at first, and in full feed only when some meal is being fed.

As already stated, succulence is an imperative requirement of early winter feeding. Yet this is not all, for to ensure continued good gains and constant good health, succulence or juiciness should be the marked peculiarity of the whole season's feeding.

After 4 or 5 weeks feeding, meal may be profitably added to the roots, or ensilage and straw, or hay. The kind fed usually depends on market prices of meal and the feeder's convenience quite as much as upon the requirements of the animal. Much care should, however, be exercised in deciding what meal ration to feed. Some sorts of meal are much better suited for feeding with certain kinds of roughage than others. To illustrate, corn meal, ensilage and Timothy hay make a very bad combination which could be materially improved by the substitution of pea meal, gluten, bran, cotton seed meal, or even oat chop, for the corn meal. Of the above sorts of meal, any one of which is well suited for feeding with ensilage, a mixture of equal parts of gluten, bran and oat chop would be likely to prove the most economical meal ration. On the other hand, the addition of bran for instance to a roughage ration of roots would be a mistake, oat chop, however, or a mixture of oat, pea and barley meal is very well suited, and corn meal may be used profitably, for feeding along with turnips or mangels. The reasons for the above statements are obvious if the composition of the feed stuffs mentioned be considered. Experiments at different places and at different times, as well as the practice of many observant feeders also support the above remarks.

The amount of meal to feed each day depends upon the size of the steer, the kind of meal, the kind of roughage, and the more or less advanced stage of the fattening process. Enough meal should be fed in the early stages or in fact at any stage to keep the steer making good gains. The richer the meal in protein, the less is required at any given time, since one of the principal reasons for feeding meal is to balance the ration: that is, to make the proportion of protein to carbo-hydrates therein just right for the most rapid and most economical production of flesh. To give the best results, the grain and meal ration should be thoroughly mixed with the roots or ensilage. The hay, or at least some of it, should be fed long.

The feeding of steers loose or tied is largely a matter of convenience. The results of most careful experiments appear to be slightly in favour of feeding loose, so far as gains in weight are concerned. The care and work of feeding is, as a rule, less when steers are fed loose, but the amount of straw or other litter required is very much greater than when the steers are kept tied up. No small part of the success or failure of steer operations is due to the man who does the actual work. The skilful, careful, observant and kind feeder can bring steers out in the spring from twenty-five to seventy-five per cent better on the same amount of feed than will the careless, rough or ignorant man. It is probably wise to conclude by saying that except under exceptional circumstances no great profits over and above the cost of food, shelter and labour need be expected from steer feeding, but a home market for feed grown on the farm and all

the manure produced for use in enriching the soil are no small consideration to the progressive farmer.

EXPERIMENTS IN 1902.

The experiments in 1902 have been similar to those in 1901. The prices charged for feeds are the same as those mentioned in connection with feeding dairy cows.

It will be noticed that the profits on the different lots fed are quite high, seemingly controverting the last statement in the preceding paragraph, but the good profits made are in no small measure due to a happy combination, of circumstances viz., good feed, ensilage was exceptionally good in 1901-2, low cost of steers and very high selling price due to a scarcity of beef in the world. Such fortunate conditions seldom occur.

LOOSE *vs* TIED.

The feeding of steers loose as contrasted with similar steers fed tied has been continued during the past year, and the scope of the experiment slightly enlarged to include the comparison of steers fed loose, allowed a large area of floor space with similar steers fed loose, allowed a limited area of floor space.

The steers fed tied occupied 56 square feet of floor space each and another lot fed loose occupied 84 square feet floor space each.

Both lots fed loose made greater daily gains than did the lots fed tied, while the loose lot with the smaller floor area made a considerably greater daily gain than did either of the other lots.

To summarize :—

Lot 1. Tied, 56 sq. ft. per steer, gained in all 2,760 lbs. or 307 lbs. per steer, or 1·65 lbs. per steer per day.
Lot 2. Loose, 84 sq. ft. " " 2,961 " 329 " 1·77 " "
Lot 3. Loose, 38 sq. ft. " " 3,199 " 345 " 1·86 " "

The very considerable difference of 38 lbs. per steer in favour of close quarters for feeding is rather noticeable and if subsequent experiments support this finding, will be worthy of attention in such a climate as ours, where shelter is rather costly and absolutely necessary.

NOT DEHORNED, TIED (3 YEARS OLD).

Each steer occupied 56 sq. ft. floor space

Number of steers in lot	9	
First weight gross	11,610	lbs.
First weight average	1,290	"
Finished weight gross	14,370	"
Finished weight average	1,597	"
Total gain in 186 days	2,760	"
Average gain per steer	307	"
Daily gain for lot, 9 steers	14·8	
Daily gain per steer	1·65	
	$ cts.	
Gross cost of feed	171 75	
Cost of 100 lbs. gain	6 22	
Cost of steers 11,610 lbs. at 450 per 100 lbs.	522 45	
Total cost to produce beef $522·45 x 171·75	694 26	
Sold 14,370 lbs. at 6·17½ per 100 lbs. less 5 per cent	842 98	
Profit on lot	148 78	
Net profit per steer	16 53	
Average buying price per steer	58 05	
Average selling price per steer	93 66	
Average increase in value	35 61	
Average cost of feed per steer	19 08	

Amount of meal eaten by 9 steers	4,783 lbs.
" ensilage and roots eaten	84,960 "
" hay	6,516 "

DEHORNED LOOSE (3 YEARS OLD).

Each steer allowed 84 sq. ft. floor space.

Number of steers in lot	9
First weight gross	11,844 lbs.
First weight average	1,316 "
Finished weight gross	14,805 "
Finished weight average	1,645 "
Total gain in 186 days	2,961 "
Average gain per steer	329 "
Daily gain for lot	15·92
Daily gain per steer	1·77
	$ cts.
Gross cost of feed	178 34
Cost of 100 lbs. gain	6 02
Cost of steers, 11,844 lbs. at 4·50 per 100 lbs	532 98
Cost to produce beef 532·98 + 178·34	711 32
Sold 14,805 lbs. beef at 6·17½ per 100 lbs., less 5 per cent	868 50
Profit on lot	157 18
Net profit per steer	17 46
Average buying price per steer	59 22
Average selling price per steer	96 50
Average increase in value	37 28
Average cost of feed per steer	19 82
Amount of meal eaten by 9 steers	5,062½ lbs.
" ensilage and roots	88,065 "
" hay	6,516 "

DEHORNED LOOSE (3 YEARS OLD).

Each steer allowed 38 sq. ft. floor space.

Number of steers in lot	9
First weight gross	10,611 lbs.
First weight average	1,179 "
Finished weight gross	13,720 "
Finished weight average	1,523 "
Total gain in 186 days	3,109 "
Average gain per steer	345 "
Daily gain for lot of 9 steers	16·72
Daily gain per steer	1·86
	$ cts.
Gross cost of feed	168 34
Cost of 100 lbs. gain	5 41
Cost of steers, 10,611 lbs. at $4.50 per 100 lbs	477 50
Total cost to produce beef, 477·50 + 168·34	645 84
Sold 13,720 at 6·17½ per 100 lbs., less 5 per cent	804 85
Profit on lot	159 01
Net profit per steer	17 67
Average cost price per steer	53 05

	$ cts.	
Average selling price per steer	89 43	
Average increase in value	36 38	
Average cost of feed per steer	18 71	
Amount of meal eaten by 9 steers	4,536	lbs.
" ensilage and roots	84,645	"
" hay	6,516	"

INFLUENCE OF AGE ON COST OF BEEF.

COST OF PRODUCING BEEF WITH

Three Year Olds, Two Year Olds, Yearlings, Calves.

The experiment in beef production to determine the comparative cost of beef produced by feeding steers of different ages has been continued.

Full statements of the particulars in connection with each lot will be found below. A few of the more important particulars are grouped for comparison as follows :—

Ages.	Daily gain.	Gain in 186 days.	Cost 100 lbs. gain.	Profit per steer.
	Lbs.	Lbs.	$	$
Three Year Olds	1·65	307	6·22	16·53
Two Year Olds	1·67	311	5·70	20·50
Yearlings	1·85	345	4·65	26·07
Calves	2·14	398	3·60	14·11

In daily gain and cost of production there is a quite remarkable gradation in favour of the younger classes. The apparent change in 'profits per steer' column was due to the lower price available for the smaller animals when for sale.

THREE YEAR OLDS.

Number of steers in lot	9	
First weight gross	11,610	lbs.
First weight average	1,290	"
Finished weight gross	14,370	"
Finished weight average	1,597	"
Total gain in 186 days	2,760	"
Average gain per steer	307	"
Daily gain for lot 9 steers	14·8	
Daily gain per steer	1·65	
	$ cts.	
Gross cost of feed	171 75	
Cost of 100 lbs. gain	6 22	
Cost of steers, 11,610 lbs. at $4.50 per 100 lbs.	522 45	
Total cost to produce beef, $522.45 + $171.75	694 20	
Sold 14,370 lbs. at 6·17½ per 100 lbs., less, 5 per cent	842 98	
Profit on lot	148 78	
Net profit per steer	16 53	
Average buying price per steer	58 05	
Average selling price per steer	93 66	
Average increase in value	35 61	
Average cost of feed per steer	19 08	

Amount of meal eaten by 9 steers	4,783 lbs.
Amount of ensilage and roots	84,960 "
Amount of hay	6,516 "

TWO YEAR OLDS.

Number of steers in lot	9
First weight gross	9,648 lbs.
First weight average	1,072 "
Finished weight gross	12,445 "
Finished weight average	1,383 "
Total gain in 186 days	2,799 "
Average gain per steer	311 "
Daily gain for lot, 9 steers	15 "
Daily gain per steer	1·67
	$ cts.
Gross cost of feed	159 66
Cost of 100 pounds gain	5 70
Cost of steers, 9,648 at 4·00 per 100 lbs.	385 92
Total cost to produce beef, 385·92 + 159·61	545 53
Sold, 12,445 lbs. at 6·17½ per 100 lbs., less 5 per cent.	730 06
Profit on lot	184 53
Net profit per steer	20 50
Average buying price per steer	42 88
Average selling price per steer	81 12
Average increase in value	38 24
Average cost of feed per steer	17 74
Amount of meal eaten by lot of 9 steers	4,221 lbs.
Amount of ensilage and roots	79,898 "
Amount of hay	6,516 "

YEARLINGS.

Number of steers in lot	9
First weight gross	8,577 lbs.
First weight average	953 "
Finished weight gross	11,680 "
Finished weight average	1,298 "
Total gain in 186 days	3,103 "
Average gain per steer	345 "
Daily gain for lot, 9 steers	16·68
Daily gain per steer	1·85
	$ cts.
Gross cost of feed	144 49
Cost of 100 lbs. gain	4 65
Cost of steers, 8,577 lbs. at $4 per. 100 lbs.	342 08
Total cost to produce beef, 342·08 + 144·49	486 57
Sold 11,680 lbs, at 6·17½ per 100 lbs., less 5 per cent.	721 24
Profit on lot	234 67
Net profit per steer	26 07
Average cost price per steer	38 01
Average selling price per steer	80 14
Average increase in value	42 13
Average cost of feed per steer	16 06
Amount of meal eaten by lot of 9 steers	3,537 lbs.
Amount of ensilage and roots	73,297 "
Amount of hay	6,516 "

CALVES.

Number of steers in lot	5
First weight gross	2,275 lbs.
First weight average	455 "
Finished weight gross	4,200 "
Finished weight average	840 "
Total gain in 180 days	1,925 "
Average gain per steer	385 "
Daily gain for lot	10·70
Daily gain per steer	2·14
	$ cts.
Gross cost of feed	69 26
Cost of 100 lbs. gain	3 60
Cost of steers, 2,275 lbs. at $3.50 per 100 lbs	79 63
Cost to produce beef, $69.26 + $79.63	148 89
Sold 4,200 lbs., $5.50 per 100 lbs., less 5 per cent	219 45
Profit on lot	70 56
Net profit per steer	14 11
Average cost price per steer	15 93
Average selling price per steer	43 89
Average increase in value	27 96
Average cost of feed per steer	13 85
Amount of meal eaten by 5 steers	3,620 lbs.
Amount of ensilage and roots	20,060 "
Amount of hay	1,200 "

HEAVY *versus* LIGHT FEEDING.

The experiments in feeding lots of steers a heavy ration from birth to block in comparison with similar lots fed a light ration till a few months before it is desired to slaughter them are being continued.

The first lots were selected in the spring of 1900. The heavily fed lot of the first selection were ready for slaughter in March, 1902, at 22 months old. The lightly fed lot of the same selection are being fed off at present and it is expected that they will be ready for the block in March or April, 1903.

In 1901 another selection was made. The following statements give the particulars of these two lots for 1902.

YEARLINGS—HEAVY FEEDING.

Number of steers in lot	5
First weight gross, December 1, 1901	2,215 lbs.
First weight average, December 1, 1901	455 "
Final weight gross, December 1, 1902	5,420 "
Final weight, average, December 1, 1902	1,084 "
Total gain in 365 days	3,205 "
Average gain per steer	641 "
Daily gain for lot of 5 steers	8·80
Daily average gain per steer	1·76
	$ cts.
Gross cost of feed	138 81
Cost of 100 pounds gain	4 33
Cost to feed 1 steer 1 day	7·60
Cost to feed 1 steer 1 year	27 76

Amount of meal eaten by lot	7,216 lbs.
Amount of ensilage and roots eaten by lot	35,525 "
Amount of hay eaten by lot	2,340 "
Number of months on pasture	1 mo.

YEARLINGS—LIGHT FEEDING.

Number of steers in lot	5
First weight gross, December 1, 1901	2,026 lbs.
First weight average	405 "
Final weight gross	4,126 "
Final weight average	825 "
Total gain in 365 days	2,100 "
Average gain per steer	420 "
Daily gain for lot of 5 steers	5·75
Daily average gain per steer	1·15
	$ cts.
Gross cost of feed for year	70 81
Cost of 100 pounds gain	3 37
Cost to feed 1 steer 1 day	3·89
Cost to feed 1 steer 1 year	14 16
Amount of meal eaten by lot	215 lbs.
Amount of ensilage and roots eaten by lot	31,600 "
Amount of hay eaten by lot	1,865 "
Number of months on pasture	6 mos.

In 1902, another selection was made. The following statements give the particulars of these two lots for 1902.

CALVES—HEAVY FEEDING.

Number of steers in lot	6
First weight gross	665 lbs.
First weight average	110 "
Final weight gross	2,400 "
Final weight average	400 "
Total gain in 200 days	1,735 "
Average gain per steer	290 "
Daily gain per lot of 6 steers	8·70
Daily average gain per steer	1·45
	$ cts.
Gross cost of feed	53 37
Cost of 100 pounds gain	3 07
Cost to feed 1 steer 1 day	4·44
Amount of meal eaten by lot	3,316 lbs.
Amount of ensilage and roots eaten by lot	2,832 "
Amount of hay eaten by lot	679 "
Amount of skim milk eaten by lot	4,490 "

CALVES—LIGHT FEEDING.

Number of steers in lot	6
First weight gross	675 lbs.
First weight average	112 "
Final weight gross	2,280 "
Final weight average	380 "
Total gain in 200 days	1,605 "
Average gain per steer	267 "
Daily gain per lot of 6 steers	8 "
Daily average gain per steer	1·33

	$ cts.	
Gross cost of feed for 200 days	47 55	
Cost of 100 pounds of gain	2 96	
Cost to feed 1 steer 1 day	3·96	
Amount of meal eaten by lot	2,699	lbs.
Amount of ensilage and roots eaten by lot	4,706	"
Amount of hay eaten by lot	675	"
Amount of skim milk eaten by lot	4,490	"

SHEEP.

There are at present two flocks of sheep on the Central Experimental Farm.

Shropshires :—

1 ram (imported).
14 ewes (9 imported).

Leicesters :—

1 ram.
8 ewes.

The past year has been most discouraging so far as sheep are concerned. The lamb crop was rather small to begin with, and their number was greatly reduced by goitre and worms.

In addition to the pure breds, a few grade sheep are kept. These are bred to the Shropshire or Leicester ram and their young fed off as lambs.

SWINE.

There are at present four herds of swine in the piggery.
They are as follows :—

Yorkshires (Large Improved) :—

2 boars (stud).
8 sows.
50 young Yorkshires (from 2 to 4 months old).

Berkshires :—

2 boars (stud).
4 sows.
13 young Berkshires (3 months old).

Tamworths :—

1 boar (stud).
4 sows.
10 young Tamworths (2 months old).

Large Blacks :

2 boars (stud).
4 sows.
11 young Large Blacks (2 months old).

EXPERIMENTS.

A number of feeding experiments have been conducted during the past year but they are as yet unfinished.

SHALLOW CULTIVATION AND ROTATIONS.

For many years farmers in Eastern Canada were grain growers merely. Necessity forced the inception of such a system of agriculture. Habit and ignorance prolonged the practice of such farming. The wonderful strength and seemingly inexhaustible fertility of the soil made its long continuance possible. The discovery of the possibilities of the north-west and the gradual exhaustion of our fields called a halt. Hence, for some years past change has been in the air.

Live stock farming, the system making the smallest demands on soil fertility, is rapidly supplementing grain growing. Parts of nearly every farm are now much better in condition than they were a few years ago; and, further, such is nature's wonderful recuperative power, since the partial cessation of the tremendous drain of grain exportation the average crop returns for Eastern Canada have gone up very considerably. But, as every farmer knows, even live stock farming long continued means a gradual loss of fertility, unless considerable food other than that produced on the farm is fed to stock and the manure properly cared for and utilized.

This fact has led to a study of the methods for cheaply restoring lost fertility and profitably cultivating soils so that 'improved,' rather than 'impoverished,' may be the annual verdict.

It is impossible to discuss the subject exhaustively in such an article as this, but one plan of cultivation found to give good results is where the meadow or pasture is ploughed in August, the sod being turned to a depth of 3½ or 4 inches only. Immediately after ploughing, if in a dry time, the land is rolled, then harrowed with a light harrow. It is then left untouched until grass and weeds start to grow, when it is again harrowed, care being exercised to prevent the sod being disturbed. The harrowing or cultivating process is continued at intervals (as the weed seeds germinate) until October, when by means of a (3 plough gang) double mould-board plough the surface soil to a depth of about 4 inches is put into drills about 22 inches apart and 8 to 10 inches high. This is found to be a most satisfactory preparation of the soil for corn, roots or grain. Where grain is sown, the soil is ready for seeding at a considerably earlier date than where late fall ploughing is practised.

If, along with this system of shallow cultivation, a proper rotation is adopted, most excellent results are sure to follow. As clover is the only crop which while giving a profitable harvest still serves to enrich rather than to impoverish the soil, it is evident that clover should take a prominent place in any rotation in this country. With this fact in mind, a few rotations suitable for the improving of our lands may be offered, as follows:—

(a.) 3 year rotation—1, grain; 2, clover hay; 3, pasture.

(b.) 3 year rotation—1, corn and roots; 2, grain; 3, clover hay.

(c.) 4 year rotation—1, corn, roots, potatoes or pease; 2, grain; 3, clover hay; 4, hay or pasture.

(d.) 5 year rotation—1, grain, with 10 lbs. clover seed to plough down for fertilizers; 2, corn, roots, potatoes or pease; 3, grain; 4, clover hay; 5, hay or pasture.

(e.) 5 year rotation—1, grain; 2, clover hay or pasture; 3, corn, potatoes, roots or pease; 4, grain; 5, clover hay or pasture.

(f.) 6 year rotation—1, grain; 2, clover hay or pasture; 3, corn, roots, potatoes or pease; 4, grain; 5, clover hay; 6, pasture or timothy hay.

Rotation *(a)* is one well suited for some remote part of a farm where it is not convenient or practicable to apply manure regularly.

Rotation *(b)* is well suited for the farm where it is desired to keep a large number of cattle, and where there is more or less broken land to serve as pasture.

Rotation *(c)* is adapted to the requirements of the average farmer and is one well suited for general farming.

Rotation *(d)* may be followed with some advantage where there is a moist climate. The use of clover for a fertilizer merely is undoubtedly profitable where climatic conditions permit of a good growth after the cover crop has been removed.

Rotation *(e)* is probably even better suited than *(d)* for the average farmer anxious to quickly put his farm in good heart and keep it in that condition. This is more especially true in sub-humid regions.

Rotation *(f)* the longest, it is seldom or ever advisable to follow, includes one year of timothy hay, which may recommend it to many farmers. The four year rotation *(c)*, however, has the same peculiarity, and is for various reasons to be preferred.

In all save *(a)* it is understood that barn-yard manure is to be applied when roots or corn or potatoes are grown. Experiment has shown over and over again that frequent light applications of barnyard manure give better returns than heavy applications at longer intervals. To illustrate, it has been proven that 10 tons per acre every third year will give much better results than 20 tons per acre every sixth year. This fact would seem to indicate very strongly the adoption of a short rather than a long rotation by all who are anxious to improve their farms and get the greatest returns from manure applied.

The chief reason for surface cultivation and the adoption of such short rotations as given above is to increase the quantity of, and place properly the chief factor making for soil fertility, humus.

Dead vegetable matter exposed to moisture and warmth soon breaks down to a form called humus or black earth, the factor just mentioned. Our prairie and newly cleared soils contain immense quantities of this material. Exposure to heat and the intermixture of earthy matter serve to waste the same. Thus, repeated grain cropping with deep ploughing provide the conditions best calculated to dissipate this matter most readily and most effectively.

The functions of this common, yet easily lost, substance are varied and important. Being, as every one can prove for himself, of the nature of a sponge, it retains the moisture in a dry time, but will allow all superfluous water to rapidly and harmlessly percolate to the lower soil layers in a wet season. It holds loose, porous soils together, and so otherwise loose sands become stable and provide a good root hold for plants. It renders dense, impermeable soils open and porous, permitting the free circulation of air and water and allowing the weak rootlets to penetrate the erstwhile impenetrable space in search of food. In brief, it is the chief factor making for good physical condition in our soils. It contains much plant food, since it is really vegetable matter, and a large percentage of this food is in available forms. It aids also in the conversion of the non-available forms of the elements of fertility into available forms. Further, it retains near the surface the dissolved plant food which must otherwise have sunk into the subsoil.

The most important sources of humus on the average farm are farm-yard manure and crop residues. Upon the proper application or use of these materials depends the future of Canadian agriculture.

Keep humus near the surface.—Where the supply of humus is limited its location becomes a very important consideration. Now, most of our crops draw the greatest part of their food from the surface soil, for, while some roots of most plants penetrate to a considerable depth, most roots of all plants are found near the surface. Plants of nearly all descriptions thrive best where the surface soil is mellow and rich in humus. The great crops produced by newly cleared fields and prairie lands exemplify this, as does also the rank growth of plants in our forests, where the subsoil is never stirred, and where the annuals and smaller perennials must depend for their nourishment upon the surface soil almost exclusively. It would, therefore, seem to be clear that available

plant food should be near the surface of our fields and that our surface soil should be in particularly good physical condition or tilth.

How to secure these two requirements of rapid, rank and desirable plant growth must, therefore, be the first consideration of every would-be successful farmer. Experiment and long practice seem to prove that shallow cultivation and some rotation, more especially the three year or the four year in dry districts, and the five year in rainy districts are most serviceable in increasing the humus in the surface soil, and so 'improving the physical condition' which means 'increasing the productivity' of our fields.

ESTIMATING COST OF PRODUCTION.

The importance of determining cost of production of our grain and forage crops is scarcely questionable. The climatic, and soil factors must, however, always be of primary importance, and on that account all estimates must be more or less particular in their bearing rather than general.

In the estimates which are included in the following reports on the different crops, rent, manure, labour, material (seed, twine, &c.), and wear and tear are considered. The item of supervision, of considerable moment on such farms as this, has been omitted, since most farmers in Canada do much of their own work, as well as direct the labour of such men as they employ.

The digestibility of a feed is another factor which must enter materially into any consideration of its economy of production, since, as is well known, the digestibility of our feeding stuffs ranges from about 25 per cent of the dry matter to practically 100 per cent of the whole thing.

In dividing the cost of production of a grain crop between the straw and grain, however, where the digestible dry matter of the one part is so different in composition and value from that of the other, some additional standard is necessary. Since protein is that part of any ration the most expensive to supply, it was decided to make the digestible protein the basis of value. It is, of course, well understood that protein is not the only important constituent of straw. Frequently it is of very minor consideration indeed, as when used for litter, since about 29-30 of the whole dry matter is of equal or even greater value as absorbent material.

CROP ON THE 200 ACRE FARM

OATS.

Five varieties of oats were grown. They were Banner, Improved Ligowo, Tartar King, Waverley and Goldfinder. They were sown on land that had been in roots or corn the preceding year. As the land was not of uniform character, the results will not indicate the productivity of the different varieties.

The particulars of the lots sown are as follows:—

Banner.—40 acres, sown April 16, 2 bushels per acre; matured in 119 days, August 13. Yielded 2,239 bushels, 55 bush. 33 lbs. per acre. Measured bushels weighed 41¼ pounds. A second field of Banner of 5½ acres yielded at the rate of 47 bushels 24 lbs. per acre.

Improved Ligowo.—2 acres, sown April 24, 1¾ bushels per acre; matured in 110 days, August 12. Yielded 122 bushels 9 pounds 61 bush. 4 lbs. per acre. Measured bushel weighed 40½ pounds.

Tartar King.—2½ acres, sown April 24, 2 bushels per acre; matured in 109 days, August 11. Yielded 140 bushels 4 pounds, 56 bush. 2 lb. per acre. Measured bushel weighed 39½ pounds.

Waverley.—2½ acres, sown April 24, 1¾ bushels per acre; matured in 112 days, August 14. Yielded 145 bushels 30 pounds, 58 bush. 12 lbs. per acre. Measured bushel weighed 40½ pounds.

Goldfinder.—2½ acres, sown April 24, 2 bushels per acre; matured in 124 days, August 16. Yielded 141 bushels 9 pounds, 56 bush. 17 lbs. per acre. Measured bushel weighed 40 pounds.

Cost of growing 55 acres of Oats—

Rent of land, 55 acres at $3	$165 00
Gang ploughing in autumn, 25 acres at $1 per acre	25 00
Cultivating and ribbing, 4 days at $2.50	10 00
Cultivating and harrowing in spring	45 00
⅕ manure, at the rate of 15 tons per acre, applied in root year, at $1 per ton	165 00
Seed, 110 bushels at 50 cents per bushel	55 00
Sowing, 5½ days at $2.50 per day	13 75
Rolling, 2½ days at $2.50	6 25
Cutting with binder, 5½ days at $2.50	13 75
Use of machinery, 20 cents per acre	11 00
Twine, 130 pounds at 12 cents	15 60
Shocking, 15 days at $1.33⅓	19 90
Loading and unloading, 30 days at $1.33⅓ per day	40 00
Teams drawing, 11 days at $2.50	27 50
Threshing 3053 bushels at 2½ cts. per bushel	76 32
	$ 619 07

Total yield, 3,052 bushels 23 pounds.

Average yield per acre, 55 bushels 17 lbs.

Cost to produce 1 bushel of grain	00 22⅓
Cost to produce 100 pounds digestible dry matter, grain	0 98

MIXED CROP EXPERIMENT.

Side by side on the second year of the rotation field; that is, on what had been pasture the preceding year, were sown 9 plots of 2 acres each, the aim being to get some data as to the comparative yields of crops grown as mixtures and as pure grain. The mixtures and pure grains are as follows, with the yield of the respective crops per acre :—

	Lbs.
Plot 1, pure barley, Mensury, yielded	4,980
Plot 2, pure oats, Banner, yielded	4,990
Plot 3, pure pease, Prussian Blue, yielded	3,610
Plot 4, pease, 1 bushel, oats, 2 bushels	4,764
Plot 5, oats, 1½ bushels, barley, 1 bushel	4,720
Plot 6, wheat, ½ bushel, oats, 1 bushel, pease, ¾ bushel, barley, ¾ bushel, yielded	4,450
Plot 7, oats, 1 bushel, pease, 1 bushel, barley, 1 bushel	4,365
Plot 8, wheat, ½ bushel, barley, ¾ bushel, oats, 1¼ bushel	4,975
Plot 9, oats, 2 bushels, pease, 1 bushel, yielded	4,320

HAY.

Cost of growing 63 acres of hay—

Rent of land at $3 per acre	$ 189 00
One-fifth manure at the rate of 15 tons per acre, $1 per ton.	189 00
Half seeded at $1.50 per acre, 10 lbs. clover, 12 lbs. timothy	94 50
8 days cutting with mower at $2.50 per day	20 00
7 days raking at $1.75 per day	12 25
6½ days teddering at $1.75 per day	11 37½
Rent of farm machinery, oil, &c	12 60
Cocking, loading and unloading, 59 days at $1.33⅓	78 66
12 days drawing to barn at $2.50 per day	30 00
4 days team on horse fork at $2.50 per day	10 00
Cost to produce 63 acres of hay	$ 647 30

Yielded per acre, 2 tons, 1,347 lbs.
Total yield, 174 tons, 1,500 lbs.
Cost to produce 1 ton, $3.72.
Average amount of digestible dry matter in 1 ton of hay, 1,100 lbs.

Cost to produce 100 lbs. digestible dry matter	$ 00 34
Cost to produce 1 acre of hay	10 29

SECOND CROP HAY.

Cost to produce 24 acres—

Cutting with mower, 3½ days	$ 8 75
Raking, 3½ days	5 25
Cocking, loading and unloading, 19½ days	24 33
Drawing, 4½ days	11 25
Use of machinery	4 80
Horse fork team, 1 day	2 50
	$ 56 88

Total yield, 41 tons 1,220 lbs.
Cost to produce 1 ton, $1.37.

TREATMENT OF NEWLY SEEDED LAND AFTER CROP HAS BEEN REMOVED.

The treatment of new meadows in the autumn after the cover crop has been harvested is a problem that has not attracted much attention because farmers generally, and wisely concede that it is necessary to leave unmolested any growth the young plants may make in the autumn. It is claimed that such treatment insures, or at leasts assists in insuring the safe passage of the young plants through the first winter.

It is not my aim to condemn as unnecessary this precaution, nor to detract in any way from the importance of giving the young plants every chance to winter successfully. It is interesting, however, to note that, judging by the experiment outlined below, it is frequently unwise to let a generally wise practice prevail under exceptional conditions.

During the summer of 1901, the growth of the young clover, while the cover crops still stood uncut was very strong, and at harvest time much green clover was cut and bound in with the grain. This rapid, rank growth continued after harvesting operations were completed. On a 6 acre field it was decided to try a small experiment.

The field was divided into 3 equal parts (2 acres each).

Part 1.—This field of 2 acres was left untouched. The clover plants flowered and ripened. The crop died down and formed a thick protecting coat of dead vegetable matter.

Part 2.—This field of 2 acres was pastured by sheep. It was eaten down fairly well, but not so closely as to suggest any injury to roots.

Part 3.—This field of 2 acres was cut when the clover was in full bloom and the green clover, 8 tons, put into a silo. The plants made a few inches growth after the cutting, but did not look very vigorous when the snow came.

The fields were watched carefully in the spring of 1902 to ascertain the effects of the different autumn treatments.

Part 1.—This field started out strong, bright and promising. It made a good growth and was harvested in July. The yield was 6 tons 1,680 lbs.

Part 2.—This field offered quite as well as Part 1, and gave an almost equally good harvest. The yield was 6 tons 1,500 lbs.

Part 3.—This field did not offer as well as Parts 1 and 2 in the early spring, but began to improve towards the end of May, and when harvested in July was nearly equal to the other two fields. The yield was 6 tons 965 lbs,

CORN.

Three varieties of corn were sown in areas ranging from $4\frac{3}{4}$ to 20 acres, the aggregate being $29\frac{3}{4}$ acres.

Selected Leaming.—20 acres, sown May 28, cut for ensilage September 25. Yielded 14 tons 872 lbs. per acre. Growth strong and even, well cobbed, but very late owing to season. Cobs mostly in early milk. Part of this plot suffered from frost, lessening weight per acre.

Early Mastodon.—5 acres, sown May 29, cut for ensilage October 2. Yielded 17 tons 712 lbs. per acre. Growth very strong and even, good showing for cobs and mostly well formed in early milk.

Longfellow.—$4\frac{3}{4}$ acres, sown May 30, cut for ensilage September 22. Yielded 14 tons 1,684 lbs. per acre.

Cost of growing $29\frac{3}{4}$ acres of corn—

Rent of land, at $3 per acre	$ 89 25
Cultivating and ribbing, 5 acres, 3 days at $2.50	7 50
$\frac{1}{5}$ manure, at 15 tons per acre, at $1 per ton	89 25
Cultivating in spring, 2 days at $2.50	5 00
Ploughing in spring, $24\frac{3}{4}$ acres at $2	49 50
Harrowing in spring, 3 days at $2.50	7 50
Seed, 25 lbs. per acre, $734\frac{3}{4}$ lbs. at $1 per bushel	13 16
Sowing, team 3 days at $2.50 per day	7 50
Harrowing twice, after sowing $3\frac{6}{10}$ days	9 00
Hoeing, 129 days at 1.33\frac{1}{3}$ per day	172 00
Cultivating, team, 22 days at $2.50	55 00
Cultivating, single horse, 8 days at $1.75	14 00
Cutting with corn harvester, 8 days	20 00
Loading and unloading, tramping and putting into silo, $109\frac{1}{2}$ days at 1.33\frac{1}{3}$	146 00
Drawing with team, 21 days at $2.50	52 50
Use of machinery, 20 cents per acre	5 95
Use of engine, fuel, ensilage cutter and engineer, for $6\frac{1}{2}$ days	42 25
	$ 785 36

Yielded 446 tons of corn.

Cost of 1 ton in silo	$ 1 76

Average amount of digestible dry matter per ton (75 per cent digestible), 320 lbs.

Cost to produce 100 lbs. digestible dry matter	$ 0 55
Cost to produce 1 acre of corn ensilage	26 30

MANGELS.

Three varieties of mangels were grown on 6 acres of land. The seed was sown May 12, and harvesting operations began on October 21. The varieties were as follows:—

Mammoth Long Red.—2 acres. Yielded 23 tons 1,295 pounds per acre, or 47 tons 590 lbs., equal to 1,576½ bushels on the 2 acres.

Golden Tankard.—2 acres. Yielded 52 tons 980 lbs., equal to 1,749 bushels on the 2 acres.

Giant Yellow Globe.—2 acres. Yielded 56 tons 1,370 lbs., equal to 1,889½ bushels on the 2 acres.

Cost of growing 6 acres of mangels—

Rent of land, at $3 per acre	$ 18 00
Gang ploughing in autumn, 2 days 4 hours at $2.50	6 00
One-fifth cost of manuring at 15 tons per acre	18 00
Ploughing in spring, at $2 per acre	12 00
Harrowing, 4 hours at 25 cents per hour	1 00
Drilling, 2½ days at $2.50 per day	6 25
Seed, 24 lbs. at 18 cents, $4.32; sowing, 4½ days at $1.33⅓, $6	10 32
Thinning, 15 days at $1.33⅓ per day	20 00
Hand wheel hoeing, 8 days at $1.33⅓	10 67
Hoeing 12 days at 133⅓	16 00
Cultivating, single horse, 9 days at $1.75	15 75
Pulling, topping, loading, unloading, 32 days at $1.33⅓	42 66
Drawing to roothouse, team, 6½ days at $2.50	16 25
Cost to grow 6 acres	$ 192 90

Total yield, 156 tons 940 lbs., or 5,215⅔ bushels. Average, 26 tons 156 lbs., or 869 bushels per acre.

Cost to produce 1 ton of mangels housed	$ 1 23¼
Cost to produce 1 bushel of mangels housed	0 03 7/10
Average dry matter per ton 246 lbs	
Cost to produce 100 lbs. digestible dry matter*	0 50
Cost to produce 1 acre of mangels	32 15

TURNIPS.

Two varieties were grown, sown June 11, harvested October 27. Manure was applied during the winter and spring at the rate of about 15 tons per acre.

Champion Purple Top Swede.—1 acre yielded 17 tons 1,490 lbs., or 591½ bushels per acre.

Prize Purple Top Swede.—1 acre yielded 18 tons 1,190 lbs., or 619⅚ bushels per acre.

* Analyses made in Chem. Div. C. E. F., 1902 show larger percentages of dry matter than usual.

Cost of growing 2 acres of turnips—

Rent of land at $3 per acre	$	6 00
⅓ manure, 15 tons per acre, at $1 per ton		6 00
Ploughing in spring, at $2 per acre		4 00
Harrowing, 2 hours at 25c		0 50
Drilling, 8 hours at 25c		2 00
Rolling, 1 hour at 25c		0 25
Seed, 6 lbs. at 20c.; sowing, day at $1.33⅓		2 53⅓
Hand wheel hoeing, 1⅗ days at $1.33⅓		2 40
Thinning, 4 days at $1.33⅓		5 33
Hoeing, 3 days at $1.33⅓		4 00
Cultivating single horse, 2 days at $1.75		3 50
Pulling, topping, loading and unloading, 10 days at $1.33⅓		13 33
Drawing, 2 days at $2.50		5 00
Cost to produce 2 acres	$	54 84

Yielded, 36 tons 680 lbs., or 1,211⅓ bushels.

Cost to produce 1 ton of turnips, housed	$	1 51
Cost to produce 1 bushel turnips, housed		0 04½
Average digestible dry matter in 1 ton 215 lbs.		
Cost to produce 100 lbs. digestible dry matter		0 70
Cost to produce 1 acre of turnips		27 42

SUGAR BEETS.

Two varieties were grown on ½-acre plots, ¼ acre of each sort being in drills; ¼ acre of each sort being on the flat as for sugar. Sown, May 12; harvested, October 27. Manure was applied during the winter and spring at the rate of about 15 tons per acre.

Danish Improved.—Yield per acre was at the rate of 17 tons 720 lbs., from the forage, and 17 tons 248 lbs., from the sugar plot, or 562 bushels and 578 bushels, respectively.

Giant Sugar Feeding Mangel.—Yield per acre was at the rate of 20 tons 1,940 lbs., from the forage, and 21 tons 560 lbs. from the sugar plot, or 699 bushels and 639½ bushels, respectively.

Cost of growing 1 acre of sugar beets—

Rent of land at $3 per acre	$	3 00
Gang ploughing in autumn, 4 hours at 25c		1 00
⅓ manure at 15 tons per acre, $1 per ton		3 00
Ploughing in spring at $2 per acre		2 00
Harrowing in spring		0 40
Drilling in spring		0 75
Rolling in spring		0 16
Seed, 12 lbs. at 20c		2 40
Sowing, 5 hours at $1.33⅓		0 66
Hand wheel hoeing, 6 hours at $1.33⅓		0 80
Thinning, 5 days at $1.33⅓		6 67
Hoeing twice, 28 hours		3 73
Cultivating, single horse, 4 times at $1.75 per day, 4 hours each time, 16 hours		2 80
Ploughing out roots, 4 hours at 25c		1 00
Pulling and topping, 4 days at $1.33⅓ per day		5 33
Drawing in roots, 14 hours at $2.50 per day		3 50
Loading and unloading, 4 days at $1.33⅓		5 33
Cost to grow 1 acre	$	41 53

Average yield per acre, 19 tons 367 lbs.

Cost to produce 1 ton	$	2 17
Cost to produce 1 bushel		0 06½
Digestible dry matter in 1 ton 353·4 lbs		
Cost of 100 lbs. digestible dry matter		0 62

PUMPKINS.

The soil was a sandy loam and well drained. Manure was first applied at the usual rate of 15 tons per acre and worked into the soil. The plot was then ploughed and harrowed. It was marked off into 8-foot squares, and a hole about 18 inches square and six inches deep excavated at each corner. These holes were half filled with manure, a layer of earth thrown on the top and seed planted. The plants grew well and in a short time covered the whole area. A large quantity of fruit developed and grew to a fair size.

Cost of production of pumpkins—

Rent, half an acre	$	1 50
Manure, ⅓ applied at the rate of 15 tons per acre		1 50
Extra manure in hills, 6 tons used, half the value		3 00
Ploughing in spring		1 25
Harrowing twice		0 18
Marking, making hills and planting		2 00
Hoeing		1 33
Cultivating, single horse		0 52
Hauling		3 75
	$	15 03

Weight produced, 14,550 lbs.

Cost to produce 1 ton	$	2 06

One ton contains about 190 lbs. digestible dry matter.

Cost to produce 100 lbs. digestible dry matter	$	1 08

REPORT OF THE HORTICULTURIST.

(W. T. Macoun.)

Dr. Wm. Saunders,
Director Dominion Experimental Farms,
Ottawa.

December 1, 1902.

Sir,—I have the honour to submit herewith the Sixteenth Annual Report of this Division. In the following pages will be found the results of some of the most important experiments conducted during the past year, and the conclusions reached regarding others which have been carried on for a number of years.

Notwithstanding the severe frost on May 9, the season, on the whole, was satisfactory and good progress was made in the work of this division.

Character of Season.—Although the temperature did not fall as low during the winter of 1901-2 as it usually does, it was moderately cold most of the time. The winter set in on November 14, 1901, with a fall of 4 inches of snow and the ground unfrozen. It was very cold during the third week of December, the temperature falling to 14·3° F. below zero on the 16th, but later it was mild. January was moderately cold, on the whole, but the lowest temperature of the winter was on the 17th, when it went to 19° F. below zero. There was a very heavy snowstorm from January 21, to January 23, when 19 inches of snow fell. Another heavy snowstorm from February 1 to 3, added 15 inches more snow, which made a fine protective covering for plants and trees. February was moderately cold. It did not thaw from January 22 to February 22, but on February 25 the snow began to go rapidly, and by March 8 the sleighing was practically gone. On March 24 the frost, which had not reached a great depth during the winter, was out of the ground in many places and the soil was drying fast. Work outside was begun on April 1. On March 31, ploughing was begun in the apple orchard, the soil being in good condition and frost in a few spots only. The early spring was very fine for work, the weather being comparatively cool with little rain. Trees did not leaf out rapidly and were not much in advance of other years. It was an exceptionally favourable spring for tree planting. The winter injury to trees and shrubs was less than the average.

The most serious spring frost which has been felt in this neighbourhood for years occurred on May 9, when there were 13 degrees. This caused great destruction to early planted vegetables and badly injured herbaceous perennials and the leaves of trees and shrubs. The flowers of native plums, which were in bloom, suffered badly and the crop was much lessened; the Americana plums did not suffer as much as most of the flowers were still in bud. Cherries suffered badly where the buds were enough expanded to show white. Little injury was caused to apple blossoms. Gooseberries and currants, though in full bloom, were practically uninjured. Where strawberries had been uncovered early or had not been covered at all the injury to the flowers was very great. The grape crop was practically a failure where the vines had been uncovered, the buds being destroyed. The leaves of raspberries were badly hurt, thus weakening the plants and lessening the crop. Many herbaceous plants were injured which might be expected to stand the frost, among these being a large number of native plants. Rhubarb and asparagus, which had made considerable growth, became quite soft and useless, but grew again. Tulips and narcissus, which were in full bloom, suffered considerably, but the flowers were not destroyed. Flowering shrubs were badly hurt, a large proportion of

the flower buds being killed. Spiræa Van Houttei, which usually blooms profusely, had practically all the flower buds destroyed. The May flowering shrubs which noticeably escaped injury were the Tartarian Honeysuckles, Caraganas, Spiræa arguta, and the double flowering almond. Trees such as birch and beech did not recover from the effects of the frost till July. The flowers of the American elm were destroyed and no fruit set. There were only two days in May when the temperature was above 80° F., the highest temperature being 86° F., on the 23rd. The rainfall in May was light. June was a very showery month and growth was much retarded by cool weather. The highest temperature in June was on the 3rd, when it was 84° F. July was the warmest month of summer, but there were few really hot days. The highest temperature for the summer was 92° F., on the 8th. On July 15 there was a terrific storm of wind, rain, and hail, which blew down and broke a number of the fruit and ornamental trees at the farm, and did much damage in the surrounding country. Nearly 1½ inches of rain fell in fifteen minutes. On the 17th there was another great storm with very heavy wind and rain, which blew down and broke more trees. August was only a moderately warm month, the highest temperature being 87·5° F., on the 21st, and comparatively little rain fell during that month, nor in September, which was very fine, but not very warm. The first frost which was a killing one occurred on October 9, when 8 degrees were recorded. Everything at all tender was killed. October was a cool and frosty month, but there were no heavy rains. November was a fine month for work, the weather being comparatively mild up to November 25, when winter set in with the ground frozen. On the 26th and 27th, five inches of snow fell, and this gradually increased.

Fruit and Vegetable Crops.—The fruit crop in the provinces of Ontario and Quebec was large this year, on the whole, though in some districts it was better than in others. The apple crop was very uncertain during the early part of the season, for although the bloom was abundant, the fruit dropped much more than usual during the latter part of June and early in July. As a result of this thinning, however, the fruit grew larger, and what looked like a light crop in the early part of the season developed into a very fair one. The black spot was bad in many places and lessened the value of the crop very much, making the percentage of number one apples small. Pears, peaches, plums and cherries were all good crops in most of the districts where they can be grown successfully. Grapes did not ripen as well as usual this year. Small fruits were good. At the Central Experimental Farm the apple crop was good and the fruit clean. The plum crop was fair but the fruit smaller than usual. European plums fruited much better than usual this year. The crop of cherries was light but better than it has been since 1898. Seven rows of grape vines were uncovered before the severe frost of May 9 and the crop on these was in most cases little or nothing. The vines in the greater part of the vineyard, however, which were not uncovered at that date, produced good crops, but the autumn being cool, comparatively few kinds ripened. The crop of gooseberries and currants was good, but the injury to the raspberries in spring lessened the yield of that fruit considerably. Strawberries did well at the farm, though in the neighbourhood the crop was much lighter than usual.

Although most vegetables in the vicinity of Ottawa were badly injured and in some cases destroyed by spring frosts, few kinds suffered at the Experimental Farm, as the tender things were not put out until after the severe frost of May 9. Melons, however, were a total failure. Tomatoes, although not ripening as early as usual, were a good crop, and potatoes, which were sprayed, gave the best crop in the history of the farm.

Meetings attended and places visited.—As in the past, a portion of my time during the year was devoted to attending meetings and visiting places where I could be of service to the fruit growers, and also acquire information which would be helpful in my work here. On December 18 and 19, 1901, I attended the meeting of the Quebec Pomological Society at Coaticook, Que., and gave an address on "The Work of the Horticultural Division at the Central Experimental Farm."

On February 21, 1902, I attended the annual meeting of the Western Horticultural Society at Winnipeg, Man., and gave a lecture on "Gardening for Profit, Including Fruit Growing," and a talk with illustrations on "What the Experimental Farms are doing for the Horticulturist." At this time I took the opportunity of visiting the Experimental Farm at Brandon, Man.

On December 13 I gave an address on 'Small Fruit and Potato Culture,' at Masson, Que., and on 'Fruit Culture,' at Casselman, Ont., later on.

At the request of Mr. G. C. Creelman, lectures were delivered before the Horticultural Societies at Cayuga, Niagara Falls South, St. Catharines, Grimsby and Hamilton, Ont., on March 10, 11, 12, 13 and 14, the subjects discussed being 'The Best Hardy Annuals and Perennials,' 'The Lawn and Garden,' and 'Fruit Growing.'

The summer meeting of the Quebec Pomological Society was held at Aylmer, Que., on August 14. This was attended and a talk given on 'Fruits for the Home Market with notes on their Culture.' On the following day the members of the society visited the Experimental Farm.

On August 19 I addressed an audience at Norway Beach, Que., and gave a practical demonstration of tree planting. This was in connection with a summer school of science which the Rev. J. A. Macfarlane is establishing there.

Between September 8 and 13 I visited the Toronto Exhibition, the Grimsby District, the Ontario Agricultural College, Guelph, the fruit farm of R. W. Shepherd, Como, Que., the Trappist Fathers, Oka, Que., and N. E. Jack, Chateauguay Basin, Que., gaining much information which will be useful to me in my work, and being of some assistance, I trust, to the fruit growers with whom I came in contact.

On September 30, October 1 and 2, I attended the Plant Breeding Conference at New York, and visited the New York Botanical Garden at Bronx Park, and during the following week visited the Arnold Arboretum, Boston, Mass., as a result of which a fine collection of trees and shrubs was kindly sent by Prof. Sargent.

Acknowledgments.—During the past year I have had much assistance from the fruit growers of Canada in many ways which has been greatly appreciated. It is a pleasure to me to know that they are in sympathy with my work. Fruit growers in the United States, especially the professors of horticulture at the agricultural experiment stations, have also shown much interest in our work and have given me great aid.

In order that the work of a department may be successfully carried on, one's associates and helpers must be men who both take an interest in the work and do it well. I am particularly fortunate in having in Mr. J. F. Watson, who attends to the correspondence and much of the other office work, and in Mr. H. Holz, foreman, men who both take an interest in their work and do it well.

Donations.—Every year, plants, scions, seeds, &c., are donated to the horticultural division. When the donor so desires, the plants sent are tested here, but not disseminated without his permission. We beg to gratefully acknowledge the receipt of the following donations during the year :—

DONATIONS.

Sender.	Donation.
Archambault, Jos. (son of Louis) St. Lin, Que	Scions, No. 2, Laurentian apple.
Arnold Arboretum, Jamaica Plain, Boston, Mass., U.S.A.	Seeds. 70 species and varieties of trees and shrubs.
Bug Death Chemical Co., St. Stephen, N.B.	50 lbs. Bug Death.
Carter, H. C., Massawippi, Q	Scions, Shiawassee, King and Nodhead apples.
Carstesen, H. C., Billings Bridge	Scions, early native plums.
Cass, C. A., L'Orignal, Ont.	Scions, seedling apple.
Cockburn, J. P., Gravenhurst, Ont.	Scions, Stormont plum.
Dempsey, W. H., Trenton, Ont.	Scions, apple.

DONATIONS—*Concluded.*

Sender.	Donation.
Déry, F. L., St. Hilaire, Que	Scions, St. Hilaire and Elzear apples.
d'Orsonnens, Count, Agnès, Que	Orchids.
Dupuis, Aug., Village des Aulnaies, Q	Plums, fine collection.
Erwin, A. T., Ames, Ia., U.S	Ampelopsis Engelmanni, plants, 2.
Fowler, Miss, Headingly, Man	Scions, apples.
Foveston, F., Minesing, Ont	Scions, Willie's Favourite and unknown apple.
Jack, N. E., Chateauguay Basin	Scions, Norman, Cox's Orange Pippin apples.
Jones, Harold, Maitland, Ont	Scions, Fameuse apple.
Macaulay, T. B., Montreal, Q	Nuts, Juglans regia.
Macoun, Prof. John, Geological Survey, Ottawa, O.	Seeds, Yukon plants.
Macoun, J. M., Geological Survey, Ottawa, Ont	Seeds, and bulbs of Pink Erythronium.
McLean, C. F., Burton, N.B	Scions, Johnston apple.
Matheson, Miss J., Perth, Ont	Scions, Rufus and Fameuse apples.
Newman, C. P., Lachine Locks, Que	Stones, peach, 82.
Pelletier, Jos., St. Roch des Aulnaies, Q	Scions, Germain, St. Pierre apples.
Reynaud, G., La Trappe, Q	Scions, Fenouilles Gris apple.
Royal Botanic Garden, Kew, England	Seeds, collection.
Saunders, W. E., London, Ont	Plants, *Menispermum canadense.*
Shepherd, R. W., Como, Que	Scions, Early Joe, Matthew's Winter, and Fameuse Sucré apples.
Snow, C. H., Cumming's Bridge, O	Strawberry plants.
Watrous, C. L., DesMoines, Ia	Tree, Terry plum.
Waugh, Prof. F. A., Agricultural College, Amherst, Mass	Apples, collection.
White, Lt.-Col. Wm., Ottawa, Ont	Plant, variety of, *Lilium candidum.*
White, R. B., Ottawa, Ont	Plants, Herbert raspberry, Plum trees and Perennials.

I have the honour to be, sir, your obedient servant,

W. T. MACOUN,

Horticulturist.

APPLES.

The apple orchards at the Central Experimental Farm are improving in appearance every season. Many of the trees have been planted from twelve to fourteen years and are now of good size and bearing well. Few trees died from winter injury, but during the year 75 were blown down by strong winds or were so badly broken that they had to be removed. In nearly every case the trunks of the trees were rotten almost through, although the trees looked quite healthy when growing.

There were 105 apple trees planted in the orchards last spring, many of which were varieties that had not been tested before.

The trees were thoroughly sprayed, as usual, during the growing season, the early varieties four times and the late kinds five times. The trees were also washed to prevent borers from attacking them.

MICE.

Mice were very numerous and destructive to fruit trees in Eastern Ontario and the province of Quebec last winter. Little injury was done at the Experimental Farm, as the smaller trees were protected by building paper or by wooden veneer protectors. A few of the larger trees were gnawed considerably, as they were unprotected. The wooden veneer has proven very satisfactory as a preventive against mice, and is also thought to prevent sunscald to a large extent. The size of these protectors is 15 by 24 inches. They are simply wrapped loosely around the trunks and tied with twine. Those used this year were bought at $5 per thousand. For small trees they can be

split and two made out of one. Building paper is cheap and effective also for this purpose.

SEEDLING APPLE ORCHARDS.

Last year 494 seedlings of some of the best varieties of apples were planted, and this year 894 more were set out, making a total of 1,388 trees. Those planted this year were put in the standard orchard and are 10 by 15 feet apart. There were 54 varieties fruited in the Russian seedling orchard this season, 17 of which had not fruited before. The trees in this orchard were getting so thick that they were thinned out this season, and there are now 245 left. Few of these seedlings are of value and none of them have been found worthy of general introduction, though they may prove useful in Manitoba and the North-west. A few of the best of them have been propagated for test at the Experimental Farms at Brandon and Indian Head.

TOP GRAFTING.

The top grafting of the best winter apples on hardy stocks was continued this year, and the results will soon become interesting. Northern Spy does well here top grafted, and it is hoped that other kinds will be successfully grown also.

ORCHARD CULTURE.

The orchard culture adopted at the Experimental Farm has been described in previous reports. Briefly, the method adopted is to keep the orchard in clover for part of one year and the whole of the next, then plough and re-seed as soon as possible. The clover is cut several times during the season and left to rot on the ground. In 1898 it was found that about 25 tons of green clover were thus left to rot during the season. The clover was weighed again this year in the same orchard, and following are the results.

Two plots, each 4 by 4 feet, were taken at each cutting and the average of these is given :—

Clover.

	Tons.	Lbs.
1st cutting, June 4, 1902, average height 16½ inches, yield per acre green clover. A very few flower buds beginning to show.	5	1,783
2nd cutting, June 27, average height 14 inches, yield per acre green clover. A moderate number of flowers in bloom.	3	721
3rd cutting, July 21, average height 13½ inches, yield per acre green clover	4	1,826
4th cutting, August 29, average height 13½ inches, yield per acre green clover	4	1,103
Total yield per acre, green clover	18	1,433

Although this is a less yield than that which was obtained in 1898, the clover is not noticeably less vigorous than at that time. Where the weights were taken the clover was not as good a stand as in the Russian orchard, where five cuttings were made, but the crop was not weighed there.

This system of culture is varied when thought necessary. This year, for instance, that part of the orchard planted with seedlings was kept cultivated in order to get the young trees well established.

APPLE CROP.

The crop of apples was good this year and the fruit free of scab and but slightly affected with Codling Moth. The greater part of the crop was disposed of on the Ottawa Fruit Exchange and fair prices were obtained. A small shipment was, however, made to Glasgow, Scotland, with gratifying results.

SHIPMENT OF APPLES TO GLASGOW.

On October 3, 1902, a shipment, mostly of autumn apples, was made to Glasgow in the steamer '*Kastalia*,' without cold storage. The apples were packed in boxes, the inside measurement of which was: depth, 10½ inches; width, 11½ inches; length, 22 inches. The sides and top and bottom were made of three-eighth inch boards, and the ends of ½-inch, dovetailed and glued.

Apples practically free from defects of any kind were selected and packed tightly in layers. A thin layer of excelsior was placed between each layer of apples and a sheet of strong white paper on both sides of each layer of apples, which kept them perfectly clean. Enough excelsior was packed in at the sides and also at the top to keep the apples tight. Most of the fruit was packed on September 30, and kept in the cellar until the afternoon of October 1, to cool. It was then taken to Ottawa and packed in a freight car, which left for Montreal that night, and reached there the next day and was loaded on the steamer, which sailed on the morning of October 3.

Following are the account sales:

GLASGOW, October 16, 1902.

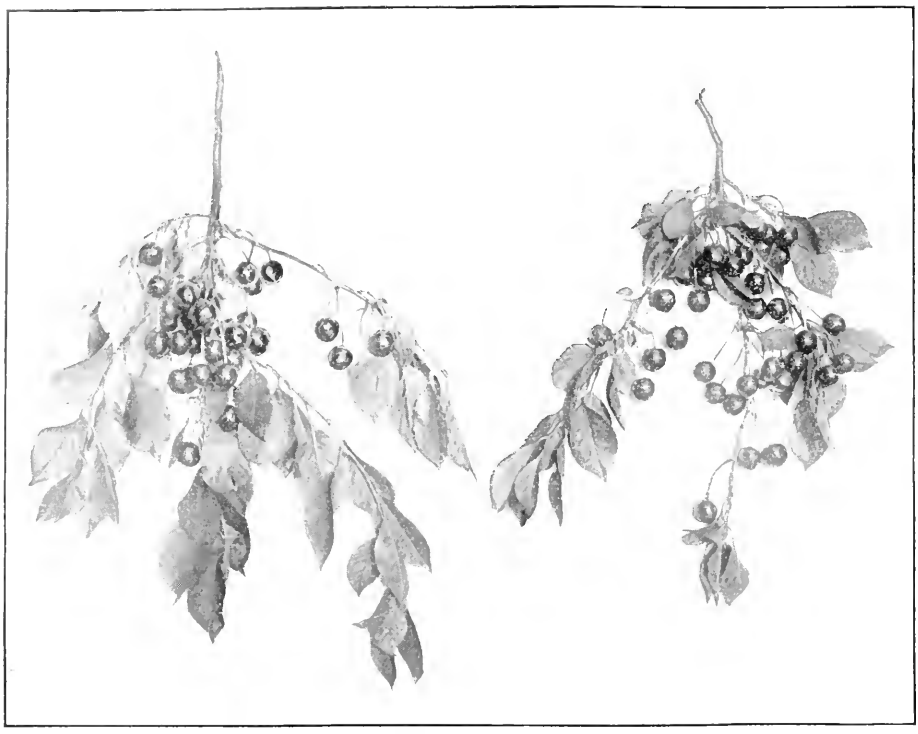
Account of sales of 100 cases of apples ex '*Kastalia*.' Sold by Thomas Russell, by order and for account of W. T. Macoun, Horticulturist, Central Experimental Farm, Ottawa.

W. T. Macoun.			£	s.	d.	£	s.	d.
128 XXX	59 cases	Wealthy, 6 | 9	19	18	3			
	1 "	" empty						
XXX	30 "	McMahon, 4 | 9	7	2	6			
XXX	5 "	Patten's Greening, 5 | —	1	5	0			
XX	5 "	Fameuse, 6 | —	1	10	0			
	100 "		29	15	9	29	15	9
		Charges.						
	Freight on goods		3	8	11			
	Freight on empties, river and harbour duties, master porterage, landing, selecting, coopering, catalogues, advertising, &c., cartage to warehouse, houseing, delivering.		2	10	0			
	Commission and guarantee		1	9	9	7	8	8
		Net proceeds	....	....	....	22	7	1
		"				$108	41	

The expenses of the shipment on this side of the Atlantic, exclusive of growing the fruit, picking, packing, and sending to the car at Ottawa, were:—

Cost of 100 boxes at Toronto	$12 00
Freight on 100 boxes, Toronto to Ottawa	2 52
Freight on 100 boxes, Ottawa to Montreal	7 74
Cost of 200 lbs. Excelsior at 3c. lb	6 00
	$28 26
Leaving a net balance of	$80 15

or 80c. per box, or $3.20 per barrel, taking four boxes packed as these were to a barrel. The average profit per barrel of fall apples sold in baskets on the Ottawa Fruit



Koslov Morello Cherry. —Photo. by Frank T. Shutt.

Wealthy Apple Trees Planted 10 x 10 Feet Apart.

Exchange, after deducting price of baskets and commission, was about $1.10, showing $2.10 difference per barrel in favour of the shipment to Great Britain. Furthermore, it was found this season that as good prices could be obtained on the Exchange for good windfalls as for hand picked fruit. So that the difference in favour of the shipment to Great Britain is even greater than appears. Thos. Russell writes as follows regarding the fruit :—

'I think these apples sold very well and I trust the result will be satisfactory to you and lead to further consignments of specially selected fruit.'

Mr. W. A. McKinnon, Chief of the Fruit Division, Commissioner's Branch, Department of Agriculture, Ottawa, who was in Glasgow at the time, inspected the fruit and reported the following :—

'The Wealthy looked best and sold best (6/9 per case, as you probably know), and all I saw were in perfect condition. McMahon also arrived in good order, but appeared not to command the confidence of buyers, probably because new to them; the price was 4/9. Patten's Greening was in perfect condition, looked very attractive, and brought 5/ per case.

'Viewed commercially, the shipment had only one fault, namely, that there were too few apples in the cases. The trade not only object to the Excelsior as making needless bulk, but as leaving an opening for fraud, and my observations go to confirm this opinion, that packing is quite unnecessary for nearly all varieties of apples, and that at the most a thin layer top and bottom would suffice. I liked your plan of having a sheet of paper placed between the Excelsior and the apples.

'Viewed as exhibition stock, your shipment could not have been nearer perfection.'

It is not probable that as good results would always be obtained by shipping autumn apples in this way, but the returns show that if fruit is picked carefully and packed carefully and reaches the steamer in the proper condition, it may arrive at the other side of the Atlantic in good condition without cold storage.

A CLOSE PLANTED WEALTHY APPLE ORCHARD.

In the spring of 1896 there were in the farm nursery 144 five-year old Wealthy apple trees which had been used in an experiment. As there was a piece of land available that spring they were planted out 10 by 10 feet apart, the object being to carry on further experiments with them. Eight of these trees have died, but most of the rest are making thrifty growth, though some of the trees are affected with canker and sunscald. The soil has been kept thoroughly cultivated during the growing season every year since. During the past four years this little orchard has given very good returns, considering the size of the trees, and it promises to be still more profitable. It is doubtful if the trees will need much thinning, as a few of them die every year, letting the light and air into the rest. The soil is a cold, light, sandy loam and from 1896 up to the autumn of 1901 the only fertilizers applied were 284 lbs. of superphosphate, 54 lbs. of muriate of potash, and 132 lbs. of sulphate of ammonia, the estimated value of which was $6.64.

In the following tables will be found the receipts and expenses for the past four years :—

					$ cts.	$ cts. Per acre.
1899—Picked,	189 gallons,	sold at	10c. a gall.		18 90	59 15
1900— "	455 "	"	10c. "		45 50	142 39
1901— "	156 "	"	15c. "		23 40	73 23
1902— "	982 "	" 333 galls.	at $25\frac{2}{3}$ (Glasgow)		85 41	356 83
		530 "	(second grade) sold at Ottawa,	$6\frac{15}{155}$	32 55	
1899—Windfalls,	66 galls.	sold at	5c. gall.		3 30	10 33
1900— "	143 "	"	5c. "		7 15	22 38
1901— "	224 "	"	5c. "		11 20	35 05
1902— "	$932\frac{1}{2}$ "	"	$8\frac{200}{373}$ "		79 60	240 79
					307 01	940 15

EXPENSES.

1899-1901, estimated expenses per acre for three years, including rent of land, fertilizers, cultivating, spraying and marketing	$148 80
1902, 45 tons per acre barnyard manure at 50c. per ton	22 50
Rent of land per acre	3 00
Cultivating and spraying per acre	14 43
Baskets and boxes	120 12
Picking, packing and marketing	145 77
Total expenses	454 62
Total receipts per acre for 4 years	$ 940 15
Total expenses " "	454 62
Net receipts	485 53
Average profits per acre per year	$ 121 38

There were 512½ gallons of small apples which were not sold, of which 119 gallons were among the picked fruit and 393½ gallons among the windfalls.

The reason that there is such a large proportion of windfalls is that the Wealthy apple drops badly, and this was especially the case this year. The windfalls, however, which were sold brought a better price than the second grade picked apples, and as good prices as picked fruit from other Wealthy trees. There is a great advantage in having a good local market, as the windfalls can be disposed of before they decay. The expenses are all estimated on a very liberal basis. The greatest yield of picked fruit from one tree in 1902 was 16½ gallons, and the greatest yield of windfalls and picked fruit was 34 gallons from the same tree.

It has not been possible to obtain the exact cost of this orchard prior to 1899, but including rent of land, cost of trees, planting and cultivating, the expenses per acre would be about $150.

When such good returns can be had in a short time from Wealthy apple trees planted 10 feet apart, it is worthy of consideration. Is it not possible that it would be a good practice to have blocks of such early bearing trees of different ages and keep rooting out the older ones when they begin to fail? The development of this little orchard of Wealthy apple trees will be watched with much interest.

SEEDLING APPLES.

A larger number of seedling apples than usual were received for examination this year, which was probably due to the fact that apple trees bore well. It is gratifying to know that the originators of these fruits are desirous of getting our opinion of them, and it is hoped that still more will send in specimens. The judgment passed upon the majority of seedlings is unfavourable to them, as it is very rarely that a variety is equal or better than the best named kinds.

Most of our best commercial apples, however, are chance seedlings and other good kinds will probably originate that way. The more seedlings that are raised, the greater chances there are of getting something of superior merit.

Full descriptions follow of the best of those received.

Record.	Province.	Address of Sender.	Description of Fruit.
219	Quebec...	C. P. Hudon, Mont St. Hilaire	Medium size, crimson; acid, medium quality; season, October.
220	Ontario...	J. I. Graham, Vandeleur.....	Below medium, greenish yellow with red blush, almost sweet.
221	" ..	"	See full description.
222	" ..	C. A. Cass, L'Orignal.....	"
223	" ..	"	Above medium size, deep red, sweet, medium quality; season, early winter.
224	" ..	J. P. Cockburn, Gravenhurst.....	See full description.
225	" ..	Thos. Beall, Lindsay.....	"
226	" ..	"	"
227	" ..	C. L. Stephens, Orillia..... ...	"
228	" ..	Mr. Marr, Simcoe.....	"
229	" ..	F. Birch, Wode House.....	"
230	" ..	F. G. Allerby, Galt.....	Medium, pale yellow, pink blush, mild subacid, good; season, October.
231	" ..	T. W. Gibbs, Bracebridge.....	Medium, pale green splashed and streaked with purplish red, subacid, quality above medium; season, early September.
232	" ..	J. T. Couch, Davisville.....	Medium, orange red, mild subacid, quality above medium; season, October.
233	" ..	W. F. Fairburn, Ottawa	Large, deep red, subacid, medium quality; season, late September.
234	" ..	C. Wallenshlager, New Edinburgh...	Medium, waxy yellow, subacid, quality above medium; season, early winter.
235	" ..	J. Ballantyne, Ottawa East	No. 1, see full description.
236	" ..	"	No. 4, medium, greenish yellow, pink blush, sweet, medium quality.
237	" ..	"	No. 5, small, pale green, subacid, quality almost good.
238	" ..	"	No. 6, small, yellow, acid, medium quality.
239	" ..	"	No. 7, below medium, yellowish green, acid, quality above medium.
240	" ..	"	No. 8, medium, mild subacid, quality above medium.
241	" ..	"	Small, splashed and washed with purplish red, subacid, medium quality.
242	Quebec...	R. Hamilton, Grenville	'Roses,' medium, splashed and streaked with orange, subacid, quality above medium.
243	" ..	"	'Like Talman,' medium, yellowish green, sweet, good.
244	" ..	"	'Gills Line,' above medium, splashed and streaked with red, sweet, medium quality.
245	" ..	"	'Flat Pea,' above medium, splashed with red, subacid, quality above medium.
246	" ..	"	'Aromatic,' medium to below, red, subacid, quality above medium.
247	" ..	"	'Like Spy,' see full description.
248	" ..	"	'Lane,' see full description.
249	" ..	"	'Calf Pasture,' see full description.

No. 221.—Seedling apple from J. I. Graham, Vandeleur, Ont.:—Fruit roundish conical; above medium size; cavity medium depth and width, russetted; stem broken off; basin medium depth and width, slightly wrinkled; calyx partly open; colour, greenish yellow well washed and splashed with deep red; dots moderately numerous, white, prominent; skin thick, tough; flesh yellow, moderately juicy; core large; subacid, pleasant flavour; quality good; season, probably early to mid-winter. Promising.

No. 222.—Apple from C. A. Cass, L'Orignal, Ont.:—Fruit oblate, conic, large; cavity medium depth and width; stem short, stout; basin narrow, medium depth, slightly wrinkled; calyx partly open; colour pale yellow, well splashed and washed with purplish red; dots fairly numerous, yellow, distinct; skin moderately thick, fairly tender; flesh white, slightly tinted with red, juicy, tender but a little coarse;

core medium size; subacid, pleasant flavour; quality good; season, September and perhaps later. Tree in a friend's garden. Seedling very thrifty, hardy, and a wonderful bearer, always loaded. Says they will keep nearly as long as Wealthy. A large handsome apple, which may prove an acquisition, coming between Duchess and Wealthy.

No. 224.—Seedling apple from J. P. Cockburn, Gravenhurst, Ont:—Fruit roundish, regular; size medium to above; cavity deep, moderately open; stem short, stout; basin medium depth and width, smooth; calyx open; colour yellow, well splashed and streaked with bright purplish red; dots few, bluish, indistinct; skin moderately thick, tender; flesh yellowish, tinged with red; core rather large; briskly subacid; quality above medium; season just after Duchess. Very similar to Duchess in outward appearance, but flesh is firmer and not so tender. Core is also more open than Duchess. Said to have sprung up from root of Duchess tree.

No. 225.—Seedling apple from Thos. Beall, Lindsay, Ont.:—Fruit roundish, obtusely conical, angular, large; cavity deep, medium width; stem short, stout; basin, deep, open, smooth; calyx open; colour yellow, washed with orange and purplish red, mostly on sunny side; dots obscure; skin, moderately thick, tender; flesh yellow, tender, juicy; core medium size; subacid, rich, pleasant flavour; quality very good; season, evidently late September and early October. Tree said to be growing in Lindsay. Bearing five or six years. This apple is quite promising and well worthy of being given a thorough test.

No. 226.—Seedling apple from Thos. Beall, Lindsay, Ont.:—Fruit oblate, somewhat angular, large; cavity deep, open; stem short or very short, moderately stout; basin medium depth and width, smooth; calyx closed; colour pale green, splashed and streaked with purplish red on sunny side; dots fairly numerous, pale, indistinct; skin thin, tender; flesh yellow, tender, melting, moderately juicy; core medium; subacid, not high flavoured; quality good; season evidently October. Tree grown fifty miles north of Lindsay. This should make an excellent cooking apple, but is not high enough in flavour to make a good dessert fruit.

No. 227.—No. 1 from C. L. Stephens, Orillia, Ont.:—Fruit roundish, conical, above medium size; cavity medium depth and width; stem medium length, stout; basin medium depth and width, almost smooth; calyx open; colour yellowish green, well splashed and washed with deep red; dots fairly numerous, pale, indistinct; skin moderately thick, moderately tough; flesh white, slightly tinged with red, tender, fairly juicy; core medium; subacid, pleasant flavour, Fameuse-like; quality good; season October probably. Evidently a seedling of Fameuse. Same season as Wealthy, no better in quality.

No. 228.—Seedling apple from Mr. Marr, Simcoe, Ont.:—Fruit roundish, very large; cavity deep, open; stem short, stout; basin deep, open, slightly wrinkled; calyx open; colour pale, greenish yellow with a bronzy pink blush; dots obscure; skin thick, moderately tender; flesh yellowish, juicy, rather coarse; core medium; subacid; quality above medium; season evidently early October. Tree said to be a seedling grown by Mr. Marr, Simcoe, Ont. A big apple, but too coarse for dessert and not a late enough keeper to be valuable.

No. 229.—Seedling apple from F. Birch, Wode House, Ont.:—Fruit roundish, medium size; cavity medium depth and width, russetted; stem short, moderately stout; basin medium depth and width, smooth; calyx open; pale green with a bronzy or dull red blush; dots fairly numerous, gray, distinct; skin moderately thick, tough; flesh white, fairly juicy; core medium size; mildly subacid, pleasant; quality good; season early winter. Tree said to be a seedling of Fameuse. Flesh is suggestive of Fameuse, but apple is not worth propagating as compared with the McIntosh Red or Fameuse.

No. 235.—No. 1, from J. Ballantyne, Ottawa East, Ont.:—Fruit conical, roundish, angular, very large; cavity deep, open, russetted; stem slender; basin deep, medium width, wrinkled; calyx open; colour, greenish yellow, well washed and splashed with dark red; dots obscure; skin moderately thick, rather tender; flesh white, ten-

der, fairly juicy; core small; briskly subacid; quality above medium; season late October, November. A very large apple, but not sufficiently promising to make it desirable.

No. 248.—'Like Spy':—Apple from R. Hamilton, Grenville, Que.:—Fruit oblate, conical, large; cavity deep, open; stem medium length, stout; basin deep, medium width, wrinkled; calyx open; colour pale yellowish green splashed and washed with purplish red; dots obscure; skin moderately thick, tender; flesh white, firm, moderately juicy; core small; subacid; quality above medium; season probably October to November; not specially promising.

No. 249.—'Lane' from R. Hamilton Grenville, Que.—Fruit roundish, angular; medium size; cavity narrow, deep; stem short, slender; basin narrow, medium depth, smooth; calyx open; colour pale yellow, well splashed and washed with red; dots few, yellow, distinct; skin thick, moderately tough; flesh white, slightly tinged with red, juicy; core small; subacid, pleasant flavour; quality good; season probably October to November. Tree growing in fence near lane. Not as good as Wealthy in quality.

No. 250.—'Calf Pasture' from R. Hamilton, Grenville.—Fruit oblate, angular, irregular; medium size; cavity medium depth and width; stem medium length, moderately stout; basin shallow, moderately open, wrinkled; calyx open; colour pale green, well washed on sunny side with deep crimson; dots small, yellow, fairly numerous, indistinct; skin moderately thick, tender; flesh white, fine grained, tender, juicy; core medium, subacid, peculiar aftertaste; quality good; season early October; probably seedling of Fameuse, as flesh is Fameuse-like.

PEARS.

Fourteen years' experiments in the growing of pears at the Central Experimental Farm have shown that this fruit is almost a total failure on sandy loam soil here. The chief cause of failure is blight. This disease has killed many trees outright in one season, while others have been so badly affected that they eventually die. The Longworth pear has been practically free of blight, but this variety is only of medium quality. Of the good varieties which have been tested, Flemish Beauty has proven the hardiest. Even on clay loam soil the pear has not succeeded well in the vicinity of Ottawa.

GRAPES.

This season was one of the most unfavourable in many years for the ripening of grapes. The summer was a cool one and, although there was no autumn frost until October 9, the weather was not sufficiently warm to mature the fruit, and only ten varieties ripened thoroughly. Although most of the grape vines in the vicinity of Ottawa suffered very badly from the severe frost of May 9, fortunately only seven rows out of the twenty-two in the vineyard at the Experimental Farm were uncovered. The injury done to the vines in these seven rows was great, the buds in many cases being destroyed, and the vines thus very much weakened. The crop on the remaining rows was good. It is interesting to note that the following varieties among those in the seven rows uncovered were comparatively little injured by the frost, and produced good crops:—Barry, Delaware, Telegraph, and Essex.

The varieties which ripened this year are:—Champion, Campbell's Early, Moore's Early, Early Ohio, Jewel, Moyer, Peabody, Maxatawney, Creveling, and Potter. The Campbell's Early promises to a valuable variety.

It has been noticed this year and in past seasons, that some varieties which ripen comparatively early when the season is a warm one, do not come any nearer maturity than some of the later kinds when the season is cool but long, thus showing that some varieties require certain high maximum temperatures in order to mature while others only require a moderately high temperature and a longer season.

PLUMS.

The plum trees wintered well this year and made good growth during the summer. The trees were thoroughly sprayed with Bordeaux mixture and Paris green four times, and twice with tobacco water and whale-oil soap to kill aphis, which, however, were confined to only a few trees this year. The plum curculio was more prevalent than usual. On May 9, when the severe frost came, the native plums were in full bloom, the Americana plums nearly in bloom, and the European plums not quite so far advanced. The first were moderately injured; the next, slightly to moderately; and the last practically not injured at all. The crop of native plums was only light to medium; the Americanas, medium to good; and good crops of European plums were obtained from several varieties. The fruit of the native and Americana plums was smaller than usual this year. Last year, three seedling Americana plums which originated at Ottawa, were named and described. This year the following have been thought worthy of description:—

Consul, (Wolf Seedling).—Form roundish; large size; cavity narrow, medium depth, suture a distinct line; apex rounded; colour deep red; dots moderately numerous, yellow, distinct; bloom light; skin moderately thick, tough; flesh deep yellow, juicy; stone medium size, oval, considerably flattened; almost free; flavour sweet; quality good. Season, late September. Will probably prove a useful late plum.

Sunrise, (DeSoto Seedling).—Form oval; large size; cavity narrow, shallow, abrupt; suture a distinct line, not depressed; apex rounded; colour yellow, more or less covered with bright red; dots few, yellow, distinct; bloom moderate; skin thick, moderately tough; flesh deep yellow, juicy; stone large, flat, oval, practically free; flavour sweet; quality good. Season, late September; promising.

Among the European or Domestica plums tested the following three varieties which fruited well this year are the hardiest and bear the most regularly:—

Early Red.—Form oval; medium size; cavity narrow, shallow, abrupt; stem medium length, slender; suture an indistinct line, no depression; apex rounded; colour dull purplish red; dots moderately numerous, yellow, distinct; bloom thin, blue; skin fairly thick, moderately tender; flesh yellowish green, juicy; stone medium size, long, oval, cling; moderately sweet with an acid aftertaste; quality medium. Season, late September. Of the Lombard type. Imported from Russia by Prof. Budd from Dr. Regel, St. Petersburg, during the winter of 1881-2. Prof. Budd writing in 1890 said of this plum, 'This was sent out quite extensively eight years ago marked 'mixed Arab.' The sorts mixed were Early Red, White Nicholas and Black Arab,' most of the trees proved to be Early Red Russian No 3.

Richland.—Form oval; size medium to above; cavity narrow, medium depth abrupt; stem medium length, $\frac{3}{4}$-inch, slender; suture a distinct line, no depression; apex rounded; colour deep purplish red; dots fairly numerous, yellow, indistinct; bloom moderate, blue; skin thick, fairly tender; flesh greenish yellow, juicy, moderately firm; stone medium size, oval, flat, cling; sweet but not rich; quality above medium. Season, middle of September. Hardier than most European sorts. Originated on the farm of Randall Elden, Richland, Pennsylvania.

Ungarish.—Form long, oval; size above medium to large; cavity narrow, shallow, abrupt; suture distinct, very slightly if at all depressed; apex round; colour dark purple; dots moderately numerous, indistinct, brown; bloom moderate, blue; skin fairly thick, tender; flesh greenish yellow, firm, fairly juicy; stone large, long, oval, free; moderately sweet; quality above medium; season, middle of September. Introduced by Prof. Budd from C. H. Wagner, Riga Russia.

This plum is somewhat like the Raynes (Dunlops, 53). A prune plum. Promising on account of hardiness.

While the results from experiments in plum culture made at the Central Experimental Farm should be somewhat similar to those obtained in other parts of the pro

vinces of Ontario and Quebec, where the conditions are nearly the same as at Ottawa, there are many varieties which will not succeed here which will grow and fruit well in certain parts of the province of Quebec, where the temperature falls as low also, but where other climatic conditions are different. This is especially true of parts of the counties of Montmorency, Montmagny, L'Islet, and Kamouraska, where owing to the influence of the St. Lawrence river and the moist atmosphere the conditions are favourable for the successful culture of the best European plums. The successful culture of European plums in L'Islet county has been well demonstrated by Mr. Auguste Dupuis, Village des Aulnaies, Director of the Fruit Stations of the province of Quebec, who has done much to assist in the development of horticulture in the province. This year Mr. Dupuis, had a large number of varieties of plums fruiting, and at my request kindly sent me specimens of the fruit of 17 of them. These were very good indeed. The Washington, Bradshaw, Grand Duke and Pond's Seedling being particularly fine. A fruiting branch of Grand Duke heavily loaded which was sent showed how productive this was with Mr. Dupuis. Following is a description of the Amaryllis, a promising seedling originated by Mr. Dupuis :—

Amaryllis.—Seedling of Mirabelle : Fruit roundish to heart shaped, size above medium to large, cavity medium depth and width, abrupt, stem medium to long, moderately stout, suture distinct, slightly depressed, apex rounded, colour greenish yellow, dots moderately numerous, indistinct, skin moderately thick, moderately tender, flesh yellow, juicy, stone medium size, oval, cling, flavour sweet, rich, quality very good, grown from seed of Mirabelle in 1890. Began to bear in 1896. Tested September 30, 1902.

The climate of the Island of Montreal is a little more favourable for fruit growing than that of the Ottawa district, but the European plums will not succeed as well there as in L'Islet county, and few of the named varieties are satisfactory. For many years a number of European plum seedlings have been grown in the vicinity of Montreal, which have proven hardier than most of the named kinds, and some of these are very valuable. Mr. W. W. Dunlop, of Outremont, Que., has had most to do in bringing these plums into notice, as he has collected and thoroughly tested them at his place. At the summer meeting of the Quebec Pomological Society, held at Aylmer, Que., in August of this year, a committee was appointed to name these plums. As these varieties will probably prove very useful where the climate is even more severe than at Montreal, a copy of this report is herewith given :—

REPORT OF THE COMMITTEE APPOINTED AT THE AYLMER MEETING TO NAME THE MONTREAL SEEDLING PLUMS, WHICH AT PRESENT ARE ONLY LOCALLY KNOWN BY NUMBERS.

September 11, 1902.

The following ten varieties were examined and named, viz :—

No. 54. Large round blue plum, covered with bloom, excellent quality. Size 1¼ in. dia. Yellow flesh, nearly free stone. Good market plum. Named, Mount Royal.

No. 53. Large bluish purple, prune shaped, of fair quality, free stone. Size 1¼ x 1½ in. in dia. Flesh green, an abundant bearer, good market plum.

Resolved to name this plum 'Raynes' after the late Capt. Raynes of Westmount, who largely distributed the variety.

No. 60. Very large purplish blue plum, size 1½ x 2in. moderately heavy bearer. Clingstone; flesh green, melting, sweetish ; quality fair. Named this plum the 'Lunn Plum'.

No. 58. Purplish-red plum. Size 1 x 1½ in. ; good bearer. Quality good ; juicy and sharp ; flesh orange. This plum is a fine preserver and carrier. Named the 'Outremont'.

Seedling of 54. This plum grown by Mr. W. W. Dunlop. Large blue plum. Size 1¼ x 1½ in. ; quality medium. Clingstone. At request of Mr. Dunlop, name left in abeyance.

No. 91. Purplish-red plum. Size 1¼ x 1⅛ in. ; green flesh ; clingstone, juicy, of high quality and pleasant. Abundant bearer. Named 'Harrigan' (after Mr. Harrigan, who introduced it.)

No. 90. Large roundish, yellow plum. Size 1½ x 1¾ in. Very fine quality and recommended. Flesh light green, juicy and delicious. Clingstone. Named 'Mountain'.

No. 2. Greenish, yellow plum. Size 1⅛ in. and round. Small, freestone, excellent quality. Known at Quebec as 'Reine Claude de Montmorency'. Heavy and early bearer. Excellent. Named 'Montmorency'.

No. 3. Blue plum about 1-in. dia., freestone of excellent quality. Flesh green and moderately juicy, firm and a splendid shipper. Named 'Brodie' after Mr. Robt. Brodie who introduced it.

No. 4. Yellow plum, size 1¼ x 1½ in. Flesh yellow and very juicy. Quality good ; an annual bearer ; clingstone. Named 'Lachine.'

Respectfully submitted,

(Signed) W. W. DUNLOP,
ROBT. BRODIE.
R. W. SHEPHERD.

The following more detailed descriptions were made by the writer of the varieties thought to be of most commercial value.

Mount Royal (Dunlop 54).—Fruit received from W. W. Dunlop, Outremont, Que. Form roundish, flattened at stem end ; size medium ; cavity medium to open, medium depth, somewhat flaring ; stem short to medium, moderately stout ; suture distinct, very slightly depressed ; apex rounded, slightly flattened ; colour dark purple ; dots numerous, irregular, distinct ; bloom blue, moderate ; skin moderately thick, moderately tender ; flesh greenish yellow, juicy, firm ; stone below medium, roundish cling ; flavour sweet, moderately rich ; quality good ; season early to mid September. Should be a good shipping plum.

Raynes (Dunlop 53).—Fruit received from W. W. Dunlop, Outremont, Que. :—
Form oval, long, flattened on side of suture ; size above medium to large ; cavity medium depth and width, abrupt ; stem medium length, moderately stout ; suture distinct, slightly depressed ; apex rounded ; colour dark reddish purple ; dots small, numerous, indistinct ? bloom moderate, blue ; skin thin, tender ; flesh, yellowish green, firm, fairly juicy ; stone above medium to large, long, oval, free ; moderately sweet ; quality above medium ; season early to middle of September. A prolific bearer and should be a good shipper. A prune plum.

Lunn (Montreal No. 60).—Fruit received from W. W. Dunlop, Outremont, Que :—
Form oval, broad (round oval) ; size large ; cavity shallow, medium width, slightly flaring ; stem medium length, ½ inch stout ; suture a distinct line, very little if any depression ; apex rounded, very slightly flattened ; colour dark purple ; dots fairly numerous, irregular, indistinct, brownish ; bloom moderate ; blue ; skin, moderately thick, tough ; flesh yellowish green, very juicy, fairly firm ; stone large, oval, cling ; sweet, rich ; quality very good. Season early to middle of September. A fine dessert plum.

Mountain.—Fruit received from W. W. Dunlop, Outremont, Que. :—

Form roundish, flattened slightly at ends; size medium to above; cavity medium depth and width, slightly flaring; stem medium to long, moderately stout, suture distinct, usually slightly depressed; apex slightly flattened, colour, greenish yellow, more or less overspread with dull coppery red; dots numerous, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh yellowish green; stone above medium, broad, roundish, cling; sweet, rich; quality very good; season early to middle September. An excellent dessert plum. Well worth propagation.

The variety known as Lachine is also a profitable kind to grow. It resembles the Yellow Egg somewhat. These varieties are not yet offered for sale by nurserymen, but they should be propagated as soon as possible, as they are valuable.

CHERRIES.

There has not been a good crop of cherries on the Central Experimental Farm since 1898. The best crop since that time was borne this year, but on most trees it was light. A few varieties, however, had a medium to good crop. Everything pointed to a fine crop this year up to May 9, at which time the flowers were almost ready to open. The severe frost of that date destroyed the pistils of a large number of flowers, the result being that the fruit did not set well. The varieties which escaped the frost best and had medium to good crops were :—Orel 25, medium to good crop; Minnesota Ostheim, medium crop; Vladimir, medium crop; Orel 24, medium crop; Cerise d'Ostheim, medium crop; Montmorency Ordinaire, medium crop; Koslov Morello, good crop. These varieties are probably the hardiest. They are all sour cherries and with the exception of Vladimir are of good size and quality. The Vladimir is rather small. These cherries, with the exception of Orel 24 and Koslov Morello, were described in bulletin No. 17, on cherries.

The Koslov Morello cherry is worthy of special mention. In the spring of 1890, Mr. L. Woolverton, Grimsby, Ont., received 50 yearling cherry trees from the late Mr. Jaroslov Niemetz, Winnitza, Podolie, Russia. These were called by Mr. Niemetz, seedlings of Koslov Morello. He recommended them very highly, saying that they bore early and were quite productive. Mr. Niemetz stated that at fifteen years of age they were only 3 feet high. Mr. Woolverton distributed these among the directors of the Ontario Fruit Growers' Association, and sent some to the Central Experimental Farm, and planted ten of them himself. Two of those received here were sent to the Experimental Farm at Agassiz, B.C., and twenty-three were planted. Of these 17 are now living. Mr. Woolverton reports that of the ten he planted 'all but two or three were uniformly valuable and fairly alike in fruit and in season, but two were a little superior to the others. All were very late in season—later than English Morello—and regular and abundant bearers. The trees, though twelve years planted, are still only bushes. The tallest not being over four or five feet high. I have thought they might be grown like berries in cultivated rows.'

Of the trees or bushes growing at the Central Experimental Farm, 15 have fruited, all of which have been different and all quite late. The fruit of some trees was quite bitter, and all are very acid. All of them, with the exception of two, have borne only light crops, the flower buds having been injured by frost like most of the other varieties, but two have proven quite promising, and one particularly so.

Koslov Morello (R. 6. T. 29).—Tree bush-like, planted in 1890. Height 5½ feet. Breadth 8½ feet. Fruit large, long, heart-shaped, slightly flattened, firm; stem very long, slender; suture rather indistinct. Skin deep red; flesh deep red, juicy, very acid; pit large, long. Season very late. Two pickings were made in 1902, one on August 2, and one on August 8. Total yield 26½ lbs. This variety had a good crop in 1898, and medium crop in 1900. Although too acid for eating out of hand, it makes preserves of excellent flavour and fine colour.

Koslov Morello, (R. 6. T. 28).—Tree, bush-like, planted in 1890. Height 7½ feet, breadth 9 feet. Fruit large, heart-shaped, rather deep red, firm; stem long, stout; suture distinct; flesh bright red, very acid; pit, large, oval, flat. A little later in ripening than the last and has not borne as well.

Dwarf cherries, such as the Koslov Morello, may yet prove very valuable, even in the best cherry districts. Birds have become so troublesome that it is difficult to save the fruit on large trees, while bushes can be easily covered. Bushes such as these could be planted 10 to 12 feet apart each way and leave ample room for cultivating.

At ten feet apart, 435 trees could be planted on an acre. If these trees all produced as much in one year as that at the Experimental Farm, the yield would be 435 x 26½ lbs., or 11,527½ lbs. of fruit per acre, a very profitable crop indeed. The pits of the best variety were saved this year and planted to get, if possible, still hardier kinds.

STRAWBERRIES.

The strawberries came through the winter in good condition this year and there was practically no winter killing. The plants which were covered in the autumn with a light mulch of oat straw, about four tons to the acre, were uncovered on April 28, and the straw placed between the rows. The practice here is to leave the plants covered in the spring until there is no danger of heating, in order to avoid spring frosts as much as possible. The wisdom of this course was amply shown this year. In most places in this vicinity, where plants were uncovered early or had not been covered at all, the crop was very much lessened by the frost of May 9, which destroyed a large number of blossoms. At the farm some flowers were injured and a few varieties badly injured, but the crop on the whole was good. If it is desired to get early fruit for market a part of the plantation could be uncovered early and the rest left protected. The varieties, the flowers of which were badly injured by frost were:—Marshall, Nick Ohmer, Hunn and Vories.

Most of the varieties which have averaged well for the past three years were described in the report for 1900. Following are descriptions of some that were not:—

Mele, P.—This is certainly the most productive variety in the plantation. It stood second in 1901, and first in 1902, and averages the highest for three years. Foliage, healthy; plant, vigorous. Fruit, above medium to large, roundish or pointed conical, rather pale but glossy red. Soft, acid, medium quality. For near market this might prove a profitable sort.

Bisel, P.—Foliage healthy, plant vigorous. Fruit large, roundish, bright red, handsome, moderately firm, briskly subacid, quality above medium. A good variety.

Enhance, B.—Foliage healthy, plant vigorous. Fruit above medium to large, roundish, dull deep red; flesh firm, bright rich red, meaty, subacid. Quality above medium.

Burton's, Eclipse P.—Foliage healthy, plant vigorous. Fruit large, bright red inclined to have a white tip, irregular, wedge conical; flesh moderately firm, bright red, subacid. Medium quality.

Daniel Boone, P.—This variety is similar to Warfield, but the plant is more vigorous,

Marie, P.—Foliage healthy, plant vigorous. Fruit, large, roundish, glossy, but rather pale red, attractive; flesh, pale red, briskly subacid. Medium quality. Keeps its size well to end of season. This is one of the most promising of the newer sorts.

Buster, P.—Although this variety was described in 1900, it is so little known that it will bear further remarks. This variety is not yet advertised by many nurserymen, although it is one of the best. A few plants were obtained from C. C. Stone, Moline,

Ill., U.S., in 1895, and for the past five years it has proven one of the most productive sorts. It is said to be a cross between Bubach and Sharpless. It is a pistillate variety, medium to late in season, of large size: rather pale red, moderately firm, and of medium quality. The points which make it superior to many others are its long fruiting season, the fact that it holds its size well to the end of the season, its good foliage, and its great productiveness.

In the following table will be found the yields of 145 varieties for each of the past three years, and the average yield for the three years. The dates of blooming and the time of ripening are also given with other particulars. During the past season 72 varieties were discarded, and these are not included in the table:—

Name.	Average Rank, 1900-1902.	Date of full bloom, 1902.	Date of first ripe fruit, 1902.	Date of first picking, 1902.	Date of last picking, 1902.	Number of pickings, 1902.	Weight of 25 average berries, 1902.	Total yield, 1901.	Total yield, 1902.	Average yield, 1900-1902.
							Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.
Mele, P.	1	June 6.	June 23	June 25	July 25	12	6	34 5	35 6	30 10¼
Steven's Early, P.	5	" 7.	" 20	" 21	" 18	11	6¼	10 12	31 8	23 8½
Buster, P.	2	" 7.	" 29	" 30	" 22	9	7	30 12¼	30 ..	27 1½
Daniel Boone, P.	13	" 5.	" 20	" 21	" 18	11	6½	23 9½	29 6½	21 2½
Barton's Eclipse, P.	20	" 5.	" 27	" 28	" 22	9	7	23 10½	27 2	19 6½
Crescent, P.	39	" 5.	" 19	" 21	" 22	11	4½	11 3	26 8	15 13½
Bisel, P.	8	" 7.	July 1	July 2	" 28	10	7½	33 3½	26 7	22 12½
Afton, P.	4	" 5.	June 24	June 25	" 14	7	6	15 4	25 3	24 4½
Stone's Early, P.	16	" 5.	" 19	" 21	" 25	11	5½	17 6	25 5½	20 10½
Warfield, P.	11	" 5.	" 21	" 25	" 18	9	5	12 10	25 3½	21 12½
Hattie Warfield, P.	23	" 5.	" 23	" 25	" 22	10	5½	16 1	24 14½	18 13½
Marie, P.	....	" 5.	" 27	" 28	" 25	10	6	.....	24 13	.....
Daisy, P.	3	" 7.	" 27	" 30	" 25	9	7	18 6	24 14½	25 3¼
Greenville, P.	6	" 7.	" 26	" 30	" 18	8	7	35 11½	23 7	23 4½
Beder Wood, B.	24	" 5.	" 19	" 21	" 22	11	6	25 5	22 15½	18 11½
Thompson's Late, P.	14	" 7.	" 27	" 30	" 25	9	6	22 2	22 2	21 1½
Clyde, B.	33	" 5.	" 27	" 28	" 25	10	7	17 3	22 ..	16 9¼
Dora, P.	12	" 5.	" 25	" 25	" 22	11	6	26 9¼	21 13¾	21 3½
John Little, P.	38	" 5.	" 20	" 21	" 25	10	5¼	10 11	21 12	16 6½
Parker Earle, B.	25	" 5.	July 1	July 2	" 25	8	7	22 10½	21 10½	17 11½
Swindle, P.	34	" 8.	" 30	" 2	" 28	10	7	10 12	21 4	16 9½
No Name, B.	21	" 5.	" 24	June 25	" 22	10	6¼	21 1½	21 2¾	19 4⅝
Porto Rico, P.	....	" 7.	" 30	July 2	" 25	9	7	.....	20 11	.....
Enhance, B.	10	" 5.	" 30	" 2	" 28	8	7¼	29 5	20 7	22 0
Lovett, B.	36	" 5.	" 21	June 25	" 25	12	6	21 9½	20 5½	16 1½
Dr. Arp, P.	26	" 9.	" 29	" 30	" 28	11	6¾	23 8¼	20 5	17 12½
Howard's 41, P.	7	" 7.	" 27	" 30	" 22	9	6½	24 5½	20 5	23 4⅓
Sample, P.	....	" 7.	July 1	July 2	" 25	9	7¼	30 15	20 4½	.....
Cyclone, P.	31	" 7.	June 29	June 30	" 25	11	7¼	20 7	20 4	16 10½
Glen Mary, B.	9	" 5.	" 30	July 2	" 25	10	8¼	28 12¼	20 6¾	22 8½
G. H. Caughell, B.	28	" 5.	July 2	" 4	" 25	9	6½	23 3½	19 13	17 12½
Wm. Belt, B.	50	" 7.	" 2	" 4	" 25	7	7¼	17 10½	19 7	12 15⅝
Senator Dunlap, B.	....	" 5.	June 24	June 25	" 22	10	6½	9 6	19 7	.....
Bomba, P.	35	" 5.	" 19	" 21	" 18	10	5¼	9 0	19 6¾	16 7⅝
X. 288, P.	50	" 5.	" 27	" 28	" 22	10	5	9 8	19 4½	13 10⅜
Carleton, P.	15	" 5.	" 27	" 28	" 18	8	6	16 10½	19 4	29 10⅝
Bubach, P.	30	" 7.	" 27	" 28	" 18	10	9½	29 5¼	17 14½	17 2½
Tennessee Prolific, B.	42	" 7.	" 27	" 30	" 22	9	7	23 2	17 14	15 1½
Carrie, P.	27	" 7.	" 27	" 30	" 28	10	8¼	29 15	17 13¾	17 12½
Mattie Warfield, P.	17	" 5.	" 21	" 25	" 14	8	6	20 6	17 13	20 2⅝
Cole's Seedling, B.	....	" 9.	July 3	July 4	" 25	9	7½	25 0	17 11	.....
Gandy Belle, B.	64	" 5.	June 27	June 30	" 25	9	7½	11 13	17 11	12 2⅝
Boynton, P.	69	" 5.	" 19	" 21	" 25	11	5	6 15	17 1	11 4
Maggie, P.	19	" 5.	" 26	" 21	" 18	10	5	22 3½	16 14½	19 8⅝
Brandywine, B.	41	" 7.	July 2	July 4	" 25	6	8	20 1	16 8	15 6¾
Haverland, P.	58	" 5.	June 26	June 28	" 22	10	6½	10 8½	16 8	12 12⅜
Satisfaction, B.	44	" 5.	" 29	" 30	" 25	9	6¾	11 13	16 6½	14 7¼
Anna Forest, P.	53	" 5.	" 24	" 25	" 22	10	7¾	17 15½	16 5½	13 4¼
Scarlet Ball, P.	65	" 7.	July 2	July 4	" 28	8	8	13 13½	16 4	11 13
Enormous, P.	43	" 5.	June 25	June 28	" 25	10	9	22 12½	16 3½	14 15⅓
Arkansas Traveller, B.	25	" 5.	" 27	" 28	" 25	10	6¼	29 10	15 14¼	18 6¼

Name.	Average Rank, 1900-1902	Date of full bloom, 1902.	Date of first ripe fruit, 1902.	Date of first picking, 1902.	Date of last picking, 1902.	Number of pickings, 1902.	Weight of 25 average berries, 1902.	Total yield, 1901.		Total yield, 1902.		Average yield, 1900-1902.	
							Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Wonderful, P.	18	June 7.	June 27	June 28	June 25	10	6¼	21	13	15	14¼	19	14¼
Lady Rusk, P.	52	" 5.	" 27	" 28	" 18	9	6¼	13	10	15	14	13	8½
Princess, P.	48	" 7.	" 27	" 28	" 25	10	6½	22	11	15	11½	13	15⅚
Rough Rider, B.	....	" 9.	July 2	July 2	" 25	9	7¼	7	0½	15	4¼	.....	.....
Morgan's Favorite, B.	51	" 5.	June 26	June 28	" 18	8	7⅜	21	1	15	1	13	9⅔
Hood River, P.	46	" 7.	" 27	" 30	" 18	7	8	23	9	14	15¼	14	5⅚
Williams, B.	22	" 7.	" 25	" 28	" 22	8	7	26	4	14	15	18	14
Judsonia, B.	37	" 7.	" 26	" 26	" 18	8	6	14	9¾	14	7¾	16	1½
Hatch Exp. Station, B.	61	" 7.	July 3	July 4	" 25	9	6½	21	2½	14	6½	12	7⅔
Sherman, B.	45	" 5.	June 27	June 30	" 18	8	6	22	7	13	15	14	6
Irene, P.	..	" 5.	" 27	" 28	" 25	10	5¾	.....		13	11½	.....	
Mrs. Cleveland, P.	57	" 5.	" 27	" 28	" 18	7	5½	14	0	13	10½	12	13½
World's Champion, B.	32	" 9.	" 30	" 30	" 28	11	7½	29	2	13	8¾	16	9⅝
Sadie, B.	59	" 7.	" 21	" 25	" 22	10	4½	19	15	13	7½	12	9⅝
Snow's Perfection, B.	....	" 7.	" 30	" 30	" 25	10	7	.....		13	4¼	.....	
Pennell, B.	...	" 7.	July 1	July 2	" 22	8	7	9	12	13	4	.....	
Kansas Prolific, B.	54	" 5	June 23	June 25	July 18	10	4½	23	11	13	2¼	13	2⅞
Jucunda Imp., B.	....	" 7	" 28	" 28	" 18	8	6¾	.....		13	2		
Kyle, B.	40	" 7	July 2	July 4	" 25	8	7	23	15½	12	15	15	7⅝
Leroy, P	....	" 5	June 25	June 28	" 22	11	6¼	.....		12	14½		..
Excelsior B.	....	" 5	" 20	" 21	" 14	9	4¾	10	1	12	14¼		..
Sharpless Seedling, B.	....	" 7	July 2	July 2	" 25	8	9	15	11½	12	10⅔		..
Bismarck, B.	....	" 5	June 23	June 25	" 18	9	6½	2	15	12	9		..
Beverly, B.	77	" 7	" 27	" 30	" 25	8	6½	13	10½	12	8	9	5
Twilight, B.	...	" 5	" 23	" 25	" 25	10	6	9	3½	12	8		..
189, B.	63	" 5	" 27	" 28	" 22	9	6	16	14½	12	7	12	2⅝
Ona, P	68	" 5	" 20	" 21	" 18	10	5¼	13	9	12	0	11	6⅚
Kansas, P.	....	" 7	" 29	" 30	" 25	9	6¼	.....		11	9½		..
Avery Seedling, P.	104	" 5	" 24	" 25	" 22	11	7	4	10	11	8¼	5	13¼
Saunders, B.	75	" 7	" 28	" 30	" 18	7	7	10	9	11	6½	9	11
X. 119, B.	..	" 5	" 27	" 30	" 25	9	6	11	13½	11	6		..
Greenville Seedling, B.	79	" 5	" 27	" 28	" 18	8	6½	7	6	11	5½	9	1⅞
Sam Sperry, B.	71	" 7 July	2	July 4	" 25	7	7	5	1	11	5	10	12¼
H. H., P.	89	" 5 June	19	June 21	" 14	9	5½	8	5½	11	4⅝	7	5⅓
Van Deman, B.	72	" 5	" 20	" 21	" 22	11	6	12	9	11	4	10	3½
Ridgeway, B.	70	" 5 July	6	July 8	" 25	6	7	19	12	10	14	11	3½
New Dominion, B.	47	" 5	" 3	" 4	" 25	9	6½	17	9½	10	11½	14	2½
Anna Kennedy, P.	62	" 7 June	23	June 25	" 18	9	5	18	4	10	11	12	3¼
X 77. P.	82	" 9 July	1	July 2	" 25	9	7½	8	1	10	1⅝	8	13⅜
Bennett, P.	....	" 5 June	23	June 25	" 18	9	6	5	1½	9	14¾		..
Little No. 30, P.	....	" 7 July	1	July 2	" 22	7	6¾	6	8	9	12		..
Gandy, B.	81	" 9	" 5	" 6	" 25	8	7	13	0½	9	12	8	15⅔
Maximus, B.	96	" 7 June	30	June 30	" 22	9	8½	7	13	9	11	6	7⅜
Osceola, B.	87	" 5	" 18	" 21	" 11	8	4	7	12¼	9	6¼	7	14½
Della, B.	101	" 5	" 30	July 4	" 25	8	6½	8	4	9	4	6	1
Budd's No. 7, B	88	" 5	" 23	June 25	" 14	8	6½	12	15	9	2½	7	13⅝
Oberholtzer, No. 2, P.	100	" 7 July	2	July 4	" 25	7	7¼	3	4⅔	9	0⅝	6	3⅝
W. J. Bryon, B.	....	" 7 June	30	" 2	" 25	8	7	7	10½	8	15⅜		..
Lloyd's Favorite, P.	49	" 9	" 27	June 30	" 22	9	7¼	26	10	8	13	13	13
Timbrell, B.	98	" 5.	" 29	" 30	" 25	10	6¾	8	9½	8	10½	6	6½
Wilson, B	....	" 5.	" 20	" 21	" 22	11	5¾	.....		8	9	.....	
Hawaii	....	" 5.	" 6	" 21	" 14	9	4½	.....		8	7½	.....	
Young's Seedling, B	60	" 7.	" 22	" 25	" 18	9	5½	15	10½	8	7¼	12	8⅔
Winnie Warfield, P.	73	" 5.	" 29	" 30	" 22	8	5½	13	12¾	8	4	9	13¼
New York, B.	....	" 5.	" 28	" 30	" 18	8	6½	.....		7	15⅔	.....	
Eleanor, B	95	" 5.	" 20	" 21	" 18	10	5	7	13¼	7	5⅔	6	7⅜
Vories, B.	66	" 5.	" 20	" 21	" 14	9	5	26	8½	7	5¼	11	12½
Emperor, B.	....	" 9.	July 3	July 4	" 25	7	7¼	4	6	7	2⅔	.....	
Jucunda, B.	74	" 5.	June 27	June 30	" 18	7	6½	17	10½	7	0½	9	11⅓
Logan, B	67	" 9.	" 27	" 30	" 18	8	5¼	21	3½	6	14	11	10⅓
Johnston's Early, B.	85	" 5.	" 27	" 30	" 25	8	6¼	14	14	6	9	8	5⅙
McKinley, B	91	" 7.	" 30	July 2	" 18	6	8¼	11	5½	6	7	6	12
Parson's Beauty, B.	....	" 5.	" 24	June 25	" 18	9	6½	.....		6	5¾	..	.....
X 341, B.	78	" 5.	" 19	" 21	" 14	8	4½	14	15½	5	14½	9	4⅛
Lincoln, P.	55	" 5.	" 19	" 21	" 14	8	4	23	12	5	11½	12	15⅞

Name.	Average rank, 1900–1902.	Date of full bloom, 1902.	Date of first ripe fruit, 1902.	Date of first picking, 1902.	Date of last picking, 1902.	Number of pickings, 1902.	Weight of 25 average berries, 1902.	Total yield, 1901.	Total yield, 1902.	Average yield, 1900 1902.
							Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.
Edgar, B	86	June 7.	June 27	June 30	July 18	7	5¼	8 6	5 10½	8 2¾
Nettie, P	....	" 7.	July 7	July 8	" 18	4	9	.....	5 10	.....
Joe, B	....	" 9.	" 2	" 2	" 22	8	6½	.....	5 10	.....
Michel's Early, B	99	" 5.	June 18	June 21	" 11	8	4½	9 7½	5 1½	6 5 7/8
Sharpless, B	84	" 5.	" 30	July 2	" 18	6	6¼	15 2	5 0½	8 9 3/8
Orange County, P	105	" 5.	" 23	June 25	" 14	8	6	5 4	4 13½	5 8 3/8
Gladstone, B	102	" 7.	July 2	July 2	" 22	7	9	10 3	4 11¾	5 14 1/8
Louis Gauthier, B	80	" 9.	" 7	" 8	" 28	7	8	17 15	4 8	9 0 3/8
Mayflower, B	....	" 5.	" 16	" 21	" 11	8	5	10 7½	4 2	.....
Magoon, B	93	" 5.	July 1	July 2	" 22	7	7½	10 4	4 1	6 8 3/8
Snowball, B	90	" 7.	June 29	June 30	" 25	10	6½	9 12¾	3 9	6 15 1/8
Nick Ohmer, B	76	" 7.	" 30	" 30	" 22	8	6¾	20 7	3 9	9 9½
Jessie, B	107	" 5.	" 25	" 25	" 14	8	5½	6 11½	3 4¾	4 0 7/8
Cruses No. 9, P	92	" 5.	" 27	" 30	" 18	7	6½	**7 1**	3 2	6 11 3/4
Gibson, B	...	" 7.	" 30	July 2	" 22	6	6	.....	2 9	.....
Klondike, B	94	" 7.	July 10	" 11	" 25	5	6	13 1	2 8	6 8
Sampson, B	....	" 7.	" 7	" 8	" 18	4	.....	.....	2 7	.....
Bouncer, B	108	" 7.	" 10	" 11	" 22	4	6½	8 15¾	2 5	3 15¾
Albert, B	....	" 8.	" 6	" 8	" 25	6	7	6 7	2 2½	.....
Noble, B	106	" 5.	" 2	" 4	" 14	4	7	5 8	2 2	5 5 1/2
Champion of England, B	83	" 5.	" 3	" 4	" 14	5	6¾	14 6½	2 1½	8 11 5/8
Great American	....	" 9.	" 7	" 9	" 22	6	7	2 15	2 0½	.....
Iowa Beauty, B	97	" 5.	June 25	June 28	" 28	6	4½	9 9	1 11	6 7
Hunn, P	110	" 9.	July 12	July 14	" 28	4	6	7 2	1 9½	3 8
St. Joseph, B	109	" 5.	June 27	June 30	" 14	7	3½	5 14	1 9½	3 9
Empress, B	....	" 7.	" 27	" 28	" 8	5	5½	.....	1 9½	.....
Marshall, B	103	" 7.	July 6	July 8	" 22	5	6½	11 9¼	1 8½	5 13 5/8
Leamington	....	" 5.	" 1	" 2	" 11	4	.....	7 15	0 12	.....

RASPBERRIES AND BLACKBERRIES.

The raspberry crop was only medium this year owing to the severe frost of May 9, which injured the leaves and weakened the canes very much. A new plantation was made in the autumn of 1901, consisting of 63 varieties. These made good growth this summer and when vacancies occurred they were filled up. The Herbert raspberry, originated by Mr. R. B. Whyte, Ottawa, Ont., again did well. It and the Sarah, a seedling originated by Dr. Wm. Saunders, were among those least affected by the spring frost. These are two of the hardiest varieties which have been tested here. Marlboro and Cuthbert are two of the best older commercial varieties. The Clarke is also a good kind for home use. The crop of blackberries was light, though there was more fruit this year than usual.

CURRANTS.

There was a good crop of currants this year, notwithstanding the severe spring frosts which occurred when they were in full bloom. The varieties in the new plantation grew very well and many of the bushes fruited this year. Among red varieties, Wilder, Greenfield, Pomona and Fay's Prolific are four of the best for commercial purposes, while Defiance and Benwell are promising. The Moore's Ruby and Early Scarlet are two of the best for home use, being milder in flavour. In black varieties, the Standard, Success, Climax, and Victoria are four of the best. The last named is not a heavy cropper, but is very large. Topsy is very promising. Following is a description of it

Topsy.—Fruit large, black, very glossy, sweet, good flavour; quality very good; fruit clings exceptionally well, which makes it especially valuable. Bush productive. It originated with Dr. Wm. Saunders as follows:—Some seeds of a cross between Dempsey's black currant and a cross-bred gooseberry (Houghton X Broom Girl) were sown in a pot in the greenhouse in the autumn of 1890. Five plants grew. Of these, four had gooseberry foliage and one, black currant foliage. The latter was planted out in 1891 and has been called Topsy.

GOOSEBERRIES.

The European gooseberries did better this year than ever before, but the crop was light on most varieties. A determined effort was made to prevent the spread of mildew this season, but it was only partially successful. Beginning when the leaf buds were breaking, on April 18, the bushes were sprayed thoroughly every week with a solution in the proportion of 1 oz. potassium sulphide and 2 gallons of water. This was continued until June 5, when traces of mildew being noticed, the bushes were sprayed twice a week until July 19, making 20 sprayings in all. Notwithstanding this thorough and constant application of a fungicide, the leaves dropped badly from most European varieties, though what fruit remained on the bushes was not nearly as much affected as usual. In some gardens in the city of Ottawa very fine, clean European gooseberries can be grown without spraying. Whether this is due to the kind of soil or to the moister atmosphere in a closely planted garden has not yet been determined.

Among the American varieties, the Downing, Pearl, and Red Jacket (Jocelyn) are the most profitable, though some of Dr. Saunders' newer seedlings are very promising.

SPRAYING.

In no season, probably, since spraying has been recognized as necessary to successful fruit culture has the value of it been more apparent than this year. The crop of fruit was abundant, but conditions were very favourable for the development of fungous diseases. What promised to be a good apple crop in the early part of the season was very much lessened in value by the development of the black spot fungus and the percentage of No. 1 apples was small where trees were unsprayed. Thorough spraying, though difficult to manage owing to showery weather, prevented the spread of the disease, and there were many instances were men who sprayed well had a large percentage of clean fruit. Although it is recommended to spray winter apples five, or even six, times during the season, many persons do not spray more than three times. This is a great mistake, as was amply demonstrated this year, as the black spot developed late and where spraying had been discontinued the fruit was moderately to badly affected. The expense of spraying is considerable and it is money thrown away to not do the work thoroughly and frequently.

In Great Britain and Europe during the past three years a mixture has been made with washing soda to neutralize the sulphate of copper instead of lime. It is claimed that this mixture adheres better than the ordinary Bordeaux mixture. Tests were made at the Central Experimental Farm this year to learn how much soda was necessary to neutralize 4 lbs. of bluestone, and it was found that 5 lbs. were needed. The formula for the preparation of the soda mixture would thus be:—

4 lbs. copper sulphate.
5 lbs. washing soda.
40 gallons water.

An experiment was tried to determine the value of this mixture as compared with the ordinary Bordeaux, but as none of the fruit was spotted no conclusions could be drawn. The soda mixture is well worthy of a trial, for although a little more expensive, it is more easy of application than that made with lime, and often good lime is hard to get in the country.

FUNGOUS DISEASES AND OTHER INJURIES.

The following fungous diseases and other injuries are thought worthy of special mention this year :—

Sooty Fungus or Fly Speck Fungus *(Leptothyrium pomi)*. My attention was called to this disease by Mr. Alex. McNeill, Chief Fruit Inspector for the Dominion. It is not a common disease in Ontario, but was more prevalent than usual in the vicinity of St. Catharines this year. The following quotation from a letter received from Mr. Robert Thompson, St. Catharines, Ont., gives information regarding it. He writes : 'We have had it here in very low lying orchards, in flats or creeks or orchards in valleys in damp seasons, but never very much. This season it is more prevalent. It has always been called by the buyers in Montreal 'The Cloud' and the fruit is called 'clouded fruit'. This disease also occurred to a limited extent in the orchard of Mr. D. J. McKinnon, Grimsby, Ont., who submitted a specimen of affected fruit for examination. The Sooty Fungus is more prevalent in some of the Eastern States than it is in Canada, the variety of apple most affected being the Rhode Island Greening.

The disease appears on the surface of the skin in irregular, black, sooty-like patches, which look not unlike splashes of ink. Fortunately, it is easily controlled and one spraying with Bordeaux mixture when the apples are about the size of hickory nuts is said to prevent the spread of it.

Russetting of Apples.—The skin of apples russetted badly in 1902, from Prince Edward Island westward to the province of Ontario, and there has been much discussion as to its cause. At the Central Experimental Farm a few varieties are russetted every year, but this season more kinds were affected.

It is our opinion that the russetting was due to spraying and that some kinds are more subject than others. This year, by mistake, a very strong copper sulphate mixture was put on a few trees here. The fruit on these was much more russetted than on those which received the regular mixture, showing that the strong mixture had caused russetting. It is our belief that owing to the exceptionally cool season the skins of apples were not as tough as usual, and that the ordinary Bordeaux mixture caused the russetting which occurred in different parts of the country. Statements have been made that the fruit was russetted on both sprayed and unsprayed trees in orchards, and others have said that the russetting only occurred where the trees were sprayed. Closer observations will be made next year.

Dropping of Apple Leaves.—The leaves of apple trees dropped badly this year, especially during the month of July. This dropping occurred in the Maritime provinces, in the province of Quebec and also in Ontario. It was also common in the eastern states. Small brown patches first appeared on the leaves which gradually became yellow and dropped off. The brown patches looked as if they were caused by scald. They were put under a high power microscope at the Central Experimental Farm and no trace of disease could be found. In one orchard visited it was noticed that there was little or no injury where the leaves did not get the direct rays of the sun. This injury occurred in both sprayed and unsprayed orchards. There is a leaf disease in the United States which causes injury somewhat like this, but as no disease was to be found the only present explanation of the dropping is that it was caused by unusual climatic conditions.

Black Rot of the Cabbage.—Since 1899 the cabbages at the Experimental Farm have been affected with the disease known as black rot and this year they were badly injured by it. The mid season and late varieties have been most affected. This disease has only been recognized since 1889, when it was found in Kentucky, but it has become very troublesome within the past ten years, and now occurs in the United States in a great many states and does serious damage to this vegetable. It has not, however, been often reported in Canada. The only report this year was from A. Bangel, Nicolet, Que., who wrote that it was doing much damage to his cabbages. It attacks cauliflowers, Brussels sprouts and turnips and some other allied vegetables.

The first indication of the disease is a wilting and turning yellow of parts of the outer leaves and finally of whole leaves. The disease rapidly spreads to other parts until the whole head is affected and becomes an unsightly mass of rotting leaves. Sometimes the stem is so badly affected that the leaves wither, even though not all diseased. When the outside leaves are destroyed the head bursts and becomes useless. The germs of the disease usually enter from the margin of the leaves through the pores which exude the drops of water so familiar to the cabbage. The germs lodge in these drops and from them enter the leaf pores and gradually spread through the leaf. It is thought that insects also carry the disease. The germs remain over winter in the decaying vegetables and in the spring infect the new plants. The germs are also spread by manure from stock which have been fed with infected plants.

The only known remedy for the disease is prevention. Cabbages should not be planted on land where the disease has been the year before.

The diseased leaves and plants should be taken away and burned as soon as noticed and on no account should they be fed. All cruciferous weeds such as wild mustard should be destroyed. Sow seed in new soil every year.

Owing to the serious damage done to cabbage by this disease, its spread should be prevented if possible.

The late varieties which have been least affected during the past four years have been the Late Flat Dutch types, such as Premium Flat Dutch, Bloomsdale Large Late Flat Dutch, All Seasons, Henderson's Selected Late Flat Dutch and Large Late Flat Dutch.

More information regarding this disease can be obtained from Bulletin, No. 65, Agricultural Experiment Station, Wisconsin; Bulletin No. 66 Vermont; and Farmers' Bulletin No. 68, Department of Agriculture, Washington, D.C., U.S.

VEGETABLES.

Experiments in testing the different varieties of nearly all the kinds of vegetables and experiments in different methods of culture were continued this year. Owing to the cold spring and late frost, the melons failed and the cucumbers were poor but nearly everything else did well. For the past three years selections have been made of beans and pease with a view to originating earlier and more productive strains and in the case of beans a marked difference in time of being ready for use is already noticed. The experiments with potatoes have been the most varied, as the potato is such an important vegetable. For the past four years a 'List of Best Vegetables for Farmers' has been given, but this is omitted this year owing to the lack of space and also for the reason that no changes of any importance are necessary.

EXPERIMENTS WITH POTATOES.

The yields of the varieties of potatoes in the uniform test plots were very good this year. The largest crop was from the Peachblow, an old variety, which yielded at the rate of 772 bushels 12 pounds per acre, being the highest yield of potatoes ever recorded at the Central Experimental Farm. The fine crop this year was due principally to good seed, thorough cultivation and thorough spraying with Bordeaux mixture to prevent blight and rot and Paris green to kill the potato beetl A good growing season also favoured the development of the tubers. Farly planted potatoes were injured by spring frosts which injured the vines and weakened the plants.

There were 131 varieties tested in uniform plots this year. The difference between the highest and lowest yields was 618 bushels 12 pounds per acre which shows the value of planting the most productive kinds. The loss from planting inferior varieties must be enormous every year. The average yield per acre from all the varieties tested was 429 bushels per acre.

The test was made on good sandy loam soil which was given a moderate dressing of well rotted manure on April 23. This was ploughed under on April 24. Shortly before planting, the soil was brought into good condition and the manure thoroughly mixed through it by harrowing twice with the disc harrow and once with the smoothing harrow. Drills 2½ feet apart and 4 inches deep were opened with the double mold board plough and 66 sets of each variety were planted 1 foot apart in a single row. The sets were of good size, having at least three eyes and a liberal amount of flesh. The large yields which are obtained nearly every year are no doubt to a large extent due to the fact that a perfect stand is obtained by using good sets. The soil was harrowed once before the plants were above ground to destroy weeds and then kept loose with the cultivator until the vines were too large to get through without doing damage. The vines were sprayed with Paris green to destroy the potato beetle and three times with Bordeaux mixture to prevent rot and blight. The potatoes were planted on May 27 and dug on October 8, 9 and 10.

POTATOES—Test of Varieties.

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Peachblow	Medium	772	12	690	48	81	24	White.
2	Flemish Beauty	Poor	697	24	624	48	72	36	Bright pink.
3	Dr. Maercher	Medium	695	12	644	36	50	36	White.
4	Irish Cobbler	Good	646	48	563	12	83	36	"
5	Money Maker	"	622	36	583	0	39	36	"
6	Late Puritan	"	613	48	486	12	127	36	"
7	Troy Seedling	Medium	609	24	532	24	77	0	"
8	Irish Daisy	Good	605	0	473	0	132	0	"
9	Dakota Red	Medium	594	0	550	0	44	0	Red.
10	Pearce	Good	574	12	481	48	92	24	Pink and white.
11	Brown's Rot Proof	Medium	565	24	501	36	63	48	Pink.
12	Carman No. 1	Good	552	12	503	48	48	24	White.
13	Mammoth Pearl		552	12	488	24	63	48	"
14	Early Elkinah	Good	545	36	440	0	105	36	Pink.
15	Swiss Snowflake	Good	532	24	497	12	35	12	White.
16	Livingston		530	12	446	36	83	36	White, pink eye.
17	Wonderful		519	12	413	36	105	36	"
18	Bergeron	Medium	517	0	470	48	46	12	" "
19	Sabean's Elephant	Good	517	0	435	36	81	24	White.
20	American Wonder	"	508	12	462	0	46	12	"
21	Hale's Champion	Poor	506	0	448	48	57	12	"
22	Napoleon	Good	506	6	462	0	44	0	Pink.
23	Enormous	"	501	36	457	36	44	0	White.
24	Sharpe's Seedling	"	499	24	453	12	46	12	Pink and white.
25	Reeves' Rose		497	12	426	48	70	24	Pink.
26	Rawdon Rose	Good	497	12	418	0	79	12	Pink and white.
27	I.X.L.	"	492	48	453	12	39	36	"
28	Country Gentleman		488	24	420	12	68	12	"
29	Montana Bluff		488	24	413	36	74	48	White, bright pink eye.
30	Jubilee	Good	486	12	451	0	35	12	Pink and white.
31	Early St. George	"	481	48	400	24	81	24	"
32	Burnaby Mammoth	"	479	36	418	0	61	36	"
33	Quaker City		477	24	415	48	61	36	White.
34	Northern Spy	Poor	473	0	426	48	46	12	Bright pink.
35	Maule's Thoroughbred		473	0	409	12	63	48	Pink.
36	Rochester Rose	Good	473	0	402	36	70	24	"
37	Delaware	"	473	0	391	36	81	24	White.
38	Carman No. 3	"	470	48	435	36	35	12	"
39	Clay Rose	Medium	470	48	424	36	46	12	Pink.
40	Dublin Prize		466	24	409	12	57	12	
41	Brosseau		464	12	444	24	19	48	Red and white.
42	Early Norther	Good	464	12	420	12	44	0	Pink.
43	Daisy	"	464	12	380	36	83	36	Pink and white.

POTATOES—Test of Varieties—*Continued.*

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
44	Seattle	Medium	464	12	356	24	107	48	White.
45	Burnaby Seedling	Good	462	0	418	0	44	0	Pink and white.
46	Early Harvest	"	457	36	407	0	50	36	Pink.
47	Thorburn	"	457	36	398	12	59	24	Pink and white.
48	Early Sunrise	"	457	36	378	24	79	12	Pink.
49	Burpee's Extra Early	"	453	12	376	12	77	0	Pink and white.
50	Rose of the North		453	12	371	48	81	24	Pink.
51	Early Puritan	Good	448	48	391	36	57	12	White.
52	20th Century		446	36	385	0	61	36	"
53	State of Maine	Good	442	12	396	0	46	12	"
54	Uncle Sam	"	442	12	389	24	52	48	"
55	Empire State	"	442	12	376	12	66	0	"
56	Dreer's Standard	"	440	0	400	24	39	36	"
57	Penn. Manor		440	0	393	48	46	12	Pink and white.
58	Vick's Extra Early	Good	440	0	385	0	55	0	"
59	Doherty's Seedling		437	48	411	24	26	24	White.
60	Holborn Abundance	Medium	437	48	380	36	57	12	"
61	Champion from N.B		437	48	367	24	70	24	"
62	Early Market		435	36	404	48	30	48	Pink.
63	Columbus		435	36	385	0	50	36	Pink and white.
64	Wonder of the World	Good	435	36	323	24	112	12	"
65	New Queen	"	431	12	321	12	110	0	"
66	Early Summer		429	0	323	24	105	36	"
67	Polaris	Good	426	48	398	12	28	36	White.
68	McIntyre	Medium	426	48	371	48	55	0	White and purple.
69	Gem of Aroostook	Good	426	48	368	36	57	12	Pink and white.
70	Prize Taker	"	426	48	365	12	61	36	Pink.
71	Early Michigan		426	48	316	48	110	0	White.
72	Early Rose	Good	422	24	396	0	26	24	Pink.
73	Dobson's Early		420	12	385	0	35	12	White.
74	Canadian Beauty	Good	420	12	356	24	63	48	Pink and white.
75	Burbank's Seedling	"	420	12	352	0	68	12	White.
76	American Giant	Medium	415	48	380	36	35	12	"
77	Seedling No. 7	"	413	36	369	36	44	0	Bright pink.
78	White Beauty	Good	413	36	281	36	132	0	White.
79	Chicago Market	"	407	0	387	12	19	48	Pink.
80	New Variety No. 1	Poor	404	48	369	36	35	12	White.
81	Seedling No. 230	Medium	404	48	345	24	59	24	White.
82	Rose No 9	"	402	36	363	0	39	36	Pink.
83	Lizzie's Pride	Good	400	24	325	36	74	48	Pink, red eye.
84	Bovee	"	400	24	299	12	101	12	Pink and white.
85	Dooley		398	12	382	48	15	24	
86	Harvest King		398	12	380	36	17	36	White.
87	Rural Blush No. 2	Good	396	0	380	36	15	24	"
88	Dutch Blue		396	0	347	36	48	24	Dark purple.
89	White Elephant		393	48	360	48	33	0	Pink and white.
90	Everett	Good	391	36	332	12	59	24	Pink.
91	General Gordon	"	389	24	343	12	46	12	"
92	Reading Giant	Poor	389	24	323	24	66	0	"
93	Earliest of All	Good	385	0	231	0	154	0	Pink and white.
94	Early Pride	"	378	24	341	0	37	24	Pink.
95	Green Mountain	"	378	24	272	48	105	36	White.
96	Rural Blush	"	376	12	281	36	94	36	Pink.
97	Sir Walter Raleigh		374	0	343	12	30	48	White.
98	Bliss' Triumph		374	0	286	0	88	0	Red.
99	White Giant		367	24	334	24	33	0	White.
100	Great Divide	Good	367	24	334	24	33	0	"
101	Clarke's No. 1	"	360	48	299	12	61	36	Pink.
102	Early Six Weeks	"	358	36	292	36	66	0	"
103	Silver Dollar		358	36	288	12	70	24	White.
104	Up-to-date		354	12	261	48	92	24	"
105	Vanier	Poor to med.	354	12	242	0	112	12	Red.
106	Pink Eye		352	0	275	0	77	0	White, bright pink eye.
107	Mills' Prize	Good	349	48	259	36	90	12	White.

POTATOES—Test of Varieties—*Concluded.*

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
108	Beauty of Hebron	Medium	341	0	272	48	68	12	Pink and white.
109	Pearce's Prize Winner	Good	334	24	281	36	52	48	Pink.
110	Early Ohio	"	332	12	266	12	66	0	"
111	Churchill Seedling		330	0	281	36	48	24	White.
112	Seedling No. 214	Good	323	24	255	12	68	12	"
113	Maggie Murphy	Medium	321	12	303	36	17	36	Bright pink.
114	Cambridge Russet	Good	321	12	294	48	26	24	White.
115	Wall's Orange		321	12	281	36	39	36	Yellow, purple eye.
116	Rose of Erin		319	0	299	12	19	48	Pale pink, bright pink eye.
117	Early Andes	Good	316	48	264	0	52	48	Pink.
118	Early White Prize	"	314	36	248	36	66	0	White.
119	Red Rock		308	0	237	36	70	24	Red.
120	Pearce's Extra Early	Good	305	48	213	24	92	24	Pink.
121	Early Rose	"	283	48	213	24	70	24	"
122	Pride of the Market	"	277	12	178	12	99	0	White.
123	Bill Nye		275	0	195	48	79	12	"
124	Livingston's Banner	Good	274	48	202	24	70	24	"
125	Early Dawn		268	24	228	48	39	36	Pink, brighter at seed end.
126	Brownell's Winner	Good	266	12	222	12	44	0	Red.
127	Ohio Junior		259	36	211	12	48	24	Pink.
128	Vigorosa		250	48	200	12	50	36	Pink and white.
129	Seneca Queen	Very good	250	48	178	12	72	36	Pink and white, bright pink eye.
130	Blue Potato		237	36	171	36	66	0	Deep purple.
131	Houlton Rose		154	0	123	12	30	48	Pink.

An average yield per acre of 429 bushels.

ADDITIONAL VARIETIES OF POTATOES TESTED IN 1902.

In addition to the varieties of potatoes grown in the uniform test plots, smaller quantities of the following kinds were planted :—

Name of Variety.	Number of Sets Planted.	Total Yield Per Acre.		Yield Per Acre of Marketable.		Yield Per Acre of Unmarketable.	
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Seedling No. 2, D. Murray, N.S.	15	503	22	387	12	116	10
Kaiser	33	475	12	431	12	44	..
Snowball	33	470	48	404	48	66	..
Early Envoy	33	435	36	409	12	26	24
Eureka Extra Early	33	413	36	343	12	70	24
Northern Beauty	33	409	12	299	12	110	..
Seedling No. 1, D. Murray, N.S.	15	396	53	329	7	67	46
Crimes Lightning	33	396	..	365	12	30	48
Pat's Choice	33	356	24	330	..	26	24
Pingree	33	352	..	312	24	39	36
Van Orman's Earliest	33	343	12	321	12	22	..
Cyclop	33	330	..	277	12	52	48
King Michigan	33	330	..	259	36	70	24
Woltman	33	316	48	202	24	114	24
Todd's Seedling, W. H. Todd, Ingersoll, Ont	33	154	..	123	12	30	48

TWELVE BEST YIELDING POTATOES—AVERAGE OF THREE TO EIGHT YEARS' TESTS.

Name of Variety.	Average Yield per Acre.		Name of Variety.	Average Yield per Acre.	
	Bush.	Lbs.		Bush.	Lbs.
1. Swiss Snowflake, 3 yrs.....	452	28	7. McIntyre, 3 yrs.....	409	12
2. Late Puritan, 8 yrs.....	431	59	8. Country Gentleman, 4 yrs..	403	4
3. American Wonder, 8 yrs.....	430	29	9. Uncle Sam, 5 yrs.....	402	36
4. Seattle, 8 yrs.....	428	8	10. Flemish Beauty, 8 yrs	397	56
5. Holborn Abundance, 8 yrs....	426	28	11. Burnaby Seedling, 8 yrs.....	391	49
6. Penn. Manor, 4 yrs.....	411	24	12. Reeves' Rose, 6 yrs.	391	5

An average crop of 414 bushels 43 lbs. per acre.

The above table was taken from Bulletin 41, prepared by Dr. Wm. Saunders.

POTATOES PLANTED AT DIFFERENT DATES.

In 1898, an experiment was begun in planting potatoes at different dates, beginning when the main crop was put in and continuing at intervals of two weeks until August 23, 1898. July 23, 1899; July 21, 1900; July 11, 1901, and July 24, 1902. An early and a late variety were used each year, the varieties being Early Norther and Irish Daisy, in 1898, Early Norther and Rural Blush, in 1899; Early Norther and Sir Walter Raleigh, in 1900; Early St. George and Rural No. 2, in 1901, and Everett and Carman No. 1, in 1902. In 1902, two plantings were made before the main crop was put in, the yields from the planting made on May 15, being the best of the series. This experiment proves that as far north as Ottawa a fairly good crop of marketable potatoes can be obtained by planting as late as July 10, when they might succeed an early crop, such as garden pease. The vines in this test were not sprayed with Bordeaux mixture this year.

Date of planting.	Total yield per acre 1898.		Total yield per acre, 1899.		Total yield per acre, 1900.		Total yield per acre, 1901.		Total yield per acre, 1902.		Total average yield per acre, 1898-2.		Average yield per acre marketable, 1898-2		Average yield per acre Unmarketable 1898-1902.	
Early variety.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
1st early planting, May 1, 1902	.....	.....	.....	.....	.....	.....	.....	.....	268	24						
2nd early planting, May 15, 1902	.....	.....	.....	.....	.....	.....	.....	.....	294	48						
1st planting, May 26, 1898; May 26, 1899; May 26, 1900; May 30, 1901; May 29, 1902	277	12	505	47	409	12	374		217	48	356	48	306	25	50	23
2nd planting, June 10, 1898; June 9, 1899; June 9, 1900; June 13, 1901 June 12, 1902	160	36	459	48	453	12	299	12	217	48	318	7	254	8	63	59
3rd planting, June 24, 1898; June 23, 1899; June 23, 1900; June 27, 1901; June 26, 1902	125	24	237	10	365	12	246	24	140	48	222	59	174	25	48	34
4th planting, July 8, 1898; July 7, 1899; July 7, 1900; July 11, 1901; July 10, 1902	30	48	9	41	268	24	74	48	136	24	104	1	72	10	31	51
5th planting, July 23, 1898; July 21, 1899, ; July 21, 1900; July 24, 1902	1	6	.....		26	24	.....		77		.....		.....		.....	
6th planting, Aug. 9, 1898	No yield															
7th planting, Aug. 23, 1898																
Late variety.																
Planted on same dates as early variety—																
1st early planting	.....	.....	.....	.....	.....	.....	.....	.....	378	24						
2nd "	.....	.....	.....	.....	.....	.....	.....	.....	459	48						
1st planting	259	36	338	48	277	12	501	36	411	24	357	43	314	20	43	23
2nd "	173	48	164	34	338	48	404	48	281	36	272	42	220	37	52	5
3rd "	68	12	157	18	198		325	36	206	48	191	10	163	2	28	8
4th "	8	48	19	22	202	24	57	12	233	12	104	11	64	14	39	57
5th "	1	6	.....		26	24	.....		118	48						
6th "	No yield															
7th "																

AVERAGE RESULTS FROM OTHER EXPERIMENTS WITH POTATOES.

Planting at different distances apart:—A test of seven years has proven that the best results are obtained in sandy loam soil from planting in rows 2½ feet apart with the sets 14 inches apart in the rows.

Planting at different depths:—For six consecutive years the highest yields of potatoes have been obtained in sandy loam soil from planting the sets only 1 inch deep. Planting from 4 to 5 inches deep is, however, recommended for field culture.

Different kinds of sets:—The highest yields have been obtained from large, whole potatoes, but the best and most economical method is to cut medium to large potatoes into sets having at least 3 eyes with a good amount of flesh. The results vary with different varieties.

SPRAYING POTATOES.

It is surprising that more farmers do not spray their potatoes with Bordeaux mixture to prevent blight and rot. For years the Central Experimental Farm has been recommending it, and it has been shown that the yields were more than one-third greater when the potatoes were thoroughly sprayed, and this year the yields in some cases were doubled.

A material known as Bug Death was compared this year with poisoned Bordeaux mixture in an experiment to prevent blight and rot, and to kill the Colorado potato beetle.

In the pamhlet on Bug Death, published by the Bug Death Chemical Company, it is claimed that this material, Bug Death, 'kills the bugs, feeds the plants, and increases the yield.' The object was to find out whether this statement was correct, and to learn if Bug Death could be applied economically in preferenee to Paris green and Bordeaux mixture.

On May 28 two rows each, of eleven varieties of potatoes, were planted in as uniform soil as possible. The rows were divided into three equal parts, making the three plots one-thirty-sixth of an acre each.

At the Experimental Farm it is not the custom to spray for the potato beetle until the young are hatched. The first spraying was not, therefore, made until July 10, at which time the larvæ were very numerous and the plants large and vigorous.

It is recommended by the Bug Death Company to apply Bug Death dry at the rate of 12½ pounds or more per acre from three to five times. In order to test its value as plant food it was applied the first time at the rate of 144 lbs. to the acre. The plants which were large were gone over twice, in order that the surface of the leaves should be entirely covered with the Bug Death. At the next three applications, namely, on July 22, July 30 and August 13, the Bug Death was sprayed on the vines; the formula used being 1 lb. to 3 gallons of water, as recommended by the company. It was found that 3 gallons of the mixture covered the vines nicely. This was at the rate of 108 gallons per acre, or 36 lbs. of Bug Death. The amount of liquid used was by no means excessive, as 190 gallons per acre of Bordeaux mixture were used at each spraying in the experiment, and in field work 120 to 150 gallons per acre has been applied. Where Paris green and water alone were used the mixture was sprayed on at the rate of 130 gallons per acre.

The following is a statement of the results, and also of the comparisons with other mixtures used :—

Formula 1.—Bug Death, applied dry, July 10, 1902. Applied at the rate of 144 lbs. per acre.

Result as an Insecticide.—Practically all beetles were killed.

Formula 1a.—Bug Death, mixed with water in the proportion of 1 lb. of Bug Death to 3 gallons water. Sprayed on vines July 22, July 30, August 13, each time at the rate of 36 lbs. per acre. Total, 108 lbs. per acre.

Result as an Insecticide.—Killed practically all the beetles.

Result as a Fungicide.—Plants remained green longer and yield was larger than where sprayed with Paris green alone, which is an insecticide only, but plants were not as long green, nor the yield as heavy, as where sprayed with Bordeaux mixture.

Formula 2.—Paris green, 8 ounces to 40 gallons of water. Sprayed on vines July 10, July 22 and July 30, each time at the rate of 2 lbs. 4 ounces per acre. Total, 6 lbs. 12 ounces per acre.

Result of spraying July 10.—Only a few bugs left, but more than where Bug Death was used at the rate of 144 lbs. per acre.

Formula 3.—6 lbs. bluestone, 4 lbs. lime, 8 oz. Paris green, 40 gallons water, the ordinary formula for potato blight. Sprayed on vines July 10, July 22, July 30, August 13, each time at the rate of 28½ lbs. bluestone and 2 lbs. 6 oz. Paris green per acre. Total, 114 lbs. bluestone and 9 lbs. 8 oz. Paris green per acre.

SPRAYING WITH BORDEAUX MIXTURE AND BUG DEATH TO PREVENT BLIGHT AND ROT.

Name of Variety.	Plants dead where sprayed with Bordeaux mixture.	Plants dead where sprayed with Bug Death.	Plants dead where unsprayed.	Yield per acre marketable potatoes. — Bordeaux mixture.		Yield per acre marketable potatoes. — Bug Death.		Yield per acre marketable potatoes. — Unsprayed.		Yield per acre rotten potatoes. — Bordeaux mixture.		Yield per acre rotten potatoes. — Bug Death.		Yield per acre rotten potatoes. — Unsprayed.	
				Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Jubilee	Sept. 30	Sept. 16	Sept. 10	379	30	339	54	214	30	9	54	72	36	95	42
Carman No. 3	" 22	" 13	" 4	376	12	247	30	224	24	.....		13	12	23	6
Bliss Triumph	" 13	" 7	" 4	359	42	316	48	300	18	.....		3	18	19	48
Early Ohio	" 22	" 13	" 4	349	48	174	54	148	30	29	42	52	48	56	6
Holborn Abundance	Oct. 2	" 20	" 16	346	30	349	48	290	24	59	24	62	42	62	24
Great Divide	Sept. 21	" 13	" 4	339	54	277	12	174	54		....	33	..	23	6
Empire State	" 29	" 15	" 10	297	..	231	..	132	..	13	12	16	30	42	54
Livingston's Banner	Oct. 1	" 10	" 9	280	30	171	36	141	54	3	18	6	36	23	6
Polaris	Sept. 19	" 10	" 4	264	..	178	12	165	..	19	48	42	54	16	30
Vigorosa	" 20	" 13	" 5	217	48	201	18	151	48	33	..	52	48	16	30
McIntyre	Oct. 1	" 16	" 13	201	18	273	54	145	12	.....		.....		.....	
Average	Sept. 25	Sept. 13	Sept. 7	310	12	251	6	189	51	15	18	32	24	34	28

COST OF MATERIALS.

Formula 1: Bug Death, dry, at the rate of 144 lbs per acre.

144 lbs. at 8c. per lb $11 52

Formula 1a: Bug Death, 1 lb. to 3 gallons water.

108 lbs. (3 applications) at 8c. per lb 8 64

Total cost $20 16

Yield per acre: 251 bush. 6 lbs.

Formula 2: Paris green, 8 oz. to 40 gallons water.

6 lbs. 12 oz. (3 applications) at 20c. lb ..... $ 1 35

Yield per acre: 189 bush. 54 lbs.

Formula 3: Bluestone, 6 lbs.; lime, 4 lbs.; Paris green, 8 oz.; water, 40 gallons.

114 lbs. bluestone at 7c. per lb ..... $ 7 98
9 lbs. 8 oz. Paris green at 20c. lb 1 90

Total cost ..... $ 9 88

Yield per acre: 310 bush. 12 lbs.

COMPARISON OF COST OF MATERIAL AND YIELDS PER ACRE.

Formula.	Cost of material. Per acre.	Yield per acre. Average of 11 Varieties.
Paris green	$ 1 35	189 bush. 54 lbs.
Bug Death	20 16	251 " 6 "
Bordeaux mixture and Paris green	9 88	310 " 12 "

It may be urged that the quantities of Bug Death used in the above test were altogether excessive. Let us then presume that the amount recommended by the company in its circular, namely, 12½ lbs. per acre, applied from 3 to 5 times, is sufficient to destroy the bugs, and let us further grant that with this lesser quantity the yield would be equal to that obtained in our experiment, we have, taking 50 lbs. per acre as the amount applied, (12½ lbs. four times) the following comparative figures :—

Paris green	$1 35	per acre.
Bug Death	4 00	"
Bordeaux mixture and Paris green	9 88	"

Difference in cost in favour of Bug Death : $5.88. There was, however, a difference in yield per acre of 59 bush. 6 lbs. in favour of Bordeaux mixture and Paris green. At 40c. a bushel, a fair price at the present time, this difference in yield would mean $23.64, or a net difference in favour of Bordeaux mixture and Paris green of $17.76 per acre.

OBSERVATIONS AND CONCLUSIONS.

As a fungicide, Bug Death is not as economical to use as Bordeaux mixture. As an insecticide and fungicide combined, it can probably be used more profitably than Paris green alone, which is an insecticide only, as there is a difference of 61 bush. 12 lbs. per acre in favour of Bug Death as compared with Paris green alone.

Bug Death cannot, however, be used as economically as Bordeaux mixture and Paris green combined.

Nine varieties out of the eleven in the test, yielded more per acre where Bordeaux mixture was used than were Bug Death was applied. In two varieties the yield from Bug Death was greater.

There was no evidence from this year's experiments to show that Bug Death is a plant food. The vines were no more vigorous than where Bordeaux mixture and Paris green were used together.

Bug Death adheres well to the foliage.

TOMATOES—TEST OF VARIETIES.

As the tomato is one of the most popular of vegetables, the different varieties which are offered for sale have been given a thorough trial. Many of the varieties have been tested for seven years and the average results, which each year become more valuable, are given in the following tables. The earliest varieties of tomatoes are the most profitable, and as many early kinds as possible have been obtained. For three years the Sparks Earliana has been tested and this is considered the best early tomato grown here, as it is very early, of good size, and quite smooth. The Early Richmond and Extra Early Jersey tomatoes have been discarded, although they were very productive sorts, but as they were wrinkled kinds and resembled the Early Bermuda very closely it was thought best to discontinue them. Other poorer sorts were also discarded this year.

The seed of the tomatoes grown this year was sown in hot beds on April 3; the young plants were pricked out into strawberry boxes on April 25, and planted in the open ground on June 2. They were placed 4 feet apart each way, and five plants of each variety were used. The soil was a light sandy loam where corn had been grown the previous year, the corn having been well manured. The soil was kept cultivated until the growth of the plants prevented it. The vines were spread out to admit sunshine, but not trained or pruned in any way. The early part of the season was not favourable to the ripening of the fruit, but by the end of the season a good crop of ripe fruit had been produced. Ninety three varieties were tested this year.

TOMATOES—TWELVE BEST YIELDING VARIETIES, 1902.

Name of Variety.	Date of first ripe fruit.	Yield of ripe fruit, first three pickings.		Yield of ripe fruit, balance pickings.		Total yield of ripe fruit, all pickings.		Total yield of ripe fruit, per plant.		Remarks.
		Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	
1 Dominion Day	July 30.	2	10	137	6	140		28		Large, wrinkled, scarlet.
2 Early Leader	" 31.	8	12	129	12	138	8	27	11	Below medium, half wrinkled, scarlet.
3 Earliest of All	Aug. 6.	2	4	115	14	118	2	23	10	Medium, half wrinkled, scarlet.
4 Conqueror	July 31.	3	2	113		116	2	23	4	Medium, wrinkled to smooth, scarlet.
5 Maule's Earliest	Aug. 4.		12	109		109	12	21	15	Large, wrinkled, scarlet.
6 Thorburn's Earliest	" 4.	2		106		108		21	10	Above medium, wrinkled, scarlet.
7 Canada Victor	" 12.		4	105	4	105	8	21	2	Medium, wrinkled to smooth, scarlet.
8 Quicksure	" 7.	1	6	103	12	105	2	21		Medium, almost smooth, scarlet.
9 Bond's Early Minnesota	" 7.		8	101		104	8	20	14	Below medium to medium, smooth purplish pink.
10 Atlantic Prize	July 30.	2	8	101	15	104	7	20	14	Medium, almost smooth, scarlet.
11 Bright and Early	Aug. 7.	1		102	12	103	12	20	12	Below medium, smooth, scarlet.
12 Early Ruby	July 29.	2	12	95	10	98	6	19	11	Medium, half wrinkled to smooth, scarlet.

TOMATOES—SIX EARLIEST VARIETIES, 1902.

Early Leader	July 31.	8	12	129	12	138	8	27	11	Below medium, half wrinkled, scarlet.
Early Ruby	" 29.	2	12	95	10	98	6	19	11	Medium, half wrinkled to smooth, scarlet.
Dominion Day	" 30.	2	10	137	6	140		28		Large, wrinkled, scarlet.
Atlantic Prize	" 30.	2	8	101	15	104	7	20	14	Medium, almost smooth, scarlet.
Extra Early Red	" 30.	1	6	93	12	95	2	19		Below medium, smooth, scarlet.
Spark's Earliana	" 29.		6	77		77	6	15	8	Medium, smooth, scarlet.

SIX BEST YIELDING WRINKLED VARIETIES—AVERAGE FOR FIVE YEARS OR MORE.

Name of Variety.	No. of Years.	Average date of first ripe fruit.	Average yield per plant.		Remarks.
			Lbs.	oz.	
1 Early Bermuda	7	Aug. 6..	17		Medium, wrinkled, scarlet.
2 Canada Victor	7	" 6...	16	2	Medium, wrinkled to smooth scarlet.
3 Money Maker	7	" 4 ..	16	1	Medium to above medium, wrinkled, scarlet.
4 Conqueror	7	" 2...	15	5	Medium, wrinkled to smooth, scarlet.
5 Democrat	7	" 9...	13	8	Medium, wrinkled, purplish pink.
6 Boston Market	5	" 7...	13	7	Large, wrinkled, scarlet.

TWELVE BEST YIELDING SMOOTH VARIETIES—AVERAGE FOR FIVE YEARS OR MORE.

1 Bright and Early	6	Aug. 9...	17	1	Below medium, smooth, scarlet.
2 Baltimore Prize Taker	7	" 19...	16	4	Medium to above medium, smooth, purplish pink.
3 Bond's Early Minnesota	7	" 2...	15	14	Medium to below medium, smooth, purplish pink.
4 Early Ruby	7	July 31...	15	3	Medium, half wrinkled to smooth, scarlet.
5 Extra Early Advance	7	Aug. 6...	15	1	Below medium, smooth, scarlet.
6 Essex Hybrid	7	" 8...	14	12	Medium to above medium, smooth purplish pink.
7 Freedom	5	" 6...	14	11	Medium to below medium, smooth, scarlet.
8 Atlantic Prize	7	" 4...	14	1	Medium, almost smooth, scarlet.
9 Comrade	7	" 6...	13	15	Medium to below medium, smooth, scarlet.
10 Brinton's Best	7	" 15...	13	10	Above medium to large, smooth, scarlet.
11 Liberty Bell	6	" 8...	13	9	Large, smooth, scarlet.
12 Trophy	7	" 12...	13	6	Above medium to large, smooth, scarlet.

PEASE—EXPERIMENTS FOR COMPARISON OF YIELDS AND QUALITY.

For the past five years a large number of garden pease have been tested in the horticultural department and notes taken on their earliness, productiveness and quality, the length of vines being also ascertained. For the past three years a number of varieties which were considered the most promising from the standpoint of yield and quality have been grown on larger plots, in order to learn which were the best and most productive. Some of those tried in 1900 have been discarded, while other new ones are being tried. Twelve hundred selected pease of most of the varieties were sown in drills 100 feet long and 2½ feet apart on May 5 of this year. The pease germinated well and there was a good stand. As each variety became ready for use, the date was recorded and the yields of green pods from the several pickings entered.

In the following table the average results for the three years are given :—

PEASE—TEST OF VARIETIES.

Name of Variety.	Ready for use, 1902.	Average Date ready for use, 1900-2.	Number of Pickings, 1902.	Yield of Green Pods, 100 feet, 1902.	Average Yield of Green Pods 100 ft., 1900-2.	Average length of Vine, 1902.	Quality.
				Quarts.	Quarts.	In.	
Early—							
Exonian	July 6..	July 6..	3	66	38⅓	37	Good.
Child's Morning Star	" 6..	" 4..	3	60	34⅔	28	Very good.
American Wonder	" 10..	" 7..	3	50	34⅔	26	"
Gregory's Surprise	" 6..	" 2..	3	44	31⅔	31	"
Nott's Excelsior	" 10..	" 6..	3	45	29⅓	18	"
Excelsior	" 9..	....	2	52	.....	24	"
Second Early—							
Gradus	" 10..	July 8..	2	72	43⅓	31	"
Nott's New Perfection	" 14..	" 11..	3	64	43⅓	.....	"
Chelsea	" 22..	" 8..	3	66	42⅓	26	"
English Wonder	" 14..	" 11..	2	68	41⅔	26	Good.
Premium Gem	" 14..	" 8..	3	40	36⅔	36	Very good.
Medium—							
Burpee's Quantity	" 17..	" 15..	3	70	51⅔	36	Good.
McLean's Little Gem	" 16..	" 14..	3	74	50⅔	37	Very good.
McLean's Advancer	" 16..	" 14..	4	72	48⅔	40	"
Heroine (2 years)	" 24..	" 20..	2	68	43	30	"
Telephone	" 19..	....	3	86	.....	54	"
Late—							
McLean's Prolific	" 24..	July 22..	3	116	67⅓	43	Good.
Champion of England	" 21..	" 21..	3	94	64⅓	85	Very good.
Boston Wrinkled	" 21..	" 20..	2	82	60⅓	49	Good.
Eugenie	" 22..	" 21..	2	81	53⅓	55	"
Yorkshire Hero	" 26..	" 21..	2	56	39⅔	46	Very good.
Juno	" 26..	" 23..	2	50	37⅓	30	Good,
Veitch's Perfection	" 28..	" 26..	2	48	36⅓	69	"
Stratagem Improved	" 26..	" 22..	2	58	36	.....	Very good.

FOREST BELTS.

In the Annual Report for 1901, a description was given of the Forest Belts at the Central Experimental Farm, the objects for which they were planted, and also a table giving particulars regarding the time of planting and present height and diameter of the more important timber trees. Space will not permit of republishing the table with this year's records.

Owing to the favourable season the trees grew well this year. As usual, measurements were taken of the height and diameter of average marked trees in the belts. No

planting was done this year. In the mixed belts it was necessary to go through with a hook and cut back the tops of the stronger growing trees of inferior value, in order that the leaders of the better kinds could predominate, as if left the valuable trees would have in many cases been crowded out. The evergreen plantation was also thinned out as much as the trees could stand without breaking the leafy canopy, and the dead wood removed. The pines in this plantation are doing very well and are tall and straight. The trees removed made very good poles.

ARBORETUM AND BOTANIC GARDEN.

The trees, shrubs, and herbaceous plants made very satisfactory growth in the Arboretum and Botanic Garden this year, there being less injury from winter than usual and the growing season very favourable. The Arboretum is now all seeded down to lawn grass with the exception of about two acres occupied by the nursery of the Ottawa Improvement Commission, and the grass, which was kept regularly cut all summer, looked well. A large number of additions were made this year to the collection of both woody and herbaceous plants. The following figures show how rapidly the number of species and varieties under test have increased. In 1889, 200 species and varieties of trees and shrubs were set out, and by the autumn of 1894 about 600 were being tested. Up to the autumn of 1901, there had been 3,728 species and varieties of trees grown, of which 2,871 were living, comprised of 185 genera, represented by about 4,500 specimens.

Of herbaceous perennials there were 1,605 species and varieties living in the autumn of 1902.

Canadian trees and shrubs have been thoroughly tested, and are well represented. All of the trees mentioned in Prof. John Macoun's paper on the 'The Forests of Canada and their distribution' have been tried, with the exception of a few Western species which have not been given a thorough trial as yet. Among these are *Salix scouleriana*, Baratt; *Pinus flexilis*, James; *Pinus albicaulis*, Eng.; *Pinus monticola*, Dougl.; *Tsuga pattoniana*, Eng.; *Tsuga mertensiana*, Carr; *Abies grandis*, Lindl.; *Abies amabilis*, Forbes.

Of Canadian trees which have been thoroughly tested the following have not proven hardy :—

Asimina triloba, Duval (Papaw). This has killed out root and branch.

Liriodendron tulipifera, Linn. (Tulip-tree). The Tulip-tree killed to near the ground every winter until last winter when it was hardier. A variety of this species, however, *integrifolia*, imported from Berlin, Germany, in 1897, has proven hardy for the past four years.

Cercis canadensis, Linn. (Judas-tree or American Red-bud).—The tree now living in the Arboretum was planted in the autumn of 1896. That winter it killed to the ground and only made weak growth in 1897; the next winter it killed back two-thirds; the third, one-half; the fourth winter it was almost hardy to the tips, and it was also the same the last two winters. This is a good example of the acclimatization of trees.

Cornus florida, Linn. (Flowering Dogwood).—One specimen of this tree was practically hardy from 1897 until two years ago when it killed to near the ground. Other specimens were not as hardy.

Nyssa sylvatica, Marsh (Sour Gum).—The tree now living was planted in the spring of 1897; the first winter it killed back one-half; the next, one-half; the third, it was hardy nearly to the tips, and again the same the last two winters.

Sassafras officinale, Nees (Sassafras).—This has killed out root and branch thus far, though it has not been as thoroughly tested as some of the others.

The following other trees peculiar to South-western Ontario, appear to be hardier than the above, and some individual trees are perfectly hardy :—

Platanus occidentalis, Linn. (Buttonwood).

Castanea sativa, Mill. var. *Americana* (Chestnut).

Fraxinus quadrangulata, Michx. (Blue Ash).

Gleditschia triacanthos, Linn. (Honey Locust).

Some of the rest, such as *Gymnocladus canadensis*, *Cratægus Crus-galli*, *Pyrus coronaria*, and *Juglans nigra*, are quite hardy.

A few of the coast trees of British Columbia kill out root and branch, among such being *Acer macrophyllum*, *Arbutus Menziesii*, *Cornus Nuttallii*, and *Quercus garrayana*.

It is interesting to note that out of the list of 121 species of native trees published by Prof. J. Macoun, about 100 have proven hardy or half hardy here, and the writer has no doubt that when all the species are tested there will not be more than 10 which cannot be grown at Ottawa.

The question of the acclimatization of trees, shrubs and plants is a very important one, and one in which there is a good field for work at the Central Experimental Farm. A few instances have been mentioned where native trees have gradually become hardier after being planted several years. It might have been further stated that other specimens of these had been killed out root and branch. These furnish excellent examples of the individuality of trees. We have noticed over and over again in nursery rows that some trees of the same species are hardier and more vigorous than others. It has also been noticed that a tree which has a wide range from north to south, will not be as hardy when imported from the south as from the north. An excellent example is the red maple, *Acer rubrum*. This tree imported from some parts of the United States has killed back and made scrubby trees, while from further north it has done well.

There is no doubt, in the writer's opinion, that many trees which we have great difficulty in getting to fruit here, will eventually be much hardier when raised from seed ripened at Ottawa.

Contributions of plants and seeds, especially of rare Canadian species, will be gratefully received, as the desire is to increase the collection as rapidly as possible and to have the native flora well represented.

In the report for 1897, a descriptive list of 100 of the best herbaceous perennials was published and since then additional short lists have been given in the annual reports.

During the past two years the writer has had the opportunity of visiting many gardens and the great dearth of herbaceous perennials has been very apparent. This was most noticeable in the early part of the season.

The following list of the best herbaceous perennials which bloom at Ottawa before May 31, has been prepared in the hope that it may prove of assistance to lovers of flowers in helping them to make a good selection of plants, some of which will begin to bloom almost as soon as the snow is off the ground. Spring flowering bulbs are very desirable, but they should be supplemented by other plants. As there are not many who would desire to get all the kinds described, the best twenty-five are marked with an asterisk. In the following list the species and varieties are given in order of blooming.

LIST OF BEST SPRING-FLOWERING PERENNIALS.

* *Anemone patens*. Spreading pasque flower, (North America).—Height 6 to 9 inches. In bloom fourth week of April. Flowers large and pale purple. Very early. A beautiful flower.

Arabis albida. Mountain rock cress. (Caucasus).—Height 6 to 9 inches. In bloom first week of May. Flowers small but pure white and borne profusely in racemes or clusters.

Arabis alpina. White Alyssum. (Europe, North America).—Height 6 inches. Somewhat like the last, but with smaller flowers. This is very subject to attacks from the flea beetle, which destroys the leaves and buds.

* *Adonis vernalis,* Ox-eye. (Europe).—Height 6 to 9 inches. In bloom first week of May. Flowers large, lemon-yellow, borne singly on the ends of the stems. A very beautiful early flowering perennial.

Vinca minor. Periwinkle. (Europe).—Height 6 to 9 inches. Begins to bloom first week of May. Flowers a charming shade of bright blue. This pretty evergreen perennial succeeds well in shady places. The prostrate stems take root and it spreads rapidly.

Saxifraga (Megasea) cordifolia. (Siberia).—Height 1 foot. Blooms in first week of May. Flowers bright pink in a close panicle and on a heavy stem. This is an attractive plant with large shiny, evergreen foliage. Looks better in a clump than grown as a single plant. *S. Schmidti* is also good.

Viola odorata. English Violet (Europe, Great Britain).—Although not perfectly hardy, the single sweet scented or English violet can be grown successfully with a little care. It should be planted in a partially shady place, preferably with a Northern exposure and protected in winter with evergreen boughs, which should be gradually removed in the spring in order to give the plants a chance to harden off. The double varieties are tenderer, but one known as Hardy Russian appears to be hardier than other double kinds.

* *Mertensia virginica.* Virginian Cowslip. (Western Ontario, United States).—Height 12 to 18 inches. Blooms early in May. Flowers delicate gentian blue, changing to pink, and borne in long pendulous cymes. Leaves of an attractive shade of green. A very attractive plant. Not thoroughly tested at Ottawa yet but hardy as far north as Wisconsin.

Corydalis nobilis. (Siberia).—Height 9 inches. In bloom first week of May. Flowers yellow tipped with green, and finely cut, fern-like foliage. A pretty and striking species in early spring.

Pulmonaria mollis (maculata). Lungwort. (Siberia).—Height 1 foot. In bloom first week of May. This is closely related to *Mertensia virginica.* Flowers blue and borne in graceful racemes. The leaves are mottled, which give this plant a very striking appearance.

* *Pholx subulata* Moss Pink. (Western Ontario, Eastern States).—Begins to bloom in second week of May. There are many varieties of this charming little plant, the flowers of which vary in colour from white to deep pink and are produced in great profusion. The variety *atropurpurea* has proven one of the hardiest and best.

Polemonium humile pulchellum. Dwarf Jacob's Ladder. (Rocky Mountains).—Height 6 to 9 inches. In bloom second week of May. Flowers small, blue, in drooping panicles. This plant has finely cut foliage which helps to make it attractive.

Doronicum caucasicum. Caucasian leopard's-bane. (Europe).—Height 1 foot. In bloom second week of May. Flowers large, yellow and borne singly. A good early perennial.

* *Epimedium rubrum.* Red-flowered barrenwort. (Japan).—Height 1 foot. Blooms in second week of May. Flowers small, bright crimson and white, borne in a loose panicle. A very dainty and beautiful little flower. This and the next two should be in every collection. Both flowers and leaves are ornamental.

* *Epimedium pinnatum (sulfureum).* Yellow flowered barrenwort. (Persia).—Height 8 to 12 inches. In bloom second week of May. Flowers bright yellow, borne

in a loose panicle. This species and *E. rubrum* make a charming contrast when planted together. One of the best early flowering perennials. *E. niveum* is a white-flowered species, which is not a very robust grower.

* *Epimedium macranthum.* Large flowered barrenwort. (Japan).—Height 12 to 15 inches. Blooms during second week of May. Flowers bright red, violet and white with conspicuous spurs, making a very pleasing combination of colour. There are several good varieties of this species.

* *Papaver nudicaule.* Iceland Poppy. (Mountains and Arctic regions of Northern Hemisphere).—Height 1 foot. Begins to bloom second week of May. Flowers medium size, yellow, white, or orange. This is a very useful and pretty poppy, blooming freely until July and again in the autumn. Grows rapidly from seed.

Primula officinalis (veris). Polyanthus Primrose. (Europe, Great Britain).—Height 6 to 9 inches. In bloom second week in May. Flowers bright yellow. There is a strain of this old favourite known in the trade as the 'Hardy Primrose' or 'Harry Mitchell' which has proven perfectly hardy at Ottawa. Originated by H. Mitchell, Port Hope, Ont.

Orobus vernus. Spring-flowering bitter vetch. (Europe). Height 1 foot. In bloom second week of May. Flowers reddish-purple, pea-shaped, attractive. A good early flowering perennial.

* *Aquilegia oxysepala.* Russian Columbine. (Northern Asia).—Height 1 foot. In bloom second and third week of May. Flowers large, deep purplish-blue with blue and yellow centres. A very desirable early species and one of the best spring perennials. Being earlier than most other species, it does not hybridize, and thus remains pure.

* *Polemonium Richardsoni.* Richardson's Jacob's Ladder. (Rocky Mountains).—Height 6 to 9 inches. In bloom second and third week of May. Flowers of a fine shade of blue with yellow centres and larger than other species. Very desirable.

* *Phlox amoena.* Lovely Phlox. (Virginia).—Height 6 inches. In bloom second week in May. Flowers medium size, bright pink, in compact clusters. A fine early species.

Aquilegia glandulosa.—Altaian columbine. (Siberia).—Height 1 foot. In bloom third week of May. Flowers large, azure blue, with white centres and short spurs. A fine species. Should be treated as a biennial, as it is likely to kill out after the second season.

Aquilegia Stuarti. Stuart's Columbine.—Height 9 to 12 inches. A hybrid species. Flowers large, rich, deep blue with white centres. Finer than *A. glandulosa.* This also should be treated as a biennial, as it is not to be relied on after the second season.

* *Macrotomia (Arnebia) echioides.* Prophet Flower. (Armenia).—Height 9 inches. In bloom third week of May. Flowers borne in clusters, rich yellow with five black spots on the petals which gradually fade away leaving them all yellow. A very pretty plant.

* *Dicentra spectabilis.* Bleeding Heart. (Siberia and Japan).—Height 3 feet. Blooms during latter half of May. Flowers heart-shaped, red and white, borne in pendulous racemes. An old favourite.

* *Doronicum plantagineum excelsum.* Tall plantain-like leopard's bane. (Great Britain).—Height 2 feet. In bloom third week of May. Flowers large and deep yellow. Good for cutting. A fine plant and very desirable.

Iris pumila. Crimean Iris. (Europe, Asia Minor).—Height 4 to 5 inches. This little iris, with its purple flowers, is well known, being found in many old gardens. It is very hardy and blooms during the second and third weeks of May. There are several

varieties, among the best of which is *coerulea*. There are now some good hybrids between this and other species which bloom early, have a wider range of colour, and should prove very desirable.

* *Trollius*, Orange Globe. Globe Flower.—Height 1½ to 2 feet. In bloom third and fourth weeks of May. Flowers large, double rich golden yellow. A very desirable plant. Other Globe flowers which are very good are *Trollius asiaticus*, with large orange flowers, and *T. europaeus* and *T. europaeus giganteus* with paler yellow blossoms.

* *Iberis sempervirens*. Evergreen Candytuft. (South Europe).—Height 9 to 12 inches. Begins to bloom in third week of May. Flowers pure white; foliage evergreen. This is really an evergreen shrub, but can be treated as a herbaceous perennial. It is quite hardy and desirable. The variety *garrexiana* is also good and blooms about the same time.

* *Mysotis alpestris*. Alpine Forget-me-not. (Mountains of Europe, Great Britain).—Height 4 to 6 inches. Begins to bloom in third week of May. This popular flower needs no description. It should be in every garden.

Phlox divaricata. Blue Phlox. (Ontario, United States).—Height 9 to 14 inches. Begins to bloom in third week of May. Flowers pale bluish lilac. A free bloomer, continuing to flower for a considerable time.

Iris cristata. Crested Iris. (North Carolina).—Quite dwarf, 3 to 6 inches in height. It blooms the third and fourth weeks of May. A very dainty little species with light blue and yellow flowers. Fine in masses.

Primula Sieboldi. Japanese Primrose. (Japan).—Height 9 inches. Begins to bloom third week of May. This is a very pretty primrose and one not generally known. The flowers are of good size with fringed petals and range in colour from pure white to crimson, according to variety. This primula should not be planted in exposed places, as it is liable under such conditions to kill out.

Aquilegia canadensis. Wild Columbine. (Eastern Canada, United States).—Height 1 to 2 feet. Begins to bloom in third week of May and continues for some time. This beautiful and graceful wild plant, which succeeds well under cultivation, is not planted as extensively as it deserves. The flowers are red with yellow centres and are quite attractive and freely produced. The foliage, also, is attractive.

Polemonium reptans. Greek Valerian. (United States).—Height 6 to 10 inches. Begins to bloom during third week of May and continues for some time. Flowers numerous, blue, and borne profusely in loose clusters.

* *Anemone sylvestris*. Snowdrop windflower. (Europe).—Height 12 to 18 inches. Begins to bloom third week in May and continues for some time. A beautiful large, pure white-flowered species with long stems. Succeeds best where there is plenty of moisture.

* *Phlox reptans*. Creeping Phlox. (United States).—Height 4 to 6 inches. In bloom fourth week of May and later. Flowers medium size, rosy pink with a shade of lilac. A very pretty species.

* *Convallaria majalis*. Lily of the Valley. (Europe, North Asia).—Height 6 inches. Blooms during the fourth week of May. This beautiful flower should be in every garden, but should be planted by itself in a partially shaded place.

* *Aquilegia coerulea*. Rocky Mountain Columbine. (Rocky Mountains).—Height 12 to 18 inches. In bloom fourth week of May. Flowers large, deep blue with white centre and long spurs. A very beautiful species of which there are some charming varieties in cultivation.

Aquilegia flabellata nana alba. Dwarf White-flowered Columbine. In bloom fourth week of May. The species of which this is a variety comes from Japan. This is a white-flowered perennial with attractive foliage which has a bluish tinge.

Paeonia tenuifolia. Fennel-leaved Paeony. (South-western Europe).—Height 14 to 18 inches. In bloom fourth week of May. Flowers medium size, deep crimson, contrasting well with the finely cut fern-like foliage.

* *Paeonia tenuifolia flore pleno.* Double-flowered Fennel-leaved Paeony. This variety is even better than the species. The flowers are deep crimson and double.

* *Iberis corifolia.* Correa-leaved Candytuft. (Eastern Europe).—Height 1 foot. Begins to bloom during last week of May. Flowers pure white, in compact heads which elongate as later buds open. This is the best of the hardy evergreen candytufts and blooms later than *I. sempervirens.*

Ajuga genevensis. Geneva Bugle. (Europe).—Height 4 to 6 inches. Begins to bloom in last week of May. Flowers bright blue, in compact spikes. This plant blooms so profusely that the foliage, which is also attractive, is almost hidden. Of no value for cutting, but useful for covering the ground. It spreads rapidly.

Iris sibirica. Siberian Iris. (Central Europe to Siberia).—Height 2 to 4 feet. In bloom last week of May. So many fine kinds of better iris follow this species in bloom that in an ordinary border it may be omitted, but where there is a bog this should not be left out as it is quite striking when treated as a wild plant. There are several varieties, ranging in colour from white to deep blue. The native species, *I. versicolor* is almost, if not quite, as good, but does not grow as tall.

Iris Chamæiris. (South Europe). Height 6 inches. In bloom fourth week of May. Flowers bright yellow with brown markings. A pretty species.

* *Iris florentina.* Oris root. (Central and Southern Europe).—Height 2 to 3 feet. Begins to bloom in last week of May. Flowers very large, pale blue or lavender, almost white; sweet scented. A splendid iris.

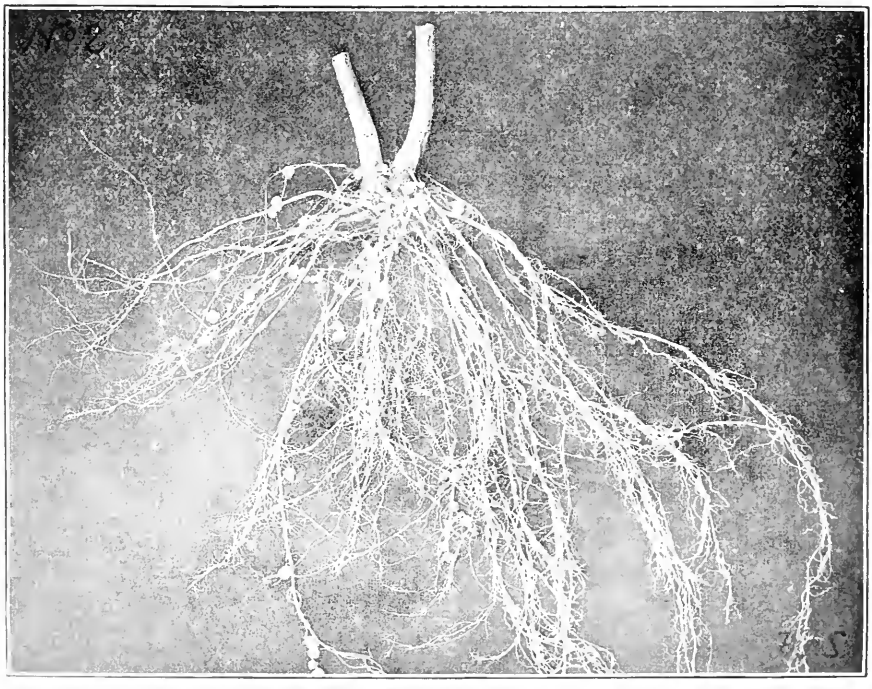
* *Iris germanica.* German Iris. (Central and Southern Europe).—Height 2 to 3 feet. Begins to bloom in last week of May. Flowers very large, bright bluish purple. Very handsome. This is the old-fashioned species. The varieties, which have been grouped under the name 'German Iris,' bloom early in June. Two fine varieties of the May flowering species are Kharput and Purple King.

In addition to the above species and varieties, there are some fine native spring flowering perennials which will succeed under cultivation, especially if given partial shade and a liberal supply of leaf mould, among these being:—

Sanguinaria canadensis, Blood Root; *Dicentra cucullaria*, Fly Flower; *Tiarella cordifolia*, False Mitrewort; *Trillium grandiflorum*, White Trillium; *Trillium erectum*, Purple Trillium; *Actaea spicata var. rubra*, Red Cohosh; *Anemone Hepatica*, Windflower; *Viola canadensis*, Branching White Wood Violet; *Viola Dicksoni*, Large blue Violet; *Thalictrum dioicum*, Early Meadow Rue; *Uvularia grandiflora*, Bellwort.

The herbaceous perennials described should be well supplemented in gardens with spring flowering bulbs, which are especially valuable for massing in beds.

SOJA BEANS, COLLECTED SEPT. 15TH.
Height of Plants 3 ft., 3 in. Yield 9 tons, 1,700 lbs. per acre.



Photos. by Frank T. Shutt.

SOJA BEANS. Roots (1 ft., 3 in.) showing nodules.

REPORT OF THE CHEMIST.

(Frank T. Shutt, M.A., F.I.C., F.C.S., F.R.S.C.)

Ottawa, December 1, 1902.

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith the sixteenth annual report of the Chemical Division of the Experimental Farms.

There has been no effort to incorporate all the results obtained in the laboratories during the past year, many of the investigations being still in progress and others having already received publicity in bulletin form. Further, the desirability of reducing the size of the complete report has made it necessary to omit certain details which, though interesting, are not perhaps essential to the elucidation of the results now presented. I trust, however, in the attempt to be concise there has been no sacrifice of clearness and that the explanations and deductions given will be found sufficiently explicit for the purposes of our readers. As in past years, there has been a great deal of work, also, which does not find a place in the annual report from the fact that the results are considered of value only to the individual for whom it was made. Of such work, we may instance the examination of a number of soils and other samples received from farmers. It must not be thought, however, that this has not proved useful and valuable, for the Experimental Farms system seeks to educate the farmer as an individual as well as to benefit the agricultural community as a whole.

Certain investigations that have involved considerable labour, are reported upon elsewhere. Of these we may refer to articles on the fattening of chickens, and on the preservation of eggs, in the present report of the poultry manager; the examination of Canadian honey, in the transactions of the Ontario Bee-keepers' Association; and the analysis of Canadian Creamery Butter, as published by the Dairy Division, Department of Agriculture, Bulletin No. 4, New Series. Mention may also be made of the bulletin on Clover as a Fertilizer, (No. 40, July, 1902, Experimental Farm Series), the joint work of Dr. Saunders and the writer.

No attempt will be made in this letter to summarize the work in this report, but attention may be briefly directed to those investigations which appear to the writer as being of greater interest or importance and which afforded results of immediate and practical value to Canadian agriculture.

The Relation of Cover Crops, Sod and Surface Tillage, to the Moisture content of Soils—This research, begun in 1901, has been continued during the past season, the experiments being carried out on soils of the Central Farm orchards. Further and valuable information has been gained on this important subject, especially instructive being the data obtained from the plot under a two year old sod. According to this year's results, the latter makes a very much heavier draught upon soil moisture than a system which calls for cover crops (*e.g.*, clover) and surface tillage.

Fodders and Feeding Stuffs.—Under this caption we include, first, a report on certain mixed ensilages, (clover and corn) produced on the Central Farm, and show that from such a combination it is possible to obtain a succulent, palatable food considerably richer in the flesh-forming constituents than corn ensilage.

An examination of the ordinary farm roots (mangels, turnips, &c.), has again been made, determining their dry matter and sugar contents. The feeding value of many of them is far in advance of that obtained last year, largely due, we presume, to the favourable conditions of weather prevailing during September. Reference must also be made to the so-called sugar mangels and their general superiority from the standpoint of composition for feeding purposes.

Among fodders, an account of Bromus arvensis, as grown in Manitoba, is furnished and its feeding value contrasted with its near relation—the justly celebrated Awnless Brome Grass. Upland and lowland hays from Assiniboia, sedge hay from the salt marshes of New Brunswick have also been analysed. The principal feeding stuffs examined comprise gluten meals and other corn by-products, oil cake, cocoanut cake, cotton seed meal, bran, Blatchford's calf meal, and certain mixed feeds used on board ship for cattle en route to England.

Insecticides and Fungicides.—Analyses have been made of several brands of 'cyanide' upon the Canadian market. This, as is well known, is used largely in fumigation for the destruction of the San José scale on nursery stock. The value of any particular sample of potassium cyanide is, of course, dependent upon its gas (prussic acid gas) producing power, and our results show how far dependence can be placed on the ordinary guarantee under which it may be sold and the causes for deterioration.

The 'Lime, Sulphur and Salt Wash,' or so-called California Spray, is another remedy used in the control and destruction of the San José scale, and very much in favour at the present time for orchard treatment. Certain information, the result of experimental work, is given with regard to the correct proportions of the constituents to be used.

The new insecticide, Bug Death, for which so much has been claimed, has been analysed and the results inserted in this report.

Sugar Beets.—Though we have since the establishment of the Experimental Farms studied the sugar beet as grown in various parts of the Dominion with a view of determining the suitability of our soils and climate for sugar production, there has been an increase this season in the number of samples usually examined. The following provinces are represented:—Prince Edward Island, Nova Scotia, Ontario, Manitoba, and the North-west Territories. The data thus supplied will no doubt prove especially valuable this year, when there is a more than usual interest being taken in the development of the beet sugar industry in Canada. Speaking generally, we may say that our results this year, as in the past, have shown that beets of an excellent quality and purity—and quite suitable for factory purposes—can be raised over large areas in the Dominion. In these favourable areas existing in a large number of our provinces, the beets, if from good seed and properly cultivated, are quite equal to those grown in the United States and European countries for sugar production.

Flour.—The high standing of Canadian Baker's Strong Flour, as manufactured from No. 1, Hard Red Fife wheat, has been brought out by a series of comparative analyses. The data, it is expected, will prove valuable in developing a Canadian export flour trade to the Orient, now largely served by flour from Oregon and Washington.

Tuberculin.—In July of the current year the preparation and distribution of tuberculin was handed over to Dr. Higgins, Pathologist of the Veterinary Branch of the Department of Agriculture. From November 1, 1901, to July 12, 1902, 3,025 doses of tuberculin had been forwarded from the farm laboratory to Dominion Veterinary Inspectors.

Toxicological Work.—At the instance of the Chief Veterinary Inspector, we have during the past year examined several cases of alleged poisoning, reports of the analyses being made to that officer.

Correspondence.—The letters received by this division from November 30, 1901, to December 1, 1902, in addition to those referred to us by the other departments of the farm, numbered 1,163; those sent out during that period, 1,233.

Samples Received for Analysis.—In the following tabular statement the samples received from farmers during the past year are enumerated and their nature indicated. Every year sees an increase in this branch of our work, which is sufficient evidence of its usefulness and popularity:—

SAMPLES Received for Examination and Report, November 30, 1901, to December 1, 1902.

Samples.	British Columbia	North-west Territories.	Manitoba.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Total.	Number at present awaiting examination.
Soils	12	3	5	100	6	3	25	4	158	21
Mucks, muds and marls	2	1	0	4	4	6	9	10	36	8
Manures and fertilizers	0	0	0	4	0	1	7	4	16	6
Forage plants and fodders	2	15	13	74	5	12	9	9	139	19
Well waters	1	12	10	53	19	3	3	1	102	0
Miscellaneous, including dairy products, fungicides and insecticides	3	4	4	115	4	7	8	2	147	4
Total	20	35	32	350	38	32	61	30	598	58

Acknowledgments.—The very large amount of analytical work accomplished in the Farm laboratories during the past year has only been made possible by the hearty co-operation of the Assistant Chemists, Mr. A. T. Charron, M.A., and Mr. H. W. Charlton, B.A.Sc. My thanks are due to these gentlemen for their prompt and skilful assistance on all occasions, as well as for their warm interest in the various investigations undertaken by this division.

To Mr. J. F. Watson I am also much indebted for valuable help in connection with the clerical work of the division. His duties have always been performed with assiduity and care, and I am pleased to bear testimony to the excellence of his work.

I have the honour to be, sir,

Your obedient servant,

FRANK T. SHUTT,

Chemist, Dominion Experimental Farms.

SOIL INVESTIGATIONS.

BRITISH COLUMBIA.

Peachland, Okanagan Valley.—Much of the soil of this district appears to be of an extremely light and sandy nature, though under irrigation yielding fair crops. A correspondent, in sending samples of new (surface) soils from that district, states that clover usually grows well and furnishes two or three cuttings in a season, but that garden crops (vegetables) and fruit trees have not been very successfully grown, save with the aid of manure. The soils were of a grayish-yellow colour and would be termed sandy loams of poor quality. The quantity sent did not allow us to make a complete analysis, but certain important data were obtained.

Organic Matter and Nitrogen in (water-free) Soil.

	Organic Matter.	Nitrogen.
No. 1	3·66	·048
2	4·02	·068
3	3·30	·064

Qualitative analysis showed that all the soils possessed a fair amount of lime.

For arable lands these soils are exceedingly poor in nitrogen. It is evident also that they stand in need of humus or semi-decomposed vegetable matter. For these important constituents organic manures must be supplied and the stock of stable manure supplemented from time to time by clover turned under.

A very important matter for such soils as these is that there should be a sufficiency of water, for, poor as they may be in plant food, their crops frequently suffer more from drought than from lack of nourishment. Increasing the soil's store of organic matter not only enriches it in the elements of fertility, but vastly improves its moisture-holding capacity.

As a fertilizer for garden stuff, the following formula may be suggested, the quantity being for one acre :—

	Lbs.
Superphosphate	150
Bone meal	150
Muriate of potash	100–150
Nitrate of soda*	100–200

*Applied in two or more applications as a top dressing.

Enderby.—A dark-gray, heavy clay soil, which when received at the laboratory had dried into a hard, refractory mass, indicating a poor or unfavourable condition.

A partial analysis afforded the following data :—

Moisture	7·18
Organic and volatile matter	10·59
Oxide of iron and alumina	24·68
Lime	1·21
Nitrogen, in organic matter	·301
Lime, soluble in 1 per cent solution of citric acid	·075

This soil, as regards nitrogen, must be considered above the average, and this fact no doubt accounts in a large measure for the high productiveness of this land and its suitability for wheat growing. It is also well supplied with organic matter.

The percentage of lime obtained by using hot, strong hydrochloric acid as a solvent is by no means insignificant, but that a very small proportion exists in an available condition is evident from the amount soluble in dilute citric acid, viz., ·075 per cent.

It seems therefore, from our examination that this might be considered a rich soil, but one that might be improved by thorough drainage, careful working and the judicious use of lime. An application of this 'amendment,' say at the rate of 40 bushels per acre, harrowed under would, we believe, increase the soil's productiveness, and in conjunction with drainage, weathering and 'dry' working of the land, materially ameliorate its physical condition.

The continued use of lime makes it desirable that organic manures should also be employed from time to time, and to this end, if there be not a sufficiency of stable manure, it is advisable to occasionally turn under a green crop, such as clover.

NORTH-WEST TERRITORIES.

Alberta.—At our request, two samples of soil, representative of the first and second foot, respectively, of the land about Lethbridge, Alta., were kindly collected by Mr. W. H. Fairfield, of the Canadian North-west Irrigation Co., Lethbridge, and forwarded to the farm laboratories. In this district the soil is extremely uniform in character, being of the nature of a true prairie and very fertile, provided there is a sufficiency of moisture. There are no woods save in the river bottoms.

In a letter accompanying the samples, Mr. Fairfield writes: 'The soil samples were taken October 20, 1901, from the north-western portion of the Canadian North-west Irrigation Experiment Farm. The spot from which they were taken was typical of the farm, and for that matter of the surrounding country, as far as surface indications (e.g. grass, &c.) are concerned. The land at this point has never been irrigated.' After describing the manner in which the samples were taken, he says: 'No. 1 is therefore, representative of the first foot, and No. 2 of the second foot of soil. The soil changes to a lighter colour at a depth varying from twenty inches to two feet and over.'

The surface soil as received was a dark gray inclining to black, loam, light and friable, free from stones and containing an abundance of root fibres. From appearance, one would judge it of more than average fertility. The soil from the second foot only differs from the surface sample in being slightly lighter in colour and containing less fibre. The soils freed from all fibre were submitted to analysis, with the following results:—

Analysis of (air-dried) Soils.

	No. 1. 1st Foot.	No. 2. 2nd Foot.
Moisture	2·53	2·78
Organic and volatile matter	5·74	5·55
Clay and sand (insoluble in acid)	80·74	80·00
Oxide of iron and alumina	8·00	8·01
Lime	1·01	2·07
Magnesia	0·39	0·82
Potash	0·45	0·50
Phosphoric acid	0·12	0·11
Carbonic acid, &c. (undetermined)	1·02	0·16
	100·00	100·00
Nitrogen, in organic matter	0·210	0·145

Available constituents in Surface Soil.

Potash	0·028
Phosphoric acid	0·008

No. 1. In organic matter (humus) and nitrogen, the results are exceedingly satisfactory, indicating a high degree of fertility.

The percentage of potash is somewhat above the average, in lime also this soil is well supplied. The amount of phosphoric acid is not equal to that present in our better virgin soils.

The estimation of the more readily available potash and phosphoric acid furnishes data of a highly gratifying nature as regards potash, but shows that in phosphoric acid the store is of a limited character.

It is not always the case that the amounts of 'total' and 'available' mineral elements correspond, that is, are relative, but in this soil we have an instance which well illustrates an apparent rule as regards virgin soils, that the larger the amount of 'total' the larger the amount of 'available' potash and phosphoric acid.

Our results indicate that cropping will first lead to a deficiency of phosphoric acid, and consequently emphasize the value of a phosphatic manure.

No. 2. Considering the depth from which this soil was taken, the results are remarkable. In all essential particulars they prove the great fertility possessed by this sub-soil, though by reason of its richness in plant food, appearance, texture, &c., we should be inclined rather to consider it as part of the surface soil.

ONTARIO.

Abitibi Region, Nipissing District.—At the request of Dr. Robert Bell, Acting Director of the Geological Survey of Canada, a careful analysis has been made of a sample of soil from this newly explored area of North-western Ontario. The sample was collected by W. J. Wilson of the Geological Survey staff during his explorations of 1901, in the vicinity of Lake Abitibi, at a point on the Black River near its first fall, 17 miles from its mouth. Latitude about 48° 38′, and longitude about 80° 27′. Our report on this soil is as follows:—

General appearance and texture.—This is a sandy loam of a dark-gray colour and showing a considerable amount of vegetable fibre, derived chiefly from fragments of roots and bark.

There are no pebbles and the soil appears to be in an excellent physical condition, due no doubt chiefly to its comparatively speaking large proportion of organic matter. Judging from its general appearance and texture, it should prove a fertile soil, though more suited for potatoes and root crops than for the growth of the cereals.

Analysis of (air-dried) Soil.

Moisture	1·86
Organic and volatile matter	9·73
Insoluble matter (clay and sand)	79·96
Oxide of iron and alumina	7·67
Lime	·45
Magnesia	·44
Potash	·36
Phosphoric acid	·11
Carbonic acid, &c. (undetermined)	——
	100·58
Nitrogen, in organic matter	·227

Available Constituents.

A determination of the amounts of phosphoric acid, potash and lime soluble in a 1 per cent solution of citric acid, and consequently to be considered as more or less immediately available for plant use, yielded the following data :—

Phosphoric acid	·0192
Potash	·0142
Lime	·376

This soil appears to be very fairly well supplied with all the essential elements of fertility, save phosphoric acid, which latter is somewhat below the average found in our better and more fertile soils. The proportions of these constituents present in an assimilable condition indicate that it would prove productive.

In humus and nitrogen this soil may be said to be particularly rich, though no doubt much of the latter exists in a condition not immediately available to crops.

Considered from the chemical, as well as the physical, standpoint, this soil might be expected to be one that would yield remunerative crops, provided climatic conditions were favourable.

Mr. Wilson, in his 'Summary Report' for 1901, speaking of the locality from which the soil was taken, says : 'A half-breed family named McDougall have a neat house and small clearing at this point, where they have planted a patch of potatoes which promised an abundant crop. An average stalk measured 42 inches in length and some of the potatoes were quite large.'

In another place in the same report Mr. Wilson makes the following observations regarding the quality of the land and the climate : 'I am convinced that there are large areas of agricultural land of excellent quality, especially in the river valleys, the soil being in most cases a clay loam, free from stones and easily cleared. The climatic conditions also seem favourable for farming operations, and these would improve with the clearing and drainage of the land. When it is remembered that Lake Abitibi is further south than the southern boundary of Manitoba, it will be seen that there is nothing in the latitude to prevent the successful cultivation of the soil, and further, it has been practically proved for many years that vegetables of all kinds can be successfully grown at Abitibi.'

NEWFOUNDLAND.

This soil was forwarded by T. A. Maher, Esq., St. John's, who furnished the following particulars :—

'Soil from farm at Nagle's Hill, 2 miles from St. John's, under cultivation for 20 years ; was seeded down to clover and timothy seven years ago and remained undisturbed since. During this seven years it has been continually cropped, but has not received any manure. It was originally a marsh. Surface soil about 8 inches deep ; subsoil of brown clay with white and blue stones. The sample indicates the nature of the soil in and about the suburbs of St. John's, which consist of small farms. Surrounding locality wooded with fir and spruce.'

This soil is essentially a gravelly loam, of a dark yellowish gray colour. When air-dried and sifted (using a mesh of ·5 mm) the soil was found to consist of :—

	Per cent.
Gravel, pebbles, small rock fragments	42·65
Fine soil	57·35

The rock fragments appeared to be weathered and partly disintegrated feldspar ; the fine soil was chiefly sand, the amount of clay and silt present being small. It is consequently to be regarded as a 'light' soil, with a very loose, open texture and consequently not well adapted to all classes of crops.

On submitting the fine soil to analysis we obtained the following data :

Analysis of (air-dried) fine Soil.

Moisture	3·02
Organic and volatile matter	20·22
Insoluble residue (chiefly sand)	63·05
Oxide of iron and alumina	11·95
Lime	·43
Magnesia	·10
Potash	·22
Phosphoric acid	·25
Carbonic acid, &c. (undetermined)	·76
	100·00
Nitrogen, in organic matter	·536

Available Constituents.

Phosphoric acid	·041
Potash	·0096
Lime	·308

Conclusions and Suggestions.

The most noticeable features in the above data are the comparatively speaking large percentages of organic (vegetable) matter and nitrogen. Though no doubt much of this latter element is in a 'locked-up' form, we should not expect that the soil would be greatly benefited by the application of nitrogenous fertilizers, provided climatic influences were favourable for nitrification. Further, although from appearance one might judge the soil as somewhat poor from the physical standpoint and apt to dry out, analysis does not indicate the immediate need of an organic manure. It must be remembered, however, that this soil for the past seven years has been continually in sod, which has had the effect of increasing the humus and nitrogen content, and that if the the soil is now put under active cultivation the tendency will be towards the dissipation of the humus. Consequently, the desirability (under the latter circumstances) of applying farm-yard manure from time to time will be obvious, as well as adopting a rotation which provides for the growth of clover, say every third or fourth year.

The amount of phosphoric acid is somewhat similar to that found in soil of average fertility ; the potash falls slightly below the limit for the best returns. While not rich in lime, it is by no means deficient in this important element.

The percentages of the mineral elements of fertility that may be regarded as more or less immediately available for plant nutrition have been determined. They indicate (1) an apparent sufficiency of phosphoric acid for the present as regards the cereals, though for root crops the amount might be increased to advantage. (2.) That an application of potash would, in all probability, tend to increase the productiveness of the soil. (3.) That the necessity of any special lime fertilizer is not apparent, though, if potash salts are used, it will no doubt be found of benefit to also furnish a small amount of lime. These conclusions and suggestions are based on the analysis of the 'fine' soil which, it must be remembered is that part furnishing the immediate sustenance to crops. More then 40 per cent of the soil consists of pebbles, gravel, &c., which though materially affecting the physical character of the soil can scarcely be taken into account when considering the possible stores of plant food.

SESSIONAL PAPER No. 16

THE CONSERVATION OF SOIL MOISTURE IN ORCHARDS.

The subject of the relation of 'cover' crops and cultivation to soil moisture was discussed in our report for 1901. Results were also given of a series of experiments carried out on the Central Farm during that season that demonstrated the intimate connection between the condition of a soil (i.e., whether in crop or cultivated) and its moisture-content. These experiments with certain modifications have been continued during the past summer with the view of still further extending our knowledge on this important matter. The investigation of 1902, comprised two series of experiments. The first was to learn the effect upon soil moisture-content *(a)* by cultivation throughout the entire season, *(b)* by cropping with clover till the end of May or beginning of June, followed by ploughing and cultivation until the latter part of July and then resown with clover, and *(c)* by the growing of clover throughout the season. The second series was planned to ascertain the difference in moisture-content between soil cultivated throughout the season and that kept in (grass) sod.

The moisture determinations were made fortnightly from the beginning of April to the middle of November, on samples taken to a depth of fourteen inches.

First Series.—Three adjoining plots, each 40 by 120 feet, in the apple orchard.

Plot 1.—Disc-harrowed in spring, and cultivated throughout the season at intervals of a few days to a fortnight, as occasion required.

Plot 2.—The clover from the previous year's sowing was cut June 4, but allowed to grow until June 9, when it was ploughed under. The land was then disc-harrowed and kept fallow by constant harrowings and cultivations (June 12, 16, 25 and July 8). It was resown to clover on July 21, but the growth was exceedingly sparse, and the ground became, before the close of the season, virtually covered with purslane, with very little clover showing.

Plot 3.—The plot was allowed to remain in clover (sown in 1901) throughout the season, the crop being cut from time to time, but not taken away. The dates of cutting were as follows: June 4, 26, July 22, August 27.

TABLE I.—First Series—Percentages of Water in Soils, (*a*) cultivated throughout the season, (*b*) under cover crop and cultivated, and (*c*) in clover throughout the season.

Dates of Collection.	Rainfall in Inches.	PLOT 1.	PLOT 2.	PLOT 3.
		Cultivated throughout Season.	Clover ploughed under June 9, cultivated to July 21, then resown with Clover.	In Clover throughout Season.
1902.				
April 5	1·11	14·77	15·55	15·96
" 19	·71	10·09	12·96	12·93
May 3	2·13	13·36	16·63	14·69
" 17	·52	12·79	10·02	11·89
" 31	1·10	11·46	10·80	12·00
June 14	2·14	12·98	12·36	13·16
" 28	2·01	9·86	13·13	11·79
July 12	·41	11·30	11·07	9·07
" 26	3·55	15·44	13·46	13·56
August 8	·24	11·66	12·91	9·23
" 23	1·53	13·76	13·72	10·91
September 6	·49	11·83	7·14	6·99
" 20	·37	7·85	7·98	5·43
October 4	1·31	13·33	13·69	10·66
" 18	1·51	14·45	13·56	14·68
" 31	1·45	14·57	14·44	14·30
November 15	1·06	14·63	15·48	15·53

In considering the data presented in Table I. it must be borne in mind that the past season has been a very poor one for clover. The growth on plots 2 and 3 was very sparse and in no way comparable to that of 1901. There, consequently, was not the same draught upon the soil moisture due to the growth of 'cover' crop this season as there was last year. Usually, there is a very fair mat of clover by the middle of May. This season, on June 4, when it was cut, the crop would be considered a very light one. This fact, in addition to an ample and equable rainfall, will, we believe, account in a very large measure for the differences between the moisture contents of the soils of the three plots not being so marked as last year. In other words, the soil conditions on the plots more or less approximated in certain essential particulars. Nevertheless, the results on the whole point in the same general direction as in the previous work, namely, that cultivation conserves soil moisture, and that the growth of a cover crop or sod dissipates it. Hence the wisdom, in districts where there is likely to be a scarcity of rain, of clean cultivation during the period when the trees are most in need of moisture, followed by a cover crop to furnish protection through the winter and enrich the soil. The probabilities are that there is very little necessity, ordinarily, for cultivation in the orchards of the Experimental Farm at Ottawa to conserve moisture, for the district enjoys usually an ample precipitation, fairly well distributed throughout the growing season, and the practice of the Horticulturist in at once seeding down after the ploughing under of the cover crop, receives much support from this year's results.

In reviewing the data presented by the second series of experiments, and comparing them with the foregoing, it will be readily observed that the effect of a permanent sod upon the soil's moisture is very much more marked than that of a cover crop, such as clover.

Second Series.—Two adjoining plots in the plum orchard.

Plot 1.—Cultivated throughout the season of 1902. The dates of cultivation are as follows:—May 8, June 11, July 9, July 29 and August 4. The plot had been ploughed in the spring of 1901 and kept cultivated during the season.

Plot 2.—In permanent (2-year old) sod throughout the season. The grass was cut and allowed to remain that it might act as a mulch. The mowings were on June 2, June 30 and August 11.

TABLE II.—Second Series—Percentages of Water in Soils, (*a*) cultivated, and (*b*) in sod.

Dates of Collection.	Rainfall in Inches.	Plot 1.	Plot 2.	Excess of Moisture in the Cultivated Plot.	
		Cultivated throughout Season.	In Sod (2nd Year.)		
1902.				Tons. per acre.	Lbs.
April 5	1·11				
" 19	·71	15·31	15·88	16	29
May 3	2·13	18·37	16·26	58	1,332
" 17	·52	15·37	10·75	117	25
" 31	1·10	17·30	9·81	192	211
June 14	2·14	16·62	10·49	157	253
" 28	2·01	18·19	13·69	121	1,836
July 12	·41	16·07	7·24	217	1,136
" 26	3·55	14·32	11·80	64	285
August 8	·24	14·65	6·47	196	58
" 23	1·53	15·83	8·96	171	1,020
September 6	·49	13·61	8·33	126	1,818
" 20	·37	9·24	4·77	98	1,875
October 4	1·31	12·29	9·17	75	980
" 18	1·51	14·77	15·12		
" 31	1·45	15·94	15·57	9	1,946
November 15	1·06	16·52	17·29		

This is a most instructive series of results. The data are well worthy the careful perusal of every orchardist.

These two soils started out with practically the same moisture content (see April 19), but as the season advanced and the grass grew, the demand on the soil moisture of plot 2 became greater and greater. This began to be evident soon after May 1. By May 15 there was 50 per cent more moisture in the soil (to a depth of 14 inches) of the cultivated plot than in the soil covered with sod. At the end of May this difference had increased to almost 100 per cent; in other words, there was nearly twice as much moisture in the cultivated soil as in that under sod, due partly to the conserving action of cultivation on the one plot (No. 1), and partly to loss of moisture from transpiration of the foliage and greater loss due to capillary action in ths soil on the other (No. 2) plot.

Throughout the whole growing season most marked differences in the moisture-content of the soils of these two plots are to be observed—and always in the same direction. If during the two weeks previous to the collection of the samples there had been an ample rainfall—as, for instance, for the periods ending June 14 and 28, and July 26—the moisture-content of the plots did not differ to the same extent that they did after periods of comparative drought. The last column of Table II furnishes data in this connection of a most decisive character, pointing especially to the heavy call on the moisture of the orchard soil by sod at a time when the trees are most in need of it. Towards the close of the season, when vegetative growth has ceased, and there is a liberal rainfall, the soils approximated more and more in their moisture content, and the experiment closed as it had begun, with soils equally moist or practically so.

In concluding this brief discussion, we may say that although the past season's work did not yield results as regards the effect of cover crops (clover) on soil moisture, of such an emphatic character as those of the previous season (the chief reason for which undoubtedly was the poor growth of clover on the plots this year), the data for the most part corroborate our conclusions given in the report for 1901 on this subject.

The plan or system of orchard management that includes cover cropping and cultivation will vary somewhat according to the district (*see* pages 149, 150, 151, Report for 1901), but its effectiveness generally in regulating the soil's moisture, in enriching the soil with humus and nitrogen, in arresting the loss of nitrates in the autumn and in furnishing protection during the winter to the trees' roots cannot be doubted.

Perhaps the most valuable lessons from this year's investigation are to be drawn from the experiments of the second series. We learn, in the first place, that a very great distinction must be drawn between sod and cover crops as regards effect upon soil moisture. The former dries out the soil to a much greater degree and consequently cannot be advised, save in exceptionally well watered districts or where the water level is high. As already stated, the system of orchard soil management must be worked out after a careful consideration of the soil and climatic conditions, but it does seem to the writer that the instances in which it would be advantageous to keep the orchard in permanent sod must be exceptional, and especially so when the trees are young.

FODDERS AND FEEDING STUFFS.

CORN AND CLOVER ENSILAGE.

Though corn is, and probably will ever remain, in Canada the most important ensilage crop, the desirability of a succulent roughage richer in protein is often felt and expressed. Naturally, clover, or some other of the legumes, such as horsebeans, occurs to the mind as probably suitable for making such an ensilage, and many experiments have been made to learn with what degree of certainty good ensilage from such crops can be made. As pointed out in our report for 1901 (p. 177-8), certain difficulties are met with in ensiling succulent crops rich in nitrogen, but that with careful attention to one or two details these difficulties may be in a very large measure overcome. Thus, in

the report of the farms just referred to (p. 303) the Agriculturist furnishes particulars of an excellent ensilage made at the Central Farm entirely from clover, palatable and eaten with eagerness by dairy cattle. This ensilage, among others, was submitted to analysis and its superiority to corn ensilage, in point of protein-content, demonstrated, as the following averages make evident :

—	Dry Matter.	Nitrogen Compounds. (Crude Protein).	
		Albuminoids.	Non-Albuminoids.
Corn ensilage	22·94	·85	1·05
Clover ensilage	19·76	1·85	1·14

The figures calculated on the water-free basis make the richer character of the dry matter of the clover ensilage still more apparent.

—	Nitrogenous Compounds. (Crude Protein).	
	Albuminoids.	Non-Albuminoids.
Corn ensilage	3·69	4·56
Clover ensilage	9·34	5·84

In spite of these very satisfactory results, however, we must recognize that the ensiling of clover by itself is fraught with more or less uncertainty, for efforts made in silos on the experimental farm have at times resulted in a loss or waste equal to 10 per cent of the total feeding value, due to coarseness of material, lack of closeness in packing, or other causes. The plan of ensiling corn with the clover in varying proportions was consequently thought worthy of trial by the Agriculturist of the Central Farm, who carried out the idea in 1901-2, by putting in the experimental silo (made of staves, diameter 9 feet, height 22 ft.), certain mixtures, as follows :—

A.—Corn, 4 tons ; clover, 2 tons ; sunflowers, $\frac{1}{4}$ ton.

B.—Corn, 2 tons ; clover, 4 tons.

C.—Corn, 4 tons ; clover, 2 tons.

D.—Corn, 2 tons ; clover, 2 tons.

'D' was placed in the silo first, then 'C', 'B', 'A', in the order named.

The corn and clover were run through the cutting machine together, so that they were considered as fairly well mixed.

These ensilages kept very well, with little loss, and are reported by the Agriculturist as of excellent quality and relished by the cattle.

They were analysed, samples for this purpose being taken (at the dates mentioned in the subjoined table) during the period in which they were fed ; February, March and April, 1902.

CORN AND CLOVER ENSILAGES, 1901–2.

Number	Date of Collection.	Composition.	On Fresh Material.								On Water-free Substance.						
			Moisture.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.	Crude Protein.		Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.	Crude Protein.	
									Albuminoids.	Non-Albuminoids.						Albuminoids.	Non-Albuminoids.
	1902.		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
A	Feb. 1	Corn 4 tons, clover 2 tons, sunflowers ¼ ton..	75·37	2·68	·35	12·68	6·56	2·36	1·82	·86	10·88	1·41	51·50	26·63	9·58	7·38	3·50
B	Mar. 14	Corn 2 tons, clover 4 tons	75·20	3·61	·44	10·74	6·66	3·35	2·86	·75	14·56	1·76	43·35	26·84	13·49	11·56	3·00
C	Apr. 10	Corn 4 tons, clover 2 tons . ..	77·09	3·18	·44	10·30	5·87	3·12	2·18	1·00	13·88	1·92	44·97	25·62	13·61	9·50	4·38
D	„ 23	Corn 2 tons, clover 2 tons	75·62	2·60	·36	11·06	7·14	3·22	1·63	·97	10·69	1·47	45·35	29·28	13·21	6·69	4·00

Comparing these ensilages, we notice first that in percentage of dry matter three of them, 'A', 'B', and 'D', are almost identical. Ensilage 'C' contains about 1·5 per cent more moisture than the others.

In crude protein, as well as albuminoids, ensilage 'B', consisting of two-thirds clover, is the richest, as might be expected.*

The relation of protein to proportion of clover does not, however, hold good in ensilage 'C', consisting of two-thirds corn, probably due to imperfect mixing of the material when being put into the silo, which would naturally result in the sample for analysis not being strictly representative of such a mixture. The general effect of the clover in increasing the protein-content is, however, well illustrated, especially on comparing these results with those for corn ensilage, as already given in the series. It seems quite possible by this means to obtain an ensilage containing from one-half to three-fourths more of the flesh-forming constituents than is obtainable from corn only. This is, of course, a very important matter, for it points to the fact that the use of such ensilages would allow of a reduction in the grain part of the ration.

The addition of the small proportion of sunflower heads, in ensilage 'A', does not appear to have affected in any marked degree the composition of the ensilage. They were expected to increase the percentage of fat.

The table of data gives the composition of the fresh material and of the dry matter, the latter results allowing a closer comparison to be made as to the changes brought about by varying the proportions of corn and clover.**

BROME GRASS.

The excellent feeding qualities of the Awnless Brome Grass (*Bromus inermis*) have been set forth in previous reports of this division (see reports, Experimental Farms 1897, p. 146; 1898, p. 146), the data obtained in the Farm laboratories having shown

* The 'crude protein' includes the albuminoids or true flesh-formers and the non-albuminoids, the latter consisting of amides and other compounds of much less feeding value than the albuminoids.

** The various constituents of fodders have been discussed and their functions in the animal economy explained in several of the past reports of the chemical division (see, for instance, report for 1900, p. 166-7).

it to be a grass rich in protein (flesh-forming substances), and low in fibre—the least valuable of a fodder's constituents.

Both for hay and pasture this hardy grass has been extensively introduced into Manitoba and the North-west Territories. As a hay grass it has proved a heavy cropper —the hay being palatable and highly nutritious. As a pasture grass it is particularly valuable by reason of its earliness, large growth, and succulent aftermath—features of considerable importance to the farmer, dairyman, and stock raiser.

This year we have made a comparison between the hays of *Bromus inermis* and *Bromus arvensis*, the latter, a grass that has recently received some attention in the North-west, and concerning which Dr. Fletcher, Botanist of the Experimental Farms, furnishes the following information: 'This European grass has been grown to some extent in Manitoba, where some seed was sold as that of *Bromus inermis*. The plants live for two years only, and in most places it is a smaller cropper than *Bromus inermis*. I have cultivated Field Brome since 1892. If cut early it will give a second crop.'

The samples analysed were forwarded by Mr. Herbert W. Husband, St. François Xavier, Man., who writes as follows:—'We have had 3 years experience with *Bromus arvensis* and find it a much heavier yielder than *Bromus inermis*. There is no actual knowledge of its relative feeding qualities compared with *inermis*, and we should, therefore, be glad to have an analysis made.'

An examination of the samples by Dr. Fletcher showed that the *Bromus inermis* was relatively somewhat younger than the *Bromus arvensis*—a large portion of the seed of the former being in the dough condition, while that of the latter was ripe.

Analysis of hays of Awnless Brome (*Bromus inermis*) and Field Brome (*Bromus arvensis*).

Name of Grass.	Hay.						Calculated to water-free substance.				
	Moisture.	Ash.	Fat.	Crude Protein.	Carbohydrates.	Fibre.	Ash.	Fat.	Crude Protein.	Carbohydrates	Fibre.
Bromus inermis	7·51	8·25	·43	6·56	50·81	26·44	8·92	·46	7·09	54·95	28·58
" arvensis	7·73	7·63	·38	4·23	46·55	33·48	8·26	·41	4·58	50·41	36·26

In the subjoined data the proportion of the true albuminoids contained in the crude protein is shown. The non-albuminoid nitrogenous substances, consisting of amides principally, are of much less feeding value than the albuminoids.

Name of Grass.	Crude Protein in Hay.		Crude Protein Calculated to water-free substance.	
	Albuminoids.	Non-albuminoids.	Albuminoids.	Non-albuminoids.
Bromus inermis	5·85	·71	6·32	·77
" arvensis	3·88	·35	4·20	·38

Of the two samples, *Bromus inermis* is evidently the more valuable. This is shown by its larger percentage of protein, as well as by its lower fibre content. Though we have no data as to the relative digestibilities of these hays, it seems at least fair to assume

that *Bromus inermis*, owing to the smaller percentage of fibre, will not be less digestible than *Bromus arvensis*. If this be granted, the superiority of the former will be obvious. The examination of the crude protein furnishes further results of a confirmatory character and justifies the conclusion that *Bromus inermis* is the more nutritious.

In Bulletin No. 17 of the Experimental Farm Series the writer pointed out that grasses lose somewhat in nutritive value as they approach maturity and the seed ripens. It is probable, therefore, that the analysis of *Bromus arvensis* would have been more favourable to that hay if it had been cut earlier. A similar comparative study will be made next season with the grasses taken at the same stage of growth, in order to obtain further data as to the relative values of these important grasses.

UPLAND AND LOWLAND HAY.

The question has frequently been asked by farmers in Manitoba and the North-west Territories : 'which is the more nutritive, hay cut from the uplands or that from the sloughs?' To obtain data on this important matter we have submitted to analysis two samples collected and forwarded through the kindness of L. G. Bell, Esq., Qu'Appelle Station, Assa. One taken from the 'upland' or prairie, the other from the 'lowland' or swamp or slough.

On arrival the samples were submitted to Dr. Fletcher, botanist of the Experimental Farms, who has furnished the following note regarding their botanical composition :—

Upland hay.—The sample of upland hay consisted chiefly of barren stems of grasses. There were also a few seed-bearing stems of the Rough Fescue *(Festuca scabrella)* and several of the ripe seeds of the Porcupine grass *(Stipa spartea)*. The barren stems were apparently *Agropyrum tenerum*, the Western Rye Grass, *Stipa spartea* and *Festuca scabrella*, together with the leaves of one of the small prairie sedges.

Lowland hay.—The sample of lowland hay consisted chiefly of *Poa serotina* and *Deyeuxia neglecta* (grasses) and *Carex aristata* (a sedge) with a few stems with seed on them. All common plants in prairie sloughs.

The analysis of the hays afforded the following data :—

Analysis of Hays.

	Upland.	Lowland.
Moisture	4·91	4·95
Crude protein*	7·63	5·46
Ether extract, (fat.)	0·96	0·57
Carbo-hydrates (starch, gum, &c.)	40·30	48·95
Fibre	38·46	35·19
Ash	7·74	4·88
	100·00	100·00
*Nitrogenous compounds—		
Albuminoids	6·56	5·02
Non-albuminoids	1·07	0·44

There are certain somewhat remarkable differences to be noted. The most important of these, from the feeding standpoint, is the much larger percentage of crude protein in the upland hay, making it naturally the more nutritious of the two. The crude protein includes the albuminoids or so-called flesh formers, and the amides, &c., of much less feeding value. The percentage of albuminoids is approximately one-fifth higher in the upland than in the lowland hay. The larger percentage of ether extract (crude fat) in the upland hay would also tend to increase its feeding properties, though its somewhat larger fibre-content is against it. Other matters, such as the noticeable increase of ash in the upland over that in the lowland hay, are of no particular interest from the feeding standpoint and, therefore, need not be discussed here.

Of the relative digestibility of these hays, we have no data, but we may fairly conclude, I think, from the results of this examination that there is a fair margin in favour of the upland hay,

SEDGE HAY.

This hay, although known in the maritime provinces as 'sedge' hay, contains, as a rule, very little of the true sedges (which may be very easily distinguished from the grasses in possessing triangular, solid stems), but is made up prineipally of species of spartina which grow in salt marshes and along sea beaches.

The sample examined, forwarded by Dr. W. W. Andrews, Sackville, N.B., consisted entirely of *Spartina juncea.*

Analysis of Sedge Hay.

Constitutents.	Hay, as received.	Calculated on water-free substance.
Moisture	8·75	—
Crude protein*	5·40	5·90
Fat	0·54	0·59
Carbo-hydrates	43·99	48·27
Fibre	27·16	29·74
Ash	14·16	15·50
	100·00	100·00
*Non-albuminoids	1·02	1·10
Albuminoids	4·38	4·80

These results indicate for the sedge hay a certain feeding value, though it is not equal to the larger number of cultivated grasses. It compares very favourably with Spartina cynosuroides (fresh water cord grass), much esteemed in many parts of the maritime provinces, and known as 'Broad Leaf.'

In writing of this hay (S. juncea) Dr. Andrews, who has given much careful attention to the matter, says: 'All the facts that I can gather as to the sedge hay are favourable to its use. It can be used to the extent of one-third to one-half of the coarse ration, and many farmers report excellent results from a mixture of half and half with other hays. Horses turned out on 'sedge' areas are said to do remarkably well.' Further, he states: 'That it has proved valuable for mulching, and will decay in a season when so used or in compost.' Probably its large percentage as ash, consisting chiefly of common salt, may enhance its mulching qualities as well as add somewhat to its fertilizing value.

ROOTS.

Continuing the determination of dry matter and sugar in field roots in order to ascertain the extent to which these constituents may vary from season to season, we have this year again examined the chief varieties of mangels and Swedes, in addition to certain sugar beets and new varieties in mangels rich in sugar.

Analysis of Roots, C.E.F., 1902.

—	Sowing.	Dry Matter.	Sugar in Juice.	Average Weight of one Root.	
		Per cent.	Per cent.	Lbs.	Oz.
Mangels, Half-sugar Rosy	First	14·21	8·79	2	5
" "	Second	15·06	9·95	1	9
" Half-sugar White	First	11·85	7·89	1	3
" "	Second	12·36	8·78	2	8
" Giant Sugar feeding	First	14·19	9·49	2	0
" "	Second	14·74	9·29	2	1
" Giant Yellow Globe		10·24	5·24	3	9
" Giant Sugar Feeding	Flat culture	16·61	9·69	2	0
" "	Drill "	13·11	7·34	4	7
" Golden Tankard		12·77	8·42	3	2
" Gate Post Red		13·90	9·39	3	2
Swede, Prize Purple Top		10·37	2·59	2	8
" Champion Purple Top		11·15	1·78	2	10
Sugar Beet, Danish Improved	Ordinary culture	19·56	13·33	2	8
" "	Special culture	21·41	13·96	2	2

Comparing the results with those obtained in previous years, a decided improvement as to the dry matter and sugar content is noticeable. Evidently the season has been one favourable to sugar production. The feeding value of many of the roots of this season is fifty per cent higher than that of the roots of 1901.

Of the mangels tested from two sowings, those of the second sowing show a slightly higher value. This may be accidental, and therefore needs corroboration before any definite conclusions can be drawn.

Attention may again be directed to the so-called sugar mangels, Half-sugar Rosy, Half-sugar White, &c., which are evidently roots of a high order as far as composition is concerned.

BARLEY.

The use of this grain for feeding is, we imagine, becoming more common in Canada and, in a large measure, in many parts of the Dominion may now be found replacing oats in the ration, chiefly due no doubt to the high price of the latter grain. Barley, like other cereals, is subject to variation in composition, the climatic conditions under which it is grown undoubtedly being the principal factor in its modification. The probabilities are, for instance, that barley grown in Manitoba and the North-west Territories will be richer in protein than that raised in the irrigated districts of British Columbia, which would make the former better for feeding purposes, while the latter would be more valuable for brewing.

Compared with oats, barley, speaking generally, contains less protein but more starch. In oil or fat, oats are considerably richer. As part of the grain ration it has given excellent results with all classes of farm stock, but especially is it valuable for pork production and poultry fattening.

At the request of the Agriculturist of the Central Experimental Farm, we have analysed a sample of Huliess White barley, grown by P. E. Woods, Grand Prairie, B.C. For the purpose of comparison we add the average composition of Ontario barley, as ascertained by the examination of 20 samples in 1895.

	Hulless White Barley, B.C.	Average of 20 Ontario samples.
Moisture	9·26	11·96
Protein	8·81	10·57
Fat	1·22	2·06
Carbo-hydrates	77·76	68·90
Fibre	1·09	4·10
Ash	1·86	2·41
	100·00	100·00

Though containing somewhat less fibre, the Hulless White barley is not equal in feeding value to the Ontario grown hulled barleys, since it possesses less protein and fat.

OIL CAKE.

Inquiries having reached us from several farmers in Manitoba as to the feeding value of the locally manufactured oil cake meal compared with that of flax seed, we submitted to analysis a sample of the former, forwarded by Mr. K. McIver, of Virden, Man., and stated to be manufactured by Body & Noakes, Winnipeg :—

Analysis of Oil Cake Meal.

Water	7·71
Protein	33·31
Fat	6·26
Carbo-hydrates	36·02
Fibre	10·84
Ash	5·86
	100·00

These data indicate a meal of excellent quality.

The composition of oil cake will vary somewhat according to the process used in extracting the oil, but in that obtained by the new process, the average percentage of protein is 33·2 and of oil or fat 3·0. Such cake differs from that of the old process in being somewhat richer in protein and poorer in oil.

The relative feeding values of flax seed and oil cake meal (old and new process) may be deduced from the data in the following table :—

—	Dry Matter in 100 lbs.	Digestible Nutrients in 100 Lbs.		
		Protein.	Carbo-hydrates.	Fat or Oil.
	lbs.	lbs.	lbs.	lbs.
Flax seed	90·8	20·6	17·1	29·0
Oil cake (old process)	90·8	29·3	32·7	7·0
Oil cake (new process)	89·9	28·2	40·1	2·8

In the total amount of 'dry matter,' flax seed and oil cake meal are seen to be practically identical. There are, however, certain marked differences in the composition of their dry matter. The flax seed contains from 22 to 25 per cent more oil than the cake, while the latter is 8 or 9 per cent richer in protein.

Assuming for the purposes of comparison that the oil and protein are of equal value (*) and worth two and a half times the value of carbo-hydrates (starch, gum, &c.), we

* It should be stated that for special purposes, as for fattening sheep in winter, for calves, &c., the oil is worth somewhat more than protein.

find by calculation that 100 pounds of flax seed has a feeding value equal to that of 120 pounds of oil cake. In other words, if the flax seed, for feeding purposes, is worth $3 per 100 pounds, the value of 100 pounds of oil cake would be approximately $2.50.

COCOA-NUT CAKE.

This feeding stuff, the residue left from the expression of the cocoa-nut oil, has found much favour among the dairymen of British Columbia. Messrs. Lindsay & Fletcher, Abottsford, B.C., in forwarding a sample furnish the following information :—'This feed is procured by a wholesale dealer in Vancouver from a San Francisco house, and presume that it originally comes from the Hawaiian Islands and islands further south. It is sold F.O.B. at Vancouver for $25 per ton.' They further say :—'It is now extensively used by dairymen along the Fraser, who value it highly, thinking it imparts a peculiar nutty flavour to the milk and cream. It would be of great service to us here to know how it compares in feeding value with oil cake selling at Vancouver for $30 per ton.'

The cake as received was of a light red colour, possessing in a certain degree the pleasant odour and sweet taste of cocoa-nut. I should judge it to be a very palatable food.

Analysis.

Moisture	5·57
Protein	22·37
Fat	9·10
Carbo-hydrates (starch, sugar, &c.)	29·18
Fibre	29·07
Ash	5·71
	100·00

Its high protein content and richness in fat make it a feeding stuff of considerable value.

To obtain the *approximate* feeding values of cocoa-nut cake and oil cake, we may compare their 'food units, calculated by multiplying the sum of the protein and fat by $2\frac{1}{2}$ and adding the total to the amount of carbo-hydrates. Thus :—

	Cocoa-nut cake.	Oil cake.
Protein	22·37	33·31
Fat	9·10	6·26
	31·47	39·57
	2·5	2·5
	15735	19735
	6294	9914
	78·675	98·925
Carbo-hydrates	29·18	36·02
Food units	107·85	134·94

According to these figures, the oil cake has a feeding value about 25 per cent higher than the cocoa-nut cake. The larger percentage of fat in the cocoa-nut cake, however, would make it specially valuable for furnishing this important element of the ration, and in some measure reduce this difference.

COTTON SEED MEAL.

Early in the present year our attention was directed to a brand of cotton seed meal for sale in the Maritime provinces which differed in appearance from that usually sold and which was therefore suspected of being of inferior quality. In forwarding a sample for analysis and report as to quality, the Sussex Mercantile Co., Limited, Sussex, N. B., wrote : 'This meal is of a darker colour than that usually handled here. The farmers in this vicinity have been making complaints, claiming it is not as good an article as the ordinary cotton seed meal of a brighter colour. It is purchased from the Florida Cotton Oil Co., Jacksonville, Florida, through their St. John, N. B., agent and is quoted at $3 to $5 per ton less than the ordinary bright meal.'

Analysis.

Moisture	9·48
Protein	25·25
Fat	5·43
Carbo-hydrates	36·05
Fibre	18·65
Ash	5·14
	100·00

The average composition of cotton seed meal as ascertained from the analyses of 35 samples, is stated by the Department of Agriculture, Washington, D.C., to be as follows :—

Moisture	8·2
Protein	42·3
Fat	13·1
Carbo-hydrates	23·6
Fibre	5·6
Ash	7·2
	100·00

In 1900, we analysed two samples of cotton seed meal sold in Canada, and obtained the following results :—

	No. 1.	No. 2.
Protein	43·87	43·37
Fat	11·63	13·11

It is very evident from the foregoing data, that in the two most important constituents—protein and fat—the sample under consideration is very much inferior to that ordinarily on the market. Thus, calculating on the basis of equal values of the food units in the two kinds, we find that one ton of the ordinary cotton seed meal has a feeding value equivalent to 1 ton 876 lbs. of the Florida Cotton Oil Co.'s meal. We have never before examined a sample with so low a percentage of protein, nor is there any account of such a meal in the standard works on cattle foods.

CORN BY-PRODUCTS—GLUTEN MEAL, ETC.

In the subjoined table are given the analytical data obtained on certain samples of gluten meal, corn oil cake,* &c., examined in the farm laboratories during the past year :—

——	Moisture.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.
Gluten meal	10·83	33·12	6·83	47·26	1·00	·96
Gluten meal	10·50	34·75	5·58	46·92	1·77	·48
Corn oil cake	6·95	26·56	14·40	40·09	10·46	1·63
Corn bran	4·54	11·47	4·53	59·49	17·90	1·02

The whole question of these corn by-products was discussed in our report last year and their relative feeding values explained. It will therefore be unnecessary at the present time to do more than again emphasize the desirability of manufacturers adopting a uniform nomenclature for these corn feeds and to express the hope that ere long all high priced concentrated feeds will be purchased according to protein and fat content.

The above data may be considered as eminently satisfactory. It is doubtful, however, if the general run of corn oil cake would contain as much oil as that shown by this sample.

BRAN.

There is a difference of opinion among dairymen regarding the nutritive value of bran from Manitoba and the North-west Territories as compared with that from mills in Ontario. The former is from Red Fyfe; the latter, is variable as to its origin, but frequently we may presume from a mixture of Red Fyfe and some winter wheat which is much softer, such as Clawson.

Two samples, representative of such brans, were submitted to us recently by a local dairyman with a view of obtaining some information on this point. As regards appearance, the local bran was brighter in colour and more mealy. Both were apparently of excellent quality. On analysis, they furnished the following data :—

Analysis of Brans.

	No. 1, Keewatin Bran.	No. 2, Dowds (local) Bran.
Moisture	11·43	11·24
Protein	14·50	15·63
Fat	5·76	5·56
Carbo-hydrates	49·64	49·48
Fibre	12·39	11·46
Ash	6·28	6·63
	100·00	100·00

* All these samples are the product of The Edwardsburg Starch Co., Cardinal, Ont.

The slightly higher percentage of protein in No. 2, makes this bran somewhat the more nutritious of the two.

We shall endeavour to make a further study of this matter, obtaining for this purpose samples of bran from known varieties and mixtures of wheat, and particulars respecting the milling. The present results are to be regarded as tentative only.

BLATCHFORD'S CALF MEAL.

This preparation, like several others of a more or less similar character analysed by us in past years, is sold as a substitute for new milk in feeding calves. Being employed in a test this year by the Agricultural Division of the Central Farm, it was thought desirable to submit it to analysis. The following data were obtained :—

Analysis.

Water	9·17
Protein	28·44
Fat	10·13
Carbo-hydrates	38·86
Fibre	8·47
Ash	4·93
	100·00
Water-soluble extract	25·90
Saccharine matter, in extract	17·07

This feed compares, from the standpoint of composition, most favourably with the calf meals previously examined in our laboratories. Its large percentages of protein, fat, and sugar place it in the category of concentrated feeding stuffs of high value.

MIXED CATTLE FEEDS.

We have again, at the request of the Department of Marine and Fisheries, made an examination of certain feeds with the view of ascertaining their relative nutritive values. The analyses were used in judging as to the best for feeding cattle en route to England. The samples were forwarded by Messrs. Pope & Morgan, Inspectors, Montreal. Our report was as follows :—

Analysis.

	No. 1.	No. 2.	No. 3.
Moisture	10·40	10·86	10·12
Protein	11·87	9·69	12·87
Fat	7·13	4·71	5·91
Carbo-hydrates	61·39	64·90	59·71
Fibre	6·17	7·55	8·35
Ash	3·04	2·29	3·04
	100·00	100·00	100·00

For the purpose of comparison, we must assume the feeds to be equally digestible and that the albuminoids (protein) and fat are worth, weight for weight, two and a half times the carbo-hydrates (starch, sugar, &c.) On this basis, we find by calculation that if No. 1 be valued at $20 per ton, then No. 2 would be worth $18.53, and No. 3 $19.63 per ton.

An examination of the three 'feeds' bears out the deduction from the chemical data with regard to their order of merit. Nos. 1 and 3 contain, in addition to crushed oats and Indian corn, a considerable amount of bran—a by-product rich in protein. The proportion of hulls is decidedly larger in No. 3 than in No. 1, hence the larger percentage of fibre in the former. In view of these facts, I am of the opinion that the nutritive or feeding value of feed No. 1, compared with that of Nos. 2 and 3, is, in all probability, greater than shown by the foregoing computation.

THE SOJA BEAN.

Experiments with Soja beans have been carried on for some years past at the Central Farm, with a view of determining the value of this legume as a fodder plant. As a field crop it was first tried in 1897, and analyses were made in 1898 by us to determine the relative nutritive properties of the plant when grown in various ways. (Report of Experimental Farms, 1898, p. 147). In common with other legumes, the soja bean plant was shown to be rich in albuminoids, and being able fairly well to withstand drought, it was considered a promising crop for use with corn in the silo.

The Soja bean is now under trial as a 'cover crop' for orchards, being sown early in the season in drills. This method appears to have several advantageous features, for it allows surface tillage (between the rows) throughout the summer to conserve soil moisture and at the same time provides for an excellent growth (8 to 14 tons) towards autumn to hold the snow and protect the roots of the trees. Its large percentage of nitrogen gives it an especial value as a fertilizer.

The following data give weights of foliage and roots, per acre, taken this season on the Central Farm :—

	Tons.	Lbs.
Stems and leaves	9	1,700
Roots		1,382

Average height of plant, 3 feet 3 inches; roots taken to a depth of 15 inches.

The illustration (see frontispiece) shows very well the general form and habit of growth and also the numerous and large nodules with which the roots are supplied, and by means of which the plant can obtain free nitrogen from the atmosphere.

CHEMISTRY OF INSECTICIDES AND FUNGICIDES.

POTASSIUM CYANIDE.

This chemical is now used in large amounts in the fumigation of plants and shrubs for the destruction of the San José scale. All nursery stock imported into Canada from scale-infested countries must be fumigated at the port of entry and before distribution. By the action of sulphuric acid upon the cyanide, hydrocyanic (prussic) acid gas is evolved, the quantity being proportionate to the purity of the cyanide, providing there is sufficient acid present. It is this poisonous gas which destroys the scale.

From these statements it will be evident that the quality of the cyanide in the Canadian market is a matter of some moment. We have accordingly, at the instance of the Entomological Division, examined several samples of cyanide submitted by certain wholesale druggists, and obtained the following results :—

No. 1.—Bottle labelled 'Potassii Cyanidum, C. P.' The Elliott Company, Ltd., Toronto. The bottle contained 4 oz.; the cork was covered with a paper seal but not waxed.

Examination showed that it was sodium cyanide, potash being entirely absent. (*a*) Sample from top of bottle. This, on analysis, proved to contain 60·26 p. c. of sodium cyanide, equivalent to 33·26 p. c. of hydrocyanic acid.

(*b.*) Sample from centre of bottle. This sample contained 75·04 p. c. sodium cyanide, equivalent to 41·41 p. c. hydrocyanic acid.

No. 2.—Bottle labelled 'Potassii Cyanidum, Double Salt.' The Elliott Company, Ltd., Toronto. The bottle contained 4 oz.; the cork was covered with a paper seal but not waxed.

Examination showed this to be potassium cyanide with traces or small amounts only of the corresponding sodium salt. A determination of the potash gave data equivalent to 98·7 p. c. potassium cyanide.

(*a.*) Sample from top of bottle. This gave the following results:—Potassium cyanide 77·24 p. c., equivalent to 32·05 p. c. hydrocyanic acid.

(*b.*) Sample from centre of bottle. This showed 95·66 p. c. potassium cyanide, equivalent to 39·62 p. c. hydrocyanic acid.

No. 3.—Sample labelled 'Pot. cyanide 98 p. c., Lyman, Sons & Co., Montreal. Contained in 2 oz. bottle.

Qualitative examination showed this to be potassium cyanide.

Analysis: Potassium cyanide, 94·9 p. c., equivalent to 39·3 p. c. hydrocyanic acid.

No. 4.—Sample labelled 'Pot. cyanide 98 p. c., Lyman, Sons & Co., Montreal. Contained in 2 lb. glass stoppered bottle. Sample for analysis taken from centre of bottle.

Qualitative examination: potassium cyanide.

Analysis: Potassium cyanide, 94·69 p. c., equivalent to 39·26 p. c. hydrocyanic acid.

Conclusions and Suggestions.

Chemically pure, water-free sodium cyanide would yield 55·18 p. c. hydrocyanic acid. Chemically pure, water-free potassium cyanide would yield 41·49 p. c. hydrocyanic acid.

Tabulating the results, we have:—

	Hydrocyanic acid. Per cent.
Sodium cyanide, pure and water-free	55·18
Potassium cyanide "	41·49
Sample No. 1, sodium cyanide, from top of bottle	33·26
" " centre of bottle	41·41
Sample No. 2, potassium cyanide, from top of bottle	32·05
" " centre of bottle	39·62
Sample No. 3, potassium cyanide, average of bottle	39·30
Sample No. 4, potassium cyanide, centre of bottle	39·26

It is a matter of little moment perhaps that the cheaper base soda should be substituted for potash (indeed, weight for weight, pure sodium cyanide will evolve more hydrocyanic acid gas than pure potassium cyanide), but it is of the greatest importance that the cyanide should be of the strength specified and yield the amount of hydrocyanic acid gas as calculated from that strength. The cyanides are extremely subject to deterioration. The action of the air, as entering through a poor cork, is sufficient to cause decomposition, resulting in loss of gas generating strength, as may be observed from the foregoing results.

All the samples examined were below advertised strength, but this, we believe, was not owing to intentional act or fraud on the part of the vendors, but merely to imperfect protection from the air. Most probably the cyanide will be found to retain its strength better when kept in large bottles. When, however, it is desired to have it in small doses, as one, two and four ounces, decomposition of the cyanide may be very largely retarded by thoroughly coating the surface of the cork with paraffin wax.

CALIFORNIA SPRAY.

(Lime, Sulphur and Salt.)

This mixture has recently received considerable attention in the horticultural press in connection with the remedies for the San José scale, and several formulæ with vary-

ing methods of preparation have appeared. This has given rise to inquiries as to the best mode to adopt in making the spray. To answer these the more satisfactorily, we have made a series of experiments, using the quantities and methods of procedure advocated by the more important authorities, and as a result have obtained information on one or two points that may be of interest to orchardists.

1. Since the insecticidal and fungicidal properties of the spray appear to be due to sulphide of lime and not to free (uncombined) sulphur or lime, it is desirable on the grounds of economy and efficiency that the proportion of sulphur to lime should be such that after boiling there may be little or no free sulphur in the mixture. We find to ensure this that the quantity of lime should at least equal that of the sulphur. A slight excess of lime apparently does no harm, indeed, according to some authorities, it is necessary in order to give the spray the correct consistency, but too large an excess is certainly to be avoided, as it will be apt to cause clogging of the nozzle and possibly reduce the insecticidal efficiency of the wash. We have found the following proportions satisfactory :—

Lime	25 lbs.
Sulphur	20 "
Water	50 gallons.

We also tried a formula with a larger excess of lime and obtained a good result, though possibly not quite so strong in insecticidal properties :—

Lime	35 lbs.
Sulphur	15 "
Water	50 gallons.

2. The lime should be thoroughly slaked to avoid subsequent clogging of the nozzle. If part of the lime is added after the spraying mixture is made, as directed in some recipes, *the proportion of lime to sulphur in the mixture as boiled should not be less than that indicated in the first formula given above.*

3. It is essential that the boiling should be continued a sufficient length of time to allow all the sulphur to enter into combination. This, if accompanied by constant stirring, will be usually between 2 and 3 hours.

4. The addition of salt (usually at the rate of 15 lbs. to each of the foregoing formulæ) is recommended by all writers. This may be due to its alleged action in increasing the adhesive qualities of the spray. It does not seem to affect its properties otherwise.

5. On cooling certain of the lime sulphides formed crystallize out. It is, therefore, important, we consider, to make the application while the mixture is still hot.

The addition of Potash to the California Spray.—It was suggested that potash might be a valuable addition to this spray, enhancing its value probably both as an insecticide and fungicide. We accordingly made some laboratory experiments and found that by the addition of potash to the spray, the fluid which is essentially sulphide of lime is in part decomposed thereby, lime separating and sulphide of potash, soluble in water, taking its place. It is quite possible that the latter compound is as effective as sulphide of lime, but we have no data on that point. For effectiveness and ease of application it is apparently essential that the spray should be used while still hot and, under such circumstances, the addition of the potash would not in all probability, materially affect the application. But if the spray became cold the separation of the lime by the addition of the potash would undoubtedly increase the tendency to clog in the nozzle.

BUG DEATH.

In response to numerous requests from farmers and horticulturists for information regarding 'Bug Death', we submitted to analysis, in January, 1902, a sample of this material, obtaining the following data :—

Analysis.

Moisture	0·40 per cent.
Insoluble matter, sand, &c	11·21 "
Oxide of iron and alumina	5·60 "
Lime	·51 "
Potash	None.
Zinc oxide	82·10 "
Lead and copper	Faint traces.
Phosphoric acid	Traces.
Chlorine	·47 per cent.
Nitrogen	·107 "

These results show that it is practically an impure or commercial zinc oxide. As regards the essential elements of plant food, it is strikingly deficient, the only constituent present of any fertilizing value being nitrogen, of which there is only one-tenth of one per cent. It is, therefore, obvious that any claims made for it as supplying nourishment for crops are without foundation.

If, as stated in the advertisements of Bug Death, a larger yield is obtained from its use, the explanation may probably be that it acts as a fungicide, preventing blight and keeping the foliage healthy and green. This would mean a longer growing period and, naturally, tend to an increase of crop. Certainly, this material cannot act either directly or indirectly as a fertilizer.

FERTILIZERS.

SQUID AND CAPLIN.

In forwarding these samples for analysis, Mr. J. T. Lawton, of Harbour Grace, Newfoundland, states that caplin and squid, are largely used in Newfoundland as fertilizers, and that some farmers say they have an 'exhaustive' effect, while others esteem them of great value.

Squid.—This is the popular name for a small cuttle-fish found in abundance in North American waters and very largely used as bait for cod. The squid sent to the laboratories had been 'canned', i. e., the fresh squid put into the tin, soldered up hermetically, boiled 1 hour, opened to allow the escape of air, and resealed. No water or salt had been added.

Analysis of Squid.

Water	82·74
Organic matter *	16·17
Ash	1·09
	100·00

	Per cent.	Pounds per ton.
Nitrogen	1·91	38·2
Phosphoric acid	·45	9·0

* Containing 3·16 per cent fat.

Valuing the nitrogen at 10c. per lb. and the phosphoric acid at 5c. per lb., one ton of fresh squid would be worth $4.25 as a fertilizer.

Caplin.—A small fish, often occurring in immense shoals in the Gulf of the St. Lawrence and on the coasts of Newfoundland and Labrador. 'It is much used by the poorer classes', writes a correspondent in Newfoundland, 'as an article of food and also as a food for pigs and dogs—about 1,500,000 barrels being salted and dried for the latter purposes.'

Analysis of (salted and dried) Caplin.

Water	19·13
Organic matter*	68·38
Ash (including salt)	12·49
	100·00

	Per cent.	Pounds per ton.
Nitrogen	8·09	161·8
Phosphoric acid	2·91	59·2

The fertilizing value of the salted and dried fish per ton is $19.14. Assuming the caplin as caught and used as a fertilizer to contain 80 per cent water, then the manurial value of such fish would be $4.77 per ton.

Mr. Lawton further writes: 'The majority of farmers make composts of caplin and squid with clay; but those who have not facilities for getting clay lay the caplin between the potato stalks and 'earth up'. Turf is used with caplin in making compost; but not with squid, as it will not decay rapidly in turf.'

The foregoing analyses show that both caplin and squid are agriculturally valuable as sources of nitrogen and phosphoric acid. They, however, require the addition of some form of potash to make them a complete fertilizer. Wood ashes, muriate of potash, sulphate of potash, and kainite are all potash fertilizers and their application to the soil in conjunction with caplin or squid would no doubt enhance the effect of these 'fish' manures.

PEATS.

Nova Scotia, Brookfield, Queen's County. Forwarded by Mr. Franklyn McLeod:

No. 1.—Surface, moss (Sphagnum). A clean bright sample.

No. 2.—From a depth of 3 feet. Peat. Apparently of excellent quality.

No. 3.—From a depth of 6 feet. Peat. Somewhat darker and more compact than No. 2.

Analysis of air-dried Samples.

	No. 1.	No. 2.	No. 3.
Moisture	7·62	8·03	7·99
Organic matter	90·89	90·97	91·02
Ash	1·49	1·00	0·99
	100·00	100·00	100·00
Nitrogen	1·510	0·834	1·052

*Containing 13·71 per cent fat.

Though all the samples are excellent and could be used as absorbents in the stable or as composting materials, No. 1 is the most valuable, by reason of its better mechanical condition and larger percentage of nitrogen.

LIMESTONE.

The value of an occasional dressing of lime for soils deficient in this element is fairly well known, but unfortunately owing to the high price or scarcity of this element in many districts the practice of liming is practically impossible. It is from such districts that we frequently receive samples of limestone or of rocks supposed to be such, with a request for information as to their value for lime manufacture. Thus, in our report for 1901 will be found data obtained on specimens sent from certain localities in Quebec and Ontario. This year we present a report on samples forwarded from Heatherton, Nova Scotia, as follows:—

Constituent.	No. 1.	No. 2.	No. 4.	No. 5.	No. 6.
Insoluble rock matter	3·22	5·12	81·35	3·62	3·25
Oxide of iron and alumina, &c.	2·60	6·49	5·00	2·55	2·40
Carbonate of lime	87·70	57·95	8·70	91·80	73·55
Undetermined	6·48	30·53	4·95	2·05	20·80
	100·00	100·00	100·00	100·00	100 00

No. 3.—Omitted from the above table is gypsum or sulphate of lime, a very pure sample. It does not, of course, form lime on burning, but has a value as a fertilizer for certain crops.

The best sample of lime is, naturally, that with the largest percentage of carbonate of lime. This is No. 5. We then have Nos. 1, 6 and 2 in order named. It is doubtful if it would pay to burn this latter, as the burnt rock would only contain 25 per cent lime.

No. 4 cannot be regarded as a limestone, and certainly would be valueless for the production of lime.

MISCELLANEOUS INVESTIGATIONS.

SUGAR BEETS.

The establishment during the past year of no less than four beet sugar factories in Western and North-western Ontario has been instrumental in again awakening a keen interest in sugar beet culture in Canada. Inquiries have been received from farmers in every province in the Dominion with regard to the suitability of the climate and soil of the districts written from, varieties of beets to be sown, culture, &c., and frequently these questions have been accompanied by beets for analysis. These samples, in most instances could scarcely be considered as representative, the results of their examination (though forwarded to the senders) therefore, will not be included here. The analyses of sugar beets grown on the Experimental Farms at Nappan, N.S., Ottawa, Ont. and Indian Head, N.W.T., will, however, furnish useful information and are, therefore, recorded in this report. In addition, we have tabulated the data from samples forwarded from Prince Edward Island; from the Department of Agriculture of Manitoba, and from Strathcona, N.W.T., collected by Mr. N. D. Mills, of that town.

Prince Edward Island—Six samples forwarded by Mr. Callaghan, of Charlottetown, have been examined. The results are much more favourable than those of 1901, indicating in the majority of instances beets with a very satisfactory sugar content and quite suitable for factory purposes.

Sugar Beets, Prince Edward Island, 1902.

Variety.	Locality.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
					Lbs.	Oz.
1. Vilmorin Imp'd	St. Dunstan College, Charlottetown Royalty.	20·49	24·25	84·49	1	15
2. " ..	Campbellton, Prince Co.....	17·91	21·86	81·93	2	0
3. " ..	West River, Queen's Co.....	15·65	18·94	82·63	1	9
4. " ..	Freeland, Lot 11, Prince Co.... ...	16·85	20·00	84·25	1	1
5. " ..	Foxly River, Lot 11, Prince Co. ..	15·80	19·43	81·31	1	2
6. " ..	Port Hill, Prince Co.....	14·89	18·77	79 38	1	12

The beets were well grown, free from forkiness and not too large.

Nova Scotia, Nappan.—A summary of the particulars of growth, as furnished by Mr. R. Robertson, superintendent, is as follows: 'Sown, May 20; pulled, Oct. 28; drills, 2 feet apart, plants thinned to 1 foot; clay loam manured at the rate of 20 tons per acre with farm-yard manure; previous crop, clover and aftermath ploughed in.' All the roots were well grown, free from forkiness and not too large.'

Analysis of Sugar Beets, Nappan, N.S., 1902.

Variety.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
				Lbs.	Oz.
Vilmorin's Improved.	14·57	18·06	80·67		14
Danish Improved.....	10·18	14·16	71·89	1	9
Red Top Sugar	12·31	15·39	79·98		11
Red Top White.....	13 20	16·11	81·93		13
Trés Riche (French very rich).....	16·95	20·77	81·12	1	0
Royal Giant....	8·75	10·84	80·72	1	8
Lane's Improved	11·62	15·86	73·26		15
Klein Wanzleben..	16·08	18·68	86·08	1	0
Danish Red Top..	10·76	13·87	77·57	1	5

The varieties Très Riche (French very rich), Klein Wanzleben, and Vilmorin's Improved give most satisfactory results, both as regards percentage of sugar and co-efficient of purity.

The other varieties, of which we give results, with perhaps the exception of Red Top White, are too low in sugar content for factory purposes. This does not necessarily mean that the soil or weather conditions were unfavourable, for we understand from excellent authority that the majority of these beets are not grown for sugar.

Ontario, Ottawa.—Eight varieties of sugar beets were grown on the Experimental Farm: First sowing, May 12th; second sowing, May 26th; pulled, October 28th; Soil, sandy loam of good quality.

Drills two feet apart: plants thinned, six to eight inches.

SUGAR BEETS, OTTAWA, C.E.F., 1902.

VARIETY.	Percentage of Sugar in juice.	Percentage of Solids in juice.	Co-efficient of Purity.	Average weight of one root.
				Lbs. Oz.
Vilmorin's Improved, 1st sowing	17·74	20·36	87·1	1 3
2nd "	16·78	19·29	86·9	15
Danish " 1st "	13·28	15·83	83·9	1 10
2nd "	12·86	15·63	82·3	1 1
Red Top 1st "	13·59	15·2	89·4	1 1
2nd "	13·31	15·27	87·1	1 0
Très Riche (French very rich) 1st sowing	15·58	17·57	88·6	1 2
2nd "	16·04	17·74	90·4	15
Royal Giant 1st sowing	11·95	14·73	81·1	1 5
2nd "	11 06	13·60	81·3	1 4
Lane's Improved 1st "	14·67	16·70	87·9	1 3
2nd "	14·18	15·79	89 2	14
Klein Wanzleben 1st "	17·48	19·00	92·0	1 8
2nd "	18·21	19·98	91·1	15
Danish Red Top 1st "	11·98	13·97	85·7	1 13
2nd "	12·06	14·74	81·8	1 1

With two exceptions, the percentages of sugar and purity co-efficients indicate a profitable beet for factory use, the varieties Klein Wanzleben, Très Riche, and Vilmorin's Improved again standing at the head of the list. These latter have shown sugar in juice ranging from 15·58 per cent to 18·21 per cent, and purity co-efficients from 86·9 per cent to 92·0 per cent.

Manitoba.—Fourteen samples, forwarded by Mr. Hugh McKellar, Chief Clerk, Department of Agriculture, Winnipeg, have been examined. Samples 1 to 9 were received on November 10, and unfortunately through insufficient care in packing, the several varieties in each parcel could not be distinguished. These, with the exception of Nos. 2 and 9 fall below the average for profitable sugar manufacture. Samples Nos. 10 to 14 were received on December 5, and were found to be shrivelled, evidently due to drying. This would make the percentage of sugar as obtained somewhat higher than that originally present. The results, however, from the varieties Jaensch Victrix, Très Riche (French very rich), and Klein Wanzleben are such as to indicate rich beets.

SUGAR BEETS, MANITOBA, 1902.

No.	Variety.	Grower.	Locality.	Percentage of Sugar in juice.	Percentage of Solids in juice.	Co-efficient of Purity.	Average Weight of one Root.
							Lbs. ozs.
1	Danish Red Top (?)	P. R. Friesen	Gretna	9·46	14·31	66·10	3 6
2	Hanna 2677 / Vilmorin's Improved	S. J. Thompson	St. James	13·88	20·73	66·95	1 12
3	Klein Wanzleben / New Danish Improved	T. Outhwaite	Headingly	9·51	15·47	61·47	1 8
4	New Danish Improved	R. de Vries	Louise Bridge	13·07	18·05	72·41	1 5
5	Hanna 2677 / Danish Red Top	M. McKellar	Pilot Mound	10·62	15·86	66·96	1 3
6	?	W. Morden	Morden	8·39	12·87	65·19	3 15
7	?	R. Cook	Boissevain	6·91	11·90	58·07	3 2
8	Carter's Sugar Cane / Klein Wanzleben	J. Kircaldy	Brandon	10·88	16·26	66·91	1 10
9	New Imperial	R. de Vries	Louise Bridge	13·24	18·66	70·95	1 8
10	Jaensch Victrix	— Seafield	Ninga	18·71	22·73	82·31	1 2
11	Très Riche (French, very rich)	"	"	20·17	23·05	87·50	15
12	Klein Wanzleben	"	"	16·63	20·42	81·44	1 3
13	Klein Wanzleben	D. H. Scott	Brandon	17 19	21·82	78·77	1 1
14	Carter's Sugar Cane	"	"	13·58	18·60	73·01	1 8

North-west Territories, Indian Head, Assa.—Nine varieties examined. Vilmorin's Improved, Très Riche (French very rich) and Klein Wanzleben show good percentages of sugar, but the others are decidedly below the average.

SUGAR BEETS, INDIAN HEAD, N.W.T., 1902.

Variety.	Percentage of Sugar in juice.	Percentage of Solids in juice.	Co-efficient of Purity.	Average Weight of one Root.
				Lbs. ozs.
Vilmorin's Improved	14·12	17·8	79·32	15
Danish Improved	10·44	14·4	72·50	1 3
Red Top	11·56	15·2	76·05	1 11
Très Riche (French very rich)	16·52	19·8	83·43	1 0
Royal Giant	9·16	12·7	71·89	1 8
Lane's Improved	11·64	15·8	73·39	1 4
Klein Wanzleben	14·80	18·6	79·69	15
Danish Red Top	11·65	15·4	75·65	1 2
Imperial Improved	11·42	14·9	76·28	1 4

Strathcona, Alta.—Four samples of Klein Wanzleben were examined, of which the particulars are as follows:—

SUGAR BEETS, STRATHCONA, ALTA., 1902.

Number.	Name.	Variety.	Dates.		Distance between		Remarks.
			Sowing.	Pulling.	Rows.	Plants.	
					In.	In.	
1	R. Sheppard.....	Klein Wanzleben .	May 24	Oct. 10	15	9	Black loam, previous crop for 2 years, potatoes.
2	J. W. Suddaby...	" ..	" 20	" 14	18	8	Prairie loam, no manure; 1899, turnips; 1900, potatoes; 1901, mangels.
3	Wm. Place.....	" ..	June 1	" 14	14	8	Deep prairie loam.
4	John J. Scribner..	" ..	May 29	" 17	24	8-10	Black prairie loam, previous crop on new land, potatoes.

The laboratory data are presented in the following tabular form:—

ANALYSIS OF SUGAR BEETS, STRATHCONA, N.W.T., 1902.

Number.	Variety.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
					Lbs.	Ozs.
1	Klein Wanzleben.....	13·66	18·63	73·3	2	1
2	"	16·04	20·56	78·0	1	12
3	"	13·77	16·97	81·2	1	5
4	"	17·41	20·70	84·1	1	8

It was stated that these beets merely received ordinary field culture.

CANADIAN 'BAKERS' STRONG' FLOUR.

The high standing of Red Fife wheat as grown in the Canadian North-west for the production of a superior bread-making flour has been well established, both by chemical analysis and practical baking tests. Indeed, to the 'Bakers' Strong' as manufactured from No. 1 Hard, is now generally accorded the very highest place as a bread-making flour.

In 1888, in a series of 26 samples of domestic and foreign wheats submitted to analysis in the laboratories of the Experimental Farms, the Red Fife of Manitoba and the North-west Territories was shown to have a very high gluten content and quite equal to that of the very best Russian varieties. (Bulletin No. 4, Experimental Farm Series).

At the World's Columbia Exposition held at Chicago in 1893, the writer as a professional juror was engaged in the analysis of the cereals entered for award. A summary of the results obtained will be found in the Report of the Experimental Farms for 1895, and the data in full in Bulletin No. 45 of the United States Department of Agriculture, Division of Chemistry. It was gratifying on that occasion to find that the Red Fife

samples from Manitoba and the North-west Territories were among the very best examined, as the following averages will demonstrate:—

MEANS of World's Fair Wheat Samples.

——	Weight of 100 Kernels.	Moisture.	Albuminoids.	Fat.	Fibre.	Ash.	Carbohydrates	Wet Gluten.	Dry Gluten.
Domestic (United States) (165).	3·866	10·62	12·23	1·77	2·36	1·82	71·24	26·46	10·31
*Canadian (62)	4·054	11·69	12·25	1·80	2·26	1·69	70·31	25·13	9·76
All foreign wheat (62)	4·076	11·47	12·08	1·78	2·28	1·73	70·66	25·36	9·82
All samples (227)	3·940	10·85	12·20	1·74	2·35	1·81	71·09	26·28	10·22
Manitoba (9)	3·341	11·98	14·62	1·84	2·32	1·47	67·77	28·52	11·62
North-west Territories (9)	3·841	11·55	14·53	1·86	2·14	1·63	68·35	31·27	12·44

*This series included wheats, both spring and winter, from Ontario and British Columbia, which materially reduced the average in albuminoids, and in wet and dry gluten.

In 1898 we were enabled to show from analyses made in the farm laboratories that Canadian Bakers' Strong flour, both in amount and quality of gluten was superior for bread-making to the best Hungarian flour. (Report Experimental Farms, 1898, pp. 153-4).

The following are the analytical data then obtained:—

ANALYSIS OF FLOURS.

Constituents.	Best Patents. Lake of the Woods Milling Co.	5-Star Best grade. E. O. P. O. Hungarian.
Moisture	11·47	11·51
Albuminoids	12·59	11·27
Fat or oil	1·82	1·87
Ash or mineral matter	·37	·34
Wet gluten	34.22	26·17
Dry gluten	12·33	9·79
Ratio of 'dry' to 'wet' gluten	2·77	2·67

As an effort is about to be made to introduce Canadian flour into Japan, it was thought desirable to make a series of analyses, comparing the flours now being used in that country—chiefly manufactured from wheats (Little Club and Blue Stem) grown in the Walla Walla valley, Oregon, and Washington Territory, with Canadian 'Bakers' Strong,' We should then be in a position to demonstrate their relative merits. We have accordingly this year submitted to analysis the following brands, the samples being furnished through the kindness of Mr. Wm. Hutchison, Commissioner of Exhibitions, Department of Agriculture, Ottawa.

No. 1.—'Bakers' Strong,' milled from Canadian No. 1 Hard.

No. 2.—'Centennial's Best,' milled from Little Club and Blue Stem.

No. 3.—'Legal Tender,' milled from Little Club and Blue Stem.

No. 4.—'Gold and Silver,' milled from Little Club and Blue Stem.

Nos. 2, 3 and 4 are flours from wheats grown in Oregon and Washington, U.S.A., the two latter brands, especially, being those at present exported to Japan.

ANALYSIS OF FLOURS.

Brand.	Moisture.	Albuminoids.	Fat or Oil.	Carbohydrates	Fibre.	Ash.	Gluten.		
							Wet.	Dry.	Ratio Dry to Wet.
Manitoba 'Bakers' Strong'	13·35	12·13	1·30	72·79	0·60	0·43	38·18	15·95	2·38
Centennial's Best	11·23	10·50	0·88	77·03	0·00	0·36	32·95	13·05	2·52
Legal Tender	12·57	10·94	0·79	75·12	0·06	0·52	30·74	14·29	2 15
Gold and Silver	11·95	8·88	1·25	77·32	0·12	0·48	27·63	11·63	2·37

The most important constitutent of flour, from the nutritive standpoint, is the protein or albuminoids, the special function of which is the formation and repair of the principal tissues of the body. The above data show that the Canadian 'Bakers' Strong' is much richer in this respect than the American flours examined. Calculated from the albuminoid-content, we find the following relative values :—

Manitoba 'Bakers' Strong'	100·0
Centennial's Best	86·5
Legal Tender	90·2
Gold and Silver	73·2

The gluten determinations indicate, approximately, the relative values of the flours for bread-making purposes, though the character as well as the amount of the gluten is a most important factor in such a consideration. The bread yield is dependent largely upon the so-called 'strength' of the flour · that is, the power to absorb and retain water—a quality which is directly relative to the gluten-content. The 'capacity for producing a well risen loaf,' which will retain its moisture and elasticity under a crisp crust, is rather due to the nature or physical character of the gluten. Recent research (Osborne and Voorhees) has shown that from gluten two proteid substances may be separated, to which they have given the names glutenin and gliadin, and which exist in varying proportions in different flours. These chemists further demonstrated that strong-flour glutens contain a larger proportion of glutenin than weak-flour glutens, and that it is this constituent which affects beneficially not only the moisture-holding capacity, but also the elasticity of the gluten, and hence the bread-making qualities of the flour.

Our gluten estimations (both wet and dry) give first place to the Canadian flour. Allowing the amounts of wet and dry gluten in it to be represented by 100, we have the following order of merit :—

	Wet Gluten.	Dry Gluten.
Manitoba 'Bakers' Strong'	100·00	100·00
Centennial's Best	86·3	81·8
Legal Tender	80·5	89·9
Gold and Silver	72·3	72·9

The following notes were made with regard to the quality of the glutens :—

Manitoba 'Bakers' Strong' :—Firm, tough, not sticky, elastic.

Centennial's Best :—Very similar to preceding, but slightly sticky.

Legal Tender and Gold and Silver :—Inferior to foregoing flours as regards elasticity, slightly sticky.

The facts presented by this investigation allow us to conclude that the Canadian flour is markedly superior to the other brands examined for bread-making purposes.

RIPE AND UNRIPE HONEY.

At the request of the Bee-keepers' Association of Ontario we undertook in 1901 to ascertain what differences in composition might exist between honey taken from uncapped and capped comb, respectively. Honey from the former is known to bee-keepers as immature or unripe, and is generally held to have poor keeping qualities, and therefore its sale either by itself or mixed with ripe honey is a detriment to the honey trade.

In the endeavour to determine the percentage of moisture in the honeys we encountered at the outset certain difficulties, and quickly reached the conclusion that the method employed in obtaining the results on Canadian honeys already on record (Bulletin No. 47, Inland Revenue Department) was unreliable. This method involved the drying of the honey solution on asbestos in a steam oven at 96° C. to 98° C. Under these conditions there is a continuous decomposition of the levulose, resulting in an apparent loss of moisture far in excess of the real percentage present. Further experiments were then made, employing lower temperatures, drying in a partial vacuum, &c., and an account of the results obtained presented to the Bee-keepers' Association at their Convention in Woodstock, Ont., in December, 1901, and have since been published in the proceedings of that association. Our conclusions then were of a tentative character, but the data certainly indicated that the uncapped or immature honey contained more water—probably between three and five per cent—than the fully capped or ripe honey, and, further, that the immature honey has a tendency to ferment and spoil.

In the early months of the present year the analytical methods were more critically examined by Mr. A. T. Charron and the writer and a large amount of work done on various honeys and mixtures of dextrose and levulose in order to learn the most reliable way to estimate the water-content of such substances. This investigation was successful, but as the results are of a purely chemical nature and have appeared in the transactions of the Royal Society (1902), it will not be necessary to here reproduce them.

Our revised data on the 1901 samples are given briefly in the following table, which will scarcely require any words of explanation:—

TABLE I.—Water in Honey, 1901.

Comb.	Where kept.	Bottle closed with	Date of Extraction.	Date of Analysis.	Water, Per Cent.
Fully capped	Honey room	Glass stopper	Aug. 6	Oct. 1	15·46
"	Cellar	"	" 6	" 1	15·89
"	Honey room	Cheese cloth	" 6	" 1	16·95
"	Cellar	"	" 6	" 1	15·84
Partially capped	Honey room	Glass stopper	July 1	" 1	19·12
"	Cellar	"	" 1	" 1	20·68
"	Honey room	Cheese cloth	" 1	" 1	20·63
"	Cellar	"	" 1	" 1	21·03
Uncapped	Honey room	Glass stopper	" 1	" 1	19·57
"	Cellar	"	" 1	" 1	19·24
"	Honey room	Cheese cloth	" 1	" 1	18·25
"	Cellar	"	" 1	" 1	22·09

It will be seen that in addition to the main object of the inquiry, we endeavoured to ascertain what effect upon extracted honey might result *(a)* from keeping it in a closed vessel (as in glass stoppered bottles), and *(b)* open to the air (as in a vessel covered with cheese cloth).

Further, half of the samples were stored in the honey-room in a small outbuilding, and half in a cellar, which was, however, dry and well ventilated.

The honey from the fully capped comb contained from four per cent to five per cent less water than that from the partially or entirely uncapped comb.

The differences in moisture-content between the honeys kept in glass stoppered bottles and cheese cloth covered bottles are so small that we hesitate to draw any comparisons as to the respective merits of these methods of preservation.

The honey from uncapped and partially capped comb was found to have decidedly poor keeping qualities compared with the fully capped comb. Several of the jars of immature honey had fermented when examined in October.

This work was recently repeated on honey of the 1902 crop, with the following results:—

TABLE II.—Water in Honey, 1902.

Comb.	Where kept.	Bottle closed with	Date of Extraction.	Date of Analysis.	Water, Per Cent.
All capped	Laboratory	Glass stopper	Aug. 7	Nov. 6	15·78
"	Apiary	"	" 7	" 11	15·88
"	Laboratory	Cheese cloth	" 7	" 6	17·35
"	Apiary	"	" 7	" 11	16·25
Partially capped	Laboratory	Glass stopper	July 7	" 6	16·58
"	Apiary	"	" 7	" 11	15·33
"	Laboratory	Cheese cloth	" 7	" 6	15·31
"	Apiary	"	" 7	" 11	15·90
Uncapped	Laboratory	Glass stopper	" 7	" 6	17·13
"	Apiary	"	" 7	" 11	16·33
"	Laboratory	Cheese cloth	" 7	" 6	17·56
"	Apiary	"	" 7	" 11	16·18

We notice in the first place that compared with last year's results the same differences in water-content between the ripe and unripe honeys are not observable, though, as in 1901, the latter contain somewhat the higher percentages. Evidently, the character of the season has an influence in this matter and it is quite possible that some seasons the honey from uncapped comb may be practically of equal quality to that from capped comb.

In the case of honey extracted from fully capped comb, it would appear that it absorbed moisture from the air to a slight extent when kept in cheese cloth covered vessels. Experiments are now in progress to ascertain the effect of dry and moist air, respectively, on extracted honey.

The investigation with ripe and unripe honey will be further proceeded with, and as results of interest are obtained a report will be issued.

THE PERCENTAGE OF WATER IN CANADIAN CREAMERY BUTTER.

The recent enactment in England that butter to be accounted legally genuine should not contain more than 16 per cent of water, made it desirable that we should obtain, for our own information as well as that of the English public, data regarding the moisture-content of Canadian creamery butter. We have accordingly, at the instance of the Dairy Division of the Department of Agriculture, submitted to analysis since June last 105 samples of such butter, 75 being collected at the creameries from the butter as ready for the final export package, and 30 from warehouses at Montreal from packages already on their way to the English market.

Of the 75 samples sent direct from creameries, 6 were from Prince Edward Island, 2 from New Brunswick, 15 from Quebec, 26 from Ontario, and 26 from the North-west Territories. With one or two exceptions, they were all manufactured in July or August.

The results of this investigation, together with an account of the method of sampling and analysis employed, have been published as Bulletin No. 4, New Series, Dairy Division, Department of Agriculture, Ottawa. It will, therefore, only be necessary in

this place to summarize the data and point out the position of Canadian creamery butter in respect to moisture-content as compared with other butters entering the English market.

Range of Water-content in Canadian Creamery Butter.

Percentages of Water.	Number of Samples.
Between 7 and 8	1
8 9	1
9 10	4
10 11	15
11 12	24
12 13	23
13 14	24
14 15	10
15 16	2
16 17	1
	105

Average per cent of Water.

In samples from creameries (75)	12·16
In samples taken at warehouse (30)	12·69
In 105 samples	12·31

For the purpose of comparison of Canadian creamery butter with that of certain European countries also exporting butter to England, we give the following averages, taken from the recent report of the Departmental Committee on Butter Regulations (England, 1902):—

Percentage of Water in Foreign Butters.

Danish—average of 2,001 samples, summer	14·03
" 1,930 " winter	14·41
" in 1889–92, 1,288 samples	14·58
" 1887—1900, 8,384 samples	13·97
Swedish—average in 1894—1900, 8,384 samples	13·57
Irish, yearly average 1896, 131 samples	13·93
" 1897, 329 "	14·31
" 1898, 298 "	14·42
" 1899, 552 "	14·24
" 1900, 615 "	14·11

This investigation has not only furnished proof of a most satisfactory character that Canadian Creamery Butter falls well within the limits set by the English law but also that it is much '*drier*' than much of the butter made in Europe and which is met with as a competitor in the English markets.

WELL WATERS FROM FARM HOMESTEADS.

Of the 102 samples of water received, 74 have been submitted to analysis, the remainder, owing to insufficiency in the quantity sent or for other valid reasons, were not examined chemically. Nineteen are reported as pure and wholesome, seventeen as suspicious and probably dangerous, twenty-six as seriously polluted, and twelve as saline waters.

ANALYSIS OF WELL WATERS, 1902.

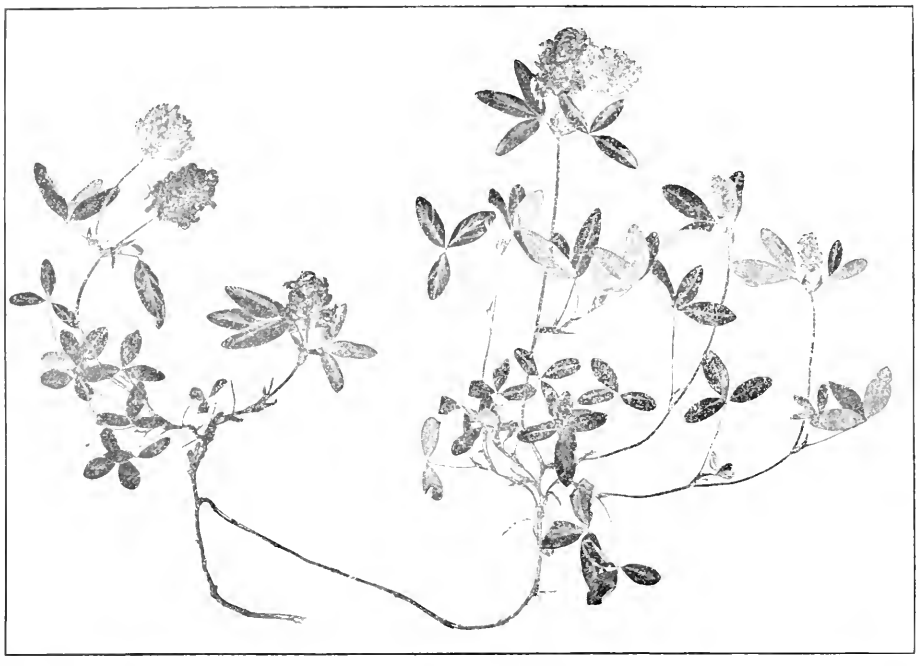
RESULTS STATED IN PARTS PER MILLION.

Number.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrites.	Chlorine.	Total Solids at 105° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.
			1901.									
1	Newburg, Ont.	H. W.	Dec. 4.	30·19	·076	None...	47150·0	78855·2	.....	.....	.....	Saline water.
2	Hanover, Ont.	J. J. W.	" 18.	·06	·112	3·516	10 0	368·8	254·4	114·4	None.	Suspicious.
3	Shawville, Que.	R. D. F.	" 24.	·012	·101	7·975	29·0	348·0	195·6	152·4	"	Seriously contaminated.
4	South End P. O., Ont.	C. F. M.	" 26.	None...	·15	14·58	94·0	701·6	422·8	278·8	Trace.	Very seriously polluted.
5	Routhwaite, Brandon, M.	G. J. G	" 28.	1·318	·141	2·836	180·0	5140·0	4328·8	811·2	V. H. trace.	Saline water.
6	Ottawa, Ont.	Mrs. R.	Jan. 8.	1·005	·251	7·536	60·8	520·0	357·6	162·4	Trace.	Polluted and dangerous to health.
7	Snow Flake, Man.	J. S.	" 24	·054	·588	·021	None...	323·0	232·0	91·0	H. trace.	Free from pollution.
8	Carleton Place, Ont.	J. D. E. No. 1.	Feb. 1.	·056	·165	18·862	66·75	691·6	544·4	147 8	None.	Most seriously polluted.
9	"	" No. 2.	" 1.	·05	·14	17·048	73·0	700 0	544·0	156·0	V. S. trace.	" "
10	St. François Xavier, Man.	L. O. P.	" 24.	.....	.....	.....	3700·0	9708·8	8870·4	838·4	.....	Saline water.
11	East Templeton, Que.	F. C	" 24.	·08	·097	1·136	3·8	240·0	168·8	71·2	Trace.	Probably free from contamination.
12	Brandon, Man.	J. M. A.	Mar. 1.	1·99	·125	·716	225·0	6064·0	5420·0	644·0	H. trace.	Saline water.
13	Cornwall, Ont.	G. H. P.	" 22.	·055	·155	1·264	1·5	76·0	40·4	35·6	None.	Pure and wholesome.
14	Gatineau Point, Que.	H. K.	" 25.	·638	·188	·072	80·0	692·4	580·4	112·0	V. H. trace.	Contaminated with drainage.
15	Moosomin, Assa	J. B. T. No. 1.	" 29.	1·585	·119	·224	77·0	2700·0	2116·4	583·6	None.	Saline water.
16	"	" No. 2.	" 29.	1·568	·096	1·854	39·0	1675·2	1336·0	339·2	"	"
17	Westboro', Ont.	J. G. C.	April 3.	·072	·215	16·255	84·0	691·2	536·0	155·2	Trace.	Probably unsafe for household use.
18	"	"	" 17.	·222	·28	13 454	99·5	752·0	555·2	196·2	S. trace.	Undoubtedly polluted.
19	Eden, Man.	J. R. S.	" 30.	·443	·143	·093	31·5	3544·8	2916·0	628·8	Trace.	Saline water, seriously contaminated.
20	Rideau River, Ont., opp. Con. K	J. B. No. 1.	May 9.	·038	·382	·081	2·1	168·8	85·6	83·2	S. trace.	Unpolluted.
21	Ottawa East, Ont.	" No. 2.	" 9.	·030	·070	·0543	7·4	265·6	169·6	96·0	V. S. trace.	Suspicious.
22	Rideau Canal, Ottawa, O.	" No. 3.	" 9.	·032	·420	·0263	3·8	160·0	78·8	81·2	"	Not a first class water.
23	Ottawa East, Ont.	" No. 4.	" 9.	·024	·134	2·088	8·0	244·8	137·6	107·2	"	Shows signs of contamination.
24	"	" No. 5.	" 9.	·204	·083	·0082	12·8	264·0	173·6	90·4	S. trace.	" "
25	Lake Dechêne	A. D. C.	" 12.	·012	·227	·1137	1·6	56·0	24·8	21·2	None.	Excellent, pure.
26	Avonmore, Ont.	H. A. McM.	" 15.	·039	·562	13·96	80·0	732·0	422 0	310·0	Trace.	Seriously polluted.
27	Shelburne, Ont.	D. H.	" 28.	·17	·058	·039	4·0	229·2	175·2	54·0	V. S. trace.	Probably good and wholesome.
28	Clarksburg, Ont	W. H	" 30	·621	·082	·0038	72·5	2616·0	2210·0	376·0	None.	Very suspicious.
29	Kepock, P.E.I.	P. C	June 3.	·012	·091	15·307	87·0	348·4	286·0	126·4	Trace.	Seriously contaminated.
30	Elm Creek, Man.	P. D. A.	" 16.	·20	·31	13·012	7·5	3692·0	2158·0	1534·0	"	Saline water.
31	Navy Bank, Man.	W. C.	July 3.	·283	·191	·0725	71·0	628·0	388·4	239·6	V. H. trace.	Suspicious.
32	Nicolet, Que	J. B.	" 7.	·44	·183	·005	81·0	374·0	266·8	107·2	"	Very suspicious.
33	Rideau River, Ont.	J. B. No. A.	" 8.	·025	·385	·031	2·5	166·0	74·0	92·0	V. S. trace.	Pure, wholesome.

34	"	" No. B....	" 8.	·028	·39	·029	2·4	177·0	80·0	97·0	S. trace....	"
35	Wright, Que.....	L. C..	" 17.	·373	·101	4·041	3·5	189·6	100·8	88·8	V. H. trace.	Polluted.
36	"	"	" 24.	·16	06	5·332	5·5	198·0	100·0	98·0	S. trace.....	"
37	"	Lake	" 24.	·024	·195	None...	1·3	59·2	26·8	22·4	None.....	Excellent, pure.
38	"	M. M	" 24.	·01	·062	11·099	142 5	852·4	436·8	415·6	V. H. trace.	Polluted.
39	Bay View, N.S.....	W. M.....	" 30.	4·42	·253	27·48	390·0	1160·6	834·0	326·0	Trace....	Very seriously polluted.
40	Oshawa, Ont.	W. H. F.....	" 31.	·033	·206	15·851	42·5	786·0	472·0	314·0	V. S. trace..	Dangerously contaminated.
41	"	M. L.....	" 31.	·275	·094	12·29	42·0	631·0	397·0	234 0	Trace.....	" "
42	Hazeldean, Ont..... ..	H. H. A. No. 1.	Aug. 1.	·024	·158	4·382	15·5	245·2	175·6	69·6	"	" "
43	"	" No. 2.	" 1.	·124	·32	·886	21·5	268·3	164·8	104·0	"	" "
44	"	" No. 3.	" 1.	·048	·05	4·198	16·0	214·4	123·2	91·2	H. trace....	" "
45	St. Eugène, Que	J. M.	" 12.	1·955	·212	·122	220·0	4686·0	4471·5	215·5	Trace.....	Saline water.
46	Lavant Station, Ont.....	S. B.....	" 14.	·012	·111	·085	3·5	257·5	155·2	102·3	"	Not polluted.
47	Wolseley Assa.....	A. D. F.....	" 18.	·118	·115	·034	9·0	484·4	368·4	116·0	"	Not contaminated.
48	Indian Head, N.W.T....	I.W.& L.C. No.1	" 18.	·072	·187	·946	53·7	1522·4	1122·4	400·0	V. S. trace..	Saline water.
49	"	" No. 2	" 18.	·039	·143	2·433	10·3	522·4	378 4	144·0	Trace.....	Very suspicious.
50	"	" No. 3	" 18.	·052	·385	29·313	100·0	4272·0	3216·8	1055·2	H. trace....	Saline water.
51	" ...	" No. 4	" 18.	·02	·355	·178	1·0	273·6	168·8	104·8	"	Unpolluted, wholesome.
52	Almonte, Ont...	J. K. D.....	" 25.	·048	·067	1·031	10·0	368·8	237·2	131·6	Trace.....	Suspicious.
53	St. John, N.B.... . .	A. McD. No. 1.	Sept. 2.	None...	·093	·095	5·0	68·8	42·4	18·4	S. trace. ...	Good and wholesome water.
54	"	" No 2..	" 2.	·313	·103	None...	7400·0	11411·2	9968·0	8443·2	None.....	Saline water.
55	"	W. J. S.....	" 2.	·132	·152	·220	4·0	32·0	21·6	10·4	S. trace.....	Suspicious.
56	Ottawa, Ont.....	J. M.	" 5.	·423	·240	None...	253·3	732 0	607·2	124·8	Trace.....	Unpolluted.
57	Fairmede, N.W.T	J. A. S.....	" 5.	·722	·138	·270	15·9	1128·8	862·4	266·4	S. trace.....	Contaminated and dangerous to health.
58	Appleton, Ont..... .	A. W	" 6.	·087	·097	·224	2·0	318·0	.....	.....	.. ..	Suspicious.
59	Ottawa East, Ont.....	J. B No. 1.....	" 10.	·016	·329	·077	2·2	126·4	60·4	66 0	V. S. trace..	Pure, wholesome.
60	"	" No. 2.....	" 10.	·014	·320	·092	2·0	127·6	61·6	66·0	" ..	"
61	Grenfell, Assa	J. L. C.....	" 16.	·29	·615	26·27	82·5	2306·0	1248 0	1058·0	" ..	Dangerously contaminated.
62	Billings Bridge, Ont ...	N. G.	" 16.	·016	·085	·019	3·0	276 0	174·4	101·6	" ..	Free from polution.
63	London, Ont..	A. H. C	" 24	·06	·156	7·667	34·0	599·6	361·6	238·0	Trace.....	Seriously polluted.
64	Georgeville, Que.....	I. C. B...	Oct. 3.	·30	·153	·217	2·5	240 4	140·4	100·0	None.....	Suspicious.
65	Waskada, Man	J. D	" 18	2·54	·28	·041	505·0	2147·2	2271·2	176·0	H. trace....	Seriously polluted.
66	Wright, Que.....	M. E. S.....	" 20.	·16	·275	·889	None...	212·0	124 0	88·0	.....	Suspicious.
67	Annapolis, N.S.....	M. G.....	Nov. 3.	·016	·145	·173	4·0	32·8	10·4	22·4	H. trace....	"
68	Vankleek Hill, Ont.....	A. H. F.....	" 3.	·09	·108	5·825	6·0	308·0	189·2	118·8	Trace.....	"
69	Treherne, Man.....	J. B.....	" 7.	·130	·282	·104	35·0	4783·6	3739·2	1044·4	H. trace....	Saline water.
70	Rideau River, Ont	J. B. No. 1.....	" 11.	·024	·371	·036	2·9	145·6	80·0	65·6	Trace.....	Pure, wholesome.
71	"	" No. 2.....	" 11	·024	·390	·346	2·5	145 2	80·8	64·4	"	"
72	Highgate, Ont.... ..	C. T. L. T	" 20	·26	·087	·003	87·5	401·6	360·4	41·2	"	Seriously polluted.
73	Ottawa East, Ont.... ..	J. B. No. 1.....	" 25.	·02	·455	6·185	105·0	653 0	522·0	130·2	"	Polluted.
74	"	" No. 2.....	" 25.	·016	·248	7 84	165·0	923 2	741·2	182·0	"	"

The results of this examination have again emphasized the folly of locating the well in the farmyards and under or near the farm buildings, as is so often practised, for by far the larger number of bad waters are from such wells. From every standpoint—the health of the family, thrift of stock, and quality and wholesomeness of dairy products—there can be no doubt as to the desirability of a water supply absolutely free from pollution. The danger from using a water which has even remotely received excrementitious matter is a serious one, though it may be insidious in its character and difficult at times to recognize. This we have repeatedly in the past pointed out and explained and, therefore, refrain now from speaking further on the subject.

We are extremely glad, however, to note that throughout the Dominion, farmers are paying more and more attention to the quality of the water supply for their household and stock, and are exercising greater care in protecting it from pollution. We feel sure that this movement will result in much good directly and indirectly to the agricultural community.



SIMPSON'S TRUE-PERENNIAL RED CLOVER.

1. Showing stoloniferous habit of growth.
2. Plot, 33 ft. x 8 ft. 3 in., in flower. Height, 6-12 in.

REPORT

OF THE

ENTOMOLOGIST AND BOTANIST

(James Fletcher, LL.D., F.L.S., F.R.S.C.)

1902.

Ottawa, December 1, 1902.

Dr. Wm. Saunders,
Director of Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to hand you herewith a report on some of the more important subjects which have received attention in the Division of Entomology and Botany during the year 1902. Many other subjects have taken up some of the time of the staff, but do not require special treatment in this report. The ever increasing number of applications for information continue to give encouraging evidence as to the utility of the investigations carried on year by year in the Division. The gradual but sure adoption by farmers of such scientific methods of protecting their crops from the attacks of injurious insects and destructive fungi, as spraying, &c., must to a large measure be traced directly to instructions given by officers of the Experimental Farms.

Correspondence.—The large correspondence of the Division has been of the usual varied character, and as in the past shows a considerable increase in the numbers of letters received. From November 30, 1901, to November 30, 1902, the number of letters exclusive of circulars, registered as received, is 3,215, and the number despatched 2,845.

Meetings attended.—Meetings of farmers' institutes, and agricultural associations of various kinds, have been attended whenever other official duties would allow of my absence from Ottawa.

January 8 to 10, Whitby, Ont.—The Eastern Ontario Dairymen's Association, where addresses were delivered: (1) 'Hay and Pasture Grasses,' 'The Cultivation of Flowers.' The Ontario Ladies College:—'The Value of Nature Study in Education.'

January 20 to 24, Wolfville, N.S.—Nova Scotia Fruit Growers' Association: (1) 'Insects Injurious to Fruits', (2) 'The San José Scale in Canada.'

January 23, Amherst, Nova Scotia Farmers' Association: 'Farmers' Friends and Foes', 'Pasture Grasses, Potato Rot, and Injurious Insects.'

February 5, Howick, Que.—Huntingdon Dairymen's Association: (2) 'Potato Rot', (2) 'Quack Grass, Perennial Sow Thistle and other Weeds', (3) 'The Care of House Plants.'

February 7, Cowansville, Que.—District of Bedford Dairymen's Association: (1) 'Insects Injurious to Farm Crops', (2) 'The best Pasture Grasses for Quebec Province', (3) 'Potato Rot,' (4) 'Perennial Sow Thistle and Quack Grass.'

February 17, Hamilton, Ont.—Hamilton Horticultural Society: The Flora of the Rocky Mountains.'

February 18, Toronto.—Toronto Normal School : 'Nature Study.'

March 6, Ottawa.—Canadian Forestry Asociation : Discussion of Forest Insects.

March 21, Ottawa.—Ottawa Normal School : 'Our Common Birds and What they do.'

May 20, Niagara Falls and St. Catharines.—Examining the experiments by Mr. Geo. E. Fisher, the Provincial Inspector for controlling the San José Scale.

June 4, Orillia, Ont.—Orillia Horticultural Society : 'Remedies for Orchard Insects and how to apply them'. The East Simcoe Farmers Institute: 'Insects injurious to farm crops.'

June 12-30.—Holding meetings in south-eastern Alberta for the North-west Government.

July 28-31.—Attending the Summer School of Science at St. Stephen, N.B., where an address was delivered on July 30 upon 'Nature Study in Education', and some other addresses before the botanical class of the Summer School.

August 5-11.—Holding farmers' meetings in Prince Edward Island in company with Prof. Robertson, at Summerside on 5th, Kensington on 6th, New Perth on 7th, Charlottetown on 8th, Crapaud on 9th, and Tignish on 11th.

August 14, Aylmer, Que.—Fruit Growers' Association of Quebec : 'Fruit Insects of the year'.

September 9-10, Brome, Que.—Attending the Brome County Exhibition, where an exhibit was arranged showing growing fodder grasses, as well as bundles of the dry hay and all the weeds of the district in a fresh and preserved condition.

September 12.—Visited Oka, Que., and examined the experiments which had been made some years ago in planting pine groves to prevent sand from blowing, and also the gardens of the Trappists' Monastery, and the extensive orchards of Mr. R. W. Shepperd.

September 23, Richmond, Ont.—Carleton Model Fair : Judged the collections of natural history objects made by the teachers and school children of the district, and gave an address on the value of these to the farmers assembled.

September 24, Whitby, Ont.—Model Fair. Judged the collections made by the teachers and school children of the district in the afternoon, and in the evening gave an address on the value of this work to farmers and particularly to the parents of the children engaged in the work.

September 25.—Visited Niagara Falls, investigating the progress of the San José Scale experiments, and inspected the Fumigation Station.

October 28, St. Catharines and Niagara-on-the-Lake.—Accompanied the Ontario San José Scale Commission, examining the experiments in treating trees for the San José Scale by the Provincial Inspector.

October 29, London, Ont.—Entomological Society of Ontario, annual meeting. Addressed Pea Weevil Conference in the afternoon 30th. 'Injurious Insects of the year' and 'Entomological Record for 1902'. Three papers were also read at this meeting by my assistant, Mr. Gibson.

Fodder Plants.—The copious rains of the past season gave the experimental grass plots, a chance to recover from the effects of injury from drought last year and severe frost early in the winter of 1901-02. The growth of all varieties was very luxuriant, and the large collection of grasses and clovers attracted the attention of all visitors. Among experiments of special interest were rows of peas grown to illustrate the injury done by the Pea Weevil and the Pea Moth ; also beds of fall wheat sown at different dates last autumn, and plots of Chess and fall wheat which are planted every year to show farmers that these two plants have no relationship to each other. During the summer we have been able to convince many, who thought otherwise, that this is the case, by digging up plants of chess after the heads have appeared, and showing that the chess seed was still attached to the roots. This seed is entirely different from that of fall wheat, having a husk upon it which bears a fringe of bristles along each side of the conspicuous groove. I would suggest to some of those who still believe that chess is 'degenerated

fall wheat' that they try this experiment for themselves. They will at any rate convince themselves that chess plants will grow from chess seeds, which is frequently stated not to be the case. Several new varieties of grasses and clovers have been added to the collection during the past year.

Insects of the year.—A satisfactory feature of the year 1902 has been a marked decrease in the injuries by some of our well known pests, such as the Codling Moth, the Cankerworms and the Tent Caterpillars, through most of our fruit-growing districts. Insect enemies which require at the present time more attention than they are receiving from the people most concerned, are the following. The Mediterranean Flour Moth, although seldom mentioned, is becoming abundant in mills in various parts of Canada. Where thorough fumigation with sulphur has been tried and frequently repeated, the best results have been obtained. This, of course, must be accompanied with scrupulous cleanliness, the mills being frequently swept down, and as small a stock as possible of ground grain or cereal products, kept on hand. Opening the mills frequently to the full intensity of the winter cold, has also been useful in checking this insect. The Buffalo Carpet Beetle is extending the range over which it is a troublesome household pest. The Eye-spotted Bud-moth did considerable harm in the orchards of the Maritime Provinces last spring. In Manitoba, particularly about Sewell Station, much loss resulted from neglecting to fight Locusts. The wheat crop of Manitoba was in some places rather seriously injured by the Hessian Fly, but the Provincial Department of Agriculture has made widely known the best way to cope with this pest. The San José Scale work in south-western Ontario is now beginning to bear excellent fruit, in the discovery of what may be called a practical remedy for this terrible pest. It has been shown during the past summer that trees which have been thoroughly sprayed early in the spring with the California lime-sulphur-and-salt wash, as well as with a modification of this, with the salt omitted, and subsequently with the ordinary kerosene emulsion, may be kept free from injury by the San José Scale. There is every reason to hope that, as this remedy becomes more generally applied, the San José Scale may be brought down to the status of an ordinary fruit pest. It will, however, require constant and extreme care, or the state of the orchards will soon revert to what it was a year ago. The San José Scale is still the very worst insect we have ever had to fight, and there must as yet be no relaxation whatever in the campaign against it. The insect requiring perhaps more attention than any other at the present time, is the Pea Weevil, which annually destroys upwards of one million dollars worth of the field peas of Ontario. I have endeavoured to draw particular attention to this insect with the object of inducing all pea growers, whether seed merchants, farmers or private individuals, to adopt the well tried and simple remedies by which this insect can be much reduced in numbers. There are perhaps more reasons to hope that total extinction of this serious enemy might be attained than is the case with many others we have to deal with. The Cattle Horn-fly, possibly from the nature of the season, increased noticeably in many parts of Canada, particularly in the maritime provinces, whence frequent demands for advice were received. Another result of the wet weather which prevailed in most parts of Canada, was the somewhat unusual amount of injury from slugs. These molluscs are not insects, but it is to the student of insects that most inquiries regarding them are directed.

There were no important additions to our list of injurious insects during the past year. The incident of greatest interest was the occurrence of a single specimen of the Brown-tailed Moth at St. John, N. B., where it was captured by Mr. Wm. McIntosh of that city. This is a European pest which, after the notorious Gypsy Moth, has caused more anxiety than any other insect in the New England States, excepting perhaps the San José Scale. Two fruit pests, enemies of the strawberry, the caterpillars of a geometer moth, *Petrophora truncata*, and of a noctuid, *Scopelosoma trisignata*, probably only of minor importance, have been received from British Columbia. These are widely distributed insects but have never previously been complained of as enemies of the fruit grower.

Collections.—The work of arranging the collections in the Division of Entomology and Botany and putting them in such condition that they can be easily consulted by visitors, has progressed satisfactorily. Large numbers of specimens of both insects and plants have been received, and the collections are becoming a valuable source of reference. Mr. J. A. Guignard, who has charge of the herbarium, has added many mounted plants from all parts of the Dominion, which have been received from correspondents, sent in for identification, or collected by the various officers of the Division. Mr. Arthur Gibson has continued the arrangement of the cabinets of insects, and has added many interesting specimens illustrative of the life histories and habits of crop pests and other insects.

During the season, as heretofore, many students in all parts of the Dominion have sent in specimens of insects and plants for identification. Many large collections have been received for this purpose, from which much valuable knowledge, as to the distribution of our native insects and plants, and as to the occurrence of the weeds of cultivated lands, has been gathered. Records have been taken of these, and in addition many desirable specimens have been acquired for the museum. So many collectors have generously presented specimens for our cabinets that it would be impossible here on account of limited space to give a list of these, but mention must be made of the following:

A representative collection of British Columbian Geometridæ from the Rev. G. W. Taylor, of Wellington, B. C.

Collections in all orders of insects, and many consignments of the eggs of rare mountain species, from Mr. J. W. Cockle, of Kaslo, B. C.

Rare British Columbian plants, from Mr. J. R. Anderson, Victoria, B. C.

Acknowledgments.—As in the past I have been during the season of 1902 under great obligations to my many correspondents, including several members of the Select Standing Committee of the House of Commons on Agriculture, who have notified me of outbreaks of injurious insects and have assisted in carrying out experiments for controlling the same. It is not possible to report upon a great deal of this work at the end of each year, but careful records are always preserved, and, when occasion demands for the treatment of any subject in the annual report, great care is taken to give proper credit for such assistance where it is due. The value of exact observations is constantly being illustrated in the scientific study of insects, and this even many years after the observations were made. In devising remedies for injurious insects, the success or failure of these will in all cases depend on the accuracy of our knowledge concerning the habits of the insects to be fought against.

In conclusion, I take pleasure in again testifying to the assiduity and excellent work constantly done by my assistants, Mr. J. A. Guignard, B. A., and Mr. Arthur Gibson, to which such success as has attended the development of the Division is largely due.

I have the honour to be, sir,

Your obedient servant,

JAMES FLETCHER,

Entomologist and Botanist.

DIVISION OF ENTOMOLOGY.

CEREALS.

Reports from all parts of the Dominion announce that the grain crop of 1902 has been abundant and of good quality with little injury by the ordinary insect pests. Any injury mentioned is from weather. In British Columbia Mr. J. R. Anderson says: 'Weather conditions were good and the crops correspondingly so. The yield of wheat in the Okanagan was very large and the quality extra good.' In the North-west Territories Mr. A. W. Peterson described the crop of all kinds of grain as 'enormous beyond precedent and of the finest quality.' Crops of fall wheat seen by me at Pincher Creek and among the Mormon settlements of south-western Alberta can only be described as magnificent, notwithstanding the excessive rains of June and July. In Manitoba Mr. McKellar sums up the reports from his correspondents as follows: 'The best crop ever raised in Manitoba; wheat No. 1 hard or No. 1 Northern. It is hardly possible to describe the perfect weather with which this province was blessed during harvest and threshing. Never in the history of the province was so much work done in the short period of ten weeks, and the garnering of the greatest crop ever grown in the province was done almost without interruption. Of our crop of over 50 millions of bushels of wheat, half was already marketed by the end of November. Threshing was practically finished and more fall ploughing done by the middle of November than was done altogether last fall. All grain crops are equally large; we have upwards of 35 million bushels of plump heavy oats and nearly 12 millions of barley.' Prof. James reports the yield of fall wheat in Ontario as 'above the average for 20 years, and spring wheat, good both in yield and quality.' 'The chief damage to crops everywhere was from rain; comparatively little injury was done by insect pests, despite the fears entertained of the Hessian Fly.' The same satisfactory reports come from Quebec and the maritime provinces. Father Burke, of Prince Edward Island, writes in November last: 'The harvest is abundant, and, as the loss from insects has been almost nil, the farmer wears his sunniest smile in the presence of bursting barns and well filled cellars.'

The only insect enemies of cereal crops requiring mention this year, are the Hessian Fly and locusts, in Manitoba.

THE HESSIAN FLY

(*Cecidomyia destructor*, Say).

The remarkable and almost entire disappearance of the Hessian Fly from the wheat fields of Ontario in 1902 after the excessive injury in 1901, is a subject of constant and grateful comment by correspondents. There has been, however, slight injury in Prince Edward Island. A few straws containing puparia were sent in by Mr. E. Wyatt, of Pleasant Grove, P.E.I., but the loss in the field from which they were taken was hardly perceptible, and no other correspondents make mention of it. In travelling through Prince Edward Island in August last, I could neither hear of nor see any trace of this pest. The most notable attack by the Hessian Fly in 1902 has been in the wheat crop of Manitoba, and several specimens of injured straws were received in September and October. Reports were also received in June of injury to the root shoots of growing wheat at Treesbank, Man. This attack at the root is very seldom noticed by farmers,

and other causes are suggested to account for the destruction of the plants, which is frequently considerable. Mr. Criddle, of Aweme, is of the opinion that many of the reports concerning cutworm injury in the wheat fields through that part of Manitoba where he is, should really refer to Hessian Fly. Mr. A. Cooper, of Treesbank, sent me specimens of wheat, saying under date of June 3: 'I have noticed a great many dead and dying wheat plants in this locality this spring, and have examined my own fields to try and learn the cause. When the injury was first noticed, the wheat was three or four inches high. To-day I find a small white maggot imbedded in that part of the stem below the ground between the surface and the seed, and, after examining your report on Hessian Fly for 1899, page 167, I came to the conclusion that this fly was the cause of the damage. The place where the damage is worst on my land, is on a piece of spring ploughed stubble land which bore a heavy crop last year and was ploughed five or six inches deep this spring. The injury seems to be worst wherever the land is loosest. One place where my cattle had tramped the ground hard there is no injury. A neighbour's summer-fallowed field is far worse than mine. I am afraid of further injury later in the summer from these pests, which I suppose is bound to happen, should my diagnosis be correct.'—A. Cooper.

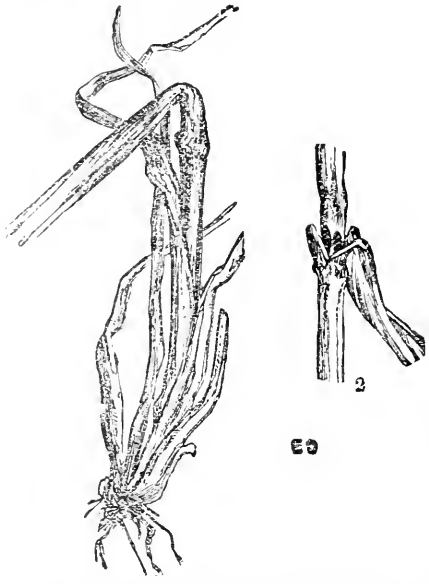


Fig. 1.—The Hessian Fly: attacked barley stems; 1, elbowed down; 2, showing 'flax seeds.'

This is the only district in which the attack on the root shoots was noticed, but later in the year several reports were received of injuries at Stockton, Wawanesa, Rounthwaite, Blythe and Aweme. When the wheat was cut, it was found that in certain places in western Manitoba many of the straws were broken down from having been injured by the Hessian Fly. Articles were published in the press by the Deputy Minister of Agriculture for Manitoba, and by Mr. W. H. Coard, of the Commissioner of Agriculture's Branch at Ottawa, in which the life history of the Hessian Fly was given and the best means of dealing with it. There is only one annual brood of the Hessian Fly in Manitoba, the eggs being laid upon the leaves of the young plants, and, according to the development of the plant at the time the maggots attack it, the larvæ are found either in the axils of the leaves below the surface of the ground, or, if the stem has begun to shoot, in the axils of those leaves on the stem nearest to the ground. The maggots assume the flax seed or pupa condition about mid-summer; but the flies in the hot dry autumns which prevail in Manitoba, probably in most cases and certainly in many, as I have seen by actual observation, do not emerge until the following spring. Therefore, the problem of controlling the Hessian Fly in Manitoba is far simpler than in the East, where the greatest damage is done to fall wheat in the autumn. In Manitoba no fall wheat is sown: so, if any flies emerge in the autumn, they die without doing any harm, because no winter grain is sown in Manitoba, and the Hessian Fly does not subsist on any wild grasses. The remedy, therefore, is comparatively simple. When Hessian Fly is known to be present, grain should be cut high and the stubble burned over or ploughed down in autumn. For fear that any of the flax seeds might be carried in the straw, this should be fed to stock or burned before the time that the flies emerge the following spring. Many of the flax seeds may be seen beneath threshing machines when straw has been badly infested. Therefore, all screenings or rubbish from machines should be put where poultry can get at it, or where it will be trampled into the ground during the winter by stock.

SESSIONAL PAPER No. 16

THE PEA WEEVIL OR 'PEA BUG'

(Bruchus pisorum, Linn.*)*.

Attack.—A small, brownish-gray, very active beetle, one-fifth of an inch long, with two conspicuous black spots on the end of the body, which emerges from seed peas in autumn or in spring, leaving a small round hole. The insect is generally spoken of under the incorrect name of 'Pea Bug,' and infested peas, as 'buggy' peas. The egg is laid on the outside of the young pod, and the grub on hatching eats its way in and penetrates the nearest pea. Here it remains until full grown, consuming the interior of the pea and passing through all its stages, from a white fleshy grub to the pupa, and then to the perfect beetle. Some of the beetles, the percentage varying with the season, escape from the peas, occasionally as early as harvest time, or during the autumn, and pass the winter hidden away under rubbish or about barns and other buildings. As a rule, however, the larger proportion do not under ordinary circumstances leave the peas until the time when peas are sown the following spring, and consequently may be carried into new districts previously uninfested. It may be added to this that the perfect insects fly easily and for long distances, and that they are attracted by instinct to growing fields of peas, where they feed upon the foliage and flowers of the plants until the young pods are formed. The beetles which leave the peas in autumn and those which remain in the seeds till the following spring, all become fully developed at the same time, which is about the middle of August, and all, whether they winter outside the peas or inside the grain, die about the same time the following season, viz., during the month of June.

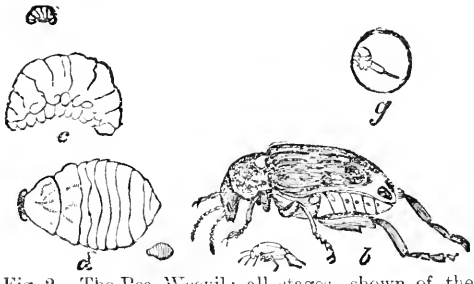


Fig. 2.—The Pea Weevil: all stages—shown of the natural size and enlarged.

The life history and habits of the Pea Weevil are so well known, and have been so frequently explained to farmers and other pea growers that it may seem superfluous to some for me again to draw attention to this matter However, the loss at the present time is so great and is increasing so rapidly year by year that it is, I believe, the most important subject in connection with my official work, which I have to-day to bring before Canadian farmers; and, as I fully believe that an enormous improvement can be made without difficulty in the existing deplorable condition of affairs, simply by practising more universally methods which are well known to be effective and which are to some extent used, the Hon. Minister of Agriculture has instructed me to do everything in my power to urge everyone connected with the growing, handling and marketing of peas, to unite in one great effort to reduce the serious loss which is taking place every year. If this can be done, I see no reason to doubt that even total extermination of this serious pest might be arrived at in a comparatively short time. There is nothing new in the way of remedies, nor, indeed, are any better remedies than have been known for many years, necessary. Since 1888 attention has been constantly drawn in my reports to the remedies which have been found effective, but apparently little has been done, and the insect has now increased so much in all the counties of the province of Ontario, where formerly peas of the very finest quality were produced, and which lie to the south of a line drawn from Kincardine on Lake Huron, through Lake Simcoe and Peterborough county about Fenelon Falls to Brockville, that pea growing is no longer a paying industry. Moreover, from the efforts made by seedsmen to obtain peas uninjured by the weevil, by having them grown in uninfested districts, the range of infestation has been widely spread in counties lying to the north of this line, because seed peas have been sent out for propagation for this purpose which had not been properly treated before sowing so as to destroy the contained weevils.

The importance of the Pea Crop both to the farmer for feeding, and for the excellent condition the land is afterwards left in for the cultivation of other crops, as well as to the merchant for export, makes it most advisable that everything possible should be done to preserve the trade in this important cereal. At the present time there is a most decided inclination on the part of farmers to give up growing peas on account of the difficulty of securing a crop free of the weevil. In many districts where formerly large and very remunerative crops were grown, hardly any are now sown, and the decrease in the acreage sown to peas in Ontario in 1902, as given in the Crop Bulletin for August last, of the Ontario Bureau of Industries, is 70,000 acres less than in 1901. It is possible that this diminution in the number of peas sown may to a certain degree affect beneficially the amount of occurrence of the Weevil next year, but this alone cannot possibly solve the question at issue, i.e., such a wholesale destruction of the Pea Weevil, that the whole of the province of Ontario may again become what it certainly was in the past, the best country in the world for the production of peas of the highest quality on the market. This end, I am confident, is well within the bounds of reasonable possibility, but will depend upon a much wider application than has ever been practised in the past, of concerted measures, which must be adopted simultaneously wherever peas are grown, both in Canada and the United States.

I have carried on during the past season a very extensive correspondence with the leading grain merchants, seedsmen, farmers, and other pea growers in the province of Ontario as well as in Montreal, from which port the greater part of the crop for export is shipped. From this correspondence I have been able to learn, I believe, pretty thoroughly what the condition of affairs, with regard to the destruction of the pea crop by the Pea Weevil, is at the present time. This article is written as a special effort to induce everybody concerned, to do something *now*, more definitely and in a more concerted manner than has ever been done before. An agitation has already been created through the efforts of this Division working conjointly with the Provincial Department of Agriculture through Prof. Lochhead, of the Ontario Agricultural College at Guelph. An important conference was held at the annual meeting of the Entomological Society of Ontario, when a resolution was passed requesting the Superintendent of Farmers' Institutes for Ontario to allow this matter to be brought prominently before every farmers' institute meeting in the province during the coming winter. Mr. G. C. Creelman, the energetic Superintendent of Farmers' Institutes for Ontario, very soon afterwards sent out to all institute workers a circular letter in which is plainly shown the great interest taken in this matter by the Provincial Minister of Agriculture. In this circular, all who are going to address institute meetings this winter were instructed to attend the annual meeting of the Experimental Union and Provincial Winter Fair at Guelph, and it is stated to be the wish of the Minister that, 'all institute workers should this year be prepared to discuss the Pea Weevil. To this end arrangements have been made, whereby special instruction will be given on this subject at the Experimental Union and Winter Fair. Prof. Lochhead, of Guelph, and Dr. Fletcher, of Ottawa, will discuss the matter. I would be pleased therefore, if you would keep yourself informed as much as possible along this line.' The matter came up for consideration at both of these important meetings and was discussed with earnestness, not only by the institute workers, most of whom were in attendance, but by several other farmers who were present. Full accounts of both the London and Guelph conferences appeared in the *Toronto Weekly Sun*, the *Montreal Weekly Star* and the *Farmer's Advocate*. These articles were widely copied in the public press, and a special bulletin has been prepared by Profs. Lochhead and Zavitz, which will appear before seeding time next spring. Timely articles will be issued next season telling pea-growers what to do, and advising them as to all details of the proposed campaign against this enemy.

Among those who have taken an active part in the discussion of the best means of remedying the existing injury to the pea crop by the weevil, the following have assisted by giving valuable suggestions and information as to the range and extent of the depredations, and by sending samples of peas, which have been fumigated at various dates to destroy the weevils :—

Adamson, E., grain inspector, Toronto.
Allan, The J. H., Seed Co., Picton, Ont.
Balkwill, J. A., London, Ont.
Bruce, J. A., & Co., Hamilton, Ont.
Carruthers, Jas., & Co., Toronto.
Coryell, The J. L., Seed Co., Oshawa, Ont.
Crain & Baird, Toronto, Ont.
DeLaporte, A. V. & Co., Toronto.
Ewing, W., & Co., Montreal, Q.
Hamilton, A. M., & Co., London, Ont.
Hay Bros., Listowel, Ont.
Hodson, F. W., Ottawa, Ont.
Hopkins, H. T., Picton.
Lick, Elmer, Oshawa.
Martin Bros., Mount Forest, Ont.
Matthews, W. D., & Co., Toronto.
McFee, Alex. & Co., Montreal.
Montreal Board of Trade.
Niles, W. P., Wellington, Ont.
Pearce, Wm., London.
Rennie, Wm., Toronto.
Ross, W. (M.P.), Port Perry, Ont.
Simmers, J. A., Toronto.
Smith, W. L., Toronto.
Steele, Briggs Co., Toronto.
Thomson, Wm., Mitchell, Ont.
Wilcox, H. H., Oshawa.
Wright, A. A., (M.P.), Renfrew, Ont.

My thanks are particularly due to Mr. R. F. Stupart of Toronto, for a liberal supply of skeleton maps of the province of Ontario, which were of great use in collecting data as to the injurious presence of the Pea Weevil in the province; also to Prof. C. C. James, Deputy Minister of Agriculture for Ontario, for much valuable advice and assistance.

The extent of the injury.—Judging from the loss during the past ten years, and the present state of affairs, the loss attributable to the work of the Pea Weevil cannot fall far short of $1,000,000 a year.

The necessity of immediate action.—Every correspondent speaks emphatically of the necessity of some steps being taken at once to preserve this remunerative industry. All agree that the injury is very great and that fresh districts are becoming infested every year. Messrs. Jas. Carruthers & Co., extensive operators of Toronto, Montreal and Winnipeg, write: 'We estimate the injury to the crop of 1902, as compared with the previous years, is 50 per cent more, both as to the quantity raised and the value. Districts that the bug did not appear in three years ago, are gradually getting bad, and, if it continues, we don't think there will be a county in the province that will not be affected. We are very much pleased to learn that steps are being taken to try and eradicate this pest.'

Nearly every one heard from writes in the same strain. The value of Canadian peas and the danger of losing the trade are indicated by the following:

'Toronto, Oct. 25.—Canada formerly had the reputation in European markets of producing the best peas in the world, but we find now, since the crop has become so badly affected by the weevil, that they will only buy the very choicest samples we can ship. One of our largest buyers writes us that they are getting large shipments from Calcutta, and the quality is very fine, being free from bugs, and better than any we are shipping from Canada. They also say they are buying them at a price equal to three cents per bushel less than we are asking for our No. 2 grade on the present crop'.—Jas. Carruthers & Co.

'Toronto, October 25.—The difficulties arising from handling weevil-eaten peas have become so great, that this season we are having some peas grown in Germany, a sample of which has just come to hand; and, while they have had a wet season, which has more or less injured the colour, yet they are entirely free from the weevil. It is more expensive to obtain peas from such sources than when grown at home; nevertheless, we must have the best samples obtainable, even if at a higher cost. Our experience in this matter will tend to encourage larger orders with our foreign growers, although we would prefer growing them at home if we could be satisfied that the existing trouble would not continue.'—The Steele Briggs Seed Co.

'Picton, October 25.—The question of controlling the Pea Weevil is of the greatest importance to farmers throughout Ontario, and deserves careful thought and united

intelligent action. Aside from the importance of the pea crop as a commercial commodity for export, both as fancy or garden varieties, and for food purposes, it is one of the most valuable crops the farmer can raise for feeding on the farm, particularly in finishing and fattening his pigs, as no other grain will equally accomplish this purpose, and pork and bacon are among the most valuable products of the farm.'—J. H. ALLAN & Co.

'Toronto, October 25.—The trade in peas has been most profitable to farmers, and before this pest became serious, Canada enjoyed the reputation of growing the best peas available for the European demand, largely for human food. It is, therefore, highly important that some concerted action should be taken at once and information given through your department, looking to the interests of the trade by stamping it out effectually, if possible. The bug appears to have spread insidiously year by year and now extends into almost every district in the province'.—W. D. MATTHEWS & Co.

'Toronto, October 27.—Our reports show that the Pea Weevil is gradually extending northward. A few years ago none were to be found in the neighborhood of Stayner, but last year a few were discovered, and this year they have increased. The writer this year found them in peas around Thornbury, and everything points to the fact that they are spreading over the province. Unless something is done, our whole pea crop will be destroyed. This has been one of the most profitable crops to the farmers in the past when our peas were sound; but heavy losses have been made by exporters on peas which looked comparatively free from bugs when shipped, but on their arrival at the other side of the ocean the bugs had emerged and almost swarmed in the bags when these were opened.'—A. V. DELAPORTE & Co.

'Picton, October 21.—As far as we know, the seedsmen in the United States bug their peas, but the farmers do not. I do not think there are enough peas imported from the States to make much difference in this question. As to districts free from weevil, we grew peas in Simcoe county last year, and there were no bugs, and there are very few from Peterborough north.'—CLEVELAND SEED Co.

That some districts are, so far, free of the weevil, the following evidence shows:—

'Renfrew, October 22.—Our soil and climate are peculiarly well adapted to growing the ordinary white field peas, and our farmers are still growing them in large quantities. They could and formerly did grow the large garden peas but gave them up as they were too troublesome to harvest. This year we had magnificent crops of white field peas, and, as prices are high, it was undoubtedly the best paying crop farmers grew. It certainly appears that from some cause, whether it be from our very severe weather, or from some other cause, the Pea Weevil cannot live in our section. Our farmers have always made the small white pea a staple crop, and it is now growing largely in favour.'—A. A. WRIGHT.

'Toronto, October 25.—We find that our Montreal office has this season bought 40,000 bushels of peas in the counties of Renfrew and Lanark, which they worked for export via Montreal, and they advise us that the quality is very good, being practically free from bugs.'—JAMES CARRUTHERS & Co.

'Wellington, October 20.—Parts of the counties of Peterborough and Simcoe are free of the weevil. In Hastings county it does not extend north of Madoc.'—W. P. NILES.

Prof. Lochhead tells me that there is no sign of the Pea Weevil in the Manitoulin Islands, and the Algoma District. The same is almost certainly true of Nipissing, Parry Sound and Muskoka districts. The soil and conditions on Manitoulin Island are well suited for the cultivation of peas, and doubtless large areas will be found equally so in the other districts mentioned, as the country becomes settled up more thoroughly.

The three chief Enemies of the Pea.—There are three distinct insects which have caused excessive losses in the pea crop of recent years and there is still some misunderstanding among farmers and seedsmen as to what exact insect is intended by the name 'Pea Weevil,' and some again have protested that the name 'Pea Bug'

is preferable because better known in the trade for what students of insects call the Pea Weevil; a few have even insisted that the Pea Weevil is what is really the Pea Moth. The name Pea Weevil, as applied by entomologists, is undoubtedly the correct name for the short roundish hard beetle which is found among seed peas from which it has emerged, leaving a perfectly round hole in the hollowed out pea where it passed its preparatory stages. This insect is shown enlarged and of the natural size at figure 2. The name Pea Weevil is claimed by entomologists to be correct for this insect, because it belongs to a family of beetles the technical name of which is weevils, and, moreover, it has always been known for nearly a hundred years by this name. There is, however, no particular objection to the use of the trade name Pea Bug, notwithstanding its inaccuracy (the insect not being a bug, nor in any way resembling one), because there is no true bug which is a serious enemy of the pea, and therefore no confusion arises from speaking of the Pea Weevil as the 'Pea Bug.' The Pea Moth, shown at figure 3 in the perfect form, which, however, is very seldom seen, is a small slaty-gray moth, three-eighths of an inch in length, resembling somewhat in markings but not in colour the Codling Moth. This insect is generally seen by pea growers when in the caterpillar state (figure 3: 1 and 2), when it is usually called 'the worm,' and frequently does a large amount of injury to the pea crop of Canada, chiefly, however, in districts lying east of the area infested by the Pea Weevil and increasing in severity as the Atlantic sea-board is reached. The small white caterpillars live inside the green pods, attacking the peas by gnawing ragged-edged cavities into them and filling up the pod around their cavities with a mass of excrement. As this insect is less known to pea growers and seed merchants than the Pea Weevil, and as the name Pea Weevil is also somewhat comparatively new to them, it having only been brought prominently forward during the last twenty years, during which efforts have been made to counteract insect attacks, I think it probable that the confusion which has arisen in the minds of some who have not studied insects, and who have applied the name Pea Weevil to the Pea Moth, has been due to their having applied the unfamiliar name Pea Weevil to the unfamiliar insect which they knew was not their 'Pea Bug,' with which they were well acquainted.

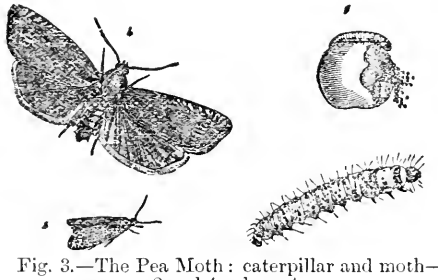


Fig. 3.—The Pea Moth: caterpillar and moth—2 and 4 enlarged.

The third insect which has drawn attention by the extent of its injuries and which like both of the above is frequently spoken of as 'the bug,' is the Destructive Pea Aphis, which is a soft-bodied plant-louse about $\frac{1}{4}$ of an inch in length and expanding about $\frac{1}{2}$ of an inch when the wings are opened. This is pale bluish green in colour with the legs darkened at the joints and with very long honey tubes at the end of the abdomen. The Destructive Pea Aphis appeared suddenly for the first time in the summer of 1899, and practically ruined the pea crop over large areas in the United States and Canada. Since that time it has become less in numbers and during the past season was only reported in a few places upon late peas and upon sweet peas in gardens. Perhaps the worst attack was upon Grass Peas which were much belated this season and upon Hairy Vetch and field peas which had been sown for ploughing down as green manure.

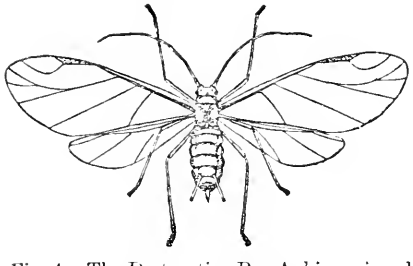


Fig. 4.—The Destructive Pea Aphis: winged viviparous female—enlarged 6 times.

To recapitulate, the Pea Weevil or 'Pea Bug' (Fig. 2) is a small beetle, the grub of which lives inside the pea until fully developed, and the beetle emerges in autumn or the following spring through a perfectly round hole.

The Pea Moth (Fig. 3) is a small gray moth, the caterpillar of which lives until full grown inside the pod, gnawing into the green peas. It then eats its way out of the pod and passes the winter in the ground inside a silken cocoon from which the moth appears the following summer. For this insect, treating the seed is useless.

The Destructive Pea Aphis (Fig. 4) is a soft bodied plant-louse or 'green fly,' which clusters in large numbers on the young shoots and stems, sucking the sap and enfeebling the vines so that they die before maturity.

Difficulties.—It must be acknowledged that, almost without a dissentient voice, my correspondents claim that the only way to bring about the extermination of the Pea Weevil, is to give up the cultivation of peas in Ontario for two or three years, and that this action should be enforced by legislation. Notwithstanding this, after considering the question in all its bearings, I cannot agree that this course would be calculated at this stage of the campaign to produce the surest results. The cessation of pea growing, to be effective, would have to be absolute, not only in every part of Ontario but also in all the United States where peas are grown for seed; and this, not merely by large pea-growers and farmers, but by every private individual who wished to grow peas for his table or for the market. At the present time, while peas are an unremunerative crop in the worst affected districts, this is not the case over large areas in northern Ontario, and, while it might be possible to induce large growers in the south-western counties of the province where pea-growing is now unremunerative, not to sow peas, it would be very difficult to persuade growers to do so north of the line mentioned above as running from Kincardine through the province to Brockville; and the difficulties in the way of persuading private gardeners from doing so seem insuperable; yet, for this measure to be of use so as to starve out the Pea Weevil, not a single patch of peas should be sown, in which the insect could propagate. Theoretically, this, at first sight, seems to be a perfect remedy, and I doubt not would prove to be so, were it in any way possible to enforce it. The chief difficulties are that every one would have to give up growing peas absolutely, not only in Canada but in the adjoining States. There is no set line which could be accurately defined as the limit of the area where the insect would breed, even if partial legislation were contemplated. Private gardeners are not yet well enough informed nor sufficiently interested for all to make the necessary sacrifice of giving up such a favourite vegetable as green peas, nor are all the gardeners in any district energetic enough or provident enough to pull up and destroy all their pea vines as soon as the crop fit for the table is gathered. That this is the proper course, is undoubted, and the land, where peas have been grown, may in most parts of Ontario be cleared of pea vines by the end of July and planted to late carrots, beets or cabbage. From special observation for several years, I have seen that a far more usual practice in gardens, is to leave the pea vines standing long after the crop is gathered and until many of the pods are perfectly ripe, which, in the Pea Weevil districts, means until the weevils are fully developed.

Legislation upon all matters affecting a large proportion of the community is only a last resort, and as a remedial measure. Legislation on agricultural matters, moreover, has always been unpopular, and, unless it can be enforced, is worse than useless. The legislation affecting noxious weeds can hardly be considered successful even in many parts of law-abiding Canada.

That a vigorous campaign against the Pea Weevil is now necessary, is abundantly evident to all who know the value of the pea crop, and wish to preserve the reputation of Canadian peas and the export trade of this valuable commodity; but it seems to me that what is now most necessary and fitting, as looking to ultimate victory against this foe, is a campagin of education. The ordinary pea-growers, or even the large grain merchants, do not know sufficiently the nature of their enemy, its natural history and distribution. There is even confusion as to which of the several insects which attack the pea, actually is the Pea Weevil. All this uncertainty should first of all be done away with through the ready means at our disposal. The federal and provincial governments have published reports and bulletins, and intend to publish more: the agricultural and public press of the country are always willing and eager to publish

articles or answer inquiries concerning matters of public interest. There are effective, sure remedies for the destruction of the Pea Weevil, and if growers can be made to understand this and see that by adopting them, even at some small trouble, they will greatly benefit themselves, while by neglecting them they will injure themselves and their neighbours, I have confidence enough in the common sense of Canadian and American farmers, to believe that they will adopt them.

These remedies will be explained and brought prominently before all who attend Farmers' Institute meetings in Ontario during the coming winter, and object lessons will be given during next summer in the pea-growing districts, but even these efforts will only reach a comparatively small number of those who are concerned, and every effort must be made to bring the importance of the matter before the country. The Boards of Trade in Toronto and Montreal have had it under serious discussion. The press of the country have done much and can and will do much more. In my official capacity I shall do my utmost towards what I believe is possible, the extermination of the Pea Weevil in Canada, and, if United States workers will co-operate with Canadians, success is assured.

Under the head of remedies I shall mention what have proved to be the best means of destroying the Pea Weevil, and at the same time shall endeavour to anticipate the difficulties which may be expected to arise in the adoption of each.

Remedies.

Cessation of growing.—The Pea Weevil has no other known food plant than the cultivated pea; therefore, as this plant will not stand our winters, there is never a volunteer crop a second year, so, if no peas are sown, the pest must die out. The difficulty in this case is the impossibility of getting everyone where seed peas are grown liable to infestation, to give up their cultivation. In the present season seed merchants have already laid in their supplies of seed peas for next year's sowing, and there would be great loss to them, were these high-priced peas ground for feed.

Fumigation.—Fumigation with bi-sulphide of carbon is a sure remedy. When properly done, either in specially constructed buildings known as 'bug-houses,' or in any tight bin, every Weevil is surely killed if the seed containing them is subjected for 48 hours to the vapour of bi-sulphide of carbon used in the proportion of 1 pound by weight of the chemical to every 100 bushels of seed, or in smaller quantities, 1 ounce of bi-sulphide to every 100 pounds of seed. The discrepancy in the quantities given above is due to the fact, that where large quantities are treated at once in specially prepared houses there is less waste of the vapour during the necessary exposure of 48 hours. The quantity given above of 1 pound to every 100 bushels is that which is regularly used by the large seed houses, some of which fumigate from 1,000 to 3,000 bushels at a time. The bi-sulphide of carbon should be of the best quality which will vaporise without any residue, and the exposure should be for the full 48 hours advised. This treatment should be done as soon as possible after harvesting, but may be done at any time when the temperature is above freezing. It is important that the bi-sulphide, which vaporizes readily at the temperature mentioned, but more quickly the warmer it is, should do so as soon as possible, so that the heavy and deadly vapour, which is much heavier than air, should sink down among the peas, where it will in 48 hours kill every weevil in the grain. To facilitate the evaporation it is usual to place the bi-sulphide in large shallow dishes at the top of the building or bin. As the vapour is very inflammable, this work must be done at a distance from other buildings, so that there may be neither accidents nor trouble with insurance companies. No lights of any kind, and no smoking must be allowed near the buildings where bi-sulphide of carbon is being used. This liquid is not more dangerous than naphtha or benzine, but the danger of these is better known.

For the treatment of small quantities of seed, particularly by farmers, I have found that an ordinary coal oil barrel is very convenient. This will hold about 5 bushels or 300 pounds of seed, which may be treated with 3 ounces of bi-sulphide of carbon. Care

must be taken to close up the top tightly. This is best done with a cap made specially for the purpose, but may also be done with fine sacks laid smoothly on the top, over which boards are laid, with a considerable weight on them to hold the covering down closely.

Fumigation with bi-sulphide of carbon, I believe, is the remedy most to be relied on in this campaign. It is perfectly effective, is now regularly used by the large seed merchants, and in future will be much more regularly used. The liquid is cheap, in large quantities costing about 15 cents a pound, although small quantities are charged for at a higher rate, owing to its inflammable nature and nauseous odour, which make it an undesirable stock for druggists to keep on hand. The treatment is easy so that no mistakes need be made, and, with ordinary care, accidents are not likely to occur. As a matter of fact, I have never heard of an accident from the use of this chemical.

Bins for fumigating with bi-sulphide of carbon should be rendered as nearly air tight as possible. This may be done in the case of an ordinary bin by pasting sheets of paper over the inside, and, in case these should be liable to be torn, over the outside as well. Where the lid fits down it should be padded with felt.

Holding over Seed.—Where only a few seed peas are used, a most reliable remedy is the holding over of seed until the second year. Peas should always be bagged up and the sacks tied at once after threshing. The weevils are not able to eat their way through the bags, even when these are made of paper. All the weevils which emerge either in autumn or the following summer will perish inside the bags, and the seed can be sown the following year without danger. The very rare instances which I have heard of, but which I have never seen, where weevils remain alive in the peas and emerge during the second summer after the peas ripened, must be of such rare and exceptional occurrence that they need not be considered. However, to make assurance doubly sure, the seed grain may be kept in a warm room or house during the first winter when there is hardly a possibility of the beetles not emerging.

Treating with Coal Oil.—A remedy which has been used by many farmers with satisfaction, is to drench the seed with coal oil using about half a gallon to a barrel or five bushels of peas. Half of this quantity however can be used successfully as I have been informed by Mr. W. M. Real of Greenbank, Ont., who writes as follows: For several years I used coal oil on part of my seed with good results. An ordinary bin or a large box will do for, say 50 bushels or less; for every 20 bushels pour over them one gallon of coal oil, spreading it so that it does not run to waste. This should be done about two weeks before sowing. Immediately after putting on the oil, the peas should be shovelled over and over so that all will be oiled, and the shovelling must be repeated every day for four or five days. This, if properly done, will kill all the bugs in the peas without injuring the seed. This plan, however, is no good when you compare it with the fumigation mentioned on p. 210 in the report you sent me which is so much easier done. The remaining part of my seed has been fumigated, only I do not use barrels because we have two bug-houses near here, and we can kill all the bugs in 400 bushels at once without emptying them out of the bags. This too is far safer than using bi-sulphide around farm buildings.'

Mr. Wm. Ross, M.P., of Port Perry, who has taken much interest in this matter of controlling the Pea Weevil tells me that he knows of many in his district who use the above coal oil method with great success.

In my own experiments I found that peas treated with coal oil, if not planted soon afterwards, were slow in germinating. This, however, only points out the advantage of oiling peas just before sowing, and this method has a special use as an emergency remedy when, as is frequently the case seed peas are found after purchase to contain living weevils.

Scalding Seed.—Of the same nature, when peas are found at the time of sowing to contain weevils, is scalding the seed. This may be done by pouring them into scalding water and then either pouring the water straight off them again or cooling off immediately with cold water.

RECOMMENDATIONS.

Loss by sowing Weevilled Peas.—That seed peas which have been bored by weevils are very seriously injured, I have proved by actual experiments during the past season and previously. Weevilled small peas in the past season, which was very advantageous for growth, gave only from 13 to 20 per cent of plants, which bore pods, and these were all weaker than plants from perfect seed. Large peas gave a better percentage of from 16 to 28 per cent. Therefore, weevilled peas should not be used for seed if any other stock is obtainable. If, however, this is impossible, much more seed should be sown to the acre.

Suggestions.—The present time must be considered as a crisis in the Canadian pea market, but I feel sure that much may be done to relieve the situation. This must be done, I think, not by legislation or by giving up the cultivation of such an important crop as peas, which we cannot well do without, but by persuading everyone who sows peas to abstain from sowing any peas which contain living weevils; when purchasing seed, to refuse determinedly to buy any without an assurance that they have been treated, and further, even with this, to examine for themselves to see that any contained weevils are really dead. I would also point out that, from the experiment already cited of growing peas from weevilled seed, such seed is only worth about one quarter as much as sound seed. To secure a supply of seed peas free from weevil injury, it will be necessary for growers and farmers to handle their crop a little differently than has been the usual practice. The injury is of an exceptional nature, and exceptional measures must be taken to avoid loss.

There are, however, special features about this attack which render its control a simpler matter than is usually the case with injuries of an equal magnitude. The Pea Weevil is not a native insect and has no native food plant, in which it could propagate, were there no cultivated peas. Indeed, it is so restricted in its food habits that no other food plant is known than the different cultivated varieties of true peas, belonging to the botanical genus *Pisum*. These peas will not live over the winter in our climate if left in the open field, at any rate, in any part of the country where the Pea Weevil is known to breed, consequently, every seed pea sown for crop must, at some time before it was sown, have been under the control of some one by whom it could have been treated before sowing, to destroy the contained weevil, if it had one. The remedy is effective, easy and cheap, is well known and can be applied by anyone. If all growers would combine and do this, the larger number of the weevils would be destroyed in a single year. This, however, would not be sufficient, because a certain number of the insects sometimes leave the peas during the autumn when the seed ripens, and this sometimes before the peas are carried from the fields. This fact is the one great difficulty in arriving at a perfect remedy, but I do not believe that it is insurmountable. There is every indication that a much smaller percentage of weevils left the seed in the autumn of 1902 than is frequently the case. The suggestions I have to offer are briefly as follows :

(1.)—That all peas for seed should be treated before they are sown to kill the weevil and that seeding should be done as early as possible, so as to get them ripe enough to harvest earlier than is the usual custom.

(2.)—That pea growers should harvest their peas as much on the green side as is safe, rather than as is usually done now, when they are dead ripe, and thresh and treat them themselves or sell at once to grain buyers. This has many advantages. Not only is the straw of very much higher quality for feed, but the seed is heavier and better for every purpose, for export, for feed and also for seed, because it is of higher germinating power, and further, because the weevil at that time is much less advanced in growth and consequently has destroyed a much smaller proportion of the bulk of the seed. The average dates for pea harvesting are from July 20 to August 20 I have no record of the Pea Weevil becoming mature and leaving the seed before August 15, and it is usually

much later than that date. Experiment has shown that the weevil at all stages may be killed inside the peas by fumigating the seed with bisulphide of carbon, consequently, if growers will harvest and thresh earlier than usual for a few years and either themselves treat their seed immediately or sell to the grain buyers, who for their own sakes will do so, much good must surely result. When for any reason peas cannot be treated at once or disposed of, they should be bagged up and the sacks tied immediately so as to prevent the escape of any weevils which might emerge in the autumn. When the grain is required for feeding the peas should be ground as soon as they are dry enough, and to prevent the meal from becoming musty the new peas should be mixed with some old peas when grinding.

Difficulties to be met.—Sometimes peas ripen so unevenly that by reaping early it is feared that the sample will be very uneven when threshed ; but, should this be the case, it simply means that these small and shrivelled peas are blown out of the seed peas when they are cleaned and are not lost but can be used for feed. The greatest difficulty of all is with regard to the peas which are shelled out in the field at the time of harvesting. This however, will be to a large measure obviated by reaping early, as the seed will not shell out nearly so much as when left till the regular time. The cleaning up of pea fields moreover by turning in hogs is a generally recognized practice, and the work is done very thoroughly. Where hogs are not available, poultry will do the same work, and, where neither of these can be used, the land should be ploughed so deeply that the weevils cannot work their way out when they leave the peas. I am aware that it is not the custom to plough up pea fields for fall wheat , but simply to cultivate or disc them, because the land is left in such excellent condition ; but it must be remembered that the loss from the Pea Weevil is now excessive, and, if this small change in method can be shown to be of great advantage, it surely is worth a trial.

Another difficulty suggested is that it would be hard to get all peas threshed before the autumn emerging weevils escaped, on account of the small number of threshing machines which would be available. In reply to this, experience has shown that demand will always produce supply ; and I feel sure that the implement makers will not lose such an opportunity of pushing their business. The much higher price obtainable for the early threshed peas, to say nothing of the enormous value of future crops due to controlling the weevil, will very soon repay to the farmer the initial expense. Where, however, there is no possibility of getting a threshing machine, I would draw the attention of growers to the old-fashioned method of treading out the peas with horses. That this is advantageous is indicated by the fact that some of the seed merchants pay a higher price for peas threshed with horses.

Mr. W. P. Niles, of Wellington, to whom I am particularly indebted for much useful information connected with this matter, writes me particularly with regard to one subject which is much discussed by the Pea Trade, viz., 'oily peas.' Mr. Niles writes : 'My sample No. 4 contains what we designate as "oily" or "glassy peas." Every one, you will notice, has had a weevil in it, and not one of these peas will germinate. Some seedsmen say this is caused by the heat of the sun in dry weather killing the weevil while in the embryo state, thereby making the pea oily. I contend that this is not the case, being perfectly satisfied that it is done by threshing with an ordinary threshing machine. At that time the weevils are not fully developed and are simply a small ball of fatty matter. The sudden shock in going through the cylinder of the machine kills or bursts this embryo weevil and the fat or oil is absorbed by the pea at once. In order to fully satisfy myself on this point, I have frequently had farmers thresh a part of their peas, the same variety on the same day, with a threshing machine, and a part with horses on the barn floor, and I have invariably found that the machine threshed peas would have a large percentage of oily peas, while the horse threshed ones would not have any. I have tried this repeatedly for the past three years, and have always got the same results.'

With regard to the above, I may say that some seed merchants do not agree with this theory ; but I received from Mr. Niles a large number of oily peas. These I soaked for two or three days and opened them carefully, when I found that the weevils were

nearly all in the pupal condition, and that in every case these had been broken in some way; and the oiliness was apparently due to the fat of the body running between the two halves of the pea and saturating the skin. If it be found by others that peas can be threshed with horses conveniently and that they get peas which are worth five cents a bushel more, which is the price offered by Mr. Niles in his last circular to growers, this may be an inducement to thresh at once and not wait for the threshing machine.

Substitute Crops.—In those localities where the cultivation of peas has been abandoned, there is a constant demand for advice as to the best similar crop to grow as a substitute. Of the leguminous or nitrogen-collecting plants, perhaps the most popular is the pea-like plant known by the name of the Grass Pea, or Chickling Vetch (*Lathyrus sativus*, L.). This has been largely grown and has given considerable satisfaction in certain sections. It is not favoured by the grain merchants, because there is no demand for it for export; but, when grown for feed, it has given such satisfaction that in some counties of western Ontario it is used for all purposes for which field peas were formerly grown. It is also claimed to give a crop of excellent seed entirely free from the Pea Weevil, of from 10 to 30 bushels to the acre. The season of 1902 was not at all suited to the best development of this plant, but it should not for this reason be condemned. Messrs. John A. Bruce & Co., of Hamilton, Ont., who have handled much of this grain, inform me that 'the Grass Pea has been grown to a limited extent in Wentworth, Lincoln and Haldimand for half a century or more, and the acreage has been largely increased the past three seasons, from its having been grown as a substitute for the field pea. This increased interest is due to the fact of its being bug-proof. The crop in this vicinity is a comparative failure this season. There was an abundance of vine but few peas.' This was a pretty general report from all sections, and, as stated above, the field crops in some places were attacked late in the season by the Destructive Pea Aphis. Other leguminous crops which may be grown instead of peas are tares or vetches, and various kinds of clover. Early varieties of Soja Bean have also given good results, and Mr. Zavitz, of the Ontario Agricultural College, strongly recommends farmers to grow the grain which formerly was grown in Canada under the name of Speltz, but which is now designated by its proper name of Emmer.

LOCUSTS.

Locusts or grasshoppers appeared again in Manitoba in the same districts as during the past two years, but, owing to the season, except in certain districts as around Sewell, the injury was not excessive. They appeared early in May, and Mr. H. McKellar, who is well informed on the subject, at once published articles in all the Winnipeg newspapers, advising farmers in infested localities what to do to counteract their attacks. Later in the year the crop of the province was so enormous that little was heard of their depredations, at the same time, where careful observations were made, it was abundantly evident that Manitoban farmers will require to be on the alert and be prepared in ordinary years to follow the example of those farmers who have saved their crops in the worst districts by practising the methods which have been advised. Mr. Norman Criddle, of Aweme, has continued his experiments in the use of poisoned mixtures. His experience during the past season in improving these is of so much importance to farmers who may have their crops attacked by locusts, that I reproduce in full a valuable report which he has sent me. This is equally applicable in Manitoba and in the other provinces. Considerable injury was done by grasshoppers in some sections of Ontario in 1902, and I would earnestly urge Ontario farmers to try the Criddle mixture described below, should these insects again appear next year. I have seen on several occasions the beneficial effects of this treatment and commend it most heartily. It should be applied promptly on the first appearance of grasshoppers in undue numbers.

Fig. 5.—The Common or Red-legged Locust

The injury to clover crops in autumn by these voracious insects is often far more serious than is generally appreciated. Grasshoppers are susceptible of being driven in large numbers to the edge of a crop by drawing a rope across the top of it, the two ends being held by two persons walking across the field. The poisoned mixture can then be scattered on the bare ground at the edge of the crop to which they are driven. They will eat this ravenously and vast numbers will be killed.

MR. CRIDDLE'S REPORT.

Aweme, Man., November 9, 1902.

According to your request, I have prepared the following notes on the locust pest for this year, at Aweme and the surrounding places.

Locusts, on the whole, were decidedly more numerous than last year, especially in places where they had not been poisoned the previous season; but, owing to cold wet weather in the latter part of April and the beginning of May, the first did not make their appearance until May 7, and the bulk until the 26th, nor did they begin to do damage until the end of the month. A succession of rains during June greatly retarded their growth and saved a considerable amount of work in fighting them, as they do very little eating during wet weather.

On June 20, the first were noted with wings. By July 7, half could fly; by the 11th most of them had wings, and they began migrating. The migratory season continued until the 30th, at which date the first eggs were being deposited. On August 12, eggs were deposited for the second time. After this date eggs were being continually laid until all the locusts died. They began to die off the latter part of August and had practically all disappeared by September 20, a few remaining until the middle of October.

In this season, as in 1900, locusts hatched out on the prairie in considerable numbers wherever the ground was at all light or sandy. In fact, along the tract of country lying between this place, Sewell, Carberry, and almost to Stockton, they were nearly as plentiful as on the stubble fields; but all those said to have hatched on the prairie of the so-called heavy land, had in reality come from old gopher hills and other bare spots. Unlike other years a large number hatched on heavy clay land, even after they had been under water for some days.

The chief damage done, was during the migratory period, by the locusts eating the heads of grain, principally, however, owing to an erroneous notion among certain farmers that it is useless to fight them after they can fly, and also because of a shortage of Paris green at that time. With us very little damage was done (possibly a few bushels lost during July).

The locusts responsible for damage at Chater, Douglas, Blyth, Aweme, Treesbank, Stockton, and almost to Wawanesa, consisted mostly of the Lesser Migratory Locust (*Melanoplus atlanis*) a fairly large proportion of Packard's Locust (*M. Packardii*), a few of the Two-lined Locust (*M. bivittatus*) and the Rocky Mountain Locust (*M. spretus*). The latter were noted principally west of Treesbank.

The only noticeable parasites or insects preying upon locusts that increased during the summer, were several species of ground beetles (*Amara*) and blister beetles. These latter were noticeable in fairly large numbers throughout most of the districts mentioned above; and here they have almost entirely exterminated the eggs in patches. The only species seen in large numbers were a small black species, *Epicauta pennsylvanica*, and a slightly grayer sort *Epicauta sericans*. A small amount of damage was done by these blister beetles to potatoes and beans; but, as a rule, they prefer the wild peas or vetches to any thing else. Tachina flies affecting locusts seem to have almost entirely disappeared during this season; but the Locust Mites were about as numerous as usual.

With regard to the strength of Paris green mixture, I had not much time to experiment personally at home; but experiments conducted by my brother, Evelyn Criddle, show that undoubtedly 60 parts horse droppings can be used to one of Paris green (by measure), and probably 75 parts. Whether it can be made yet weaker, as you surmise,

is yet to be found out. Several people who have used it as above, report it is not strong enough. The great difficulty is to thoroughly mix the stuff; this is best accomplished by mixing the Paris green in water first. Though I still recommend salt, yet I believe with fresh droppings it may be unnecessary. The poison mixture has been found much more effective when spread during hot sunny weather.

In conclusion, it is perhaps hardly necessary to add that the Paris green mixture has proved an unqualified success wherever persisted in and used according to directions, and that it is far ahead of any other remedy which has been tried here after the locusts have once hatched. My statement in your 1900 Report that locusts eat the poisoned mixture more eagerly when they are old than when young, has not been borne out by recent observations: in fact, I now see that it is somewhat the other way.

NORMAN CRIDDLE.

As to the remark made by Mr. Criddle that some reported the mixture of 1 part of Paris green in 60 of horse droppings as not being strong enough, I believe that these observers were mistaken, and that the misapprehension arose from the fact that Paris green is a slow acting, although a very fatal poison. I have found dead locusts which had plainly been killed by this mixture, fully 100 yards from where the poison had been distributed around the edge of a crop. Mr. Criddle found that a simple way to keep locusts on the edge of a field of wheat is to sow a strip of rye around it. This grain grows much more rapidly than wheat, and takes a lot of eating down to kill it. By this means the insects are held where they are easily poisoned.

The plan which has been found most convenient for distributing this poisoned bait is described in my 1901 report. The Criddle mixture, as recently modified, consists of 1 part of Paris green, mixed thoroughly in 60 of fresh horse droppings to which 2 lbs. of salt per half barrel of mixture have been added after being dissolved in water. This is placed in a half barrel and drawn on a cart to the edge of an infested field or one likely to be infested. The mixture is then scattered broadcast along the edge of the crop by means of a trowel or wooden paddle. The locusts are attracted to it from long distances and are killed in large numbers by eating the poison.

FRUIT

THE SAN JOSE SCALE

(*Aspidiotus perniciosus*, Comst.).

During the summer of 1902 a great many experiments have been tried looking to the discovery of a practical remedy for this most pernicious insect. The results obtained by Mr. Geo. E. Fisher, the Provincial Government Inspector, have been most gratifying. Mr. Fisher has supplied me with the following report:—

'Freeman, Ont., Nov. 29.—I have much pleasure in sending you as requested a report of what was done this year in working out remedies for the San José Scale, but have little to add to what you have seen yourself in the orchards where these experiments were carried out. This has been altogether the most satisfactory year I have had in scale work, and I feel very much encouraged, not only by the results obtained, which indicate that the scale may be perfectly controlled regardless of conditions in surrounding orchards, but also by the many letters I have received from friends who have seen the results.

'In the experiments I used whale-oil soap in various forms, crude petroleum in a variety of ways, and lime and sulphur with and without salt, and in different proportions in winter. Fumigation and crude oil emulsion in winter and summer, and kerosene emulsion in summer. Other remedies were tried but with less satisfaction.

'The whale-oil soap distributed this year was a very superior article and contained about forty-five per cent of oil (said to be pure cod) and twelve and a-half per cent first sorts caustic potash. The cost, delivered, was four cents per pound, and from my experience in buying soap I conclude the manufacturers will not supply a really good soap for less money. This makes a mixture suitable for treating scale, cost 10c. per pound. The effect of this soap in reducing scale was very good for soap: but I have not found soap so fatal to the scale as some of the other remedies. There is a serious objection to soap on account of its killing the fruit buds if used early and before the frosts are over. The Catawba Island people say that a cold east wind coming up off the lake on trees treated with soap will kill most of the fruit buds. This quality, together with its excessive cost, stands in the way of soap being extensively used. Speaking in a general way, there is no certainty of what soap contains. A manufacturer may turn out an inferior article, and the farmer will know nothing of its defects till the breeding season of the scale, when swarms of larvæ will tell the tale. To meet this difficulty I prepared an emulsion of fish oil and potash, using 5 quarts of fish oil and $2\frac{1}{2}$ to 3 lbs. of potash in 10 galls. of emulsion, which is easily made and will hold, with the same quantity of soap as is used for kerosene. As a remedy for scale, this is fully equal to soap and costs $\frac{2}{3}$ the price.

'The question is frequently asked "Is it the potash or the oil in soap that kills the scale?" and to settle this I made an emulsion of 5 qts. of fish oil in 10 galls. of emulsion which worked very well. When used at three fourths strength and even at half strength, plentifully applied, the result was really good. A solution of 3 lbs. of potash in 10 galls. had no apparent effect in reducing the scale. Others report better results from potash, and I will try it again next spring, but the results obtained last spring were very poor indeed.

'Crude petroleum was used diluted and undiluted, with and without soap, in the form of a mechanical mixture applied with a combination pump, and also as an emulsion prepared with soap and applied with an ordinary pump. Undiluted crude oil may be applied to peach if a very fine nozzle be used with an orifice of, say $\frac{1}{40}$ to $\frac{1}{50}$ of an inch in diameter and the least possible quantity put on a tree to cover it; but the risk is too great for it to be recommended generally. A nozzle having an opening larger than $\frac{1}{30}$ of an inch in diameter, is too coarse for applying undiluted crude oil; and, even if it be diluted, a fine nozzle gives the operator more time to look over his work and be sure of what he is doing. With a coarse nozzle a heavy treatment is given before one knows it, and sometimes part of a tree is heavily treated and other parts insufficiently. Most people do not discriminate between a large and a small quantity nor between weak and healthy trees, and very little crude oil will kill weak peach trees. The effect of soap combined with crude oil, is to lessen its injurious effects on vegetation, and when used of the strength of $\frac{1}{4}$ lb. of soap to the gallon of water with 20 per cent of oil, it reduced the scale well without seriously injuring peach trees. Crude oil in any of the above mentioned forms will prevent re-attack, and I think there is a strong tendency on the part of the scale, when oil is used, to go out on the young growth and the fruit. Mr. James Samson, of Niagara, used crude oil last spring undiluted, with one of my fine nozzles so successfully that he now declares in favour of undiluted crude oil for everything. He sprayed some peach but did most of his spraying in his apple orchard.

'The lime and sulphur wash was used in a variety of ways, with and without salt, and in proportions varying from $\frac{1}{2}$ pound of lime to 2 pounds to the gallon of wash. We generally used half as much sulphur as lime by weight, and found about 1 pound of lime and $\frac{1}{2}$ pound of sulphur to the gallon of wash to work out best and have the best results where no salt was used. Of course my limited experience with this does not justify my speaking with confidence as to details, but I think thorough cooking is imperative—two, three hours, or more—and besides the trees should be sprayed until the bark is entirely covered. A tree should first be sprayed with reasonable care; after it is dry, it should be gone over a second time, and any missed parts covered. In this way a very perfect treatment is given, which is so important in the case of this scale. Lime and sulphur is safe to use on dormant trees, but, if applied very strong and very late when the buds are opening, it may injure the soft young growth in the heart of the tree, which, however, is really no injury. I have never noticed any bad effect elsewhere.

Trees treated with lime and sulphur bore very heavily, much more so than trees treated with any other remedy. It is the most effective spray and the cheapest, and with a steam boiling plant, the most easily procured. From the best information I can get, long boiling is important, and this enhances the value of the steam process. Where this wash was tried by the farmers, it is highly spoken of, and will be used much more extensively next spring. The effect on the trees is fine, and the crop of fruit has been good in all cases where it was used. To be able to treat badly affected trees whenever they are found in summer is greatly appreciated by those who are making an honest effort to control the scale.

'Kerosene emulsion used in the proportion of 1 gallon of kerosene in 6 of emulsion for apple, pear and plum, and 1 in 7 for peach, applied in dry hot weather, has just about cleaned trees that were very badly affected. This really looks as though kerosene emulsion were all that is required to control the scale. I much prefer to use kerosene emulsion when it is perfectly fresh, that is, newly made, and to have the soap and water actually boiling when it is thrown in on the oil to emulsify it. The lower grade of Canadian kerosene has served the purpose best. Use kerosene emulsion always in dry hot weather and not at all in winter.

'I like fumigation for trees of moderate size. The effect is complete if the work is done in moderate weather with gas of normal strength, that is $\frac{1}{4}$ gramme of cyanide to the cubic foot inclosed—exposure 45 minutes; but this strength does not appear to be sufficient during low temperatures. One-tenth of a gramme with an exposure of 30 minutes, and one-seventh of a gramme with an exposure of 20 minutes apparently did perfect work in July in the day time without injuring peach foliage. The experiments in fumigation were not carried to any great length, and, although they were carefully watched duplicates might show differently. They are very satisfactory, however, to me.' —GEORGE E. FISHER.

I have given the above report in full because I know of no one in America who has done more experimenting with the San José Scale than Mr. Fisher. I have had the privilege of inspecting his work frequently during the last three years, and have perfect confidence in his extreme care and great perseverance in solving any difficulties which may arise, either in his own active mind, or in the minds of any of the fruit growers in whose orchards he has worked. Mr. Fisher is a practical and successful fruit grower, a good mechanic and altogether one well suited to carry out the complicated and very varied experiments which he has done for the Ontario Government since his appointment. The results obtained are very satisfactory and may be summarized as follows :—

The San José Scale is an insect capable of more injury to orchards than any other we know of. It is extremely difficult to control with the greatest care, but with the necessary care trees may be kept in a thrifty and bearing condition without undue expense. This may be done with the following remedies :—

1. The ordinary kerosene emulsion, two treatments during the summer—an extra one may advantageously be applied in May just before the foliage is so thick that it is difficult to reach all parts of the tree—the first summer spraying in the middle of June, and the second one after the fruit is picked. Mr. Fisher says : 'Emulsions should always be used in clear weather, particularly kerosene emulsion, which gives much the best results when applied on warm, bright, airy days. A rather coarse nozzle is best for spraying trees in leaf, for the heavy spray from it splashes off the foliage and penetrates to the wood. The emulsions will probably not do more than afford temporary relief, but they will reduce the infestation well below the danger point and carry the trees safely into winter. This must be followed in the winter or spring by a thorough general spraying with lime and sulphur, which may be expected to work an almost perfect cure. In our experiments the results from this latter mixture after standing all the summer, are almost complete. Some trees on which it is difficult to find living scales, were before treatment heavily infested.'

2. Whale-oil Soap.—The potash fish oil soaps sold under the name of Whale-oil Soap are excellent insecticides and, when used of the strength of $2\frac{1}{2}$ lbs, of soap to the Imperial gallon, have done very efficient work in clearing trees of the San

José Scale, without the slightest injury to the trees. These soaps are much more expensive than the kerosene emulsion, and very much less troublesome to dissolve and apply than the lime and sulphur washes. For this reason they may be preferable for those fruit-growers who have a small number of fruit trees. They are useful against many other insects than the San José Scale, particularly the various kinds of other scale insects, the Pear Psylla, and some other insects which pass the winter beneath the flakes of the bark of fruit trees. The best time to spray trees is just before the buds burst in spring. The soap should be dissolved in hot water and applied as hot as is conveniently possible.

3. Fumigation.—A very effective remedy for small trees, but one requiring the use of very poisonous chemicals and somewhat expensive apparatus, is fumigation with hydrocyanic acid gas; hence, in view of the success which has been secured by the careful use of kerosene emulsion, I do not consider this a practical remedy for orchard use.

In addition to the above described work which has been done by the Provincial Government of Ontario towards finding a perfect remedy for the San José Scale, the greatest care has been taken by the Provincial Department of Agriculture that no nursery stock of any kind should be sent out by nurserymen which had not been thoroughly fumigated under government inspection. The Federal fumigation stations located at St. John, N.B., St. John's, Que., Niagara Falls and Windsor, Ont., Winnipeg, Man., and Vancouver, B.C., through which ports, only, nursery stock is allowed to be imported into Canada, have been in active service, and a great deal of nursery stock has been brought into the country. have again this year the greatest satisfaction in reporting that there has been no complaint from importers as to the slight delay which must occur, nor as to any injury to trees during the necessary unpacking and handling for treatment. The superintendents at all the stations have done their work carefully and intelligently, and no single instance has been brought to my notice of living scales being detected on trees after passing through the fumigating houses, or of injury to them by the gas.

TWO NEW STRAWBERRY PESTS.

During the past summer complaints were received from British Columbia of the presence in injurious numbers of two different kinds of caterpillars, which have not, I believe, been previously reported as doing harm to cultivated strawberries in Canada. Specimens of the larvæ of both species were received from Mrs. C. E. Hickey, of French Creek, B.C. Writing under date of May 3, Mrs. Hickey, says: 'I send you separately some caterpillars. They have been doing considerable damage to our strawberry plants. Will there be another generation of them, and, if so, what should the plants be sprayed with?' The specimens mentioned arrived in Ottawa on May 12; seven of them had changed to the chrysalis state during the journey, but the others were still in the larval condition. These also soon changed to chrysalis, and the moths emerged in due course, and proved to be *Mesoleuca truncata*, Hufn., *a species not at all uncommon in British Columbia, and almost all other parts of northern Canada. The caterpillar of this geometer is a looper and when full grown measures about an inch in length. It is slender, cylindrical, in colour yellowish-green slightly glaucous, and has pale indistinct longitudinal stripes along the body, viz., a double dorsal band of more intense yellow than the body, a subdorsal band of the same colour, but clear white on the anterior segments, and a distinct yellowish ventral stripe. The tubercles on the body are white, and each bears a single short slender bristle. The head and feet are concolorous with the body. Beneath the anal flap on segment 13 is a pair of prominent slender tails, tinged with pink, each bearing a slender bristle at the tip. When mature the caterpillar changes to a chrysalis within the folds of a leaf or between two leaves, which have been drawn together by threads of silk. The larvæ which reached Ottawa alive, were put in a jar containing earth and some dried strawberry leaves. They did not enter the earth for pupation but changed to the chrysalis state as above. If these caterpillars should again prove troublesome in spring, the plants may be sprayed with Paris green or some other

*=*Petrophora truncata*, Hbn.

strong poison before the flowers open, and again in September, as the eggs of the second brood are laid in August and the caterpillars feed through the autumn months, giving moths the following spring, if our form behaves in the same way as the species is said to do in England.

The other caterpillars received were cutworms, the species being *Scopelosoma tristigmata*, Grt. These caterpillars appeared in the strawberry beds nearly a month later than the above; though they were not nearly so abundant, they did some injury, and the occurrence is worthy of record. When mature, this caterpillar is nearly an inch and a half in length, and in general appearance is a smooth, cylindrical noctuid larva, in colour a velvety seal brown, shading to a crimson brown beneath, the centre of the venter being greenish. The head is dark reddish brown, with the exception of a broad upper margin of pale brown across the top, and reaching down the sides of the face to the ocelli. There are inconspicuous dorsal and lateral stripes, paler in colour than the dorsum, also a pale substigmatal band. Under the lens the whole skin above this band is seen to be covered with streaks and blotches of a darker brown than the skin. The thoracic shield is darker than the body and rather conspicuous, The anal shield is yellowish brown. The thoracic feet are shiny dark brown, and the prolegs are concolorous with the venter. The caterpillars entered the earth for pupation on June 23, and the moths appeared on September 17. In British Columbia this caterpillar has been found at Kaslo, by Mr. J. W. Cockle, feeding on wild raspberry. The usual remedies for cutworms may be applied if this species should again prove troublesome. Probably the most convenient in strawberry beds would be the poisoned bran mash.

THE APIARY.

The apiary, as in the past, has been under the sole management of Mr. John Fixter, whose report I append herewith. The season, on the whole, has not been a remunerative one for bee-keepers in most parts of Canada, although good yields are reported in some sections. In the Experimental Farm apiary the honey crop was fairly good and of excellent quality. The same experiments which have been carried on in the past, have most of them been repeated again during 1902, owing to the extreme interest which was evinced in them by visitors to the Central Experimental Farm. Experiments to prove that bees do not injure unbroken fruit were again carried out and with like results to those obtained last year, viz., that no injury is done by these useful insects.

During the past four years attractive exhibits of honey, mostly extracted and put up in neat glass jars, have been sent to various exhibitions. These have all been prepared by Mr. Fixter, and I learn from the commissioners of the different exhibitions that these exhibits drew much attention. The following exhibits were prepared: For Omaha, Nebraska, in 1898; for Paris, France, in 1900; for Glasgow, Scotland, in 1901; for Buffalo, United States, in 1901; for Wolverhampton, England, in 1902; for Cork, Ireland, in 1902; for Osaka, Japan, in 1903. Exhibits have also been prepared for the Ottawa annual exhibitions for some years past.

Mr. Fixter attended the annual meeting of the Ontario Bee-keepers' Association at Woodstock, Ont., and took an active part in the proceedings. He has also done good educational work in explaining the habits of bees and the way to care for them to large numbers of visitors who have come to the Experimental Farm during the past summer. He has, besides, delivered addresses upon bee-keeping to farmers and public school teachers and scholars when excursions have been held to the Experimental Farm.

REPORT OF MR. JOHN FIXTER.

Season of 1902.

The honey flow of 1902 has been below the average in many parts of the Dominion, but in some localities in Ontario and Quebec fair crops have been secured. Stocks have been strong and active; swarming has been good, in some cases excessive. The cool damp weather of the past season has been unfavourable, though some apiarists had a fairly good honey crop. The yield, however, will not average over 40 pounds per colony.

The season opened very early; the colonies were set out on their summer stands on March 22, the temperature on that date being 55° and the day clear, bright and mild. There followed about ten days of very fine weather for the bees to fly and cleanse themselves and their hives. Pollen was gathered about April 1, and all colonies built up rapidly and were in excellent condition when clover bloomed. May 25, many colonies were showing signs of clustering: so, supers were put on to keep them working and keep down swarming. June 18, considerable honey was stored in supers and brood chambers. On June 18 the first swarm of the season issued. During the swarming season many swarms came off at the same time and were hived two or three together, so as to keep down the number of swarms. There being very little buckwheat grown in this district and no fall flow from any other source, all supers were removed on August 15. September 1 all colonies were weighed; any that did not weigh 50 pounds and over were given sugar syrup made with granulated sugar fed in a Miller feeder. On November 18 all colonies were weighed and found to be in good condition. They were then put into their winter quarters.

Returns from the Central Experimental Farm apiary averaged 40 pounds per colony.

Experiments with different kinds of Hives.

The experiments commenced last year with different kinds of hives for comb and extracted honey, have been continued. Two hives of each of the following sorts were used, one being arranged for section honey the other for extracted honey, the Langstroth, the Hedden and two other kinds more or less used in Canada, one measuring 15 x 15 x 12 inches, the other 15 x 20 x 15 inches. Eight colonies of bees were selected all of about the same strength and having good laying queens. The results from the four kinds of hives are shown in the following table. The hives are tabulated in the order of the returns they gave.

Hive.	Season.	Swarms.	Section Honey.	Extracted Honey.
			Sections.	Lbs.
Langstroth	1901	1	67	0
"	1902	1	0	79
"	1901	1	42	0
"	1902	1	0	48
15 x 15 x 12 inches	1901	1	56	0
"	1902	1	0	63
"	1901	1	36	0
"	1902	1	0	42
Hedden	1901	0	54	0
"	1902	0	0	62
"	1901	1	38	0
"	1902	1	0	43½
15 x 20 x 15 inches	1901	0	0	0
"	1902	0	0	23
"	1901	1	*16	..
"	1902	1	.....	46½

* The 16 sections were only partly filled.

SESSIONAL PAPER No. 16

Experiments in Feeding Sugar Syrup for Winter Stores.

These experiments begun during the autumn of 1900, with four colonies of bees, were continued in the autumn of 1901, with eight colonies, the extra four being the progeny of the first four. All the natural stores having been removed in September, a Miller feeder was placed in an empty section super, close to the top of the brood frames, any part of the brood frames not covered by the feeder being covered with a propolis quilt cut so as to allow the bees a passage through it. By keeping the feeder well packed around, except where the bees entered, the heat is kept in and at the same time the bees cannot daub themselves with the liquid. In these experiments the bees had a constant supply of syrup. The syrup was made of the best granulated sugar, two parts to one of water by weight. The water was first brought to a boil; then the boiler was set back on the stove, and the sugar having been poured in, the mixture was stirred until all was dissolved. The syrup was supplied to the bees at about blood heat. When the hives were put into winter quarters, the wooden covers were removed and replaced with a chaff cushion; the hives were also given extra ventilation at the bottom by placing at the entrance a wooden block between the brood chamber and the bottom board, raising the front of the brood chamber about 2 inches extra. In 1901, the eight colonies were put into winter quarter on November 9, their average weight being $57\frac{3}{4}$ pounds per colony; when taken out in the spring 1902 they averaged $46\frac{1}{4}$ pounds. All came out in excellent condition: there were very few dead bees about the entrance, and the bottom board was quite clean, there were no signs of dysentery.

The hives were set out on their summer stands March 22, the temperature at this date being 55° and the day, clear, bright and mild.

For the following ten days the weather was very fine and warm; the bees were flying well and built up rapidly; they were in excellent condition when the honey flow came on. The first pollen gathered was noticed on April 1; many bees were seen before this date gathering sap from maple tree stumps that had been freshly cut, also wherever a maple had been injured. During the summer each colony gave one swarm and made on an average $41\frac{1}{2}$ pounds of honey, this being considerably below the yield n 1901; but, considering the damp cool season, the results are quite satisfactory.

Experiments with Brood Foundation of Different Sizes.

These experiments have been continued with the addition of full drawn combs.

(1.) Full drawn combs;
(2.) Full sheets of foundation;
(3.) Half sheets of foundation;
(4.) Starters or strips of about one inch.

For this experiment four swarms caught on July 2 were used, weighing $5\frac{3}{4}$ pounds each. Each hive contained only one of the above size of foundation in the brood chamber, but full sheets of foundation in the super. Each hive was weighed daily during the season to ascertain the gain or loss; notes were also taken on the way the bees built up in the brood chamber.

The results are very similar to those of 1901. The hive with strips of foundation (4) gave the largest return. In this instance the bees started to work not in the frames but in the sections in the super, which had full sheets of foundation, sooner than the bees in the hives Nos. 1, 2, and 3. Queen excluders were put on to prevent the queen going up into the supers. In the hive that had half sheets (3) and in the one with full sheets (2) the bees appeared to work about evenly in the brood chamber and in the super. In the hive that had full drawn combs (1) the queen began to lay eggs at once and the bees filled up the brood chamber first, a notable fact was that in the hives that had half sheets (3), as well as in those that had starters in the brood chamber (4), the bees built worker comb as far down as the foundation went, and below that they built very unevenly; in many instances the frames could not be lifted out without the combs breaking down and some of these combs were more than half drone cells. Not being wired

they were too weak to stand the process of extracting, and they would be too weak to support heavy swarms or stand shipping. The results of these experiments show that it is better in all cases to use full sheets of foundation, both in the sections of the supers and in the frames of the brood chamber.

Experiments to test whether Bees injure Sound Fruit.

During the summer of 1901 when there was no surplus honey to be gathered from plants outside, experiments were made with ripe fruit of four different kinds, peaches, pears, plums, and grapes, exposed in different places in or near the Experimental Farm apiary, where it was easily accessible to the bees.

This experiment has been repeated during the season of 1902, with the addition of strawberries and raspberries. All the fruit was placed in the same position as in 1901, viz: (*a*) in the hives, (*b*) on trees and (*c*) in a work shop adjoining the house apiary.

Peaches, pears, plums and grapes.—The fruit was exposed in three different conditions: (1.) Whole, without any treatment; (2.) Whole, after having been dipped in honey; (3.) Punctured in several places with the blade of a penknife.

Four colonies were selected for this experiment, all of about equal strength. Each of these colonies was in a hive upon which was placed a super divided in the middle by a partition. From two of the hives the honey had all been removed, in the two remaining hives five frames were left, each having considerable brood, with honey around it. In each one of the four hives, the whole specimens of fruit not dipped in honey were hung within three empty frames tied together as a rack; the whole specimens of fruit dipped in honey were placed in one compartment of the super and the punctured specimens were placed in the other.

A. The bees began to work at once both upon the dipped and the punctured fruit; the former was cleaned thoroughly of honey during the first night; upon the punctured fruit the bees clustered thickly, sucking the juice through the punctures as long as they could obtain any liquid.

At the end of six days all the fruit was carefully examined. The sound fruit was still uninjured in any way; the dipped fruit was in a like condition, quite sound; but every vestige of the honey had disappeared; the punctured fruit was badly mutilated and worthless; beneath each puncture was a cavity, and in many instances decay had set in.

The experiment was continued the following week; the undipped sound fruit was left in the brood chamber, the dipped fruit was given a new coating of honey and replaced in the super, and a fresh supply of punctured fruit was substituted for that which had been destroyed.

At the end of the second week both the undipped and the dipped specimens of fruit that were sound at the end of the first week, as well as the punctured specimens, were considerably decayed and, where there were any openings in the skin, showed signs of having been worked on, though to no very great extent.

For the third week fresh samples of fruit of all the above kinds were used; the result was very similar to that of the first week and, as it was later in the season, some of the fruit that had been put in sound had begun to decay.

After the third week the bees in the two hives which had been deprived of all their honey, appeared to be very sluggish, and there were many dead bees about the hives, the weather being cool and damp was very much against these colonies. They had lived for the first three weeks on the punctured fruit and on the honey of the fruit which had been dipped, as there were at that season few plants in flower from which they could gather nectar; these bees had therefore died of starvation, notwithstanding the proximity of the ripe juicy fruit. This supply of food which they were urgently in need of, was only separated from them by the thin skin of the fruit, which, however, this evidence seems to prove they could not puncture, as they did not do so.

The mean weight of each of these two hives on September 5, when the experiment began, was 24¼ pounds; at the end of the experiment four weeks later, each had lost 3¼ pounds. The mean weight of the two hives in each of which five frames with brood and honey had been left, was at the beginning of the experiment 36¾ pounds; the mean loss for each of these hives was at the end 1¾ pounds.

B.—Fruit exposed in the open air, hung from the branches of a tree in the apiary inclosure. In this experiment three sets of whole fruit were used, one being dipped in honey, one left undipped and whole, and the third punctured as before. The bees worked on the dipped and the punctured fruit, but were not seen to work on the undipped fruit, which remained perfectly whole.

C.—Fruit exposed on shelves in a work shop adjoining the honey house. This fruit as in the preceding experiments, consisted of whole undipped fruit, of dipped fruit, and of punctured fruit. The bees worked both on the dipped and the punctured fruit; only an occasional bee was noticed vainly looking for an opening on the whole undipped fruit.

Strawberries.—On July 2, 1902, ripe fruit of four sorts of strawberries, the Williams, Clyde, Bubach and Warfield, was exposed in the same positions as the other fruit, where it was easily accessoible to the bees :—

(*a.*) Inside the bee hive;

(*b.*) On branches of trees in the apiary inclosure.

(*c.*) On shelves in a workshop to which bees had access through an open window. Every care was taken that all the fruit used in this experiment should be perfectly sound.

(A.) Fruit exposed inside bee hives.

The fruit was exposed in three different conditions (1) whole fruit without any treatment, (2) whole fruit that had been dipped in honey, (3) fruit of which each berry was cut in two.

Four colonies were selected for this experiment, all of about equal strength.

Each of these colonies was in a hive upon which was placed a super divided in the middle by a partition. In each one of the four hives, the whole specimens of fruit not dipped in honey were placed within three empty frames tied together as a rack in the brood chamber; the whole specimens of fruit dipped in honey were placed in one compartment of the super, and the berries cut in two were placed in the other.

The bees began to work at once upon the dipped fruit in the hive and kept continually on it as long as any honey could be obtained; they also clustered thickly on the whole berries and those cut in two, but did not appear to be getting or even trying to secure any substance from them

(B, C.) The fruit exposed on the branches of trees and on the shelves in a workshop was not visited at all by the bees but decayed and dried up. In the hives all fruit decayed more quickly from the extra heat from the bees. This experiment lasted one week.

Raspberries.—Four varieties were used, the Red, Purple, very light coloured and Black Cap. On July 29, some berries of each sort were placed in the hives in exactly the same positions as the strawberries. At this date there was considerable honey coming in, and the bees did not touch any of the raspberries.

DIVISION OF BOTANY

FODDER CROPS.

Fodder crops of all kinds, with the exception of corn, produced heavily during the summer of 1902. The excellent condition of summer pastures and the general freedom throughout Ontario from insect pests, allowed stock to keep in the best condition without trouble. Aftermaths were heavy, and there was some difficulty in saving them. A subject which is always of extreme interest to farmers, particularly in those districts where there are apt to be summer droughts, is the best mixture of grasses and clovers to sow for permanent pastures. A great many experiments have been tried during the last fifteen years with all the different kinds of well known grasses in the market. As a result of all this work one special mixture has been found which, upon a medium soil both as to fertility and moisture, has produced regularly year after year heavy crops of the very first quality of hay or feed. The grasses and clovers which have been included in this mixture will succeed well in all parts of the Dominion, and those farmers and dairymen who have tried this mixture are so well pleased with the results they have obtained, that I again bring it to the notice of stockmen believing that they will find it a very satisfactory mixture to grow for two years' cutting and for two or three years' pasture. This mixture has been known as the Central Experimental Farm Mixture and consists of

Timothy	6 lbs.
Meadow Fescue	4 "
Orchard Grass	2 "
Kentucky Blue Grass	1 "
Red Top	1 "

CLOVERS.

Alsike	2 lbs.
Alfalfa	2 "
Mammoth Red	1 "
Common Red	1 "
White Dutch	2 "
	22 lbs. of seed.

Average cost of seed per acre, $2.50.

This mixture was sown at the same time as several others mentioned below in the spring of 1901 and was mowed once during that summer to destroy the weeds. The soil for all of these mixtures, which were sown upon plots of $\frac{1}{10}$ of an acre each, was tolerably even both as to fertility and moisture. Manure had not been applied for three years. The soil may be described as a rich sandy loam, but would be improved by under draining. The plots were visited by a large number of farmers during the summer, and it is gratifying to know that many of the large dairymen in the Ottawa district have sown fields with some of the mixtures and expressed themselves as extremely well satisfied with the results they have obtained. The following table gives the crops of the different mixtures for 1901 and 1902. These are not exactly in accordance with the records

of former years as to the amount of crop produced, some being heavier this year for some reason, while others have dropped behind their average. This is particularly the case with the C. E. F. mixture (1), which this year was considerably lower than crops which have been reaped in previous years. This shortage was in the second crop. In three records of previous trials the second crop of the second year has almost equalled the July cut, while in 1902 it was over a ton less in amount. It must be borne in mind that, in compounding these mixtures, the chief object considered was their value for pastures for two (or three) years after being cut for hay for one year (or two).

Number.	Mixtures sown May 4, 1901.				Thoroughly cured Hay per acre.					
					1901.		1902.			
	Grasses.	Lbs.	Clovers.	Lbs.	September 24.		July 10.		August 30.	
					Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Timothy Meadow Fescue Orchard Grass Kentucky Blue Red Top	6 4 2 1 1	Alfalfa Alsike Mammoth Red Common Red White Dutch	2 2 1 1 2	1	280	2	1,080	1	960
2	Meadow Fescue Timothy Canadian Blue Orchard Grass Red Top	6 3 2 3 3	Alfalfa Alsike White Dutch	4 1 1	1	200	2	900	1	1,760
3	Timothy Awnless Brome Orchard Grass	5 4 2	Alfalfa Alsike	6 3	1	900	2	1,560	2	600
4	Meadow Fescue Orchard Grass Kentucky Blue	6 2 1	Common Red Alfalfa White Dutch	4 3 1	1	1,080	2	1,200	3	320
5	Timothy Upright Brome	6 4	Alfalfa Mammoth Red	6 4	1	920	2	1,120	1	1,840
6	Timothy	10	Common Red	6		1,560	2	1,040	1	1,720
7	Timothy	10	Mammoth Red	6		1,200	2	440	1	760
8	Orchard Grass	18	Alsike	5	1	120	1	1,320		1,680
9	Orchard Grass	18	Common Red	8	1	400	2	80	1	1,200
10	Meadow Fescue	20	Common Red	8	1	40	2	400		1,640
11	Timothy	12	Mammoth Red	8		1,920	2	880	1	880

Number.	Mixtures sown May 4, 1901.				Thoroughly cured Hay per acre.					
					1901.		1902.			
	Grasses.	Lbs.	Clovers.	Lbs.	September 24.		July 10.		August 30.	
					Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
12	Timothy.....	12	Common Red.....	8	1	280	2	1,360	1	760
13	Timothy.....	5	Common Red.....	5						
	Awuless Brome.....	10	Mammoth Red	5	1	680	2	1,120	1	1,280
14	Awnless Brome.	25	....		1	400	2	1,220		1,800
15	Awnless Brome.	15	Common Red.	8	1	720	2	1,280	1	1,480
16	Timothy.....	8	Mammoth Red.....	8	1	680	2	1,220	1	1,120
17	Alfalfa.....	15	(weight green, 8 tons 720 lbs)		1	1,680	2	80	1	1,080
18	Bokhara Clover.....	15	(weight grn., 12 tons 400 lbs)		2	600	2	1,560	No cut; a biennial.	

Of the different grasses used, the Awnless Brome Grass has been frequently treated of in also for its adaptability to almost all kinds of soil, whether they be moist as in the these reports and is a grass of extreme value, as a producer of both hay and pasture, and intervale lands of New Brunswick and the low meadows of New Ontario, or lacking in moisture as on the dry plains of the North-west, or the semi-arid hills of British Columbia.

The Meadow Fescue (*Festuca pratensis*, L.), is a rich succulent hardy grass which roots deeply and produces two heavy crops of excellent hay. The abundant growth of young foliage, which is very tender, makes this a valuable addition to pasture mixtures.

Orchard Grass (*Dactylis glomerata*, L.).—This grass is perhaps the quickest grower after cutting, of any grass we have tried at Ottawa. The foliage when young is particularly tender and palatable to stock, but when it is allowed to get old, it becomes tough and dry. It is a heavy producer, but the hay is rather light. It requires a deep soil and heavy feeding. When cut for hay, it must be cut early. At Ottawa it is generally ready for mowing by June 20, the same time as the Meadow Fescue. For this reason, these two grasses are well suited for mixing with the Common Red or June Clover, because they mature at the same season.

Kentucky Blue Grass (*Poa pratensis*, L.).—This is the Smooth Meadow Grass of England, the June Grass of the greater part of Canada and is one of the grasses which is frequently spoken of as 'spear grass' in some parts of the Dominion. It is a grass of extreme value, succeeding best in cool damp districts, but thriving well and increasing rapidly in all temperate climates of the world. It is by far the best lawn grass known, wherever there is sufficient summer rain to allow growth to continue, being of an intense green colour at all seasons of the year and quickly forming a thick sod. As a factor in

permanent pasture mixtures, it has no superior and never should be omitted. It produces, when closely fed, probably more actual food for stock than any other grass, and its season lasts except in very dry localities from early in the spring until hard frost. It is essentially a pasture grass, and produces but very little hay.

Canada Blue Grass (*Poa compressa*, L.).—This grass is also known as 'Wire Grass' and 'Flat-stemmed Meadow Grass.' It produces a rather small crop of exceedingly heavy rich hay. When fed down, it reproduces itself rapidly and is almost as valuable as Kentucky Blue Grass. The seed of this grass is largely sold as lawn grass, but it is not nearly so well suited for this purpose as Kentucky Blue Grass, on account of a reddish tinge which it takes on when touched with frost or when affected by drought. It has not the same habit as Kentucky Blue Grass of spreading extensively by underground root shoots or stolons, and therefore does not form so rapidly a thick sod.

Red Top (*Agrostis vulgaris*, Withg.).—This grass produces in damp soil a very large quantity of fine but not very rich hay. It is of special value in wet land, where it will stand more water than any other of the cultivated grasses. It is palatable to stock and should always be used in grass mixtures for low lands. It seeds freely and spreads rapidly.

Timothy (*Phleum pratense*, L.).—This grass is too well known by Canadian farmers to require any special mention. When mixed with clover for hay, the Mammoth Red or late clover should be used, as these two plants come to maturity at the same time, while the Common Red Clover is about a week earlier than Timothy.

SIMPSON'S TRUE-PERENNIAL RED CLOVER.

(See Plate.)

In the spring of 1897, I received from Mr. Walter Simpson, of Bay View, Prince Edward Island, some roots of a very interesting clover which he had found growing spontaneously on his farm. This clover has now been cultivated here in the experimental grass plots for six years, and has shown that it possesses many valuable agricultural characteristics. It is a long-lived perennial which spreads by copious underground stolons. Although not producing so much fodder as the Common and Mammoth Red Clovers—it has given as much as one and a-half tons of hay to the acre—it is much more persistent. Owing to its stoloniferous root system, it does not suffer, as those well known varieties do, from heaving and winter-killing. A plot of this clover one square rod in extent, was planted on April 23, 1901, by setting out root shoots in rows one foot apart, with the plants six inches apart in the rows. By June 7, there was a growth of three inches, and by July 26 the bed had an average height of four inches, many of the plants being in flower. This plot was not cut at mid-summer, and the seed was ripe by September 21. On July 3, 1902, the bed was a heavy mat of thick clover twelve inches high, with fine leaves and many large purple flowers, as shown in the plate herewith. The whole plot was saved for seed, which was ripe by the first week in October. Unfortunately, this clover has shown under cultivation the serious defect of maturing very little seed. It has, however, never been treated as the ordinary Red or Mammoth Clovers are when grown for seed, by being cut for hay in midsummer and the seed collected from the second crop. Under similar circumstances, the varieties above named also show this defect to some extent, as is mentioned by Professor W. J. Beal, in his 'Grasses of North America.' Next year the first crop will be cut as soon as the plants are well in flower, and the seed will be saved from the second crop. If it still shows the same partial sterility, an effort will be made to produce an improved form by hybridizing it with Common Red, Mammoth and other clovers.

I am unable to come to a decision upon the exact botanical status of this clover. It does not answer in all respects with any known and described species of clover, but

may probably be an aberrant form of *Trifolium medium*, L., or a hybrid of that species with some other clover. *Trifolium medium*, as described in European works, does not correspond with any clover known to such botanists as I have been able to consult, or that I myself have ever seen growing in Canada.

Mammoth Red Clover, which is the same as Cow Grass of English seedmen, is stated in most American works to be *T. medium*, L., but it lacks entirely the stoloniferous or true-perennial habit of Simpson's perennial clover. In Sutton's 'Farmers' Year Book,' Cow Grass is stated to be a hybrid between *T. medium*, L., and the Common Red Clover (*T. pratense*, L.), but Simpson's True-perennial Clover does not agree either with the description of Cow Grass, nor do plants grown from seeds received from Sutton & Sons under that name, in any way resemble the Prince Edward Island plant. *T. medium* is called Zigzag Clover, from the angulated growth of the stems, but I find no approach to this in our Canadian plant. Simpson's True-perennial Clover is a free-growing, frequently branching, narrow-leaved, rather smooth perennial clover, much resembling the figure of *T. medium*, given in Sowerby's 'English Botany,' but with, as a rule, two large cylindrical-ovate heads of flowers, on pedicels from one to two inches in length, terminating each branch of the stem. The plants have no true caudex but throw out freely in all directions through the soil vigorous stolons, by which the plants spread rapidly. The seeds are heart-shaped, pale yellow in colour, smaller than those of both Common Red and Mammoth Clovers. From the fact that so little seed is produced, the hybrid nature of this clover is suggested, and it is probable that *Trifolium medium* may have been a parent. If Mammoth Red really be a hybrid, it is possible that this form may have originated from seed sown as that variety, and, as all hybrids are for a time unstable and subject to variation in different directions, the plant under discussion may be a hybrid which has run back towards *T. medium*, much more than is usually the case.

Mammoth Red Clover is now extensively grown and is fairly constant in its characters. It may be described as merely a large free-growing variety of the Common Red Clover with larger and handsomer seeds, maturing about a week later in summer, but with exactly the same kind of rootstocks; in fact, it bears about the same relation to Common Red Clover, that Tall Fescue among the true grasses does to the slightly smaller Meadow Fescue. Common Red Clover is normally a biennial, with a tap-shaped rootstock. The plants, as a rule, die after ripening seeds the second year, although, if cut twice so as to prevent seed ripening, some plants will grow the third year. Mammoth Red Clover is slightly more persistent, but with a rootstock of the same nature; and I have never been able to find a plant which produced stolons or running rootstocks.

The Origin.

All that is known of the origin of this clover is given in the following extract from a letter of Mr. Walter Simpson, the discoverer:—

Bay View, P.E.I., Nov. 20, 1902.—'It was about ten years ago that I found this clover growing along the edge of a spruce bush on my farm here in Bay View. It was just outside the cultivated fields and under the boughs of the spruce at the south side of the bush, about four chains from my buildings. My attention was attracted to it in passing, by the peculiar shape of the leaves. The clover when first found was in a thick mat extending about two rods in length and a yard in width. It looked very pretty growing, on account of its pointed leaves and rich dark green colour. I thought at first sight that it was something new and showed it to several neighbours, but they failed to see its difference from other clovers. It was first pronounced to be *Trifolium medium*, by the expert botanists of the Prince Edward Island Natural Histroy Society, and was catalogued as such in their lists of new plants found on the island.

'The original patch still exists and has spread considerably from where first found and it has crept out into the cultivated field. I had none of it ripen this year, as the sheep had access to it all summer and cropped it close. In years that it did ripen, I could not find a single seed in the heads, though, of course, I did not examine it very closely. I have never given it any cultivation.'—Walter Simpson.

No descriptions of *T. medium*, L., which I have been able to find in European and American botanical works, answer to the Prince Edward Island plant; but, should the latter prove to be a form of that species, it indicates that *T. medium.* is a valuable clover which merits far more general recognition and trial by American agriculturists than it has so far received.

Simpson's True-perennial Red Clover is particularly well suited for including in permanent pasture mixtures, both from its low stocky growth and for its truly perennial habit, which gives it a great advantage over either Common Red, Mammoth or Alsike clovers. As compared with White Dutch Clover, it is equally hardy and is a much heavier cropper.

REPORT OF THE POULTRY MANAGER.

(A. G. GILBERT.)

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

OTTAWA, December 1, 1902.

SIR,—I have the pleasure of herewith submitting to you the fifteenth annual report of the Poultry Department.

Perhaps in no previous year has more extended inquiry been made by farmers and others, more or less interested, into the best methods of profitable poultry keeping with the object of producing eggs in winter and early chickens for export or home market, than in the past one. With the hope of aiding, more particularly on this occasion, in the production of the early chickens which bring the highest price, the subject is discussed in all its various phases. Such information is given and deductions made as experience has shown are likely to be conducive to the best and quickest results.

The best types of early chickens and how they may generally be produced are discussed from various standpoints. The objectionable features in many early birds are pointed out and a remedy suggested for the same.

Experimental fattening of chickens of different breeds in crates and with limited run and on various rations, furnishes important and interesting data. Some results showing the length of time in which the best gains are made and the time at which progress ceased cannot fail to be of value to those interested.

Details of the work of the year are given in such shape as calculated to be most useful.

During the year a number of addresses were delivered in many parts of the Dominion on subjects akin to my department.

The annual Christmas Poultry Fair at Renfrew, Ont., on December 2, was remarkable for the great improvement in the quality of and the manner in which the birds were dressed. The same may be said of the dressed poultry display at the Fat Stock Show held in Guelph, Ont., from December 8 to 12. It is evident, from the improved appearance of the dressed poultry exhibited on both occasions, that farmers are fast realizing the importance of having their exhibits present an inviting appearance and the enhanced value accruing thereby.

I have pleasure in mentioning the faithful services of Mr. George Deavey, who assists in the care and management of the poultry under my charge.

The demand for information on all lines of poultry keeping continues with unabated interest from increasing and varied sources, and which may fairly be taken as an instance of the rapid development of the poultry branch of farm work.

I have the honour to be, sir,

Your obedient servant,

A. G. GILBERT.

THE WORK OF THE PAST YEAR, 1902.

The increasing demand for the early chicken, which is desirable, because it brings the highest price, has directed attention and inquiry as to how it can best be produced.

In this connection the experimental work of the past and two preceding years has been productive of results, which it is hoped will prove useful to the farmers of our country from whom inevitably must come the greater quantity of poultry and eggs, so much in demand.

Experience, so far gained, has shown with no uncertain sound that in order to have the healthy and quick growing early chickens, in paying quantity, it is imperative to have :—

1. Parent stock in robust condition.

2. Strong germs usually the result of No. 1.

How can these conditions so essential to success be generally secured?

Close and careful observation has led to the conclusion, that the conditions named can best be attained when the winter house is so constructed, as to permit of the laying stock having greater access to, and opportunity for exercise in fresh air than the majority of winter houses at present permit.

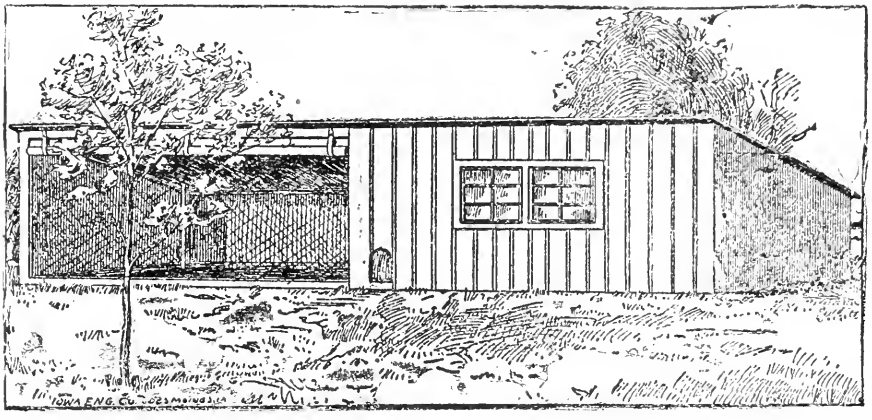
It is particularly desirable then that the hens which are layers during winter, and which are likely to be the breeding stock of spring should be allowed run during winter to barn or shed, and so obtain the desired change of air. Happily, the majority of farmers are so situated as to make this a matter of little difficulty. It is, however, still held by certain parties that no matter how favourable the conditions may be, that eggs laid in spring by hens which have been prolific winter layers are not likely to contain strong germs. Such contention has not been borne out by the observation made and results noted during the recent winter, and which are given in a following page. On the contrary these results show that where the fowls have had fresh air and exercise, although winter layers above the ordinary, the germs of their spring eggs were much stronger than those of hens which had been confined, in a comparatively warm atmosphere, from beginning to end of winter. The importance of using every effort to secure strong germs in early spring eggs and so preventing the number of 'dead chicks' in the shell near maturity cannot be too strongly emphasized.

RECURRENCE TO THE SUBJECT.

It may be said that recurrence to weak germs and 'chicks dead in the shell' is to repeat an old story. But it is one nevertheless of the greatest moment, as the numerous letters received on the subject prove. Its importance demands careful and patient investigation, for it is palpable that unless a paying percentage of chickens are hatched and reared there will be all work and no profit. Without a margin of profit, early chicken raising would surely be abandoned. It is of vital consequence to the success of this enterprise, which offers such a wide field of emolument, that its prosecution should be made as easy and certain as possible. It is, therefore, desirable to consider the best means to this end.

THE OPEN SHED ATTACHMENT TO POULTRY HOUSE.

One way of securing fresh air and exercise during winter is the open shed attachment to the poultry house, a plan of which, is shown below. This arrangement has been adopted and successfully operated by numerous farmers. The following shows a single house and shed owned by Mr. J. S. Jeffreys of St. Catharines, who writes a description of the premises as follows :—



A cheap and convenient Poultry House with Scratching Shed. Property J. S. Jeffreys, St. Catharines.

St. Catharines, November 10, 1902.

'The house referred to is 12 x 60 divided into four pens, each having a roosting and laying house 7 x 12 and scratching shed 8 x 12. The roosting room is built of double boards and battens outside, then paper and matched sheeting on the inside. The sheeting and all studs are of hemlock, the outsides boards pine and sills of cedar set on cedar posts, 6 feet apart.

'The hemlock sheeting was used for two reasons. First, because it was cheaper than pine and second rats do not go through it as much as they do pine.

'There are no floors, but the earth on the bottom of the pens is raised three feet higher than the ground outside.'

THE BEST TIME FOR AND MEANS OF HATCHING THE CHICKENS.

The strong germs being secured in the manner as outlined, it is now in order to consider the best time and means of hatching and rearing the chickens so as to have the most satisfactory results. These will to a great extent be governed by the exigencies of locality and facility. In some cases it may be quite possible to begin operations earlier than in others, and such effort will doubtless be rewarded with a higher price, for the earlier the chicken the better the price. To such persons the open scratching shed poultry house will be invaluable. But it was pointed out in report of this department for 1900 that the most suitable time for the great majority of farmers to hatch out their chickens is in April, or, early May, for the reason that unless provided with incubator room and brooding house, so as to be independent of outside temperatures, it would be inconvenient, if not impossible to raise chickens in paying numbers at an earlier season. Further experience and expressions of opinions from farmers strengthen that statement. Experience has also shown that pullets hatched prior to late April, or, May, although they may begin to lay in late summer or early fall, are apt to moult and

remain non-productive when eggs are at their highest value. On the other hand the May pullet, which probably begins to lay in November and continues to do so without ceasing during the season of high prices is obviously the most suitable bird for the farmer.

As to the best means of hatching and rearing the chickens, farmers and poultry breeders are fast realising that in order to have the early chickens in requisite number and uniform age artificial means are necessary. There is no intent to belittle the hen as a hatching medium. Doubtless she will be the favourite with those who desire only a limited number of chickens and are not particular as to whether early or late hatched. But where over one hundred chickens are desired early and at the same time, many more hens than are usually obtainable at that season would be required to give desired results.

HOW MANY CHICKS SHOULD A FARMER REAR?

In connection with the early hatching and rearing of chicks the question is frequently asked as to the number of hens a farmer should keep and the number of chickens he should hatch. This question has been answered in a previous report, but it is asked so frequently that it may be admissible to reply to it again. Under ordinary conditions a farmer should be able to keep from 50 to 100 hens and to raise with success 150 chickens. If there is help to be had from wife, sons or daughters a greater number may be successfully handled. But it is fair to presume that the greater number of chickens throughout the country will be produced by the farmers with a few hens rather than by few farmers with a great number. As in other lines of business it is not wise to aim at large results in poultry keeping without the assistance necessary to ensure success.

A SENTIMENTAL VIEW OF HELP FROM THE FARM HOME.

Poultry keeping admittedly affords congenial and healthful employment for women. Many poultry plants, of less or more magnitude, are successfully conducted in this and the neighbouring country by wives or daughters of farmers and business men. In England several extensive poultry establishments are successfully managed by ladies of title and wealth. A phase of the subject which, perhaps, appeals to the farmer from a sentimental as well as practical standpoint is that in creating a taste for poultry culture in his boys or girls he may weave a tie that will permanently bind the young people to the farm. The caring for and properly feeding of 150 or 200 chickens certainly afford ample opportunity to the young or older people, for in no time of the chicken's life is proper care and feeding more required than during the first six weeks of its existence. And in too many instances that, unfortunately, is the period during which chicks are allowed to 'pick up their own living.' It is hardly necessary to say when chickens so cared for arrive at the market they receive the lowest value. It is well to bear in mind that any extra care or attention given to the chick during the period mentioned will be amply repaid by quick development. On the other hand neglect can hardly ever be repaired.

CLOSE CONFINEMENT *vs* FRESH AIR.

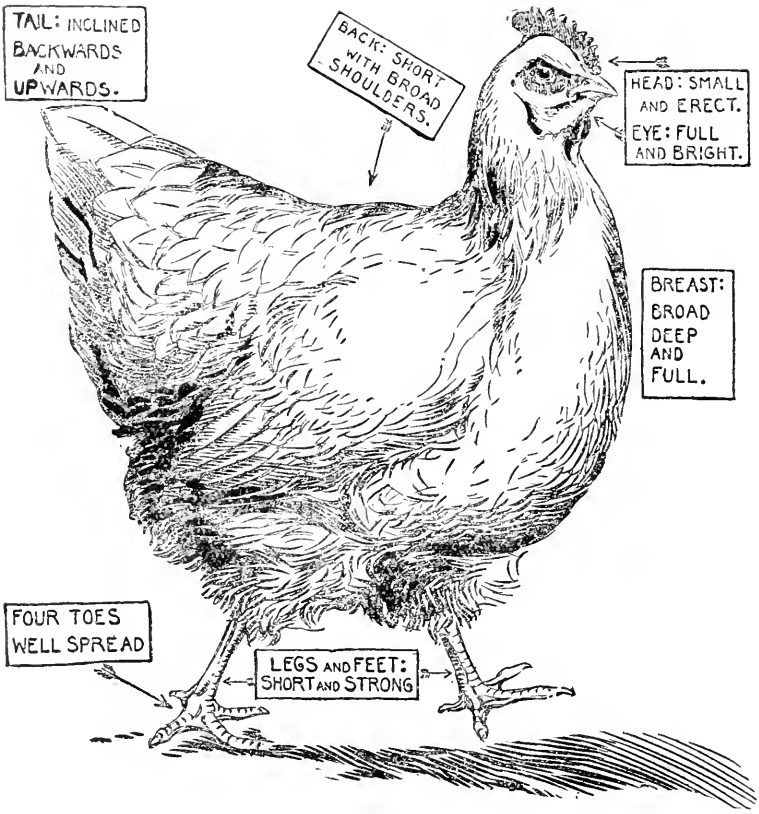
In order to ascertain results in strength of germs, and number and vitality of chicks from hens which were closely confined, in a warm house during winter as compared with those which had run in cold but fresh air, the following tests were made. On March 11 two broody hens were given 13 Barred Plymouth Rock eggs each. These eggs were from hens which had laid fairly well during the winter, were mated with a vigorous

young bird, but had been confined to pens from beginning of season, without any opportunity for outside run. The eggs were as nearly new laid, as possible. Results from the 26 eggs were 9 chickens which were placed in an outside coop and made satisfactory progress for a few days, but despite attention and careful feeding dropped off, one at a time, until only two were left, and they made most unsatisfactory progress, and never attained full size. They were all evidently weaklings, the offspring of weak germs.

A week later 13 eggs were obtained from Barred Plymouth Rock hens which had laid well during the winter, but had a run out to a small shed which they were often into, even in very cold weather. The hens were mated to a vigorous young male, which also had the benefit of the run. The result was 7 chickens, which with the mother hen as with the first lot were placed outside in a slatted coop. The chicks were hardy from the first. With the same food and treatment as given to the others, they made rapid growth, without any loss in their number. They gave every evidence of constitutional vitality. Further details as to the condition of the unhatched eggs, in both cases, will be found in the following table of eggs set and chickens hatched (by hens) during the season. This table also furnishes further instances of the effect of close confinement on hatching results, as compared with those after the fowls had opportunity to run outside. It will be seen that in all cases the eggs were placed under hens. In the case of the early eggs this is worthy of notice, for failure cannot possibly be attributed to the hatching medium, as might be done had artificial means in the shape of incubator and brooder been used. Poor results then point clearly to the eggs as the cause.

EGGS SET AND CHICKENS HATCHED. REMARKS ON RESULTS.

When Eggs were Set.	Description of Eggs.	Hens or Pullets Eggs.	When Hatched.	No. of Chickens.	Results of Examination of Eggs during and after Hatching.
1902.					
Mar. 11....	13 Barred Plymouth Rock eggs.....	Hens.	April 1.....	6	Hens closely confined during winter up to date of setting. 3 chicks nearly full size dead in shell. 4 eggs with germs in all stages of progress.
" 11....	13 " "	"	" 1.....	3	Hens closely confined during winter up to date of setting. 10 eggs with germs more or less advanced.
" 18....	13 " "	Hens and pullets.	" 8.....	7	Hens had run out to a shed during winter. Tested out 5 addled eggs. 1 chick full grown, dead in shell.
" 26....	13 White Indian Game eggs.....	Hens.....	" 16. ..	6	Hens closely penned during winter. Tested out 4 clear eggs. 2 chicks killed in nest. 1 unaccounted for.
" 27....	7 Orpington—6 Rhode Island Red eggs.....	Pullets.....	" 17.....	1	Hens closely penned during winter. Bad sitter which broke 3 eggs. 9 addled eggs, germs just started.
April 2 . .	13 Faverolle eggs.....	"	" 23.....	3	Hens closely penned during winter. On testing, all eggs seemed fertile. Examination after hatch showed embryos dead in various stages of progress.
" 3....	13 Barred Plymouth Rock eggs (1).....	"	" 24....	5	Hens closely penned during winter. Tested out 6 clear eggs. 1 chick dead in nest. 1 chick dead in shell.
" 3....	13 " " (2).....	"	" 24.....	6	These pullets had 2 pens during winter. Tested out 2 clear eggs. 1 egg rotten. 1 egg missing. 3 chicks dead at pipping stages.
" 3....	13 Buff Plymouth Rock eggs...	"	" 24...	1	Pullets apparently immature and out of condition. Remaining eggs all addled. Germs had just started and ceased progress.
" 3....	13 Rhode Island Red eggs...	"	" 24.....	5	Birds out of condition. Remaining 8 eggs contained germs in different stages of development.
" 12....	15 Silver Gray Dorking eggs.....	Hens... ..	May 3. ...	9	These eggs from a farm at Myrtle, Ont., near Toronto. Notwithstanding bad packing and rough trip, eggs did well showing strong germs and parent stock in robust condition. With exception of 6 clear eggs, all unhatched eggs contained fully developed chickens dead at or about 20 days.
" 12 ...	14 " "	"	" 3.....	7	
" 12....	15 " "	"	" 3.....	8	
" 12....	13 Faverolle eggs.....	Pullets	" 3.....	9	Good effect of run outside begins to show. Examination showed strong germs. 1 chick crushed in nest. Dead chicks in remaining 3 eggs.
" 16....	12 Buff Orpington eggs.....	"	" 7.....	11	1 egg addled. Chicks strong.
" 19....	13 Buff Plymouth Rock eggs.....	"	" 10. ..	7	Fowls much improved in condition by outside run. 3 full grown chicks crushed in shell. Remaining 3 eggs addled.
" 19....	13 Brown Leghorn eggs.....	Hens.....	" 10.....	12	1 egg addled.
" 19....	13 Barred Plymouth Rock eggs (1).....	Pullets.... .	" 10. ...	9	Remaining 4 eggs contained fully developed dead chicks.



Typical Buff Orpington Pullet.

"	19....	13 " " (2).....	"	"	10.....	2	This pen simply went to pieces. Remaining 11 eggs contained germs which had just started.
"	26....	13 Black Minorca eggs.....	Hens.....	"	17.....	11	1 egg with dead chick in it. 1 egg addled.
"	28....	11 Buff Orpington—3 Faverolle eggs.....	Pullets.....	"	19.....	11	3 clear eggs.
"	28....	13 White Leghorn eggs.....	"	"	19.....	5	5 eggs containing chicks crushed in nest. 5 eggs with germs which had apparently just made a start.
"	28....	15 Faverolle eggs.....	"	"	19...	4	1 egg containing chick crushed in nest. Male bird had evidently been ill for sometime previous to setting the eggs.
"	28....	13 Rhode Island Red eggs.....	"	"	19.....	11	1 chick dead in shell. 1 egg addled.
"	28....	13 Barred Plymouth Rock eggs.....	Hens.....	"	19. ...	5	Eggs came by Express from Quebec. Evidently injured in transit as 8 eggs were addled.
May	3....	15 " "	"	"	24.....	8	3 chicks dead in shell. 1 clear egg. 1 chicken crushed in nest.
"	3....	8 White Plymouth Rock—4 White Leghorn eggs ..	"	"	24....	9	3 chicks dead in shell fully developed. 1 clear egg.
"	10....	8 Buff Orpington—4 White Leghorn eggs.....	Pullets.....	"	30.....	7	Remaining eggs addled.
"	10....	13 White Wyandotte eggs.....	Hens.....	"	30.....	6	" contained germs more or less developed.
"	10....	13 Buff Rocks eggs.....	Pullets.....	"	30.....	7	" " "
"	10....	15 Light Brahma—Buff Plymouth Rock cross eggs..	"	"	30....	7	" " "
"	22....	11 White Leghorn—2 White Plymouth Rock eggs...	"	June	12.....	7	" " "
"	22....	12 Buff Orpington—1 Barred Plymouth Rock eggs..	"	"	12.....	11	Two eggs did not hatch.
"	23....	13 Barred Plymouth Rock eggs (1).....	"	"	13.....	10	1 chick crushed in nest. Remaining eggs did not hatch.
"	23....	13 " " (2).....	"	"	13.....	5	5 clear eggs. 3 unhatched eggs contained partially developed germs.
June	7. ..	12 White Leghorn—1 Buff Orpington eggs.....	"	"	28....	11	2 eggs gave no results.
"	22....	13 Black Minorca eggs.....	Hens.....	July	13...	12	1 " "
"	28 ...	13 Buff Orpington eggs.....	Pullets.. ...	"	19.....	8	Chicks hatched too late. Did not do well.
"	28 ...	13 White Leghorn eggs.....	"	"	19....	9	" " "
		518				281	

From the hatching results shown in above table some interesting deductions may be made, viz.:—

1. The chicks from the eggs of hens which had voluntary run during winter, proved strong and lived, while the chicks from the closely confined died, with the exception of two, which did not make satisfactory growth.

2. That germs evidently became strong at twelve or fifteen days after the hens had a run outside. This will answer a question often asked 'as to when the eggs of hens closely confined become strong?'

3. Proof of the statement made in a previous page that 'farmers have exceptional opportunities to allow their fowls a run in barn or shed during winter and so secure the strong germ,' is found in the results from the eggs obtained from a farmer at Myrtle, Ont. The eggs, 44 in number, were likely laid in late March or early April. They had come by express and over a rough road to the farm, and on reception showed every evidence of being knocked about in transit. Such was their apparent condition that few or no results were anticipated, but 24 strong chickens were hatched and made rapid growth, sure indications of robust parent stock.

4. The 15 Barred Plymouth Rock pullets in No. 2 group had two pens thrown into one, or double the space that No. 1 group of the same sort and number had. They were for the most part later hatched than those of No. 1, but all other conditions as to temperature and treatment were the same. They did not, however, lay as many eggs, nor did their eggs produce as many chickens as did those of No. 1 group. This shows that neither warmth nor rations compensated for comparatively immature development.

5. That the chickens hatched in July did not thrive well. This emphasizes the advice given in previous reports not to have chickens so late in the season if at all avoidable.

Results from eggs put into an incubator during early spring time were very similar to those obtained from eggs under hens at the same period. There was a large and discouraging number of chickens dead in the shell, at or about the pipping stage. This great mortality in fully developed chickens almost ready to leave the shell has been, and is the subject of much discussion in the poultry press of Great Britain, United States and Canada. While it is admitted that the healthy condition of the breeding stock in the spring is of paramount importance, the question is asked 'Has the incubator no responsibility in the matter?'. One of the best articles, among the many written on the subject, is by a correspondent who writes under the *nom de plume* of 'Medicus,' to an English scientific paper. His contention, strengthened by results of experiments conducted by himself, is that at all times during the period of incubation there was in the incubators tried by him a lack of oxygen, but particularly so at the critical hatching period. Doubtless the thorough ventilation of the subject will result in improvement. Already the incubators made by leading manufacturers are arranged to admit a greater amount of fresh air. This better ventilation of incubators in combination with improved methods of winter house accommodation and management of the laying stock, will no doubt, bring a more satisfactory percentage of strong early chicks. It is but fair to state that incubators are sometimes operated under the most unfavourable conditions, and satisfactory results can hardly be expected. On the other hand, where conditions are favourable, Mr. L. H. Baldwin, of Deer Park, near Toronto, by his skilful manipulation of breeding stock and machines, seldom fails to secure 80 per cent and frequently 100 per cent of returns. Investigation into and discussion of the subject, up to the present time, seem to warrant the call for 'fresh air and more of it for breeding stock and incubators.'

PROGRESS OF THE CHICKENS.

The treatment of the chickens after hatching by hens or incubators was much the same as described, at length, in reports of previous years. There was a difference, however, in the weather conditions of spring and early summer of the past year. The long continued wet and cold weather resulted in unusual mortality among the chickens of

one, two and three weeks of age. The high death rate was not confined to this locality, as was shown by the number of letters received on the subject from many parts of the country, asking as to cause and a remedy. Beyond the unfavourable weather it was impossible to assign a reason for such general loss.

Effort was made to hatch a majority of chickens of the breeds calculated to be of the most use to farmers as winter layers and rapid flesh makers. Chickens of Buff Orpingtons, Faverolles, Buff Plymouth Rocks and Rhode Island Reds were hatched for the first time. All these varieties have claims to utility from the standpoints named. The development of the chickens of these comparatively new comers, as well as from a second cross from a first one of Light Brahma male and Barred Plymouth Rock female, was watched with much interest. The first cross of Brahma and Plymouth Rock proved an excellent one, from both egg laying and market points. The number of eggs laid by 15 pullets of this first cross in comparison with an equal number of White Plymouth Rock and White Wyandotte pullets during the winter season of 1901-02 is shown in a table of eggs laid by different breeds in six months, to be found on a later page. The chickens were taken from running in a field when weighed. In a later part of this report the results of experiments conducted by the Chemical division in the fleshing of chickens of different breeds, on various rations, and in crates or limited run are given, and furnish interesting and valuable data. The following are the weight developments of the chickens, up to three months of age and previous to being used for the Experimental work referred to viz :—

Barred P. Rock Cockerel	at	3	mos.	.....	3	lbs. 10	ozs.
"	"	"		.....	4	" 2	"
White Wyandotte	"	"		.....	3	" 11	"
"	"	"		.....	3	" 2	"
Faverolle	"	"		.....	3	" 7	"
"	"	"		.....	3	" 2	"
Silver Gray Dorking	"	"		.....	3	" 15	"
" "	"	"		.....	3	" 3	"
Buff Orpington	"	"		.....	3	" 12½	"
"	"	"		.....	3	" 5	"
Rhode Island Red	"	"		.....	3	" 4	"
" "	"	"		.....	2	" 14	"
Light Bra.-B.P.R. (2nd cross)				.....	4	" 6	"
" "	"	"		.....	4	" 3	"
" "	"	"		.....	5	" 1	"

Chickens obtained from a farmer near Carleton Place, Ont., for Experimental fattening weighed as follows :—

Barred Plymouth Rock Cockerels at 2 mos. and 6 days :—2 lbs. 5 ozs : 2, 4 : 2, 5 : 2, 2. These chickens were also taken from a field, but had been regularly fed and well cared for.

EARLY MARKET TYPES.

With the view of ascertaining which breed furnished the earliest and best market type careful attention was given to the chickens of the varieties and ages named above. Among them will be noticed two well known English and French table fowl producing breeds viz : Dorking and Faverolle. The ideal chicken borne in mind was one of rather blocky frame, showing a rounded breast with fairly long, low and straight breast bone well covered with flesh and thighs carrying a generous proportion of meat, with white flesh and legs of light colour. Such a chicken should present a plump and inviting appearance and make a model three months old bird for early home market, or export. Experience so far gained goes to show that none of the utility breeds of to-day furnishes three months old chickens of acceptable type, in greater number, on an average, than another. All varieties tried have produced early chickens of desirable shape and size, but in limited

number. It is a matter of congratulation that we have the desirable models furnished by several rather than by one variety, for it renders their production so much easier. How then may the desirable types be produced?

HOW THE BEST TYPES MAY BE PRODUCED.

This should not be a matter of difficulty. Selection of the best types of the different varieties and breeding from them only, will eventually bring the early chickens of shape, size, quality and in numbers wanted. Skilful and careful crossing of breeds, with the aim of producing layers and flesh formers combined, resulted in Plymouth Rocks, Wyandottes and Orpingtons, with their many subsequent varieties, which as utility fowls are hard to better. And what has been already so successfully achieved can surely be repeated in the production of the early chickens of acceptable type.

WHAT A PURCHASER FOR EXPORT SAYS.

It may possibly be remarked that much is being said about the three months old chicken for export, while our home market also calls for the early and superior quality which cannot be had in quantity nearly sufficient to fill the demand. Some differences in the two markets are noted in a subsequent page. The following letter from Dr. Boultbee, manager of the Canadian Produce Company of Toronto, purchasers for export, on the most acceptable chicken for the English market will be read with interest. This gentleman who has spent some time in London, Eng., studying the different phases of that market, is well qualified to express an opinion. He writes as follows:—

CANADIAN PRODUCE CO.,
TORONTO, December 3, 1902.

DEAR SIR. . . . . I am afraid that I have said all I can, and all I know about export chickens many times, but I might say again that the three-pound bird, which means the same thing as the three months old bird, is what is wanted. In fact we can sell a dozen chickens weighing from 30 to 40 lbs. per dozen, to one of all the other sizes, and the preference is given to small and young birds of large breeds, rather than to the same weight but mature birds of smaller breeds. The call is, more than ever however, for quality. Everything else may go and is really of very small importance in comparison with this point. However, I am glad to say that the improvement in the quality is marvellous. As regards methods of fattening special attention should be given to processes which improve the colour, and put on a fair amount of fat without robbing the breast of its lean meat. We receive many birds with every evidence of earnest endeavour to fatten, and every evidence of same as regards quantity of fat, but the birds are actually thinner than normal. I attribute this to carrying on the process too long. Careful experiments should be made to find the exact point from which the birds go back, and I think for the average farmer partial confinement, not in coops, and good feeding, the most practical method.—ALFRED BOULTBEE.

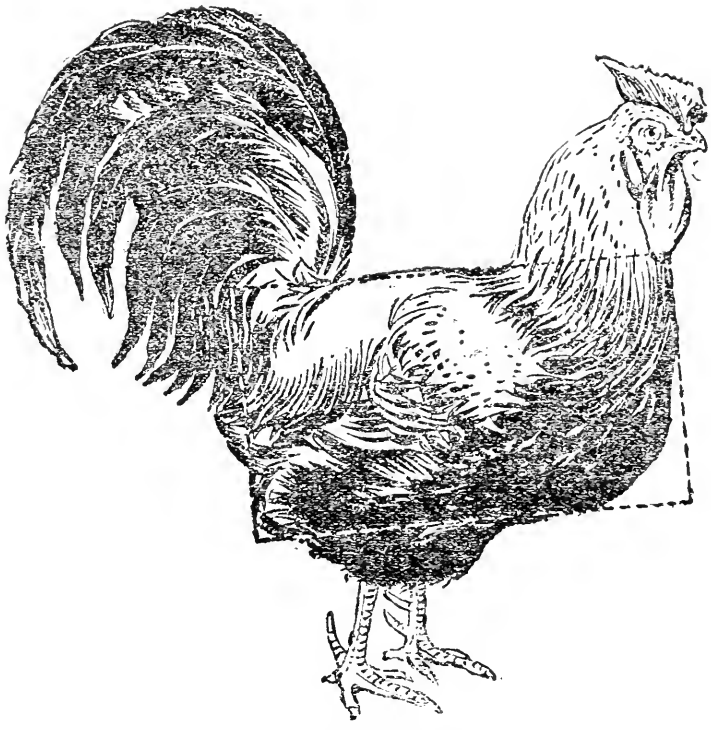
As to the time required to fatten, by crating the birds, frequent experiments have shown that three weeks should suffice to finish the bird, in the most acceptable form. In some cases it is quite possible to shorten the time by a few days. Much depends upon the breed of chickens, their age, and the condition they are in, when received from the farmer, or dealer. Experience has also shown that a crated chicken if not a hearty eater, will not likely be a rapid flesh maker. If the special feeding is carried on longer than three weeks, the bird is likely to remain stationary and if continued over a month is likely to lose weight, or, go back. This is shown in a marked manner in the results, given in following pages from the experimental fattening of chickens.

DIFFERENCES BETWEEN THE TWO MARKETS.

One of the differences between the British and home market is that our consumers do not object to a large bird, which usually means a later one. Nor do our consumers have such pronounced objection to yellow tinge of flesh, or, leg. The later bird is somewhat an easier one to produce, certainly, but it comes when the market is well stocked with similar birds and prices are generally lower. It is obviously better to produce the earlier chickens. As a result of this difference in the phases of the two markets there is a possibility of a twofold opportunity for our farmers to make money by taking advantage of the early demand for export chickens and the later birds for home use. An objection to certain strains of 3 and 4 months old cockerels of standard breeds, is that of sharp and prominent breast bone with absence of flesh. In numerous cases noticed this has not been such a cause of complaint at 5, or 6 months of age. But we are warned, as already noted, that our birds of either age named and which would probably be of 7 or 8 pounds weight each, are too large for the English consumer. We then fall back on our later home market which (as already remarked), offers no such objection, provided the birds have been well fed and cared for and show flesh of good colour and fine grain, as a rule sure indications of tenderness. In no case should quality be of secondary consideration. It is gratifying to note from Dr. Boultbee's letter that the quality of our birds is rapidly improving. Objection to sharp breast bone and yellow tinge of leg and flesh, the latter more particularly from the English consumer, experience has shown, can be overcome by breeding from selected birds.

TYPE SUITABLE FOR BOTH MARKETS.

The following is a type of an English market fowl. In this case it is represented by one of the Dorking varieties.



SUITABLE TYPE OF MARKET FOWL.

EARLY PENNING UP OF FOWLS.

On October 22 the following fowls were selected and put into pens in No. 1 house, of 8 x 14 feet with outside runs of 8 x 48 feet. They were fed the same rations as given to the other birds running at large in a field. This was done before winter laying had commenced and after the hens had moulted, and in order to ascertain if so penning and feeding the birds would cause them to lay earlier than those enjoying the greater range :—

12	Barred P. Rock hens, eggs laid in November	62
12	Light Bra. P. Rock hens (crossed) eggs laid in November	35
12	Buff Leghorn hens, eggs laid in November	20
15	Barred P. Rock pullets, eggs laid in November	49
13	White " Pullets, eggs laid in November	11
6	Faverolle " " "	15
70		192

The remaining 147 hens and pullets laid eggs, during the same time, to the number of 132. The advantage is apparently with the penned fowls.

COMMENCEMENT OF GENERAL WINTER LAYING.

The fowls of all breeds moulted well and were in good feather by middle of October. The same treatment and food were adopted, in order to secure an early moult, as described at length in report of last year. Winter laying began by the hens enumerated above and was fairly general by the beginning of December. The first pullets to lay were Barred Plymouth Rock, Light Brahma—P. Rock cross, Faverolle and Buff Leghorn. The average age at which laying began was five months.

RATIONS USED AND THEIR VALUE.

The following amounts are fed to 247 fowls at present :—

	Cts.
20 lbs. wheat	28
16 lbs. cut bone at 1c. per lb	16
16 lbs. ground grains for mash	22
Lime, grit and roots (mangels)	3
	69

The mash is composed of 7 lbs. shorts	7c.
4½ lbs. ground oats	8c.
4½ lbs. gluten meal	7c.
	22c.

As in previous years the mash was fed 3 times per week and in the afternoon during winter. In feeding at this time it was considered less liable to retard the hens from exercise, which was occasionally the effect when fed in the morning. Much depends upon the conditions under which the hens live. If in an unheated house, a little hot mash for first ration, would likely be warming and stimulating, and attended with beneficial results. But where the house is warmed it is likely to be of more benefit when fed for last ration. As to quantity, as nearly as possible one pound, measured dry, to every 15 hens. Again this depends very much upon what close observation of the effect would dictate. Pullets might require a greater quantity. Members of the

Spanish, or Mediterranean family would perhaps do better on a larger allowance, than that given to pullets of the Asiatic or American classes. And a hen, or pullet which is laying well is likely to eat more than a non-productive one.

CUT BONE,—was generally given in proportion of one pound to 15 or 20 hens.

Wheat, about 8 or 10 lbs to 100 fowls, according to their age and condition and nature of other rations. This grain was not all fed at one time, but from time to time so as to keep the fowls busy searching for it when thrown into the litter on the floor. And it was not fed when mash, or, cut bone was given. Oats were sometimes used to scatter in the litter. Occasionally buckwheat took the place of wheat, but the latter was the principal grain fed and is certainly the best, where there is no choice of variety.

Roots, lime and grit were always in supply, and water to drink was in abundance. Experience has shown that variety in food and times of feeding is desirable.

A correspondent recently wrote that treatment, according to the best advice he could receive, had failed to make his comfortably housed pullets, of early hatch, to lay so far. Another correspondent says the same of his hens and then describes the rations and quantities fed, which were very much more than should have been given to hens of a heavy breed. In the first instance it is quite possible that the pullets were from a strain of poor layers, particularly so in winter. To have early and satisfactory winter layers, they should come from parent hens well known as both. There are strains of poor laying fowls as there are strains of poor milch cows. The remedy is to make a change as soon as circumstances will permit. In the second case the hens were undoubtedly in an overfat condition, the result of mistaken generosity in the quantity of food given. The remedy is to lessen the amount fed, incite the fowls to as much exercise as possible, in searching for their food, and allow a liberal supply of roots. Lean meat, vegetables or roots and active exercise are factors in regaining the normal condition. Information in regard to the last mentioned condition of many flocks, of prospective winter layers, is so frequently asked that the information given, as to remedial action will likely be of interest to many.

EGGS LAID DURING THE YEAR.

The following are the number of eggs laid in the different months during the year:

1901.	
December	1,270
1902.	
January	1,982
February	1,937
March	2,392
April	2,584
May	1,814
June	1,015
July	367
August	288
September	132
October	20
November	324
	14,125

EGGS LAID IN THE MONTHS OF HIGHEST PRICES.

The following table will show the number of eggs laid by different breeds during six months of highest values. In making comparison, or comment it is well to remember that the experience of many years leads to the conclusion that the fowls which, as pullets lay well one winter may not do so the next as hens. It has also been found that the indifferent pullet layers of one season may be exceedingly good the year after, when hens. And so an average percentage is kept, which can only be correctly ascertained by comparing one season's results with another, for some years past.

Eggs laid by different breeds from December 1, 1901, to June 30, 1902.

Breeds.	1901.	1902.						Totals.	Remarks.
	Dec.	Jan.	Feb.	Mar.	April.	May.	June.		
10 W. Leghorn pullets...	82	141	103	133	90	89	52	690	
8 B. Minorca hens.....	41	48	44	100	147	115	53	548	
8 Andalusian hens.....	41	61	49	64	102	63	38	418	
8 Brown Leghorn hens..	52	102	98	143	178	134	50	757	
9 Langshan hens..	79	108	116	101	90	66	44	604	
5 Langshan pullets.....	41	49	39	38	76	28	30	301	
10 B. P. Rock hens	81	78	81	113	123	48	62	581	As the season advanced the hens of sitting varieties became broody and eggs were given to them.
28 B. P. Rock pullets....	92	267	260	324	348	211	100	1,602	
8 White P. Rock hens..	58	61	44	84	97	62	43	449	
14 White P. Rock pullets	67	108	132	167	166	101	73	814	
10 W. Wyandotte hens..	78	95	70	84	120	77	57	581	
15 W. Wyandotte pullets	74	132	150	166	142	66	73	893	
7 W. Ind. Game hens...	50	62	37	51	36	62	14	312	
4 Buff Orpington pullets	67	69	39	29	25	23	19	271	One of these pullets died in January.
4 Faverolle pullets	.. .	22	35	26	44	17	Brdy.	144	
9 R. I. Red pullets.....	74	133	83	108	86	77	25	586	
7 Buff P. Rock pullets..	15	57	48	38	43	51	48	300	
14 Buff Leghorn hens....	81	45	68	148	141	111	41	635	
12 Buff Leghorn pullets..	60	88	74	72	84	86	24	488	
18 Mixed hens.....	89	156	164	230	202	143	65	1,049	
15 B. P. Rock pullets ...	48	98	199	157	217	157	86	962	
	1,270	1,975	1,933	2,376	2,557	1,787	997	12.895	

OTTAWA, December 2, 1902.

THE PRESERVATION OF EGGS.

BY FRANK T. SHUTT, M. A.,

Chemist, Dominion Experimental Farms.

Continuing this investigation, begun in 1898, we have during the past season repeated the trials with several of the preservative solutions previously reported upon, such as lime-water and sodium silicate (water glass), and also added to the list one or two, which appeared to be worthy of trial.

The solutions used were as follows : (1) saturated lime-water, (2) saturated lime-water containing 1 per cent common salt, (3) saturated lime-water containing 2 per cent common salt, (4) sodium silicate (water glass), 5 per cent (5) common salt, 1 per cent, (6) common salt, 2 per cent, (7) permanganate of potash, 0·25 per cent, (8) calcium chloride, 1 per cent, (9) calcium chloride, 2 per cent, (10) magnesium chloride, 2 per cent.

In the case of the more important solutions, viz., lime-water, lime-water and common salt, and sodium silicate, the eggs were immersed February 7, 1902, and examined December 1, 1902. They were consequently kept a period of practically 10 months, during a large part of which time they would be subject to summer temperature. As in former years, the bottles containing the eggs were kept in the laboratory.

Saturated Lime-water.—The results with this solution were practically identical with those obtained in former seasons. Appearance, external and internal, good; 'white', tinged faintly yellow and somewhat more limpid than in fresh egg; yolk, globular and apparently normal. On poaching, several of the eggs developed a slightly 'stale' odour. Though not equal to fresh eggs in flavour, they were all quite sound and usable.

Saturated Lime-water and 1 per cent Salt.—These eggs, on the whole, were very similar to the preceding, though a careful rating showed those preserved simply in lime-water to be somewhat the better.

Saturated Lime-water and 2 per cent Salt.—'White', slightly limpid and more deeply tinged than eggs from foregoing tests. On poaching, very little difference, however, was to be observed between them.

Sodium silicate (water glass) 5 per cent Solution.—These eggs presented much the same appearance, externally and internally, as those preserved in lime-water.

Common Salt 1 per cent Solution.—The unsuitability of this solution was again demonstrated, the eggs possessing a most marked and disagreeable odour.

Common Salt 2 per cent Solution.—As in the trial of 1901, the eggs in this solution were quite spoilt and unusable.

Permanganate of Potash 0·25 per cent.—This solution is frequently mentioned in the press as a good egg preservative, but in our experiments it has proved totally unsuccessful. All the eggs were bad.

Calcium Chloride 1 per cent.—A large proportion of the eggs were unusable. The 'white' very limpid and highly discoloured; odour, disagreeable.

Calcium Chloride 2 per cent.—Very similar results to those of preceding test. Evidently neither solution is to be regarded as a satisfactory preservative.

Magnesium Chloride 2 per cent.—All the eggs spoilt and very bad. 'White', very limpid and highly discoloured. Contents of eggs, of unpleasant appearance generally and possessing very bad smell.

For further details respecting the condition of eggs kept in lime-water, and some of the more important solutions experimented with, the reader is referred to page 332-334 of the Annual Report of the Experimental Farms for 1901. The general results were so similar this year that it has been thought unnecessary to repeat the particulars.

CONCLUSIONS.

This fifth season's work with egg preservatives furnishes further corroboratory evidence of the value of lime-water. Of all the solutions experimented with, it has proved the most satisfactory. It is certainly equal to water-glass in effectiveness and is to be preferred to this much advertised preservative on the grounds of economy and ease of preparation.

The following note regarding the preparation of the lime-water may be found useful:—

The solubility of lime at ordinary temperatures is 1 part in 700 parts of water. Such a solution would be termed saturated lime-water. Translated into pounds and gallons, this means 1 lb. of lime is sufficient to saturate 70 gallons of water. However owing to impurities in commercial lime, it is well to use more than is called for in this statement. It may not, however, be necessary, if good, freshly burnt quicklime can be obtained, to employ as much as was at first recommended, namely, 2 to 3 lbs. to 5 gallons of water. With such lime as is here referred to one could rest assured that 1 lb. to 5 galls. (50 lbs.) would be ample, and that the resulting lime-water would be thoroughly saturated. The method of preparation is simply to slack the lime with a small quantity of water and then stir the milk of lime so formed into 5 gallons of water. After the mixture has been kept well stirred for a few hours it is allowed to settle. The superna-

tant liquid, which is now 'saturated' lime-water is drawn off and poured over the eggs, previously placed in a crock or water-tight barrel.

As exposure to the air tends to precipitate the lime (as carbonate), and thus to weaken the solution, the vessel containing the eggs should be kept covered. The air may be excluded by a covering of sweet oil, or with sacking upon which a paste of lime is spread. If after a time there is any noticeable precipitation of the lime, the lime-water should be drawn or siphoned off and replaced with a further quantity newly prepared.

It is essential that attention be paid to the following points :—

1. That perfectly fresh eggs only be used.

2. That the eggs should throughout the whole period of preservation be completely immersed.

Although not necessary to the preservation of the eggs in a sound condition, a temperature of 40° F. to 45° F. no doubt materially assists towards retaining a good flavour, or rather in arresting that 'stale' flavour so characteristic of packed eggs.

EXPERIMENTS IN CHICKEN FATTENING.

By Frank T. Shutt, M.A., F.I.C.

Chemist, Dominion Experimental Farms.

There is probably no branch of agriculture in Canada regarding which, to-day, there is a greater desire for information than that of chicken fattening. The high prices paid for properly fatted, or perhaps more correctly speaking, fleshed young poultry, both in the home and English markets have already had the effect of inducing many to enter upon this lucrative employment, and many more will engage in it as the requisite knowledge becomes disseminated, for we are assured on good authority there is relatively as much room for the development of this industry as there was years ago in Canada for the expansion of that of butter and cheese.

Recognizing this, the Chemical Division in conjunction with the Poultry Department of the Central Farm, instituted and carried on during the past season several series of feeding experiments, which, though of a preliminary character, would it was hoped furnish information of an accurate and reliable character on this important work. This investigation naturally had for its chief object the study of fattening rations, but certain other factors closely related to profitable fattening, such as breed, age, exercise, relative fineness of food, &c., also received attention.

FOODS AND RATIONS.

Fowls may be said to be naturally omnivorous ; they feed not only on vegetable matter (grains, grass, &c.), but also largely on insect life. This fact points to a ration for poultry richer in albuminoids than is usually found economical for other classes of farm stock. Practical experience with laying hens has shown this to be correct—which is not at all remarkable when we remember that eggs are very largely albumen. Further, there are on record the data of carefully conducted experiments which also indicate such a ration to be best suited for fattening chickens. Foods rich in carbo-hydrates (starch) and fat and low in albuminoids tend to excessive deposition of fat, an undesirable feature in both laying stock and table fowl.

Rations of the first order, rich in protein or albuminoids, are said to have a narrow nutritive ratio and are sometimes termed nitrogenous. They would, for poultry, contain in addition to the grain or meal, crushed green bone, meat meal or skim-milk, all of which have a high protein content.

Rations of the second class have a wide nutritive ratio, and are commonly known as carbonaceous, since starch and fat (rich in carbon) predominate. Such a diet, for instance, would be one consisting largely or entirely of Indian corn—a popular and favourite grain among many poultry keepers—but one that must be used sparingly if satisfactory results are to be expected.

It is not our purpose at the present time to discuss more fully the question of foods and their functions in the animal economy, for that has already been done in the report of the Chemical Division of the Expt. Farms for 1900, p. 166–7, to which the reader may be referred. There are probably one or two points, however, in connection with poultry feeding that might be emphasized here. They are, first, the desirability of variety in foods, and, secondly, the advisability of a certain amount of exercise. As to the first of these, variety of food (apart from the question of quality) is essential towards keeping the appetite keen, promoting digestion and maintaining health. This has been demonstrated by the supplementary use of green food as furnished by the sodded run in summer and beets, mangels, or cabbage in winter. Respecting the second, the value of exercise, it may be stated that assimilation must be preceded by digestion and that for vigorous digestion in the fowl there must not only be grit supplied, but a strongly muscular gizzard to do the grinding, which can only be developed by exercise. Further, though the function of the gizzard proper is to grind the food, its first division, or rather the part of the digestive track between the crop and the gizzard secretes a fluid of a digestive value and is the true digestive stomach, and we may well suppose that this important function can only normally proceed under normal conditions, which for poultry certainly include exercise. The present investigation has, we are of opinion, furnished data subtantiating this contention, for as will be seen further in this article, chickens with a limited run made better use of their food towards flesh production than those confined in coops which allowed no exercise.

BREED TEST.

To ascertain the relative merits of certain breeds for fattening.

This comprised eight well known breeds and a pen of crosses, as follows : Barred Plymouth Rock, White Plymouth Rock, Faverolle, Silver-gray Dorking, Orpington, Rhode Island Red, White Indian Game, White Wyandotte, cross of Barred Plymouth Rock and Light Brahma. The experiment was begun in June and continued for six weeks.

It was found impossible to obtain chickens for the whole series of exactly the same age, but the majority—as will been seen from the table—were two months old when placed in the feeding pens.

The chickens were fed in pens 8 by 14 feet (divisions of the Farm Poultry House) connected with outside runs 8 by 48 feet, partly sodded, partly gravelled, to which the fowls had access throughout the day. The food, served twice a day, was placed in small, water-tight, V-shaped troughs and only given in such quantity that it would be immediately consumed.

In this series whole grain (wheat) was fed as part (from $\frac{1}{3}$ to $\frac{1}{4}$, as a rule) of the ration ; in subsequent experiments all the food was in the condition of meal, it being found, as will be shown by one of our experiments, that ground grain gives more profitable returns for fattening birds.

Ration—Ground oats	4 parts.	Protein ratio 1:3·94.
Ground barley	3 "	
Meat meal	1 "	
Skim-milk	Sufficient to make the whole into a mash.	

The mixture of oats, barley, and meat meal was valued at $1\frac{1}{3}$ cents per pound. To the skim-milk the value of 15c. per 100 lbs. was assigned.

As stated, the above was supplemented by an evening feed of whole wheat, valued at $1\frac{1}{10}$c. per lb.

A strict account of all food consumed was kept and the chickens were weighed at the close of each week of the experiment.

In table I. We present data respecting (1) breed, (2) age, (3) sex, (4) weight at beginning of test and at end of each following week, (5) gain in live weight during the six weeks, and (6) average gain per chicken per week.

TABLE I.—BREED TEST.

Breed and Age.	Pullet or Cockerel.	Weight.														Gain in six weeks.		Average gain per Chicken per week.
		Beginning of experiment.		1st. week.		2nd. week.		3rd. week.		4th. week.		5th. week.		6th. week.				
		Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs. Oz.
Barred Plymouth Rock, 2 months...	C	2	8	2	13	3	2	3	9	4	1	4	8½	4	12	2	4	0 6
" " ...	C	2	½	2	6	2	10	3	2	3	14	4	..	4	5½	2	5	0 6¼
" " ...	C	1	15	2	3½	2	8	3	1	3	8	3	11	4	2½	2	3½	0 6
" " ...	C	2	0	2	5	2	14½	3	6	3	8	4	4½	4	9½	2	9½	0 7
" " ...	C	1	9	1	15	2	4½	2	11	2	14	3	2½	3	8	1	15	0 5⅛
White Plymouth Rock, 2 months...	P	1	½	1	6½	1	11	2	0	2	6	2	9½	2	14	1	14	0 5
" " ...	P	0	15	1	3½	1	8½	1	13	2	2½	2	3½	2	6½	1	7½	0 4
" " ...	P	1	1	1	8	1	15	2	6	2	10	2	15	3	3	2	2	0 5⅜
" " ...	P	0	14½	1	4½	1	10½	2	1	2	7	2	8½	2	14	1	15½	0 5⅛
" " ...	P	0	15	1	4	1	10½	2	1½	2	8	2	11	3	0	2	1	0 5⅛
" " ...	P	0	15	1	4	1	9	1	15	2	4	2	7½	2	14	1	15	0 5⅛
Faverolle, 2 months.....	C	1	14	2	8½	2	14½	3	3½	3	11½	4	1½	4	6½	2	8½	0 6⅝
" "	C	1	12½	2	8	2	13	3	2	3	11	4	3	4	7½	2	11	0 7⅛
" "	C	1	7	2	0	2	5½	2	10½	3	2	3	6½	4	0	2	9	0 6⅝
" "	P	1	13½	2	5	2	9½	2	13	3	1	3	7	3	12½	1	15	0 5⅞
" "	P	1	11½	2	5	2	10	2	14	3	4	3	5	3	13	2	1½	0 5⅜
" "	P	1	3	1	11	2	0	2	4	2	10	2	15	3	4½	2	1½	0 5⅜
Silver Gray Dorking, 2 months.....	C	1	5½	1	13	2	2	2	5½	2	11	2	15	3	5½	2	0	0 5⅓
" "	C	2	2½	2	14	3	4½	3	10	4	2	4	6	4	12	2	9½	0 7
" "	C	1	10½	2	0	2	4	2	12½	3	0	3	6	3	14½	2	4	0 6
" "	C	1	5½	1	15	2	4	2	7½	2	10½	2	15	3	5½	2	0	0 5⅓
" "	C	1	11	2	6	2	15	3	5	3	14½	4	4½	5	1½	3	6½	0 9⅛
" "	C	1	5½	1	14	2	5	2	13	3	4	3	8	3	12½	2	7	0 6⅛
Buff Orpington, 2 months.....	P	1	6½	1	14½	2	4½	2	9½	2	13½	2	15	3	5½	1	15	0 5⅛
" "	C	2	0	2	10	3	1	3	8½	4	0	4	6	4	14	2	14	0 7⅛
" "	C	1	12	2	6	2	15	3	5	3	13	4	4½	4	14	3	2	0 8⅛
" "	P	1	8	1	14½	2	4½	2	9	2	14½	3	2	3	9	2	1	0 5⅛
" "	P	1	8½	1	15	2	3	2	8½	2	13	3	½	3	6½	1	14	0 5
" "	P	1	5	1	13	2	2	2	7½	2	10½	2	15	3	5½	2	½	0 5⅛
Rhode Island Red, 2 months.....	C	1	8	1	15	2	4	2	8½	2	13	3	1½	3	5½	1	13½	0 5
" "	C	1	10	2	1	2	6	2	10	2	14½	3	4½	3	7½	1	13½	0 5
" "	C	1	9½	2	1½	2	7½	2	12	3	0	3	4½	3	10	2	½	0 5⅛
" "	C	1	2	1	6½	1	12	2	3	2	7	2	14	3	2½	2	½	0 5⅛
" "	P	1	4	1	10	1	15½	2	2	2	5	2	6½	2	9½	1	5½	0 3⅜
White Indian Game, 2 months.....	P	0	12½	1	0	1	5	1	9½	1	13½	2	0	2	7	1	10½	0 4½
" "	P	1	½	1	4	1	8	1	12½	1	15½	2	2	2	9	1	8½	0 4⅝
" "	P	0	15	1	2	1	6½	1	12	1	14	2	0	2	3	1	4	0 3⅛
" "	P	0	15	1	3½	1	8	1	12½	1	15½	2	2	2	7½	1	8½	0 4⅛
White Wyandotte, 11 weeks.....	C	2	14	3	12	4	6	4	5½	4	11	5	3	5	10	2	12	0 7⅛
" "	C	2	6	3	2½	3	11	3	14	4	1	4	6	4	13½	2	7½	0 6⅝
" "	C	2	7½	3	5	3	13	4	4	4	4	4	5½	4	13½	2	6	0 6⅝
" "	C	2	6½	3	1	3	9½	4	1½	4	1½	4	5	4	12	2	5½	0 6⅜
" "	C	2	4	2	14	3	6½	3	11	3	13½	4	3	4	7½	2	3½	0 6
" "	C	2	3	3	1	3	11½	4	2	4	1½	4	7	4	14	2	11	0 7⅛
Plymouth Rock and Light Brahma Cross, 9 weeks.....	C	2	6½	3	5	3	11½	4	6	5	0	5	1	5	12	3	5½	0 9
" " ...	C	3	3	3	15½	4	7½	4	15½	5	3¼	5	4½	5	7	2	4	0 6
" " ...	C	2	7	3	4	3	14	4	5	4	11	5	0	5	5½	2	14½	0 7⅝
" " ...	C	2	10	3	7½	4	0	4	9	4	14	5	1	5	12	3	2	0 8⅛
" " ...	C	2	7½	3	4	3	10	4	3	4	13	5	2½	5	9	3	1½	0 8⅛
" " ...	C	2	11	3	12	4	4	5	1	5	7½	5	13½	6	5	3	10	0 9⅝

We have evidence in these foregoing data, *(a)* of the variation that may occur in growth in the same chicken from week to week during the feeding period, *(b)* of the differences in increase in weight that may result among birds of the same breed and sex, *(c)* of the difference between pullets and cockerels as regards gains in weight, and *(d)* of the relative merits of the breeds experimented with, in flesh production.

(a.) Regarding the first mentioned feature, it is only possible at the present time to say that we found the chief cause to be the weather, or rather the temperature, though undoubtedly age and health were frequently factors. During weeks of excessive heat the usual gains were always reduced.

(b.) What we may term individualism is as strong among fowls as in other classes of live stock. Vitality, constitutional vigour and ability to digest and assimilate food are not meted out alike to all, and though there is no apparent cause, lack of thrift is not uncommonly to be observed in some members of a hatch.

(c.) In every pen made up of the two sexes it will be invariably found that the cockerels made the larger gains. This is an important fact, though not perhaps a new one to most poultrymen, confirming the wisdom of fattening the cockerels and keeping the pullets for eggs.

(d.) The evidence as to the relative merits of the breeds as fatteners will perhaps be clearer from a perusal of Table II., presenting data as to gains in weight, of food consumed and of its cost, and of cost of food per pound of increase in live weight, of the various pens under test in this experiment.

TABLE II.—BREED TEST.

BREED.	NO. OF CHICKENS.		Weight at beginning of experiment.	Weight at close of experiment.	Total increase in weight.	Average increase in weight per chicken.	FOOD CONSUMED.			Total cost of food.	Cost of food per lb. increase in live weight.
	Pullets.	Cockerels.					Wheat.	Mixed meal.	Skim-milk.		
			Lbs. Oz.	Lbs. Oz	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Cts.	Cts.
Barred Plymouth Rock	....	5	10 0	21 6	11 6	2 5	13 5	21 4	32 0	46	4·0
White Plymouth Rock	6	....	5 13	17 4	11 7	1 15	4 13	25 3	38 0	44	3·8
Faverolle	3	3	9 13	23 12	13 15	2 5	8 11	28 11	55 0	53	3·8
S. G. Dorking	....	6	9 8	24 3	14 11	2 7	8 6	29 11	56 0	57	3·8
Orpington	4	2	9 8	23 7	13 15	2 5	6 10	29 0	55 0	53	3·8
Rhode Island Red	1	4	7 1	16 3	9 2	1 13	5 7	25 0	35 0	43	4·7
White Indian Game	4	....	3 11	9 10	5 15	1 8	3 14	15 7	17 0	27	4·5
White Wyandotte	....	6	14 8	29 7	14 15	2 8	10 14	32 4	65 0	63	4·2
Crosses(P.R. x L.B.)	....	6	15 13	34 13	19 0	3 2	29 14	27 3	40 0	71	3·7

The facts in Table II. furnish a basis for discussion as to the relative economy with which the different breeds were fed.

In the first place it is to be noted that the cost of production (food only), did not exceed in any case 4·7 cents per pound of live weight, and that this figure was only reached in one pen, which for some unknown reason lacked the thrift noticeable in all the others.

The cheapest flesh production was obtained with the Light Brahma-Plymouth Rock cross at 3·7 cents per pound, but this was very closely followed by White Plymouth Rock, Faverolle, Silver-Gray Dorking and Buff Orpington, at 3·8 cents per pound, of increase. Barred Plymouth Rock at 4 cents, White Wyandotte at 4·2 cents, White Indian Game at 4·5 cents, and Rhode Island Red at 4·7 cents per pound complete the list of those under trial.

It is quite possible that the cost per pound of increase would have been somewhat lower in the case of the White Wyandottes if the test could have been made with two-months old birds, as in the other pens.

The White Indian Game, generally speaking, is small and can scarcely be considered a marketable table bird, though they have the good quality of putting flesh on the breast, and further, the meat is much esteemed for its flavour by some. It was for these reasons that they found a place in this experiment.

WHOLE *versus* FINELY GROUND GRAIN.

To ascertain the comparative values of whole grain and meal—the composition of the ration being the same in both cases.

This experiment was conducted with two sets (6 in each) of Barred Plymouth Rock cockerels all of which were of the same age, about twelve weeks old at the commencement of the test. The special feeding trial lasted six weeks. Pens with runs as already described were used. The ration for both lots of chickens consisted of:—

Oats	4 parts	Protein ratio 1 : 3·94
Barley	3 "	
Meat meal	1 "	
Skim-milk		

For one set of chickens the oats and barley were fed whole; for the other set these grains were first finely ground. The same amount of skim-milk was fed to each pen, being used in making the mash in the case of the birds fed on ground meal, and given as a drink to the chickens getting the whole grain ration.

TABLE III.—WHOLE *vs.* FINELY GROUND GRAIN, WITH BARRED PLYMOUTH ROCKS.

Lot and Ration.	Pullet or Cockerel.	Weight.														Gain in six weeks.		Average gain per chicken per week.	
		Beginning of experiment.		1st week.		2nd week.		3rd week.		4th week.		5th week.		6th week.					
		Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Lot A—Whole grain	C	3	2	3	8	3	10½	3	12½	4	0	4	9½	4	12½	1	10½	0	4½
	C	3	3	3	14	4	½	4	5	4	3	4	12	5	½	1	13½	0	5½
	C	2	13½	3	9	3	15	4	8	4	13	5	3	5	7	2	9½	0	7
	C	3	6½	3	10½	3	10	3	13½	3	6	3	12½	4	2½	0	12	0	2
	C	3	8	4	0	4	0	4	9½	4	12	4	3	4	7	0	15	0	2½
	C	3	8	4	2½	4	11½	5	2	4	15	5	8½	5	11½	2	3½	0	6
Lot B—Finely ground grain	C	2	12½	3	9	4	0	4	4	4	12	5	½	5	4	2	7½	0	6⅔
	C	3	8½	4	6½	4	9	5	7	5	7½	6	0	5	14	2	5½	0	6⅓
	C	3	11½	4	6	4	14	5	8	5	12	5	15	6	5	2	9½	0	7
	C	3	0	4	0	4	11½	5	7½	5	15	6	7	6	7	3	7	0	9½
	C	3	1½	3	15	4	5	5	1	5	8	5	12	6	6	3	4½	0	8⅔
	C	2	8	3	3½	3	11	4	3	4	5	4	12	4	14	2	6	0	6⅓

Though individualism or variation among the members of a pen in thrift is to be observed here as in all other experiments, the difference in favour of the ground feed is well marked. The two last columns of Table III. (gains in six weeks and average gain per chicken per week) furnish emphatic and readily understood data on this point.

Since the conditions of this experiment were identical in all respects save that of the relative coarseness of the food, we must conclude that the larger gains made by Lot B. were the result simply of feeding the ration in a finely ground state. The six birds of Lot A. (whole grain) showed an increase in weight of 10 lbs., while those of Lot B. (finely ground meal) gained 16 lbs. 8 oz.

TABLE IV.—WHOLE *vs.* FINELY GROUND GRAIN, WITH BARRED PLYMOUTH ROCKS.

Lot and Ration.	No. of Chickens.		Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken.		Food Consumed.				Total cost of food.	Cost of food per lb. increase in live weight.
	Pullets.	Cockerels.									Grain, Whole or Finely ground.		Skim-milk			
			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Cts.	Cts.
Lot A—Whole grain	6		19	9	29	9	10	0	1	10½	59	1	42	0	71	7·1
Lot B—Finely ground grain	6		18	10	35	2	16	8	2	12	66	8	42	0	93	5·6

In Table IV. particulars of the food consumed, its cost and cost of food per pound of increase in live weight are summarized. The deductions therefrom are easily made. The six birds on finely ground food ate more than those on whole grain, but their increase in weight cost less per pound. Thus we find that although Lot B. (finely ground food) consumed food to the value of 22c. more than that of lot A., the former chickens by reason of the larger increase in weight put on flesh at a cost of 1½ cents per lb. less than the birds on the whole grain ration.

At the expiration of the feeding term the 12 birds were killed and dressed, and the following summary has been drawn up from the data obtained:—

PROPORTION of Edible and Non-edible parts, calculated on weight of chicken as killed.

Lot and Ration.	Edible.		Non-edible.		
	Dressed Carcase.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Lot A—Whole grain	62·2	6·8	11·5	7·6	11·9
Lot B—Finely ground grain	67·2	5·4	11·2	8·0	8·2

This shows a difference of 5 per cent in dressed carcase in favour of the finely ground food chickens. These birds further, it may be remarked, were plumper, slightly yellower, and of better appearance than the birds fed on the whole grain ration, and were also considered to furnish on cooking the juicier or richer meat, due evidently to a marked (though not excessive) deposition of fat in the tissues.

Skim-milk *versus* Water.

To ascertain the value of skim-milk in fattening poultry.

This experiment was conducted in duplicate, in the one case employing an equal number of Rhode Island Red and Orpington in each pen, and in the other, made considerably later in the season, Barred Plymouth Rocks.

The ration consisted of :—

Ground oats	4 parts.	Protein ratio 1 : 3·94.
Ground barley	3 "	
Meat meal	1 "	

For six birds in each experiment this was mixed with *skim-milk* ; for the remaining six, *water* was used in making the mash.

Both feeding trials were carried on in the pens with runs attached, and were of six weeks duration.

Table V.—Skim-milk *versus* Water

No. 5.—Rhode Island Red and Orpington. No. 6.—Barred Plymouth Rock.

Ration.	Number of chicken.	Pullet or Cockerel.	Weight. Beginning of experiment.	1st week.	2nd week.	3rd week.	4th week.	5th week.	6th week.	Gain in six weeks.	Average gain per chicken per week.
			Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.
No. 5.											
Milk.. R. I. R.	10	C	2 6	3 2	3 10½	4 0	4 4	4 11	5 0	2 10	0 7
	9	P	1 15½	2 6½	2 8	3 0	3 1	3 4	3 8	1 8½	0 4⅛
	83	P	2 1½	2 8½	2 15	3 5	3 6½	3 6½	3 11	1 9½	0 4⅝
Milk.. Orpington	20	C	2 0	2 12	3 1½	3 9	3 13	4 6	4 10½	2 10½	0 7½
	27	P	2 1	2 9	2 14½	3 0	3 2	3 6½	3 11½	1 10½	0 4½
	26	C	1 11	2 4	2 12½	3 3	3 8	4 1½	4 4	2 9	0 6⅜
Water R. I. R.	12	C	1 15	2 5	2 11½	3 0	3 1	3 8½	4 0	2 1	0 5⅛
	18	C	1 14½	2 7	2 12	2 13½	2 13½	2 15	2 10	1 1½	0 3
	94	P	1 14½	2 6½	2 12	3 0	3 0	3 3½	3 7½	1 9	0 4⅛
Water Orpington	82	P	1 5½	1 13	2 3½	2 8	2 8	2 15	3 4½	1 15	0 5⅛
	88	C	1 11	2 3½	2 10½	3 ½	3 3	3 7½	3 12½	2 1½	0 5⅜
	21	C	2 5	2 14½	3 6	3 11½	3 14	4 3¼	4 8½	2 3½	0 6
No. 6.											
Milk, Barred Plymouth Rocks.	71	C	3 7	4 0	4 2½	4 11½	5 4	5 8	5 13½	2 6½	0 6⅝
	73	C	3 4½	3 14	4 4	4 13	5 4	5 10½	5 15	2 10½	0 7⅛
	74	C	3 4½	3 15	4 4	4 15	5 6	5 13	6 2	2 13½	0 7⅜
	76	C	4 0	4 6	4 13½	5 6	5 10	6 1	6 7	2 7	0 6⅛
	80	C	4 4½	5 3½	5 5	6 2	6 10	6 15½	7 9	3 4½	0 8⅝
	81	P	2 15	3 5½	3 8½	4 1	4 6½	4 11	5 0	2 1	0 5½
Water, Barred Plymouth Rock	70	C	3 9½	3 12	3 12	4 4½	4 11½	5 2½	5 9½	2 0	0 5⅛
	72	C	3 4½	3 10½	3 11	4 4½	4 12	5 2½	5 10	2 5½	0 6⅛
	78	C	3 14	4 5	4 8	5 ½	5 9½	6 0	6 0	2 2	0 5⅝
	79	C	4 ½	4 6	4 5	4 8½	4 8½	4 12	4 15	0 14½	0 2½
	81	C	3 4½	3 11	3 11	4 4	4 8½	4 15½	5 8	2 3½	0 6
	84	P	2 14½	3 5½	3 8½	3 13½	4 4½	4 7	4 14	1 15½	0 5⅛

White Wyandotte Chickens, 15 Weeks Old. Weights, 5 lbs. 3 ozs.; 4 lbs. 7 ozs. —Photo. by Frank T. Shutt.

TABLE VI.—SKIM-MILK *versus* WATER.

No. 5.—Rhode Island Red and Orpington. No. 6.—Barred Plymouth Rock.

Ration.	Number.	Cockerel or Pullet.	Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken.		Weight of mixed meal.		Weight of skim-milk.		Total cost of food.	Cost of food per lb. of increase in live weight.
			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Cts.	Cts.
No. 5.																
A.—Milk	6	{P 3 C 3}	12	3	24	13	12	10	2	2	40	13	46	0	60	4·7
B.—Water	6	{P 2 C 4}	11	½	21	11	10	10½	1	13	41	3	.....		53	5·0
No. 6.																
A.—Milk	6	{P 1 C 5}	21	3½	36	14	15	11	2	10	61	10	58	0	89	5·7
B.—Water	6	{P 1 C 5}	20	15½	32	8	11	8½	1	15	60	7	.....		78	6·7

Rhode Island Red and Orpington.—Commenced August 1. These chickens were about 2½ months old when the experiment began. They made a fair but somewhat uneven growth. The pen receiving skim-milk made the larger increase in weight, and produced that increase at a less cost per pound. The amount of meal eaten was almost the same in both pens, but the additional skim-milk made the total cost of food in ration A somewhat greater (see Table VI). Nevertheless, as already stated, the skim-milk ration proved the more profitable.

Barred Plymouth Rock.—Commenced September 8. Age of chickens, between 2½ and 3 months. The fowls exhibited more general thrift than those of the previous experiment, the gains being larger and more regular. The results again furnish evidence as regards the superiority of the skim-milk ration; indeed, the testimony on this point is more emphatic, for the cost of production was 1 cent per pound of increase less than with the water-mash pen, while in the former test it was only ⅓ cent.

These fowls were fasted, killed and dressed, and weights taken of their various parts.

PROPORTION of Edible and Non-edible parts, calculated on weight of chicken as killed.

Ration.	Edible.		Non-edible.		
	Dressed carcass.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Milk	68·9	5·1	11·0	8 6	6·4
Water	66·8	5·5	11·4	8·1	8·2

The milk ration chickens were decidedly better in appearance, being plumper and slightly yellower and were considered on cooking to furnish a juicier, richer flavoured meat.

Pen *versus* Crate.

To ascertain the Relative Merits of Pen and Crate in Fattening Poultry.

An important question in poultry fattening—especially for the farmer—is, must the chickens be fed in coops or crates in order to fatten properly and give profitable returns?

To obtain some information on this point, two experiments have been made, the first with Silver-gray Dorking pullets, the second with Barred Plymouth Rock cockerels. In each, six birds were fed in the pens with runs attached, as already described, and six in ordinary fattening coops with slat bottoms. The coops were continuous, but separated by board partitions, the dimensions of each compartment being 17 inches deep, 11 inches wide and 19 inches high. The birds were fed singly. The V-shaped feeding trough was suspended outside the range or row of coops, provision being made for grit in front of each coop by means of partitions.

The ration was alike for birds in pens and coops, as follows:—

Ground oats..... 4 parts.
Ground barley..... 3 "
Meat meal..... 1 "
} Protein ratio 1 : 3·94

made into a mash with skim-milk.

Silver-gray Dorking.—Commenced July 22, age of chickens (all pullets) between 10 and 11 weeks. Experiment continued for four weeks.

The birds in the pen made larger increases on less food than those in the crates, and consequently the cost of production per pound of increase with the former is less than with the latter—the difference in favour of the pen being no less than 1·2 cents per pound of live weight.

Table VII.—Pen *versus* Crate.

No. 7.—Silver-Gray Dorking. No. 8.—Barred Plymouth Rock.

—	Number of chicken.	Pullet or Cockerel.	Weight. Beginning of Experiment.		1st week.		2nd week.		3rd week.		4th week.		5th week.		6th week.		Gain during experiment.		Average gain per chicken per week.	
No. 7.			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Pen	71	P.	1	11½	2	3	2	7	2	15½	3	4	.....	.....	.....	.....	1	8½	0	6¼
"	73	P.	1	8	2	0	2	4	2	10	2	14	.....	.....	.....	.....	1	6	0	5½
"	74	P.	1	14	2	5½	2	10	3	1	3	5½	.....	.....	.....	.....	1	7½	0	6
"	77	P.	1	12	2	3½	2	7½	2	13	3	1½	.....	.....	.....	.....	1	5½	0	5⅓
"	78	P.	2	½	2	7½	2	11	3	1½	3	6½	.....	.....	.....	.....	1	6	0	5½
"	81	P.	1	14½	2	8	2	12	3	4	3	8½	.....	.....	.....	.....	1	10	0	6½
Crate	70	P.	1	6	1	15	2	4	2	11	2	13½	.....	.....	.....	.....	1	7½	0	6
"	72	P.	1	10½	2	2	2	8	2	11½	2	15½	.....	.....	.....	.....	1	5	0	5¼
"	75	P.	1	4½	1	11½	1	15	2	4½	2	10	.....	.....	.....	.....	1	5½	0	5½
"	76	P.	1	7	1	15	2	4½	2	11½	2	13	.....	.....	.....	.....	1	6	0	5½
"	79	P.	1	9	2	3	2	6	2	12	3	1	.....	.....	.....	.....	1	8	0	6
"	80	P.	1	13	2	4½	2	8	2	12	2	15	.....	.....	.....	.....	1	2	0	4½
No. 8.																				
Pen	89	C.	3	11½	4	12½	5	6	5	10½	6	8	6	13	7	½	3	5	0	8⅝
"	96	C.	3	5½	4	6½	4	15	5	4	5	10	5	11	6	2½	2	13	0	7¼
"	27	C.	3	2	3	14	4	9½	5	0	5	5½	5	10½	5	14	2	12	0	7⅓
"	81	C.	3	12	4	13½	5	7½	5	9	6	4½	6	12	6	9	2	13	0	7½
"	25	C.	3	3	4	3	5	0	5	6½	5	15	5	15	6	8	3	5	0	8⅝
"	82	C.	2	15	3	12	4	8	4	14	5	6	5	13	6	6	3	7	0	9⅛
Crate	23	C.	3	7	4	½	4	3	4	8	4	15	4	8	5	2	1	11	0	4½
"	45	C.	3	9½	4	8	4	14½	5	2	5	11½	5	15½	5	10	2	½	0	5½
"	42	C.	3	15½	4	12½	5	10	5	15	6	9	7	2	7	8	3	8½	0	9½
"	92	C.	3	15½	4	10½	5	0	5	6½	5	7½	6	2	6	4	2	4½	0	6½
"	84	C.	3	6	4	4	4	6½	4	14½	5	9	6	0	6	7½	3	1½	0	8⅓
"	52	C.	3	½	3	8	4	3	4	3½	4	9	4	15	5	0	1	15½	0	5⅛

TABLE VIII.—PEN *versus* CRATE.

No. 7—Silver-Gray Dorking. No. 8—Barred Plymouth Rock,

—	Number of Chickens.		Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken.		Food Consumed.				Total cost of food.	Cost of food per lb. increase in live weight.
	Pullets.	Cockerels.									Meal.		Skim-milk.			
No. 7.			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	$ cts.	Cts.
Pen	6	.....	10	2½	19	8	9	5½	1	9	19	13½	34	..	0 31	3·3
Crate	6	.....	9	2	17	4	8	2	1	6	24	4	36	..	0 37	4·5
No. 8.																
Pen	.....	6	20	1	38	8	18	7	3	1⅛	74	8	61	..	1 06	5·7
Crate	.....	6	21	6	35	15½	14	9½	2	7	69	6	61	..	1 00	6·8

Barred Plymouth Rock.—Commenced October 19, age of chickens (all cockerels) three months. Experiment continued for six weeks.

The six chickens in the crates, though weighing 1 lb. 5 oz. more at the beginning of the experiment than the six fed in the pen, weighed 2 lb. 8½ oz. less than the latter birds at the end of the feeding period, six weeks. In other words, the birds in the pen made an aggregate gain of 3 lbs. 13½ oz. more than the crate birds.

Dividing the total increase in weight into the cost of the food consumed, we find in the case of the pen-fed birds 5·7 cents as the cost per pound of increase, while for the crate-fed birds this cost was 6·8 cents.

Both tests, it will be observed, have from the standpoint of economical feeding, given marked results in favour of pen fattening.

PROPORTION of Edible and Non-edible parts, calculated on weight of chickens as killed.

—	Edible.		Non-edible.		
	Dressed carcase.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Pen	68·0	4·5	10·8	9·0	7·7
Crate	68·4	4·5	11·0	8·9	7·2

All the birds were excellent table fowl, but the pen-fed presented the finer appearance as to colour and size. Though it was difficult for some of those who tested the dressed meat to note any difference as regards juiciness, the majority considered the pen-fed fowl as the better in this respect.

Rations with Gluten Meal and Clover Meal.

To obtain some information as to the suitability of gluten meal and clover meal as part of the ration, for fattening poultry, we compounded two rations: No. 1 containing the former, and No. 2 the latter, maintaining the same protein ratio as in the ration used in the tests 'skim-milk *versus* water', 'whole *versus* finely ground grain', and 'pen *versus* crate'.

They were as follows:—

No. 1.	No. 2.
Ground oats.....3 parts.	Ground oats.....5 parts.
Gluten meal.....1 part.	Ground clover.....5 "
	Meat meal..... ...$\frac{3}{4}$ part.

Both were fed mixed with skim-milk.

The experiments were made at the same time with Barred Plymouth Rock cockerels of the same age (about 12 weeks), six being put on each ration. The pens with yards attached were used and the feeding continued for six weeks.

Table IX.—Gluten Meal and Clover Meal with Barred Plymouth Rock.

Ration.	Pullet or Cockerel.	Weight.														Gain in six weeks.		Average gain per chicken per week.
		Beginning of experiment.		1st week.		2nd week.		3rd week.		4th week.		5th week.		6th week.				
		Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs. Oz.
No. 1.—Gluten Meal Ration.....	C	2	8	2	14	2	15	3	13½	4	10	5	6	5	9	3	1	0 8¼
" "	C	3	6	4	5	4	13½	5	2	5	13½	6	5½	6	13	3	7	0 9¾
" "	C	2	9½	3	½	3	3½	3	7	3	10	3	15	4	4½	1	11	0 4½
" "	C	2	14½	3	5	3	7½	3	14½	4	3½	4	9½	5	1	2	2½	0 5¾
" "	C	3	11	4	7½	4	14	5	3	5	3	5	12	6	1	2	6	0 6¾
" "	C	2	2	2	13	3	6	3	11	4	4½	4	11½	5	0	2	14	0 7¾
No. 2.—Clover Meal Ration.....	C	3	10	4	5	4	10	5	3½	5	8½	5	14	5	15	2	5	0 6¼
" "	C	4	0	5	2	5	10	5	15	6	12	6	12½	7	2	3	2	0 8⅝
" "	C	2	4½	3	1½	3	6	3	14½	4	5½	4	9	4	13	2	8½	0 6⅝
" "	C	3	2½	3	14	4	4½	4	6	4	13	4	6½	4	14	1	11½	0 4⅝
" "	C	2	8½	3	6	3	13	4	4½	4	5	4	10	5	2	2	9½	0 7
" "	C	2	14	3	½	3	3½	3	7½	3	8	3	10	3	12	0	14	0 2⅛

Ration No. 1.—(with gluten meal), valued at 1·3 cents per pound. All the chickens on this feed did remarkably well, eating heartily but not abnormally. They were healthy and lively throughout the feeding period.

Ration No. 2.—(with clover meal), valued at 1·1 cents per pound. These birds ate nearly 19 lbs more meal and 30 lbs. more skim-milk than those on ration No. 1, their appetite apparently being abnormal. They did not exhibit the same healthy appearance during the test as those on the gluten meal ration. From the large amount of excrement produced it seemed evident that a considerable portion of the food was not digested.

TABLE X.—GLUTEN MEAL AND CLOVER MEAL.

—	No. of Chickens.		Weight at beginning of experiment.		Weight at close of experiment.		Total increase in weight.		Average increase in weight per chicken		Food Consumed.			Total cost of food.	Cost of food per lb. of increase in live weight.
	Pullets.	Cockerels.									Meal.		Skim-milk		
			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Cts.	Cts.
Ration 1—(Gluten)		6	17	3	32	12	15	9	2	9	51	0	40	72	4·6
Ration 2—(Clover)		6	18	7½	31	10	13	2½	2	3	69	10	70	87	6·6

Though ration No. 2 (clover) cost considerably less than ration No. 1 (gluten), the increase in live weight by its use cost 2 cents per pound more than that by No. 1. All the results tend to show that clover meal, at all events in the proportion here used, cannot be economically employed in the fattening ration.

Our work has shown that the age at which the chicken is fattened essentially affects the price per lb. of increase. After a certain age and size have been reached, probably varying somewhat with the breed, this cost increases. To make a strict comparison between rations, therefore, chickens of a like age must be used. We cannot consequently strictly compare the results of this experiment with those of the breed test as to economy in fattening, since the birds in that series (in which Plymouth Rocks made an increase at 3·8 cents and 4 cents per lb.) were one month younger. But the chickens of the 'Whole *versus* Finely ground Grain' were of the same age and breed, and the test simultaneously made with the one under discussion and therefore we can fairly compare them. We find in the 'Finely ground Grain' lot the increase cost 5·6 cents per lb. 1 cent per lb. more than with the ration containing gluten meal.

The birds from both tests were killed and dressed, giving data as follows :—

PROPORTION of Edible and Non-edible parts, calculated on weight of chickens as killed.

Ration.	Edible.		Non-edible.		
	Dressed carcase.	Giblets.	Head and feet.	Feathers.	Entrails, contents of gizzard, &c.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
No. 1 (Gluten)	66·4	5·4	11·6	8·1	8·5
No. 2 (Clover)	63·5	6·0	11·4	8·3	10·8

These results are distinctly in favour of Ration No. 1. (gluten) there being almost 3 per cent more dressed carcase than with Ration No. 2. (clover). Further, the gluten meal birds were better filled out, of better colour, and altogether of finer appearance than those on the ration containing clover meal, their meat was considered juicier and more delicate eating.

In conclusion we may say that this ration No. 1 has given such satisfactory results from every standpoint that it merits further investigation. Gluten meal has shown itself with other classes of farm stock an easily digested, concentrated food of great value, and we are encouraged in further work with poultry to experiment with it in varying proportions with other meals. The indications are that it will prove a profitable flesh producing food in chicken fattening.

My thanks are due to Mr. H. W. Charlton second assistant chemist for his painstaking work in carrying out the details of this investigation.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES.

REPORT OF R. ROBERTSON, SUPERINTENDENT.

NAPPAN, N.S., November 30, 1902.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my annual report of operations on the Experimental Farm for the maritime provinces at Nappan N.S.

The season has been backward and cool generally. The Indian corn crop was much below the average and did not mature well. The hay crop on the marsh was light, while the upland gave a fair yield. The grain crop was exceptionally good, and the root crop was also larger than usual. The catch of clover was exceptionally fine, and the after grass good.

More than the usual number of people visited the farm this season. These were mostly parties and excursions from surrounding sections and adjoining counties. The number would have been greatly increased, if more satisfactory railway arrangements could have been made by those living at a distance.

I again wish to acknowledge the valuable services of Mr. Thomas Coates, farm foreman, who has kept the records of all the grain experiments, and has taken charge of general farm work, and of Mr. Robert Donaldson, herdsman, under whose care all the experiments with stock have been carried on.

WEATHER.

December opened cold, with some snow, but not enough fell for sleighing until the 4th. The thermometer went down to 5° above zero on the 6th. Moderate weather for a few days was followed by cold. On the 17th and 21st there were further snow-falls. On the 23rd the thermometer registered 7° below zero, when the weather quickly moderated and all the snow disappeared. Unsteady weather, without snow, continued to the end of the month.

January commenced very cold, and continued more or less so until the 9th and 10th, when a snow storm with high winds blocked the roads in many places. Good sleighing continued until the 22nd, when mild weather, with rain, put an end to it. Sleighs did not run again until February 5. The thermometer was down to zero on January 15 and 18 and 6° below zero on January 21. February commenced cold, the temperature falling to 3° below zero. The weather kept fairly cold with small snow storms making good sleighing by the 8th, which continued to March 1. The thermometer registered 10° below zero on the 12th, 4° below zero on the 16th and zero on the 17th.

The thermometer only registered below zero once in March and that was on the 9th when 2° below zero was reached. The month generally, was moderate. Sleighing kept good until the 12th. The remainder of the month was quite open.

April was a fine open month, with no very cold weather. The thermometer fell below freezing only from the 5th to the 8th, 17th to 20th and the 26th. The month generally was quite dry but gloomy. The first seeding was done April 24th.

May opened cloudy and cool with rain on the 8th, 9th and 10th. The 12th registered 4°; 14th, 3°; 15th, 4°; 16th, 2°; 19th, 8° and 21st 6° of frost. Up to this time the weather was fine and dry. The remainder of May was showery but much warmer.

The thermometer fell to freezing on June 7, and we had some very wet, cool weather on the 3rd and 4th. After this June was showery with no very heavy rains until the 23rd and 27th. Generally the month was much cooler and more cloudy than usual. The thermometer only passed above 70° on the 10th, 14th, 15th and 17th.

July opened fine but cool, with heavy rains on the 4th and 9th. After the middle of the month it was warmer but showery to the end. On the whole this month was much cooler than usual. The thermometer registered 80° on the 15th; 81° on the 29th and 83° on the 31st and at no other time in the month was the 80° mark reached.

Heavy rains occurred on August 5, 7, 14 and 18. The weather was warmer, but not up to the average and no extremes of heat were reached. The thermometer registered as the highest 80° on the 1st; 80° on the 30th and 81° on the 31st.

September was a fine month throughout and gave a good opportunity for harvesting. The first and only frost in this month (three degrees) was on the 26th.

October was also fine to the middle of the month, after which it was more or less broken with quite heavy frosts.

November was exceptionally fine and warm, giving a good chance to complete the fall work. There were no heavy frosts this month.

METEOROLOGICAL RECORD.

Maximum and minimum thermometrical observations for the year beginning December 1, 1901, and ending November 30, 1902.

Month.	Maximum.	Minimum.
1901.		
December	14th 52° above zero	23rd 7° below zero.
1902.		
January	23rd 52° above zero	21st 6° below zero.
February	26th 45° "	12th 10° "
March	17th 55° "	9th 2° "
April	30th 73° "	7th 22° above zero.
May	26th 72° "	19th 23° "
June	2nd 77° "	7th 31° "
July	31st 83° "	11th 43° "
August	31st 81° "	29th 43° "
September	1st 77° "	26th 28° "
October	28th 66° "	18th 20° "
November	5th 58° "	9th 19 "

EXPERIMENTS WITH OATS.

The soil selected for the oat plots was a clay loam, in a good state of cultivation. The previous crop was mangels for which crop 20 one-horse cart loads of stable manure per acre were used. The land was ploughed in the fall after the root crop was removed. In the spring the ground was harrowed twice with the spring tooth and once with the smoothing harrow. No fertilizer was used.

Sixty-five varieties were included in the test. These were sown in one-fortieth-acre plots on April 30 at the rate of 2½ bus. per acre with the seed drill. The ground was seeded down with timothy and clover, 3 lbs. of alsike, 7 lbs. of Mammoth Red, and 12 lbs. of timothy seed per acre, being sown with an attachment to the seeder at the same time as the grain was sown. The crop of straw was very heavy and in some places lodged. The grain filled out well. Smut was occasionally noticed in a great number of the plots. The straw was quite free from rust. The results given in the test were as follows:—

OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Golden Tartarian	Sept. 8	131	54	Stiff	7 to 9	Sided	6,600	111	33	32
Golden Giant	" 5	128	54	"	8 " 10	"	7,600	108	8	34
Salines	Aug. 26	118	54	"	6 " 9	Branching	7,400	107	2	30
Cromwell	Sept. 1	124	54	"	7 " 10	Half Sided	6,920	105	30	32
White Schonen	Aug. 26	118	50	"	7 " 8	Branching	5,800	105	30	34
White Giant	" 30	123	53	"	6 " 8	"	5,800	104	24	35
New Zealand	Sept. 8	131	54	"	7 " 10	Sided	7,200	103	18	34
American Beauty	" 2	125	52	"	6 " 8	Branching	6,800	102	12	35
Siberian	" 1	124	52	"	6 " 8	"	7,600	102	12	36½
Lincoln	" 2	125	54	"	6 " 8	"	7,000	102	12	24
Early Golden Prolific	" 2	125	52	"	6 " 8	"	6,920	102	12	36½
Mennonite	Aug. 31	123	50	Medium	6 " 8	"	6,920	102	12	37
Early Maine	" 31	123	50	"	6 " 8	"	7,400	101	6	34
Abyssinia	" 29	121	52	Stiff	7 " 9	Half Sided	7,800	101	6	36
Bavarian	" 28	120	47	"	6 " 8	Branching	6,800	100	..	36½
Goldfinder	Sept. 1	124	52	"	6 " 8	"	7,000	100	..	32
Newmarket	Aug. 26	118	54	"	8 " 10	"	6,200	100	..	38
Sensation	" 28	120	48	Medium	7 " 8	"	6,200	100	..	36
Improved Ligowo	" 28	120	49	"	6 " 8	"	6,400	97	22	36½
Columbus	Sept. 3	126	50	"	6 " 8	"	6,400	97	22	32
Holstein Prolific	Aug. 31	123	50	"	6 " 8	"	7,400	97	22	34
Tartar King	" 27	119	48	Stiff	6 " 8	Sided	7,000	97	22	37
Danish Island	Sept. 1	124	48	"	6 " 8	Branching	6,200	97	22	37
Salzer's Big 4	Aug. 28	120	48	Medium	6 " 8	"	7,200	97	22	35
Early Blossom	" 28	120	48	Stiff	7 " 8	Half Sided	7,200	96	16	36
Pioneer	" 26	118	46	"	6 " 8	Branching	5,880	95	10	38
Thousand Dollar	" 28	120	48	Medium	6 " 8	"	6,400	95	10	34
Black Tartarian	Aug. 31	123	54	Stiff	7 " 9	Sided	6,600	95	10	34
American Triumph	Sept. 5	128	56	"	7 " 10	Branching	6,600	93	28	35
Wallis	Aug. 30	122	50	Medium	6 " 8	"	6,600	93	28	35
Buckbee's Illinois	" 28	120	50	Stiff	6 " 8	"	6,600	92	32	36
Golden Beauty	Sept. 1	124	52	Medium	6 " 9	"	6,400	91	26	34
Oderbruch	Aug. 28	120	48	Stiff	6 " 8	Half Sided	7,080	91	26	39
20th Century	" 26	118	48	"	8 " 9	Branching	6,520	91	26	35½
Banner	" 24	116	47	"	8 " 9	"	6,400	90	20	35
Miller	Sept. 3	126	56	"	7 " 9	"	7,200	90	20	35
Abundance	Aug. 25	117	46	"	8 " 9	"	7,200	89	14	34
White Russian	" 26	118	52	Medium	6 " 8	"	6,320	89	14	35
Russell	" 30	122	52	"	7 " 9	"	6,800	88	8	36
Flying Scotchman	Aug. 24	116	44	Weak	6 " 8	"	7,000	88	8	39
Rosedale	" 26	118	50	Stiff	7 " 9	Sided	6,280	88	8	37
Oxford	" 30	122	52	Medium	6 " 8	Branching	6,600	87	2	38
Bonanza	" 31	123	54	Stiff	6 " 9	"	8,000	87	2	39
Black Beauty	" 21	113	48	Medium	6 " 8	"	6,800	87	2	35
Joanette	" 28	120	46	Stiff	6 " 8	"	6,000	87	2	36½
Olive	" 28	120	52	"	7 " 9	Sided	6,260	85	30	37
Pense	" 28	120	52	"	7 " 9	"	6,600	85	30	37
Wide Awake	" 30	122	50	"	6 " 8	Branching	7,200	85	30	37½
California Prolific Black	" 30	122	54	"	7 " 9	Sided	6,800	85	30	35
Scotch Potato	" 30	122	48	"	5 " 7	Branching	6,400	85	30	38
Cream Egyptain	" 26	118	50	"	6 " 8	Sided	6,600	84	24	36
Hazlett's Seizure	" 26	118	48	Medium	7 " 8	Branching	6,000	83	18	37
Milford	" 28	120	50	Stiff	8 " 10	Sided	6,280	83	18	37
Irish Victor	" 28	120	52	"	7 " 9	Branching	5,400	83	18	36
Improved American	" 30	122	54	"	7 " 8	"	5,800	82	12	35
King	Sept. 2	125	56	"	7 " 9	"	6,680	82	12	35
Holland	" 1	124	56	"	6 " 9	"	6,000	82	12	38
Black Mesdag	Aug. 16	108	50	Medium	7 " 9	"	6,920	82	12	35
Early Gothland	" 26	118	48	Stiff	7 " 8	Sided	6,000	82	12	38
Kendal	" 30	122	50	"	7 " 9	"	6,200	80	..	38
Master	" 30	122	50	"	7 " 9	Branching	7,000	75	10	38
Brandon	" 31	123	56	Medium	6 " 8	"	7,200	74	4	35
Longhoughton	" 31	122	48	"	5 " 7	"	7,200	72	32	38
Early Archangel	" 26	118	48	"	7 " 8	"	6,000	71	26	39
Waverley	" 28	120	50	"	7 " 9	"	6,280	71	20	35

EXPERIMENTS WITH BARLEY.

Twenty-one varieties of two-rowed and thirty of six-rowed barley were sown May 16 in plots of one-fortieth acre each. The seed was sown with the seed-drill, at the rate of 2 bushels per acre. Timothy and clover seed was sown at the same time at the rate of 3 lbs. Alsike, 7 lbs. Mammoth Red, and 12 lbs. of Timothy per acre. No fertilizer was used with these plots.

BARLEY, TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Inches.		Inches.	Lbs.	Bush.	Lbs.	Lbs.
Danish Chevalier	Aug. 29	105	42	Stiff	3 to 4	6,000	60	40	50
Canadian Thorpe	" 26	102	46	"	2 " 3	4,800	50	40	52
Newton	" 27	103	42	"	2 " 3	4,400	50		50
French Chevalier	" 29	105	42	Medium	2½ " 3¼	4,200	49	8	51
Standwell	" 30	106	42	"	2 " 3	4,680	47	24	50
Victor	" 27	103	43	"	2 " 3	5,400	47	24	49½
Sidney	" 26	102	45	"	2 " 3½	5,000	45	40	50½
Hervey	" 26	102	46	Stiff	2 " 3	4,800	45		49½
Clifford	" 27	103	46	"	3 " 3½	4,680	44	8	50
Kinver Chevalier	" 29	105	42	Weak	3 " 4	4,600	44	8	48½
Beaver	" 27	103	42	Stiff	3 " 4	3,800	43	16	50
Nepean	" 26	102	43	"	3 " 4	4,400	43	16	50
Logan	" 27	103	45	"	2 " 3	4,800	42	24	48
Gordon	" 26	102	45	"	2 " 3	4,480	40	40	49
Jarvis	" 27	103	44	"	3 " 4	4,800	40		48
Dunham	" 26	102	44	"	2½ " 3	4,400	40		50
Invincible	" 27	103	42	"	2 " 3	3,600	39	8	49
Prize Prolific	" 27	103	42	Medium	2½ " 3	3,800	38	16	49
Bolton	" 27	103	41	Stiff	3 " 4	3,600	37	24	50
Fulton	" 27	103	43	"	2 " 3	3,600	37	24	49
Leslie	" 26	102	42	"	2 " 3	3,400	33	16	49

BARLEY, SIX-ROWED—TEST OF VARIETIES.

Common	Aug. 22	98	44	Medium	2 to 3	5,200	63	16	48
Royal	" 23	99	45	"	2 " 3	5,800	59	8	46
Garfield	" 22	98	45	"	2½ " 3	5,000	58	16	48
Stella	" 28	104	43	Stiff	2 " 2½	5,120	58	16	48
Mansfield	" 25	101	45	"	2 " 3	4,600	56	32	48
Empire	" 27	103	45	Medium	2 " 2½	5,600	55		46
Trooper	" 23	99	46	Stiff	2 " 3	5,600	54	8	47
Surprise	" 28	104	45	"	2 " 2½	5,400	53	16	49
Baxter	" 22	98	43	"	2 " 3	5,600	53	16	48
Nugent	" 28	104	43	"	2 " 2½	4,600	52	24	47
Oderbruch	" 22	98	43	Medium	2 " 3	4,400	52	24	48½
Argyle	" 22	98	42	Stiff	2 " 3	3,800	52	24	48
Yale	" 25	101	43	"	2 " 3	3,880	52	24	47
Odessa	" 22	98	42	Medium	2 " 3	4,200	51	32	48
Excelsior	" 20	96	46	"	3 " 4	5,000	51	32	40
Rennie's Improved	" 23	99	44	Stiff	2 " 3	3,800	51	32	49
Mensury	" 27	103	45	"	2 " 3	4,400	50		48
Vanguard	" 23	99	42	Stiff	2 " 3	3,800	50		47½
Brome	" 27	103	42	Medium	2 " 3	5,400	50		47
Claude	" 27	103	45	"	2 " 3	5,400	49	8	47
Success	" 20	96	44	"	2½ " 3	4,400	49	8	49
Hulless Black	" 20	96	34	"	2	3,600	48	16	61
Albert	" 22	98	44	Stiff	2 " 3	3,600	47	24	49
Champion	" 20	96	44	Medium	2 " 3½	4,600	45	40	39
Pioneer	" 25	101	42	"	2 " 3	4,800	44	8	49
Hulless White	" 20	96	35	"	2	3,600	44	8	60
Summit	" 28	104	43	Stiff	2 " 2½	4,800	43	16	48
Petschora	" 23	99	42	Medium	2 " 3	4,600	42	24	48
Blue Long Head	" 27	103	42	"	2 " 2½	4,600	40		45
Phœnix	" 25	101	40	"	2 " 3	4,680	39	8	48

The land was a clay loam, and was previously in corn, for which crop 20 one-horse cart loads of manure were used per acre. The land was ploughed in the fall, and in the spring was gone over twice with the spring-tooth, and once with the smoothing harrow, before seeding. The straw was not much lodged and the grain filled well. Very little smut was noticed, and the straw was quite free from rust.

EXPERIMENTS WITH SPRING WHEAT.

The wheat plots each of one-fortieth acre were sown April 26. The land was previously in mangels and received for that crop 20 one-horse cart loads of manure per acre. The soil was a clay loam ploughed in the fall and was in a good state of fertility. Seventy-two varieties were included in the test. The ground was cultivated twice with the spring-tooth and once with the smoothing harrow, and the seed sown at the rate of $1\frac{3}{4}$ bushels per acre. At the same time 3 lbs. of Alsike, 7 lbs of Mammoth Red Clover and 12 lbs. Timothy seed were sown per acre. The grain made splendid growth and filled out well. The straw was stiff, but a heavy wind and rain storm lodged small portions of it. The straw was quite free from rust and no smut was noticed.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.		Lbs.	Bush. lbs.	Lbs.
Japanese	Sept. 1	128	46	Medium	2 to 3	Bearded	6,680	55 20	60
Norval	" 1	128	47	"	2 " 3	"	6,720	55 20	61
Vernon	" 1	128	46	"	2 " 3	"	6,400	54 40	60
Plumper	" 1	128	46	"	2 " 3	"	6,400	54 ..	61
Rio Grande	" 1	128	54	Stiff	3 " 4	"	7,000	52 20	62
Hungarian	" 1	128	48	Medium	2 " 3	"	6,800	52 ..	60
Crown	" 1	128	53	Stiff	2 " 3	"	6,780	51 20	60
Huron	Aug. 31	127	50	Medium	3 " 4	"	7,200	50 40	60
Beaudry	Sept. 1	128	48	"	2 " 3	"	7,000	50 ..	60½
Benton	Aug. 31	127	46	Stiff	2 " 3½	Beardless	5,800	50 ..	60
Advance	Sept. 1	128	48	"	2 " 3	Bearded	6,800	49 20	60
Dufferin	" 1	128	52	"	2 " 3½	"	6,520	49 20	59
Colorado	Aug. 31	127	47	Medium	2 " 3	"	6,400	49 20	60½
Roumanian	Sept. 1	128	52	"	2 " 3	"	7,000	48 40	60
Red Fife	" 1	128	48	Stiff	2 " 4	Beardless	7,200	48 40	60
Red Fern	" 1	128	52	"	3 " 4	Bearded	7,200	48 40	61
Alpha	" 1	128	52	"	2 " 3	"	6,600	48 40	60
Early Riga	Aug. 28	124	48	"	2 " 3	Beardless	7,000	48 ..	60½
Cartier	Sept. 1	128	48	"	2 " 2½	Bearded	5,400	48 ..	61
Preston	Aug. 31	127	48	"	3 " 4	"	6,600	47 20	61
Clyde	Sept. 1	128	50	"	3 " 4	Beardless	6,200	47 20	60
Captor	" 1	128	48	"	2 " 3	"	6,280	47 20	60
Wellman's Fife	" 4	131	48	"	3 " 4	"	6,400	46 40	60
Byron	" 1	128	46	Weak	2 " 3	"	5,800	46 40	60
Australian, No. 13	" 4	131	48	Stiff	2 " 3	"	7,200	46 40	60
Australian, No. 27	" 4	131	48	"	3 " 4	"	7,400	46 40	60
Crawford	" 1	128	52	"	2 " 3	"	6,400	46 40	60
White Fife	" 4	131	48	"	2½ " 4	"	6,400	46 ..	60½
Countess	" 1	128	52	"	2 " 3	"	6,000	45 20	59
Goose	Aug. 31	127	46	Medium	2 " 3	Bearded	6,000	45 20	62
White Russian	Sept. 4	131	48	Stiff	3 " 4	Beardless	5,520	44 ..	60
Angus	Aug. 31	127	47	"	2 " 3	"	5,000	44 ..	60
Laurel	Sept. 4	131	54	"	3 " 4	"	5,120	43 20	59½
Speltz	Aug. 31	127	44	Weak	2 " 2½	Bearded	6,000	43 20	40

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.		Lbs.	Bush. lbs.	Lbs.
Campbell's White Chaff	Sept. 4	131	46	Stiff	2 to 3	Beardless	6,000	43 20	61
Percy	Aug. 31	127	48	"	3 " 4	"	6,000	43 20	60½
Mason	Sept. 1	128	46	"	2 " 3	"	6,400	42 40	59½
Blenheim	" 1	128	48	"	2½ " 3½	Bearded	6,200	42 40	60
Monarch	" 4	131	46	"	2 " 3½	Beardless	5,600	42 ..	60
Australian, No. 10	" 4	131	46	"	2 " 3	"	6,920	42 ..	60
Beauty	" 1	128	50	"	2½ " 4	"	5,800	42 ..	60
Ladoga	Aug. 28	124	46	"	2 " 3	Bearded	6,600	42 ..	59
Robin's Rust Proof	Sept. 4	131	46	Medium	2 " 3	Beardless	7,200	42 ..	61
Hastings	" 1	128	48	"	2 " 3	"	6,000	41 20	60
Australian, No. 25	" 4	131	48	Stiff	3 " 4	"	7,400	41 20	60
Progress	" 4	131	52	"	2 " 3	"	5,800	41 20	59
Ebert	" 1	128	46	"	2 " 3	"	5,360	40 40	60
Stanley	" 3	130	50	"	2 " 3	"	6,000	40 40	60
Bishop	Aug. 31	127	47	"	2 " 3	"	5,400	40 40	60
White Connell	Sept. 4	131	48	"	2 " 3	"	4,800	40 40	60
Weldon	" 4	131	54	"	2 " 3	"	5,800	40 ..	60½
Dion's	" 1	128	50	Medium	2 " 3	Bearded	6,400	40 ..	59
Red Swedish	" 4	131	50	"	3 " 4	"	5,600	40 ..	60
Australian, No. 23	" 4	131	48	Stiff	3 " 4	Beardless	7,200	40 ..	60
Green Mountain	" 4	131	48	"	2 " 3	Bearded	5,200	40 ..	60
Pringle's Champlain	Aug. 31	127	46	"	2½ " 4	"	5,480	40 ..	60
Herisson Bearded	Sept. 4	131	48	Weak	2 " 2½	"	5,200	39 20	60
Minnesota, No. 149	" 4	131	48	Stiff	2 " 3	Beardless	5,600	38 40	60
Minnesota, No. 163	" 4	131	48	"	2 " 3	"	5,400	38 ..	60
Essex	" 1	128	54	"	3 " 4	"	7,080	38 ..	60
Harold	Aug. 31	127	46	Medium	2 " 3	Bearded	5,400	38 ..	59
Australian, No. 9	Sept. 4	131	48	Stiff	2 " 3	Beardless	6,440	38 ..	60
Australian, No. 19	" 4	131	47	"	2 " 3	"	6,000	38 ..	60
Rideau	" 1	128	44	"	2 " 3	"	5,800	37 20	59
Dawn	" 1	128	52	"	2 " 3	"	5,800	37 20	59
Admiral	" 1	128	48	"	3 " 4	"	5,800	37 20	60
Minnesota, No. 181	" 4	131	59	"	2 " 3	"	4,800	36 40	60
Chester	Aug. 31	127	48	"	2 " 3	"	4,800	36 40	60
Fraser	Sept. 4	131	46	"	2 " 3	Bearded	6,000	35 20	59
Blair	" 2	129	46	"	2 " 3	"	6,400	35 20	60
Minnesota, No. 169	" 4	131	50	"	2 " 3	Beardless	5,200	35 20	60
Cassel	Aug. 31	127	46	"	2 " 3	"	5,600	35 20	59

EXPERIMENTS WITH PEASE.

The pease were grown on a land of a light clay loam character. The previous crop was mixed grain. This land has never had any barn-yard manure, but marsh mud at the rate of 60 two-horse loads per acre was used previous to the sowing of the mixed grain crop in 1901. The ground was ploughed in the autumn and in the spring was worked up with the disc, spring-tooth and smoothing harrows. Complete Fertilizer at the rate of 200 lbs. per acre was drilled in with the grain by means of a fertilizer sowing attachment to the seeder. The plots were one-fortieth of an acre each, and fifty-seven varieties were tested. The plots were sown May 7, with results as follows:—

PEASE—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
					Inches.	Inches.		Bush.	Lbs.	Lbs.
1	Agnes	Sept. 4.	120	Medium	36	2	Large	40		62½
2	Archer	" 5.	121	"	36	2	Medium	36		62
3	Bedford	" 4.	120	"	36	2	"	34	40	60
4	Multiplier	" 4.	120	"	38	2½	"	33	20	60
5	Victoria[1]	" 7.	123	"	40	2¼	"	33	20	61
6	Macoun	" 5.	121	"	40	2⅝	Large	30	40	61½
7	Bright	" 5.	121	"	40	2½	"	30	40	60
8	Picton	" 4.	120	"	35	2	Medium	30	40	62
9	Creeper	" 4.	120	"	34	2	Small	30		60
10	New Potter	" 4.	120	"	38	2¼	Medium	30		61
11	Dover	" 5.	121	"	40	2⅓	Large	30		60
12	Gregory	" 5.	121	"	36	2	Medium	30		62
13	Herald	" 7.	123	"	36	2	"	30		61
14	Early Britain	Aug. 31.	116	"	38	2½	"	29	20	60
15	Grass Pea	Sept. 11.	127	"	40	1½	Small	29	20	60
16	Bruce	" 5.	121	"	38	2¼	Medium	28	40	60
17	Mackay	" 5.	121	"	40	2⅓	Large	28	40	61
18	Prince Albert	" 4.	120	"	36	2	Small	28	40	60
19	Prince	" 4.	120	"	36	2	Medium	28		61
20	Large White Marrowfat	" 4.	120	"	40	3	Large	28		62
21	Fergus	" 5.	121	"	36	2	Medium	28		60
22	Trilby	" 4.	120	"	38	2¼	"	27	20	60
23	Duke	" 4.	120	"	36	2½	Large	27	20	61
24	Canadian Beauty	" 4.	120	"	36	2½	Medium	27	20	62
25	Golden Vine	Aug. 31.	116	"	34	2	Small	27	20	62
26	Crown	Sept. 3.	119	"	34	2	"	26	40	61½
27	English Gray	" 2.	118	"	36	2	Medium	26	40	60
28	Prussian Blue	" 1.	117	"	34	2	Small	26	40	61
29	Arthur	" 3.	119	"	40	2	Medium	26	40	62
30	Wisconsin Blue	" 4.	120	"	36	2	"	26		62
31	Kent	" 5.	121	"	40	2½	Large	26		60
32	Black-eyed Marrowfat	" 4.	120	"	37	2⅝	"	26		61
33	Carleton	" 5.	121	"	36	2¼	Medium	26		60
34	Cooper	" 4.	120	"	34	2	Small	25	20	60
35	German White	Aug. 31.	116	"	36	2	Medium	25	20	61
36	Lanark	Sept. 5.	121	"	38	2⅝	Large	25	20	60
37	Mummy	" 4.	120	"	38	2¼	Medium	25	20	62
38	Nelson	" 5.	121	"	40	2¼	"	25	20	61
39	French Canner	" 5.	121	"	36	2	"	25	20	61
40	Chelsea	" 5.	121	"	38	2¼	"	25	20	61
41	Chancellor	" 3.	119	"	34	2	Small	25	20	61
42	White Wonder	" 4.	120	"	32	2	Medium	24	40	61
43	Centennial	" 5.	121	"	36	2	Small	24	40	61
44	Oddfellow	" 4.	120	"	36	2¼	Medium	24	40	62
45	Pearl	" 5.	121	"	36	2¼	"	24		60
46	Elephant Blue	" 4.	120	"	34	2	Small	23	20	60
47	Alma	Aug. 31.	116	"	35	2¼	Medium	23	20	61½
48	Pride	Sept. 1.	117	"	34	2	"	23	20	62
49	Daniel O'Rourke	" 4.	120	"	35	2	Small	23	20	62
50	Elliot	" 4.	120	"	36	2¼	Medium	23	20	60
51	King	" 3.	119	"	40	2⅝	Large	20	40	61½
52	Elder	" 5.	121	"	37	2¼	Medium	20		60
53	Vincent	" 4.	120	"	35	2	"	20		61
54	Harrison's Glory	" 4.	120	"	34	2	"	20		61
55	Paragon	" 4.	120	"	34	2	"	19	20	61
56	Fenton	" 4.	120	"	40	2½	Large	18		60
57	Perth	" 2.	118	"	35	2	Medium	18		60

EXPERIMENTS WITH BUCKWHEAT.

Five varieties of buckwheat were grown in one fortieth acre plots, on a sandy-loam soil. This land was previously in grain. It was manured in the fall with 25 one-horse cart loads of stable manure, per acre. This was then ploughed under. The ground was worked up in the spring with the spring-tooth and smoothing harrows, and the seed sown June 14. The crops obtained were as follows :—

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of days Maturing.	Length of Straw.	Yield per Acre.		Weight per Bushel.
				Inches.	Bush.	Lbs.	Lbs.
Silver Hull	June 14..	Sept. 9..	88	44	46	32	48
Tartarian or Siberian	" " ..	" 10..	89	44	41	32	48
Gray	" " ..	" 9..	88	42	25		48
Rye	" " ..	" 10..	89	46	45	40	50
Japanese	" " ..	" 9..	88	46	24	28	48

EXPERIMENTS WITH FIELD GRAIN.

The land on which this grain was grown was previously in turnips, having received for this crop 30 one-horse cart loads of manure per acre ; it being the first manure and only fertilizer this land had ever received. After the turnip crop was removed the land was ploughed. In the spring this was worked up with the disc, spring-tooth and smoothing harrows, and the seed sown May 15. The crop was harvested August 27. Each plot was one acre, and produced the following yields :

Name of Variety.	Yield per acre.	
	Bush.	Lbs.
Rosedale oats	55	17
Sensation oats	53	—
Mixed Grain (Barley, oats and pease)	49	16
Cream Egyptian oats	47	—
Prolific Black Tartarian oats	46	—
Canadian Thorpe (Barley)	41	27

FIELD CROP OF BUCKWHEAT.

Half of the field on which the buckwheat was grown was previously in buckwheat; the other half was new land which had just been brought in and had never before had a crop on it. This land is of a clay loam character, and was ploughed in the fall of 1901. This spring it was worked up with the disc, spring-tooth and smoothing harrows, and the grain was sown June 17. The land that had previously been in buckwheat was fertilized with complete fertilizer at the rate of 250 lbs. per acre. The new land did not get any fertilizer. The yields from these fields are as follows :—

	Yield per Acre. Bush.	Lbs.
5 acres previously in buckwheat and fertilized	31	14
4½ acres new land and no fertilizer	14	16

EXPERIMENTS WITH INDIAN CORN.

The corn was planted on a sandy loam. The land was previously in clover, and was manured on top of the second growth in the fall, with 25 one-horse cart loads of stable manure per acre. This was ploughed under in the spring after a good growth was made. The soil was worked up by going over it once each with the spade, spring-tooth and smoothing harrows. No fertilizer was used.

The corn was planted May 30 in rows and hills. Marks were made 3 ft. apart and the seed dropped, and covered with a hoe, and duplicate plots of each variety were planted in hills 3 ft. apart each way. The plants in the rows were thinned from 4 to 6 inches apart and 3 to 5 stalks were left to a hill. Thirty-seven varieties were planted. The variety named Early August came up, made weak growth of 3 or 4 inches, and died. The crop was harvested October 3. The yield per acre is estimated from that obtained from 2 rows each 66 feet long.

CORN—TESTS OF VARIETIES.

Number.	Name of Variety.	Height.	When Tasselled.	In Silk.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
		Inches.				Tons.	Lbs.	Tons.	Lbs.
1	Giant Prolific Ensilage	96	Sept. 5.	.....	Watery	25	600	25	50
2	Eureka	100	" 4.	.....	Tasselled	25	600	22	1,100
3	Thoroughbred White Flint	94	" 6.	.....	Watery	24	1,500	25	1,150
4	Salzer's All Gold	96	Aug. 21.	Sept. 8.	"	23	1,300	23	750
5	Mammoth Eight-rowed Flint	84	" 25.	" 6.	"	23	750	22	1,100
6	Salzer's Superior Folder	100	" 27.	" 9.	"	22	1,100	21	900
7	Canada White Flint	96	" 22.	" 1.	"	22	1,100	20	1,520
8	Compton's Early	90	" 20.	" 1.	Soft Glazed	22	1,100	20	1,520
9	Early Butler	96	" 27.	" 5.	Watery	22	1,100	20	150
10	White Cap Yellow Dent	100	" 27.	" 8.	Milk	22	550	21	900
11	Red Cob Ensilage	96	Sept. 6.	.....	Tasselled	22	..	22	1,650
12	Longfellow	90	Aug. 20.	Aug. 27.	Soft glazed	22	..	23	200
13	Evergreen Sugar	92	Sept. 1.	.....	Early milk	22	..	20	1,800
14	Pride of the North	100	" 6.	Sept. 5.	Watery	21	1,450	21	570
15	Mammoth Cuban	100	" 1.	" 5.	"	21	900	20	1,800
16	North Dakota Yellow	84	Aug. 20.	" 1.	Late milk	20	1,250	20	1,800
17	Black Mexican	80	" 27.	" 9.	Watery	20	1,250	18	300
18	Sanford	84	" 25.	Sept. 6.	"	20	700	19	550
19	Pearce's Prolific	90	" 18.	Aug. 25.	Soft glazed	20	150	19	1,050
20	Early Yellow Long Eared	90	" 18.	" 25.	"	19	1,600	19	1,600
21	King Philip	84	" 25.	Sept. 5	Watery	19	1,270	21	1,450
22	North Dakota White	84	" 20.	" 1.	Late milk	19	1,050	20	150
23	Angel of Midnight	90	" 25.	Sept. 1.	Soft glazed	19	550	16	1,000
24	King of the Earliest	90	Sept. 5.	.....	Tasselled	19	550	20	700
25	Selected Leaming	100	" 1.	Sept. 10.	Early milk	18	1,400	20	1,250
26	Early Mastodon	96	" 1.	" 15.	Watery	18	1,400	17	650
27	Champion White Pearl	96	Aug. 25.	" 4.	Milk	18	850	18	1,400
28	Wisconsin Earliest Dent	98	" 27.	" 5.	Watery	18	300	17	1,750
29	Cloud's Early Yellow	100	Sept. 1.	" 7.	"	17	1,750	18	850
30	Kendall's Early Giant	68	Aug. 20.	Aug. 27.	Soft glazed	17	1,750	16	1,550
31	Early Golden Surprise	96	" 27.	Sept. 6.	Watery	17	650	17	1,200
32	Country Gentleman	84	Sept. 8.	.....	Tasselled	17	650	17	1,750
33	Extra Early Huron Dent	90	" 18.	Sept. 25.	Watery	16	1,000	12	1,300
34	Yellow Six-weeks	66	Aug. 10.	Aug. 20.	Glazed	12	1,850	12	750
35	Earliest Ripe	64	" 10.	" 18.	"	12	750	15	250
36	Mitchell's Extra Early	60	" 18.	" 8.	Hard glazed.	12	200	11	..

CORN SOWN IN ROWS AT DIFFERENT DISTANCES APART.

Experiments were again conducted, with Indian Corn sown in rows at different distances apart, Champion White Pearl, Selected Leaming and Longfellow were the varieties sown.

The land on which these were sown was similar and received the same treatment in every respect as the corn plots. The seed was sown May 31 in rows 21, 28, 35 and 42 inches apart. The crop was harvested October 3. The plots were one-fortieth acre each,

CORN PLANTED AT DIFFERENT DISTANCES APART.

Sown May 31.

Name of Variety.	Distance Apart.	Yield per Acre.	
	Inches.	Tons.	Lbs.
Selected Leaming	21	15	1,000
"	28	17	80
"	35	16	520
"	42	14	1,160
Champion White Pearl	21	15	1,320
"	28	16	400
"	35	15	1,880
"	42	14	440
Longfellow	21	15	200
"	28	15	1,480
"	35	15	1,200
"	42	13	1,720

EXPERIMENTS WITH TURNIPS.

The land on which the turnips were grown was clay loam and the previous crop was clover. The ground was manured in the fall with 15 one-horse cart loads of stable manure per acre and ploughed. In the spring it was harrowed with the disc and spring-tooth harrows, and 15 one-horse cart loads of stable manure again spread broadcast and ploughed in. The land was then gone over with the disc, spring tooth and smoothing harrow, and 200 pounds of complete fertilizer and 200 lbs. bone meal per acre sown broadcast and harrowed in with the smoothing harrow.

The ground was then run into rows 24 inches apart, the rows were raked off by hand and marks were made along the top, where the seed was dropped and lightly covered.

The plots were sown May 20, and duplicate ones two weeks later, June 3. The roots were pulled October 30, and the quantity per acre calculated from the weight of the crop obtained from two rows each 66 feet long.

TURNIPS—TEST OF VARIETIES.

No.	Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
1	Sutton's Champion	50	155	1,669	15	42	975	1,416	15
2	Elephant's Master	49	1,000	1,650		38	1,550	1,292	30
3	Magnum Bonum	47	380	1,573		37	250	1,237	30
4	Giant King	47	50	1,567	30	34	1,795	1,163	15
5	Perfection Swede	46	1,555	1,559	15	38	395	1,273	15
6	Prize Purple Top	46	400	1,540		38	1,055	1,284	15
7	Carter's Elephant	45	1,905	1,531	45	36	1,525	1,058	45
8	Hall's Westbury	45	750	1,512	30	37	1,075	1,251	15
9	Good Luck	45	750	1,512	30	34	475	1,141	15
10	Kangaroo	45	255	1,504	15	34	475	1,141	15
11	Drummond's Purple Top	44	1,430	1,490	30	35	125	1,168	45
12	West Norfolk Red Top	44	605	1,476	45	35	950	1,182	30
13	Hartley's Bronze	43	625	1,443	45	35	455	1,174	15
14	Bangholm Selected	42	1,800	1,430		36	1,755	1,229	15
15	Shamrock Purple Top	42	1,305	1,421	45	36	600	1,210	
16	New Arctic	42	1,140	1,419		31	700	1,045	
17	Halewood's Bronze Top	42	975	1,416	15	36	1,425	1,223	45
18	Champion Purple Top	41	1,655	1,394	15	37	1,405	1,256	45
19	Imperial Swede	41	830	1,380	30	31	1,855	1,064	15
20	Selected Purple Top	41	500	1,375		31	205	1,036	45
21	Selected Champion	41	5	1,366	45	34	1,300	1,155	
22	Marquis of Lorne	40	1,675	1,361	15	32	350	1,072	30
23	Mammoth Clyde	40	25	1,333	45	28	1,750	962	30
24	Prize Winner	38	1,055	1,284	15	29	905	981	45
25	Emperor Swede	38	725	1,278	45	28	1,750	962	30
26	East Lothian	38	230	1,270	30	28	100	935	
27	Skirving's	37	1,900	1,265		28	1,750	962	30
28	Monarch	36	1,425	1,223	45	27	1,275	921	15
29	New Century	36	600	1,210		29	475	974	35
30	Webb's New Renown	35	125	1,168	45	27	450	907	30
31	Jumbo	34	805	1,146	45	27	1,275	921	15

EXPERIMENTS WITH MANGELS.

The land on which the mangels were grown was adjoining the turnip plots and received the same treatment in every respect.

The ground was run into rows 24 inches apart. The rows were raked off and the seed sown in holes one foot apart, made with a marker, and from four to eight seeds were dropped in each place. These were covered with a garden rake. The plants came up well and made splendid growth.

The seed was sown May 20, and duplicate plots were sown two weeks later, June 3. The crop was pulled October 28, and the yield calculated from 2 rows each 66 feet long.

MANGELS—TEST OF VARIETIES.

No.	Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
1	Lion Yellow Intermediate	50	1,145	1,685	45	40	1,840	1,364	
2	Selected Yellow Globe	47	50	1,567	30	37	745	1,245	45
3	Champion Yellow Globe	46	235	1,537	15	37	1,570	1,259	30
4	Mammoth Yellow Intermediate	45	915	1,515	15	35	1,445	1,190	45
5	Giant Yellow Half-long	44	1,760	1,496		35	1,445	1,190	45
6	Giant Yellow Intermediate	44	1,595	1,493	15	36	1,425	1,223	45
7	Gate Post	44	935	1,482	15	36	105	1,201	45
8	Mammoth Long Red	41	1,490	1,391	30	34	475	1,141	15
9	Golden Fleshed Tankard	41	1,490	1,391	30	33	1,485	1,124	45
10	Yellow Fleshed Tankard	41	500	1,375		34	970	1,149	30
11	Half-long Sugar White	40	335	1,339	15	32	1,505	1,091	45
12	Yellow Intermediate	40	190	1,336	30	35	1,775	1,196	15
13	Prize-winner Yellow Globe	40	25	1,333	45	36	270	1,204	30
14	GatePost Yellow	39	210	1,303	30	34	1,960	1,166	
15	Giant Sugar	38	1,715	1,295	15	33		1,100	
16	Canadian Giant	38	1,220	1,287		32	1,175	1,086	15
17	Mammoth Oval-shaped	38	725	1,278	45	28	1,255	954	15
18	Warden Orange Globe	38	230	1,270	30	28	1,420	957	
19	Triumph Yellow Globe	38	65	1,267	45	36	1,590	1,226	30
20	Norbiton Giant	37	1,900	1,265		24	1,170	819	30
21	Prize Mammoth Long Red	37	1,075	1,251	15	31	1,525	1,058	45
22	Giant Yellow Globe	37	580	1,243		29	245	970	45
23	Selected Mammoth Long Red	36	1,755	1,229	15	35	125	1,168	45
24	Red Fleshed Tankard	36	1,425	1,223	45	28	1,255	954	15
25	Half-long Sugar Rosy	35	1,280	1,188		33	1,320	1,122	
26	Ward's Large Oval-shaped	33	1,650	1,127	30	26	1,625	893	45
27	Leviathan Long Red	31	865	1,047	45	30	225	1,003	45

EXPERIMENTS WITH CARROTS.

The plots of carrots were sown May 20 and duplicate ones two weeks later, June 3. Each plot consisted of 2 rows 66 feet long. The roots were gathered October 24.

The land was adjoining the turnip and mangel plots and received the same preparation and treatment. The rows were run 24 inches apart, raked off by hand and a mark made along the top of the row, into which the seed was dropped, and covered, with a garden rake.

CARROTS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.	Yield per Acre. 1st Plot.	Yield per Acre. 2nd Plot.	Yield per Acre. 2nd Plot.
	Tons. Lbs.	Bush. Lbs.	Tons. Lbs.	Bush. Lbs.
Half Long White	22 550	742 30	20 1,745	695 45
Yellow Intermediate	22 220	737	18 1,455	624 15
Improved Short White	21 900	715	16 340	539
Green Top White Orthe	21 900	715	20 1,085	648 45
Iverson's Champion	21 405	706 45	19 1,435	657 15
Mammoth White Intermediate	21 240	704	18 360	605
New White Intermediate	21 75	701 15	17 1,310	588 30
Giant White Vosges	20 1,250	687 30	17 650	577 30
Ontario Champion	20 755	679 15	17 815	580 15
White Belgian	19 1,930	665 30	15 360	506
Long Yellow Stump Rooted	19 610	643 30	15 360	506
Long Scarlet Altringham	17 650	577 30	14 1,865	497 45
White Vosges, Large Short	16 1,660	561	13 1,555	459 15
Scarlet Intermediate	16 1,000	550	14 1,700	459
Half Long Chantenay	16 505	541 45	17 815	580 15
Guerande or Oxheart	16 1,350	522 30	13 1,885	464 45
Carter's Orange Giant	15 855	514 15	17 815	580 15
Scarlet Nantes	15 525	508 45	13 400	440
Long Orange or Surrey	14 1,700	495	13 1,720	462
Early Gem	14 875	481 15	12 585	409 45

EXPERIMENTS WITH SUGAR BEETS.

The land on which these were grown was adjoining the carrot, turnip and mangel plots, and received the same treatment. The rows were made 24 inches apart, raked off and the seed sown in holes made with a marker, one foot apart, and from 3 to 6 seeds dropped in a hole. These were covered with a garden rake.

The seed was sown May 20 and duplicate plots June 3. The crop was harvested October 28. The yield per acre is calculated from 2 rows, each 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre 1st. Plot.	Yield per Acre 1st. Plot.	Yield per Acre 2nd. Plot.	Yield per Acre 2nd. Plot.
	Tons Lbs.	Bush. Lbs.	Tons Lbs.	Bush. Lbs.
Royal Giant	37 1,240	1,254 0	34 1,300	1,155 0
Danish Improved	32 1,020	1,067 0	24 1,830	830 35
Danish Red Top	31 1,525	1,058 45	25 325	838 45
Red Top Sugar	30 1,380	1,023 0	25 820	847 0
Improved Imperial	28 1,255	954 15	24 1 500	825 0
Wanzleben	28 925	948 45	20 1,250	687 30
French "Very Rich"	23 200	770 0	18 300	605 0
Vilmorin's Improved	20 1,250	687 30	17 1,475	591 15

EXPERIMENTS WITH POTATOES.

Ninety varieties of potatoes were planted May 29 and were dug September 24, 25. The yield per acre is calculated from 2 rows each, 66 feet long. The soil was a sandy loam and the previous crop was mixed grain. This land was manured in the fall of 1901 with 25 one-horse cart loads of stable manure per acre, this being the only fertilizer of any kind that had been applied for many years. In the spring the land was worked up once each with spring-tooth and disc harrows and then ploughed. The disc, spring-tooth and smoothing harrows were then each put over the ground, which was run into drills 30 inches apart. Commercial Fertilizer at the rate of 400 pounds per acre was scattered in these drills, and the potato sets were planted one foot apart, and covered with the plough.

The seed was cut leaving from 2 to 3 eyes to a piece. The plots were sprayed with Paris green and water July 12, and with Bordeaux mixture and Paris green July 24 and August 14, there was no blight. The crop of potatoes was exceptionally good. There were no rotten ones. The following table gives the yield per acre.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Dakota Red	Fair	517	..	440	..	77	..	Round, red.
Canadian Beauty	Good	499	24	433	24	66	..	Oblong, pink and white.
Enormous	Fair	495	..	451	..	44	..	Oblong, white.
Great Divide	Good	495	..	440	..	55	..	Long, white.
Rose No. 9	"	495	..	440	..	55	..	Oblong, pink.
Troy Seedling	Fair	484	..	413	36	70	24	Round, white.
Seattle	"	479	36	413	36	66	..	Long, white.
Early Norther	Good	473	..	418	..	55	..	Long, pink and white.
Irish Daisy	"	473	..	345	24	127	36	Round, white.
Pearce's Prize Winner	"	468	36	409	12	59	24	Long, white.
Clay Rose	Fair	462	..	385	..	77	..	Round, pink.
Hale's Champion	"	462	..	380	36	81	24	Long, white.
Quaker City	Good	453	12	415	48	37	24	Round, white.
Everett	"	451	..	341	..	110	..	Flattish, pink.
Rural No. 2	"	451	..	396	..	55	..	Round, white.
Northern Spy	"	451	..	396	..	55	..	Round, red.
Carman No. 3	"	451	..	407	..	44	..	Round, white.
Bill Nye	"	451	..	363	..	88	..	"
McIntyre	Fair	446	36	385	..	61	36	Round, white and blue.
Rochester Rose	Good	444	24	391	36	52	48	Oblong, pink.
Seedling No. 7	Fair	440	..	396	..	44	..	Oval, pink.
Vick's Extra Early	Good	440	..	385	..	55	..	"
Rural Blush	"	437	48	389	24	48	24	Round, pink.
Seedling No. 230	Fair	426	48	321	12	105	36	Round, white.
Money Maker	Good	424	36	358	36	66	..	Long, pink and white.
Sir Walter Raleigh	"	422	24	367	24	55	..	Round, pink and white.
Sharpe's Seedling	"	422	24	347	..	48	24	" "
Holborn Abundance	Fair	418	..	341	..	77	..	Round, white.
Early White Prize	Good	418	..	367	24	50	36	Round, pink.
Pride of the Market	"	415	48	358	36	57	12	Long, pink and white.
Penn. Manor	"	407	..	352	..	55	..	Long, pink.
Vanier	Fair	404	48	358	36	46	12	"
Pearce's Extra Early	Good	404	48	347	36	57	12	"
Burnaby Seedling	Fair	400	24	356	24	44	..	Round, pink.
Flemish Beauty	Good	400	24	341	..	59	24	Long, flat and pink.
White Beauty	"	393	48	352	..	41	48	Long, round and white.
Early Market	"	391	36	316	48	74	48	Round, pink.
Lizzie's Pride	Fair	391	36	259	36	132	..	Long, pink.
Houlton Rose	Good	389	24	345	24	44	..	"
Cambridge Russet	"	389	24	314	36	74	48	Round, white.
Carman No. 1	Very good	387	12	338	48	48	24	Flat, round and white.
Irish Cobbler	Good	385	..	286	..	99	..	Round, white.

POTATOES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
		Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
American Giant	Fair	385	..	319	..	66	..	Long, white.
Burpee's Extra Early	Good	382	48	308	..	74	48	Long, pink and white.
Dreer's Standard	"	380	36	314	36	66	..	Round, white.
General Gordon	"	378	24	316	48	61	36	Oblong, pink.
Early St. George	"	376	12	305	48	70	24	Oblong, pink and white.
Late Puritan	"	376	12	343	12	33	..	Long, white.
Early Puritan	"	374	..	330	..	44	..	"
Early Sunrise	"	374	..	312	24	61	36	Long, pink.
Brown's Rot Proof	Fair	367	24	264	..	103	24	Oval, pink.
Uncle Sam	Good	365	12	312	24	52	48	Oblong, white.
New Variety, No 1	Fair	363	..	308	..	55	..	Round, white.
American Wonder	"	363	..	319	..	44	..	"
Bovee	Good	360	48	294	48	66	..	Long, pink.
State of Maine	"	360	48	308	..	52	48	Round, white.
Green Mountain	"	360	48	305	48	55	..	Oval, white.
Early Ohio	"	358	36	303	36	55	..	Long, pink.
I. X. L	"	356	24	297	..	59	24	Long, pink and white.
Reeve's Rose	"	356	24	303	36	52	48	Long, pink.
Maggie Murphy	Fair	352	..	308	..	44	..	"
Empire State	Good	347	36	299	12	48	24	Oval, white.
Columbus	"	343	12	303	36	39	36	Long, white.
New Queen	"	343	12	255	12	88	..	Oblong, pink.
Beauty of Hebron	"	338	48	266	12	72	36	Round, pink and white.
Prize Taker	"	338	48	286	..	52	48	Round, white.
Thorburn	"	336	36	279	24	57	12	Oblong, pink and white.
Ohio Junior	"	336	36	270	36	66	..	Round, pink.
Delaware	"	334	24	286	..	48	24	Round, white.
Clarke's No. 1	Fair	323	24	294	48	28	36	Long, pink.
Lee's Favourite	Good	319	..	264	..	55	..	Round, white.
Chicago Market	"	319	..	268	24	50	36	Long, red.
Early Six Weeks	"	312	24	253	..	59	24	Oblong, pink.
Sabean's Elephant	"	308	..	264	..	44	..	Oblong, white.
Maule's Thoroughbred	Fair	303	36	257	24	46	12	"
Early Michigan	Good	297	..	253	..	44	..	Long, white.
Early Andes	"	297	..	246	24	50	36	Round, pink.
Polaris	"	297	..	250	48	46	12	Long, white.
Daisy	"	294	48	246	24	48	24	Long, pink and white.
Country Gentleman	"	286	..	244	12	41	48	" "
Early Rose	"	279	24	220	..	59	24	Long, pink.
Reading Giant	Fair	275	..	209	..	66	..	Oval, pink.
Rawdon Rose	"	275	..	220	..	55	..	Oblong, pink and white.
Prolific Rose	Good	270	36	226	36	44	..	" "
Earliest of All	"	261	48	220	..	41	48	Long, pink.
Early Harvest	"	259	36	209	..	50	36	Oval, pink and white.
Brownell's Winner	Fair	253	..	220	..	33	..	Long, pink.
Swiss Snowflake	"	244	12	209	..	35	12	Round, white.
Up to Date	"	213	24	176	..	37	24	"

EXPERIMENTS WITH MILLETS.

Five varieties of millet were sown in one-fortieth acre plots, with the Planet, Jr., seed drill June 14. The soil was clay loam and the previous crop was potatoes. The land was ploughed in the fall and in the spring was worked up with the disc, spring-tooth and smoothing harrows. No fertilizer was used. The crop was harvested green Sept. 15, and the yield per acre obtained was as follows:—

Name of Variety.	Yield per Acre.	
	Tons.	Lbs.
Italian or Indian	13	
Moha Hungarian	8	1,080
White Round Extra French	7	120
Algerian or Early Pearl	4	1,120
Cat Tail did not germinate		

EXPERIMENTS WITH SOJA BEANS.

The soil was clay loam. The land was previously planted with potatoes, and was manured for that crop at the rate of 30 one-horse cart loads per acre in the fall of 1900. After the potato crop was removed the land was ploughed. In the spring it was worked up with the disc, spring-tooth and smoothing harrows. The beans were sown with the Wisner seed drill, June 2, in rows 21, 28 and 35 inches apart, and the crop cut and weighed Oct. 3.

The object of this experiment was to obtain information as to the value of this plant as a forage crop, and to obtain the yields per acre from seed sown at different distances apart. The plots were one-fortieth acre each. The crop made fair growth only and did not mature as well as usual.

Distances Apart.	Yield per Acre.	
	Tons.	Lbs.
Soja Beans, 21 inches	9	
" 28 "	8	1,800
" 35 "	8	1,080

EXPERIMENTS WITH HORSE BEANS.

The horse beans were sown June 2nd in plots of one-fortieth acre each. The English variety "Tick" was used. The seed was sown in rows 21, 28 and 35 inches apart. The soil was similar to that on which the soja beans were grown. and received the same treatment.

The beans did not make their usual growth. The horse bean aphis was not as bad as last season, but did considerable damage. The following yield was obtained, from plots cut October 3 :—

Distances apart.	Yield per acre.	
	Tons.	Lbs.
Horse beans, 21 inches	10	1,200
" 28 "	10	1,800
" 35 "	10	1,080

EXPERIMENTS WITH FERTILIZERS ON WHEAT.

These experiments which were also conducted last year are for the purpose of learning the value of different fertilizers for economic grain production. The variety 'Preston' was used and the size of each plot was one-fortieth acre. Six plots were included in the test.

One half of the nitrate of soda on plots 1 and 2 was sprinkled finely over the ground, when the grain was 2 inches high, and the other half when it was 6 inches high. The fertilizers on plots 4 and 5 were scattered on the ground just before sowing and lightly covered with the harrow. On plot 6 one-half of the fertilizer was scattered on the ground just before sowing and lightly covered with the harrow, and the other half was scattered over the ground when the grain was 2 or 3 inches high. Plot 3 was not fertilized, being left for a check. The land on which these plots were located was previously in grain. The results obtained are given in the following table :—

EXPERIMENTS WITH FERTILIZERS ON WHEAT.

(Sown May 22. Cut Sept. 13).

Plot.	Variety of Wheat Sown.	Fertilizers used per Acre.	Lbs.	Yield per Acre. Bush.	Lbs.
1	Preston	Nitrate of Soda	100	38	
2	"	"	200	40	
3	"	Check		34	40
4	"	Superphosphate	400	41	20
5	"	Muriate of Potash	400	44	
6	"	Mixture of Superphosphate	200	39	20
		Mixture of Muriate of Potash	100		
		Mixture of Nitrate of Soda	100		

SPECIAL EXPERIMENTS WITH FERTILIZERS.

These experiments were repeated again this season, the object being to ascertain the relative value of fertilizers commonly used for field crops of various kinds. The plots were one-eighth acre each 38 x 143⅓ ft. for each kind of fertilizer used. These were subdivided into ten strips 14 ft. wide, each running lengthwise across all the differently fertilized plots. These strips were sown with ten different kinds of crops, namely: potatoes, turnips, carrots, mangels, oats, wheat, barley, pease, corn, and mixed grain making in all 140 plots. A margin of 2 feet was left between each plot, and one foot between each crop plot. Two plots were left without any fertilizer to serve as check plots. The strips that are in grain one year are planted to roots, potatoes and corn the following year. The quantity and kind of fertilizer used is applied each year. Each of the crops is sown at about the same time as the uniform trial plots with the same amount of seed per acre, and is cultivated in the same manner. This is the fourth year of the test. The following table gives the yield per acre of the various crops.

SPECIAL EXPERIMENTS WITH FERTILIZERS.

Fertilizer Used.	Barley, Canadian Thorpe.		Oats, Banner.		Wheat, Colorado.		Barley, oats and peas.		Peas, Golden Vine.		Corn, Longfellow.		Turnips, Prize Purple Top.		Mangels, Giant Yellow Intermediate.		Carrots, Half Long White.		Potatoes, Delaware.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Manure, 30 tons	62	24	100		41	40	85		36	40	20		44	1,000	40	1,500	24	1,700	550	
Manure, 15 tons, fertilizer, 250 lbs	64	28	105	30	43	20	90		35		17	1,000	47	1,000	42		31	600	530	
Complete fertilizer, 1,000 lbs	52	4	82	12	28	20	62	20	33	20	13	1,500	40	50	25	1,000	18	800	416	40
Complete fertilizer, 500 lbs	43	36	76	16	25	50	60		29	10	13	500	33	500	26	1,700	14	1,000	441	40
Check	41	32	67	22	25		50		26	40	10		25	1,500	6	500	9		366	40
Bone meal, 1,000 lbs.	47	44	79	14	26	40	55		30		13		36		16	1,700	15	700	388	20
" 500 "	45	40	76	16	30		67	20	28	20	12	1,000	33	1,000	11	1,000	15		290	
Ashes 2,500 "	52	4	70	20	28	20	60		34	10	13	1,500	40	1,500	29	1,200	18	700	383	20
Manure, rotted, 20 tons	63	26	114	24	41	40	90		41	40	17	500	45	1,500	40	500	25	1,200	510	
Check	25		61	26	20		35		25		6	1,500	16	300			4	1,500	240	
Land plaster, 500 lbs.	29	8	64	24	23	20	40		26	40	6	1,500	20		8	1,000	8	1,000	243	20
Salt, 500 "	41	32	73	18	25		45		27	30	7	1,500	25	1,700	27	300	10	700	216	40
Marsh mud, 100tons.	48	46	82	12	30		70		31	40	11	1,000	31	1,200	31	1,200	18	1,100	271	40
Manure, green, 20 "	70	40	111	26	45		92	20	40		16	500	44	1,500	44	1,500	23	400	571	40

EXPERIMENTS WITH FIELD CORN.

The land on which this corn was grown was previously in clover. It was manured in the fall with 20 one-horse cart loads of stable manure per acre. This was ploughed under in the spring just before planting after a good growth had been made. The land was worked up by going over it once, each with spade, spring-tooth and smoothing harrows. The seed was sown with the seeder in rows 3 feet apart on May 31. June and July were cold and backward and this crop made very poor growth in these months, but in August and September it made a surprisingly rapid growth. One-half acre of each of the following varieties was planted, and the crop was harvested October 4. The following yields per acre were obtained:—

Name of Variety.	Yield per Acre.	
	Tons.	Lbs.
½ acre plots—		
Selected Leaming	14	900
Mammoth Cuban	13	1,720
Longfellow	13	1,060
Early Butler	13	900
Cloud's Early Yellow	12	1,550
Compton's Early	12	1,140
Angel of Midnight	12	500

EXPERIMENTS WITH FIELD TURNIPS.

One acre plots each of five varieties were sown. The soil was a clay loam in a poor state of fertility, no manure having been previously applied and the previous crops being grain. Manure at the rate of 35 one horse cart loads per acre was spread broad cast in the spring and ploughed under. This was worked up with the disc, spring-tooth and smoothing harrows, and rows run 24 inches apart.

Before the rows were run one-half of each acre plot received complete fertilizer at the rate of 200 lbs. per acre. This was sown broadcast. The yield per acre was calculated from the weight obtained from each plot of one-half acre. The seed was sown June 12, and the crop pulled from November 3 to 8. The yields obtained were as follows:—

FIELD CROPS OF TURNIPS.

(Sown June 12, Pulled November 3 to 8.)

Name of Variety and Size of Plot.	Yield per Acre.		Yield per Acre.	
	Tons.	Lbs.	Bush.	Lbs.
½ acre plots—				
Hartley's Bronze, manure with fertilizer	31	1,071	1,051	11
" " only	30	666	1,010	
Giant King, manure with fertilizer	31	340	1,038	30
" " only	28	340	939	
Prize Purple Top, manure with fertilizer	30	1,244	1,020	44
" " only	30	744	1,012	24
Drummond Purple Top, manure with fertilizer	30	390	1,006	30
" " only	28	790	946	30
Kangaroo, manure with fertilizer	29	650	977	30
" " only	28	16	933	36

EXPERIMENTS WITH FIELD MANGELS.

The land on which these mangels were grown was clay loam, and was previously in clover. The second growth was ploughed under in the fall, and in the spring 20 one-horse cart loads of stable manure per acre was spread broadcast and ploughed in. The land was gone over twice with the spade harrow before the manure was applied, and after the ploughing the spade, spring-tooth and smoothing harrows were used. The land was then run into rows, each 24 inches apart, and the seed sown with a seeder in a continuous row, which came up very irregularly, and although there were not many blanks, yet the slow starting plants, of which there were many, made very slow growth. This was apparently due to the poor germinating power of a large portion of the seed.

Three varieties were grown of one acre each. One-half acre of each variety was fertilized before the rows were run up by sowing broadcast complete fertilizer at the rate of 200 lbs. per acre. The seed was sown May 29 and the crop harvested from October 17 to 23, giving the following yields:—

FIELD CROP OF MANGELS.

(Sown May 29, Pulled Oct. 17 to 23.)

Name of Variety and Size of plot.	Yield per acre.		Yield per acre.	
	Tons	Lbs.	Bush.	Lbs.
½ acre plots—				
Yellow Intermediate, manure with fertilizer	22	1,790	763	30
" " only	19	239	637	10
Mammoth Long Red, manure with fertilizer	20	550	675	50
" " only	18	1,040	617	20
Yellow Globe, manure with fertilizer	18	580	609	40
" " only	17	590	576	30

EXPERIMENTS TO TEST THE VALUE OF BUG DEATH AS COMPARED WITH PARIS GREEN AND BORDEEAUX AND PARIS GREEN ON POTATOES.

The object of this experiment was to test the value of Bug Death as a useful material to kill the potato bug, as compared with Paris green and to test its fungicidal value as compared with Bordeaux mixture.

Three plots one-eighth of an acre each were laid out, one was sprayed with Paris green and water at the rate of ½ pound of Paris green to 40 gallons of water, to which was added one gallon lime water ; one with Bordeaux mixture and Paris green, made by using 4 pounds of blue stone, 4 lbs. of unslacked lime, ½ lb. of Paris green and 40 gallons of water, and one with Bug Death, 5 lbs. being dusted on at each application, three applications were made, one on July 12, one July 24 and one Aug. 14. There was no blight this season consequently its effect as a fungicide could not be ascertained.

The ground was similar to that on which the potato plots were situated, and received the same treatment. The Delaware potato was the variety used in this test The following yields per acre were obtained.

——	Marketable.		Unmarketable.		Total.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Bordeaux mixture and Paris green	363	25	43	45	407	10
Bug Death	370	25	46	40	417	5
Paris green	367	30	36	10	403	40

The Paris green was put on in the form of a spray and at the rate of two forty-gallon casks per acre at each application. Three-quarters of a pound of Paris green was used to each cask of water. This would make 1½ lbs. of Paris green per acre at each application and for the three applications 4½ lbs. at 25 cts. per pound would total $1.13 per acre as the cost of material on the Paris green plots.

The Bordeaux mixture was used also at the rate of two forty-gallon casks per acre at each application. The cost of material for each application would be :—8 lbs. Blue stone at 7c. per lb., 56c. ; 8 lbs. Rock lime at 1c. per lb., 8c. and 1½ lbs. of Paris green at 25 cts. per lb., 38 cts. making a total cost of $1.02 per acre for each application. Three applications at $1.02 would make a total cost of $3.06 per acre for Bordeaux used. This material was sprayed on the plants.

The application of Bug Death made, was as effective in killing the bugs as Paris green. For killing bugs alone two applications of Bug Death proved sufficient. The third application was made to determine its efficiency as a fungicide. There was no blight, consequently its value in this respect could not be determined.

Three applications of Bug Death at the rate of 40 lbs. per acre at each time made a total of 120 lbs. per acre. This material is sold at the rate of $7 per 100 lb. keg. This would make a cost of $8.40 per acre for the Bug Death used in this experiment. The Bug-Death was put on dry with a duster and our experience would indicate that it is difficult to dust the plants thoroughly with a less amount than 40 pounds per acre at one time.

Two applications of Paris green proved sufficient to kill the bugs this season and the third application was given in order to make the number of applications for each plot uniform. The cost of putting on these materials was practically the same in each case.

The following summary gives the total yield per acre and the cost of materials used per acre.

	Total yield per acre.		Cost of material used.
	Bush.	lbs.	Per acre.
Bug Death	417	5	$8 40
Bordeaux mixture	407	10	3 06
Paris green	403	40	1 13

RUSSIAN SUNFLOWERS.

The sunflower seed was sown in rows 3 feet apart with the Wisner seed drill. The land was previously in grain, and was manured in the fall of 1901, with 25 one-horse cart loads of stable manure per acre, which was ploughed under. In the spring this was worked up with the spring-tooth, disc, and smoothing harrows. The seed was sown May 17 in one-fortieth acre plots. The crop of heads was cut Oct. 4 and the yield per acre was 5 tons 700 lbs.

HAY.

The upland which was seeded down to clover and timothy, yielded 57 tons 470 lbs. from 18 acres.

The under drained marsh of 9 acres yielded 16 tons 1,500 lbs. The remainder of marsh of 41 acres yielded 64 tons 475 lbs. This made a total of 138 tons 445 lbs. of hay harvested, which was secured in good condition.

CORRESPONDENCE.

There were 1,616 letters received and 1,336 sent out during the year, apart from the receipt and dispatch of circulars and reports.

GRAIN AND POTATO DISTRIBUTION.

Some of the most promising varieties of grain and potatoes were again distributed this year to farmers who made application. The following number of three pound packages were sent to various places.

Potatoes	325
Oats	208
Wheat	83
Barley	67
Pease	40
Buckwheat	16
Winter Rye	6
Total	745

EXHIBITIONS AND AGRICULTURAL MEETINGS.

An exhibit of farm produce was made at the International Exhibition, St. John, N.B., Aug. 30 to Sept. 6, at the Nova Scotia Provincial Exhibition, Halifax, N.S., Sept. 10 to 18, and at the Prince Edward Island Exhibition, Charlottetown, P.E.I., Sept. 23 to 26. This exhibit was made up of grains, fruits, vegetables and roots grown on the farm during the past season.

Besides occasional agricultural addresses at various places, I delivered a series of lectures at Sussex, to the students taking the dairy course at the Sussex Dairy School March 14 to 26.

HORSES.

During this year one draught horse was bought. There are now on the farm seven horses, five of which are used exclusively for draught purposes, one for express work, and one for driving.

DAIRY CATTLE.

The herd on the farm at present consists of:—

1 Guernsey bull, 4 years old.
1 Ayrshire bull, 1½ years old.
2 Guernsey cows.
1 Guernsey heifer, 1½ years old.
5 Ayrshire cows.
1 Ayrshire heifer, 1½ years old.
2 Holstein cows.
1 Holstein heifer, 2 years old.
2 Jersey cows.
19 Grade Milch cows.
5 Grade Ay. heifers, 1½ years old.
2 Ayrshire heifers, 10 months old.
1 Grade Ay. heifer, 10 months old.

We have also at present on hand 20 grade Shorthorn steers, 3 years old on experiment, 10 grade steers 1 year old, and 10 steer calves, also on experiment. Total, 83.

EXPERIMENTS WITH COWS.

The experiment with a view to determine, whether a fairly good dairy herd, well fed and cared for, would leave a credit balance after paying for feed consumed, and receiving credit for product at current prices, was again continued.

The different feeds were charged at the following prices:—Wheat bran, $20 per ton; pea meal, $30 per ton; oats, $28 per ton; oil cake, $35 per ton, making an average price of mixed meal ration, as per proportion fed to cows, of 1¼ cents per pound. Roots at $2 per ton, ensilage at $2 per ton and hay at $7 per ton.

The ration fed to cows in full milk in winter was, ensilage or roots, 50 lbs; meal, 10 lbs.; and hay, 10 lbs., making a cost of 21 cents per cow per day.

In summer months while milking they were charged $2.50 per month.

When dry in winter they were charged $3 per month, and when dry in summer $1 per month.

Different quantities were fed to different cows according to their capacity to consume and produce.

They were kept in the stable from November 1, 1901, to June 1, 1902, except on occasional fine days, when they were allowed out in the yard.

They were fed, watered and milked twice each day, at as nearly regular intervals as possible and by the same persons.

The summer feed was practically all summer soiling crop, rye, clover, oats, pease and vetches grown together and sown at different times.

The milk of each cow was weighed at milking twice each day, and a careful record kept of the number of pounds given.

The percentage of fat in the milk of each cow was determined by the Babcock milk tester, and the fat credited to the cows, on the basis that 85 pounds fat produces 100 pounds marketable butter.

The milk was sent to the Nappan dairy station, and the cows were credited with the butter produced at the prices paid to all patrons of that station, which averaged for the year 22⅔ cents per pound, which after deducting 4 cents per pound for manufacturing butter and hauling milk leaves 18⅔ cents per pound.

The skim-milk was fed to calves and pigs, and credited to the cows at the rate of 15 cents per 100 pounds.

The following table will show the results obtained during the year :—

Name.	Breed.	Days Milking.	Milk.	Fat.	Butter.	Total Credit.	Total Cost.	Profit.
			Lbs.	p. c.	Lbs.	$ cts.	$ cts.	$ cts.
Eva Rooker	Holstein	290	10880	3·4	435·20	109 52	65 25	44 27
Molly	Ayrshire Grade	287	8782	3·9	402·93	100 10	65 37	34 73
Ilda Rooker	Holstein	285	9430	3·4	377·20	94 92	62 38	32 54
Corie	Ayrshire Grade	272	8430	3·9	386·70	96 08	66 96	29 12
Carrie	Ayrshire Grade	275	6975	3·7	303·61	75 78	53 24	22 54
Lucy	"	325	8010	3·6	339·17	84 88	64 06	20 82
Jessie P.	"	221	6540	3·8	292·37	72 81	52 31	20 50
Aiton	"	300	7745	3·8	301·54	76 08	57 88	18 20
Rex's Maud	Guernsey	210	4960	4·9	285·92	69 76	53 18	16 58
Beatrice	Ayrshire	240	6560	3·6	277·83	69 53	53 31	16 22
Daisy	Ayrshire Grade	310	6450	3·8	288·35	71 80	56 03	15 77
Bell	"	240	5740	4·2	283·62	70 02	54 99	15 03
Annie	"	240	5675	4·2	280·41	69 22	54 46	14 76
Nellie	Guernsey	190	4840	4·7	267·62	65 50	50 75	14 75
Lady Lock	Ayrshire	225	5965	3·8	266·58	66 38	51 81	14 57
Louise	"	240	6260	3·6	262·84	65 69	52 69	13 00
Curly	Ay. Gn. Grade	210	5240	4·1	252·75	62 53	50 81	11 72
Sonsy	Ayrshire	280	5610	3·9	257·40	63 95	52 29	11 66
Mary	Jersey Grade	210	5110	4·1	246·48	60 99	49 50	11 47
Ida B	Ayrshire Grade	270	6010	3·7	261·61	65 30	54 18	11 12
Rose	Holstein Grade	210	5340	3·7	232·46	58 02	48 94	9 08
Yellow Kate	Ayrshire	240	5280	3·6	223·62	49 66	49 66	6 40

EXPERIMENTS WITH STEERS.

This experiment was again carried on with a view to testing the advisability of dehorning full grown steers at the commencement of their feeding period, whether fed in loose boxes or tied in stalls.

Twelve 3-year old steers were used for this test, in 3 lots of 4 each, of as nearly as possible, equal form, fatness and weight (shorthorn grades).

All weights were taken after a fast of 14 hours, i.e., at 9 a. m. without feed.

The horns were taken off lots 1 and 2 and left on lot 3.

By careful weighing both before and after dehorning, it was found that about two weeks were required to regain the loss in weight from dehorning. The average loss was about 25 lbs. per steer.

All lots were fed alike as nearly as possible from start to finish of test, and kept in the stable all the time, except on occasional fine days, when they were let out for a time, averaging not more than once a week.

The feeds were charged at the following prices: Hay, $7 per ton; roots, $2 per ton; ensilage, $2 per ton; mixed meals averaged $25 per ton as per proportion fed.

RECORD of steers, fed from December 1, 1901, to April 30, 1902.

LOT I.—DEHORNED, FED IN LOOSE BOX.

Numbers.	Dec. 1.	Dec. 31.	Gain.	Jan. 30.	Gain.	Mar. 1.	Gain.	Mar. 31.	Gain.	Apr. 30.	Gain.	Total Gain.
	Lbs.	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.
9	1,250	1,340	90	1,400	60	1,480	80	1,555	75	1,600	45	350
10	1,195	1,290	95	1,380	90	1,445	65	1,535	90	1,575	40	380
11	1,170	1,245	75	1,315	70	1,390	75	1,455	65	1,490	35	320
12	1,185	1,270	85	1,360	90	1,440	80	1,515	75	1,560	45	375
	4,800	5,145	345	5,455	310	5,755	300	6,060	305	6,225	165	1,425

LOT II.—DEHORNED, TIED IN STALLS.

5	1,120	1,200	80	1,270	70	1,320	50	1,390	70	1,430	40	310
6	1,145	1,235	90	1,305	70	1,365	60	1,445	80	1,485	40	340
7	1,130	1,200	70	1,260	60	1,310	50	1,355	45	1,395	40	266
8	1,095	1,200	105	1,280	80	1,335	55	1,395	60	1,430	35	335
	4,490	4,835	345	5,115	280	5,330	215	5,585	255	5,740	155	1,250

LOT III.—NOT DEHORNED, TIED IN STALLS.

1	1,240	1,330	90	1,400	70	1,460	60	1,525	65	1,570	45	330
2	1,205	1,260	55	1,320	60	1,390	70	1,465	75	1,510	45	305
3	1,105	1,190	85	1,255	65	1,320	65	1,400	80	1,440	40	335
4	1,160	1,220	60	1,280	60	1,330	50	1,405	75	1,450	45	290
	4,710	5,000	290	5,255	255	5,500	245	5,795	295	5,970	175	1,260

STEERS—EXPERIMENT II.

With a view to determine the advisability of putting in heavy or light steers to feed, eight steers were put in box-stalls in 2 lots of 4 each, of about equal form and fatness, weighing respectively 4,800 and 4,000 pounds. The results are as follows, after feeding the animals alike :—

LOT I.—HEAVY STEERS.

Numbers.	Dec. 1.	Dec. 31.	Gain.	Jan. 30.	Gain.	Mar. 1.	Gain.	Mar. 31.	Gain.	Apr. 30.	Gain.	Total Gain.
	Lbs.	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.
17	1,250	1,340	90	1,400	60	1,480	80	1,555	75	1,600	45	350
18	1,195	1,290	95	1,380	90	1,445	65	1,535	90	1,575	40	380
19	1,170	1,245	75	1,315	70	1,390	75	1,455	65	1,490	35	320
20	1,185	1,270	85	1,360	90	1,440	80	1,515	75	1,560	45	375
	4,800	5,145	345	5,455	310	5,755	300	6,060	305	6,225	165	1,425

LOT II.—LIGHT STEERS.

13	1,020	1,100	80	1,170	70	1,250	80	1,315	65	1,355	40	335
14	960	1,045	85	1,100	65	1,200	90	1,265	65	1,315	50	355
15	1,010	1,095	85	1,160	65	1,245	85	1,315	70	1,360	45	350
16	1,010	1,096	85	1,165	70	1,235	70	1,300	65	1,345	45	335
	4,000	4,335	335	4,605	270	4,930	325	5,195	265	5,375	180	1,375

COMMENTS ON EXPERIMENT II.

Original weight of 4 heavy steers 4,800 at 4c. per lb	$192 00
Weight at finish of 4 heavy steers, 6,225 lbs. at 6¼c per lb	381 28
Balance	189 28
Cost of feed for lot, 150 days	105 84
Profit on lot	83 44
Original weight of 4 light steers, 4,000 lbs. at 4c. per lb	$ 160 00
Weight at finish of 4 light steers, 5,375 lbs. at 6¼c. per lb	329 22
Balance	169 22
Cost of feed for lot, 150 days	105 84
Profit on lot	63 38

Making a difference in favour of heavy steers of $5.01 per steer.

Provided gains of each lot had been equal, then balance would still be $4.25, which would seem to justify paying a higher price per pound for the heavier steers when putting in to feed.

COST OF 1 STEER PER DAY FOR ENTIRE PERIOD.

Period.	Daily Ration.	Daily cost.	Cost for period.	
1901.		$ cts.	$ cts.	$ cts.
Dec. to Dec. 31	Roots, 90 lbs	0 09	2 70	
	Meal, 3 "	0 63¾	1 12½	
	Hay, 10 "	0 03½	1 05	
1902.				4 87½
Dec. 31 to Jan. 30	Roots, 60 lbs	0 06	1 80	
	Meal, 5 "	0 06¼	1 87½	
	Hay, 10 "	0 03½	1 05	
				4 72½
Jan. 30 to Mar. 1	Roots, 40 lbs	6 04	1 20	
	Meal, 7 "	0 08¾	2 62½	
	Hay, 12 "	0 04½	1 26	
				5 08½
Mar. 1 to Mar. 31	Roots, 30 lbs	0 03	0 90	
	Meal, 9 "	0 11¼	3 37½	
	Hay, 15 "	0 05¼	1 57½	
				5 85
Mar. 31 to April 30	Ensilage, 20 lbs	0 02	0 60	
	Meal, 10 "	0 12½	3 75	
	Hay, 15 "	0 05¼	1 57½	
				5 92½
Cost of feed of 1 steer				26 46
" 16 steers				423 36

Original weight of 16 steers, 18,000 lbs. at 4c. per lb	$ 720 00
Weight at finish of 16 steers, 23,310 lbs. at 6¼c. per lb	1,427 72
Balance	707 73
Cost of feed for lot, 150 days	423 36
Net profit	284 37
Daily rate of grain per steer	Lbs. 2·21
Cost of 1 lb. gain	Cts. 7·97
" feed per day per steer	" 17·64
Profit per steer	$ 17 77

CONTINUATION OF STEER CALF EXPERIMENT.

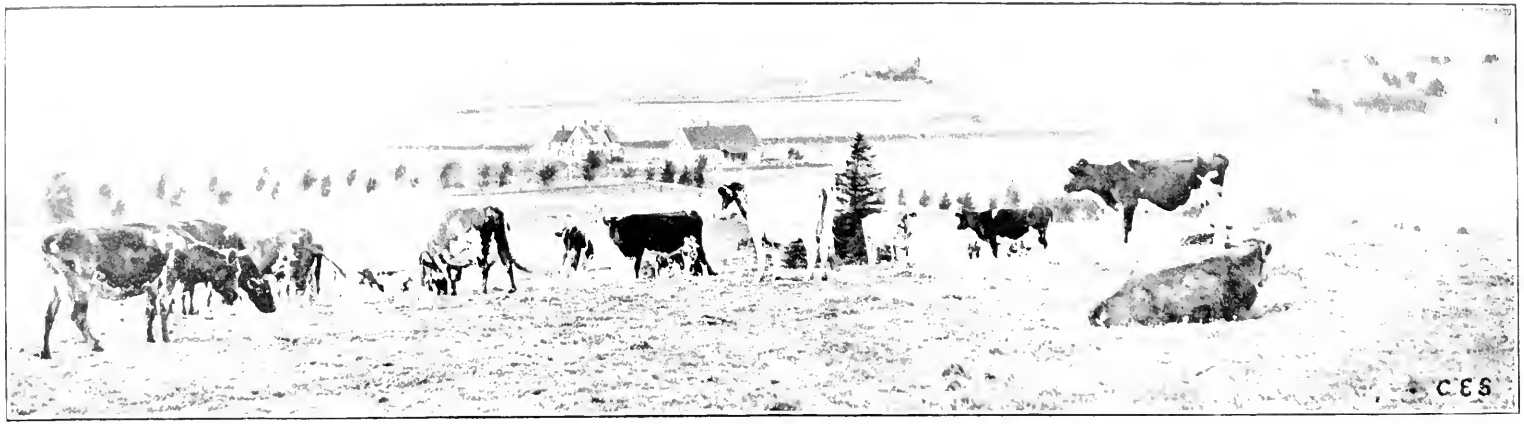
This experiment, with a view to determine the comparative economy of feeding calves a full fattening ration from the start, as contrasted with a limited growing ration, begun last year with 12 steer-calves, in two lots of six each, was continued, but owing to the death of one calf in the full-fattening lot, early in the year, it was thought best to reduce both lots and continue the experiment with 10 calves. Last year's experiment is being repeated with 10 steer calves termed 'calves of May 1902, Exp. II.'

In estimating the cost of feeding calves the following values were placed on the different feeds :—

New milk, $1.00 per 100 lbs.
Skim-milk, 15 cts. per 100 lbs.
Wheat bran, $1.00 per 100 "
Crushed oats, $1.40 per 100 lbs.
Oil-cake, $1.75 per 100 lbs.
Roots or Ensilage, 10 cts. per 100 lbs.
Hay, $7.00 per ton.
Straw, $3.00 per ton.

FULL FATTENING RATIONS—EXPERIMENT I.—CALVES OF MAY, 1901.

Period.	Daily Rations per Steer.	Amount Fed during Period.	Cost.	—
		Lbs.	$ cts.	$ cts.
Dec. 1, 1901 to Jan. 1, 1902.	Roots, 15 lbs.	2,325	2 32½	
	Meal, 2 lbs.	310	3 87½	
	Hay, 2½ lbs.	387½	1 35¾	
				7 55¾
Jan. 1 to Feb. 1.	Roots, 20 lbs.	3,100	3 10	
	Meal, 2 lbs.	310	3 87½	
	Hay, 2½ lbs.	387½	1 35¾	
				8 33¼
Feb. 1 to Mar. 1.	Roots, 25 lbs.	3,500	3 50	
	Meal, 3 lbs.	420	5 25	
	Hay, 2½ lbs.	350	1 22½	
				9 97½
Mar. 1 to April 1.	Roots, 30 lbs.	4,550	4 65	
	Meal, 3 lbs.	465	5 81¼	
	Hay, 2½ lbs.	387½	1 35¾	
				11 82
April 1 to May 1.	Roots, 30 lbs.	4,500	4 50	
	Meal, 3 lbs.	450	5 62½	
	Hay, 4 lbs.	600	2 10	
				12 22½
May 1 to June 1.	Roots, 30 lbs.	4,650	4 65	
	Meal, 3 lbs.	465	5 81¼	
	Hay, 4 lbs.	620	2 17	
				12 63¼
June 1 to July 1.	Roots, 30 lbs.	4,500	4 50	
	Meal, 3 lbs.	450	5 62½	
	Hay, 5 lbs.	750	2 62½	
				12 75
July 1 to Aug. 1.	Green feed, 40 lbs.	6,200	6 20	
	Meal, 2 lbs.	310	3 87½	
				10 07½
Aug. 1 to Sept. 1.	Pastured on rape at $1 per month.		5 00	
	Meal, 2 lbs.	310	3 87½	
				8 87½
Sept. 1 to Oct. 1.	Pastured on rape at $1 per month.		5 00	
	Meal, 2 lbs.	300	3 75	
				8 75
Oct. 1 to Nov. 1.	Pasture at $1 per month.		5 00	
				5 00
Nov. 1 to Dec. 1.	Roots, 40 lbs.	6,000	6 00	
	Meal, 3 lbs.	450	5 62½	
	Hay, 5 lbs.	750	2 62½	
				14 25
	Cost of feed for 5 steers, 365 days.			122 24¼



CATTLE AT PASTURE, EXPERIMENTAL FARM. NAPPAN, N.S.

FIELD OF UPLAND HAY, EXPERIMENTAL FARM, NAPPAN, N.S. YIELD, 3 TONS, 360 LBS. PER ACRE.

FULL FATTENING RATION.

Period.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
Dec. 1, 1901 to Jan. 1, 1902	2,450	2,660	210
Jan. 1 to Feb. 1	2,660	2,825	165
Feb. 1 to Mar. 1	2,825	3,000	175
Mar. 1 to April 1	3,000	3,190	190
April 1 to May 1	3,190	3,360	170
May 1 to June 1	3,360	3,580	220
June 1 to July 1	3,580	3,815	235
July 1 to Aug. 1	3,815	4,000	195
Aug. 1 to Sept. 1	4,000	Pasture.	
Sept. 1 to Oct. 1	Pasture.	"	
Oct. 1 to Nov. 1	"	4,400	400
Nov. 1 to Dec. 1	4,400	4,620	220

Total gain Dec. 1, 1901 to Dec. 1, 1902	Lbs.	2,170
Weight at start	"	2,450
Weight at finish	"	4,620
Daily rate of gain per steer	"	1·13
Cost of 1 lb. gain	cts.	5·63
Cost of feed per day per steer		6·46
Cost of lot 1 year	$	122 24

LIMITED GROWING RATION.—EXPERIMENT I.—CALVES OF MAY, 1901.

Period.	Daily Ration.	Amount Fed during Period.	Cost.	—
		Lbs.	$ cts.	$ cts.
Dec. 1, 1901, to Jan. 1, 1902.	Roots, 15 lbs.	2,325	2 32½	
	Meal, 1 lb.	155	1 55	
	Straw, 2½ lbs.	387½	0 58½	
				4 46
Jan. 1 to Feb. 1.	Roots, 20 lbs.	3,100	3 10	
	Meal, ½ lb.	77½	0 77½	
	Straw, 5 lbs.	775	1 16¼	
				5 03¾
Feb. 1 to Mar. 1.	Roots, 25 lbs.	3,500	3 50	
	Meal, ½ lb.	70	0 70	
	Hay, 2½ lbs.	350	1 22½	
				5 42½
Mar. 1 to April 1.	Roots, 30 lbs.	4,650	4 65	
	Meal, ½ lb.	77½	0 77½	
	Hay, 2½ lbs.	387½	1 35¾	
				6 78¼
April 1 to May 1.	Roots, 30 lbs.	4,500	4 50	
	Meal, ½ lb.	75	0 75	
	Hay, 2½ lbs.	375	1 31½	
				6 56½
May 1 to June 1.	Roots, 30 lbs.	4,650	4 65	
	Hay, 4 lbs.	620	2 17	
				6 82
June 1 to Nov. 1.	At pasture, at 75c. p. m. p. steer.		18 75	18 75
Nov. 1 to Dec. 1.	Roots, 40 lbs.	6,000	6 00	
	Straw, 5 lbs.	750	1 12½	
				7 12½
	Cost of feed for 5 steers for 365 days.			60 96

LIMITED GROWING RATION.

Period.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
Dec. 1, 1901, to Jan 1, 1902	1,960	2,100	140
Jan. 1 to Feb. 1	2,100	2,210	110
Feb. 1 to March 1	2,210	2,330	120
March 1 to April 1	2,330	2,500	170
April 1 to May 1	2,500	2,630	130
May 1 to June 1	2,630	2,800	170
June 1 to Nov. 1	2,800	3,315	515
Nov. 1 to Dec. 1	3,315	3,485	170

Total gain Dec. 1, 1901, to Dec. 1, 1902	Lbs.	1,525
Weight at start	"	1,960
Weight at finish	"	3,485
Daily rate of gain per steer	Lbs.	·83
Cost of 1 lb. gain	cts.	3·99
" feed per day per steer	"	3·25
" lot for year	$60 96	

FULL FATTENING RATION—EXPERIMENT II—CALVES OF MAY, 1902.

Period 1902.	Daily Ration per Calf.	Amount Fed during Period.	Cost.	Total Cost.
		Lbs.	$ cts.	$ cts.
May 16 to June 1	10 lbs. whole milk	750	7 50	
	10 lbs. skim-milk	750	1 12½	
				8 62½
June 1 to July 1	10 lbs. whole milk	1,500	15 00	
	10 lbs. skim-milk	1,500	2 25	
	¼ lb. bran and oil cake	37½	0 37½	
				17 62½
July 1 to Aug. 1	8 lbs. whole milk	1,240	12 40	
	12 lbs. skim-milk	1,860	2 79	
	½ lb. bran and oil cake	77½	0 77½	
				15 96½
Aug. 1 to Sept. 1	20 lbs. skim-milk	3,100	4 65	
	1 lb. crushed oats	155	2 17	
	½ lb. bran and oil cake	77½	0 77½	
	2 lbs. hay	310	1 34	
				8 93½
Sept. 1 to Oct. 1	10 lbs. skim-milk	1,500	2 25	
	1 lb. crushed oats	150	2 08	
	½ lb. bran and oil cake	75	0 75	
	2 lbs. hay	300	1 20	
				6 28
Oct. 1 to Nov. 1	10 lbs. roots	1,550	1 55	
	1 lb. crushed oats	155	2 17	
	1 lb. bran and oil cake	155	1 55	
	2 lbs. hay	310	1 34	
				6 61
Nov. 1 to Dec. 1	10 lbs. roots	1,500	1 50	
	1½ lbs. crushed oats	225	3 12	
	1 lb. bran and oil cake	150	1 50	
	2 lbs. hay	300	1 20	
				7 32
	Cost of feed for 5 calves 198 days			71 36

FULL FATTENING RATION—CALVES, 1902.

Period 1902.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
May 16 to June 1	955	1,075	120
June 1 to July 1	1,075	1,360	285
July 1 to Aug. 1	1,360	1,600	240
Aug. 1 to Sept. 1	1,600	1,830	230
Sept. 1 to Oct. 1	1,830	2,100	270
Oct. 1 to Nov. 1	2,100	2,305	205
Nov. 1 to Dec. 1	2,305	2,580	275

Total gain May 16 to Dec. 1	Lbs.	1,625
Weight at start	"	955
Weight at finish	"	2,580
Daily rate of gain per steer	"	1·64
Cost of 1 lb. gain	cts.	4·38
Cost of feed per day per steer	"	7·20
Cost of feed for lot for 198 days	$	71 36

LIMITED GROWING RATION—EXPERIMENT II—CALVES OF MAY 1902.

Period 1902.	Daily Ration per Calf.	Amount Fed during Period.	Cost.	Total Cost.
		Lbs.	$ cts.	$ cts.
May 16 to June 1	8 lbs. whole milk	600	6 00	
	12 lbs. skim-milk	909	1 35	
				7 35
June 1 to July 1	20 lbs. skim-milk	3,000	4 50	
	¼ lb. bran and oil cake	37½	0 37½	
				4 87½
July 1 to Aug. 1	20 lbs skim-milk	3,100	4 65	
	¼ lb. bran and oil cake	38¾	0 38¾	
				5 03¾
Aug. 1 to Sept. 1	20 lbs. skim-milk	3,100	4 65	
	¼ lb. bran and oil cake	38¾	0 38¾	
	2 lbs. hay	310	1 34	
				6 37¾
Sept. 1 to Oct. 1	10 lbs. skim milk	1,500	2 25	
	½ lb. bran and oil cake	75	0 75	
	2 lbs. hay	300	1 20	
				4 20
Oct. 1 to Nov. 1	2 lbs. roots	775	0 77½	
	½ lb. bran and oil cake	77½	0 77½	
	2 lbs. hay	310	1 34	
				2 89
Nov. 1 to Dec. 1	10 lbs. roots	1,500	1 50	
	½ lb. bran and oil cake	75	0 75	
	2 lbs. hay	300	1 20	
				3 45
	Cost of feed of 5 steers for 198 days			34 18

LIMITED GROWING RATION—CALVES 1902.

Period 1902.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
May 16 to June 1	605	725	120
June 1 to July 1	725	925	200
July 1 to Aug. 1	925	1,135	210
Aug. 1 to Sept. 1	1,135	1,330	195
Sept. 1 to Oct. 1	1,330	1,525	195
Oct. 1 to Nov. 1	1,525	1,710	185
Nov. 1 to Dec. 1	1,710	1,945	235

Total gain May 16 to Dec. 1	Lbs.	1,340
Weight at start	"	605
Weight at finish	"	1,945
Daily rate of gain per steer	"	1·35
Cost of 1 lb. gain	cts.	2·55
Cost of feed per day per steer	"	3·45
Cost of feed for lot, 198 days	$34 18	

PIGS.

The herd at present consists of Yorkshires, Berkshires, Tamworths and their crosses, in all 52 head, as follows :—

1 Yorkshire boar, registered.
2 Yorkshire sows, registered.
1 Berkshire boar, registered.
2 Berkshire sows, registered.
1 Tamworth sow, registered.
3 grade brood sows.
40 grade pigs from one to four months old.

EXPERIMENTS WITH SWINE.

Feeding in Pasture *versus* Feeding in Pens.

Unfortunately the pasture available for this test was quite poor, and until some further experiments are made no conclusion can be drawn.

The pigs were put into the test at from 2 to 4 months old, in 2 lots of 10 each, on July 1. They were fed on a ration of 3 lbs. buckwheat, shorts and wheat bran and 5 lbs. skim-milk. The results are as follows :—

FEEDING IN PENS.

No.	Breed.	Weight at Start.	Weight at Finish.	Net gain.	Number of Days fed.	Daily gain
		Lbs.	Lbs.	Lbs.		Lbs.
1	Yorkshire (D) Berkshire (S)	58	161	103	85	1·21
2	" "	53	160	107	85	1·25
3	" "	49	163	114	85	1·34
4	Yorkshire-Tamworth (D) Berkshire (S)	49	171	122	102	1·61
5	" " "	48	181	133	102	1·10
6	" " "	44	172	128	102	1·06
7	Chester (D) Yorkshire (S)	38	168	130	120	1·09
8	" "	35	177	142	120	1·19
9	" "	34	158	124	120	1·04
10	Berkshire	40	191	151	120	1·26

FEEDING IN PASTURE.

1	Yorkshire (D) Berkshire (S)	70	172	102	85	1·20
2	" "	68	168	100	85	1·18
3	" "	65	161	96	85	1·13
4	Yorkshire-Tamworth (D) Berkshire (S)	45	177	132	102	1·29
5	" " "	40	169	129	102	1·26
6	" " "	44	177	132	102	1·30
7	Chester (D) Berkshire (S)	29	179	150	120	1·25
8	" "	31	180	149	120	1·24
9	" "	37	185	148	120	1·23
10	Berkshire	35	180	145	120	1·30

SHEEP.

The flock on the farm at present consists of :—

1 Pure bred Leicester ram.
5 Pure bred Leicester ewes.
5 Pure bred Shropshire ewes.
2 Pure bred Shropshire ewe lambs.
4 Grade Shropshire ewes.

POULTRY.

Four varieties were kept this year. Barred Plymouth Rocks, Black Minorcas, White Leghorns and White Wyandottes. The pens were made up as follows :—

Barred Plymouth Rocks, 7 hens and 1 cock.
Black Minorcas, 4 hens and 1 cock.
White Leghorns, 6 hens and 1 cock.
White Wyandottes, 2 hens and 1 cock.

During the winter season the hens were fed a corn-meal mash in the morning and whole grain in the afternoon. Green bones and crushed oyster shells were occasionally given and free access to water and dust bath.

The eggs laid during the year by the different breeds were :—

Barred Plymouth Rocks	277
White Leghorns	401
Black Minoreas	151
White Wyandottes	120

The incubator (Willetts) was used again this year but with very poor results.

The number of eggs in each hatch and percentage of chickens hatched was as follows :

1st hatch, March 4, 100 eggs. Not fertile, 47. Died in shell, 26. Chickens hatched, 27.

2nd hatch, March 26, 120 eggs. Not fertile, 45. Died in shell, 43. Chickens hatched, 32.

3rd hatch, April 21, 120 eggs. Not fertile, 32. Died in shell, 33. Chickens hatched, 55.

April 21, set Barred Plymouth Rock hen on 13 eggs from Montreal. Not fertile, 2. Died in shell, 6. Hatched, 5.

May 3, set White Leghorn hen on 13 eggs from Montreal. Not fertile, 5. Died in shell, 1. Hatched, 7.

Whether hatching with the incubator or the hen the same results were obtained, i.e., a large percentage of the chicks died at the pipping stage, especially was this the case in the earlier hatches.

BEES.

I have to report poor success with bees this year. Four colonies were put on their summer stands on April 15, 1902. Two swarms were captured during July and two were lost.

No honey was extracted during the summer and the colonies were put in the cellar, their winter quarters, weighing respectively 40, 33, 28, 31, 35 and 37 pounds.

I have the honour to be, sir,

Your obedient servant,

R. ROBERTSON,

Superintendent.

REPORT OF THE HORTICULTURIST.

(W. S. Blair.)

Nappan, N.S., December 1, 1902.

To Dr. Wm. Saunders,
Director Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith a report of some of the work done in the horticultural department of the Experimental Farm for the maritime provinces for the year 1902.

April was a fine open month giving indications of an early spring. This, however, was offset by a cool May with several heavy frosts. The last, and most severe, was on the 19th of 8°, and 21st of 6°. Generally speaking May was cool and dry, and June cool and wet. The spring being backward made early growth with both fruits and vegetables slow, and the continued cool weather made the season unfavourable for those vegetables that require a good amount of heat. The daily average highest and lowest temperatures for the months of May, June, July, August and September, 1902, as compared with those of 1901 and 1900, were as follows :—

—	Maximum.			Minimum.		
	1902.	1901,	1900.	1902.	1901.	1900.
May	57·7°	55·3°	55·9°	37·6°	40·9°	36·3°
June	64·3°	69·8°	68·°	44·7°	48·9°	46 1°
July	72·6°	76·4°	75·°	50·9°	54·1°	54.°
August	73·°	75·7°	71·8°	53·9°	54·9°	52·4°
September	68·4°	68·2°	65·4°	46·6°	48·7°	41·4°

It will be seen from the foregoing that particularly the months of July, August and June were much cooler than usual. The average daily lowest temperature for May was 40·9° in 1901 and 37·6° in 1902, with a daily highest temperature of 57·7° in 1902 and 55·3° in 1901. Therefore, it will be seen that on the average May was about equal with other years in respect to temperature. The average highest daily temperature, for the months of June, July and August were 69·9° in 1902; 73·9° in 1901, and 71·6 in 1900. The average lowest daily temperatures for these three months were 52·6° in 1902; 49·8° in 1901 and 50·8° in 1900. It will, therefore be seen that the past season had for these three months a daily highest average of 4° less heat than 1901, and a daily average lowest temperature of 3° less than 1901. This indicates a continuance of cooler weather than usual, which was particularly noticeable in its effect on certain crops. The first frost was on Sept. 26, when 29° F. was registered. The next was on Oct. 5 of 29°.

The apple crop in Nova Scotia is this season much below the average, both as to yield and quality. Taking the whole province the yield is estimated at less than one-half of an average crop. The weather being cool and damp at the time of blossoming no doubt largely accounts for this light crop. The influence of such conditions has been much more marked in some sections than in others, and consequently the distribution of fruit is irregular. The almost continuous wet cool weather during spraying time is accountable for more apple scab fungus than usual, and the light crop of fruit instead of being of a higher grade, as one would naturally expect, is much below the average.

Fruit trees generally have made good growth this year. The apple crop at Nappan was exceptionally good, especially did the fall varieties do well. The plum crop was only fair. The cherry crop was a complete failure here. The frost of the 19th and 21st of May killed the blossoms which were about out. In neighbouring districts where this frost did not strike so heavily, and where trees came into bloom later a fair crop of cherries was obtained.

The strawberry crop was good, due very largely to seasonable showers at the time of ripening. The raspberry, and gooseberry crops were only fair. Black currants were a poor crop, and red and white currants a good crop.

The shrubs which are year by year becoming more interesting and attractive made splendid advancement this season.

The collection of annual flowering plants, and perennials, made the best show this year that we have ever had. The show of sweet peas and dahlias was especially good.

Experiments were again carried on with vegetables of various kinds, a summary of some of these experiments is given in this report.

Information is also submitted on the work done in testing different varieties of cherries, and a descriptive list is given of those which have so far done the best.

Space has also been given to some of those varieties of apples, and plums that promise to be useful for more general culture.

I beg to acknowledge the following donations:—N. E. Jack, Esq., Chateauguay Basin, P.Q. Fameuse, and McIntosh Red, scions; A. H. Johnson, Esq., Wolfville, N.S. Pryor's Red apple, and 'October' plum scions.

APPLE ORCHARD.

The apple orchard has made splendid growth this season, and a fair amount of good fruit was obtained. The many Russian sorts which are proving of little value in orchard No. 1. are being top grafted with new varieties. Orchard No. 2. which has the advantage of protection from heavy winds by a belt of spruce trees, and has also a lighter soil, is making splendid progress, and gave some good fruit this year. The following descriptive list embraces those apples which up to the present time are the most vigorous and productive and which are likely to be of commercial value for many sections of the maritime provinces.

McIntosh Red.

Three trees of this variety were planted in the spring of 1890. They have made only fair growth. The soil in which they are growing is a heavy clay loam, with a very heavy clay subsoil running to within eight or ten inches of the surface. This soil does not seem to be adapted to apples of the Fameuse group, and as this apple is one of that class the results obtained here do not give a fair idea of its general value in the maritime provinces. Excellent specimens of McIntosh Red have been grown in the St. John river valley, and in other parts of this province on naturally drained sandy soils. This fruit may probably succeed well on the lighter soils on farms in central New Brunswick.

The fruit of this variety grown here has not matured perfectly, due, no doubt, to the heavy cold soil. The fruit is liable to scab if not sprayed, but it is not so bad in

this respect as the Fameuse. It has not been so heavy or so early a bearer as the Fameuse, but the fruit is much larger. The tree has a spreading open growth. This is an excellent apple for either home use or local markets. It is shipped from Montreal to the English market, as a high grade dessert apple, packed in bushel boxes.

The following is a description of McIntosh Red as given by Waugh: 'Fruit round, oblate, slightly irregular; size medium large; cavity variable, sloping, nearly regular; stem usually short; basin medium deep, rather abrupt; calyx small, tightly closed; colour nearly even dark rich wine red, shading to light pinkish crimson in the shade; dots many; bloom heavy and conspicuous; skin tough; flesh snow white with crimson shadings; core medium; flavour subacid; aromatic; quality, good about like Fameuse; season December and January.' It originated on the McIntosh homestead in Matilda township, Ontario, and was first distributed about thirty years ago. It is now grown in many states of the Union, being specially adapted to the requirements of the fancy fruit trade in the larger cities.

Canada Baldwin.

Three trees of this variety were planted in 1890. They fruited in 1894 and have borne heavy and light crops on alternate years ever since. This fruit is said to belong to the Fameuse group. It is not liable to scab, and is an abundant bearer. The fruit is not large, and on this account is not likely to take a prominent place commercially. It is, however, of special value for central New Brunswick, where excellent specimens have been grown. This fruit does not develop properly here, due to the extremely heavy soil. The following is a description of this fruit by Waugh: 'Fruit oblate; size medium; cavity deep, flaring; stem long, slender; basin medium deep, smooth; calyx medium, closed; colour dull, dark red, striped and washed over a light greenish yellow ground; dots several white, bloom moderately heavy; skin tough; flesh white with much red, tender; core medium; flavour subacid, with Fameuse aroma, juicy; quality good; season December and January; tree thrifty and hardy.'

Ontario.

Two trees of this variety were planted in the spring of 1890 in orchard No. 1. In the No. 2 orchard, which is protected with a shelter belt of spruce trees, one tree was planted in the spring of 1897. The two trees in orchard No. 1, which is a much heavier clay loam than orchard No. 2, and not at all protected, have made from poor to fair growth. The tree in orchard No. 2 has made good growth. This variety fruits early. The two trees planted in 1890 fruited lightly in 1894, and the one planted in 1897 fruited this season. It gives a good crop of handsome, well formed, even sized fruit of good quality for the table, and excellent for cooking. The tree has a rather spreading head, is vigorous and hardy. This is a desirable winter sort for either home use or market. The fruit ships well and has been sent from Ontario to the British market and realized as good prices as the Spy. This apple is medium to large, oblate, frequently angular, and slightly conical; cavity broad, deep, irregular; basin deep, slightly corrugated; calyx small; skin firm and close in texture; colour whitish yellow with a red cheek and covered by bright bloom, with a few dots. The flesh is whitish yellow, juicy, tender, a brisk, sub-acid, fine grained, slightly aromatic, quality good. Season January to April. This fruit should be handled very carefully as it shows bruises readily. It was originated by the late Charles Arnold, of Paris, Ont., by crossing Wagener with Spy.

Canada Red.

Trees of this variety were planted in 1890. The tree has made fairly strong growth. Specimens that I have seen growing on a lighter soil than that at Nappan were more healthy and vigorous. The fruit is medium in size, but it is an abundant bearer, and comes into fruiting early. It is a good dessert or cooking apple, and ships well to foreign

markets. This fruit is well adapted to localities where the Baldwin does not succeed. It should prove of value, both in Prince Edward Island and New Brunswick. As far as it has been tested it has given good results in these provinces. The fruit is medium, roundish, slightly conical, regular; colour greenish yellow, almost covered with red, sometimes splashed or slightly striped with darker red, having numerous large prominent greenish dots; stem medium in a small deep and often russeted cavity; calyx closed, small, in a slightly corrugated basin. The flesh is greenish white, fine grained, firm, moderately juicy; mild, sub-acid, flavour fair, Season December to April. Its origin is unknown.

York Imperial.

One tree of this variety was planted in the protected orchard in 1897. It has made good growth, and fruited this year for the first time. It had a peck of excellent fruit which coloured up well. This is a good variety and should be more largely grown. The fruit always brings a top price on the market, and it is an excellent shipper. The apple is medium to large, oblong, angular, oblique, smooth; colour striped somewhat and splashed with red over nearly the whole surface with a yellowish ground, thinly sprinkled with light and gray dots; basin deep, wide; calyx closed or partially opened; cavity not deep, narrow, russeted slightly; stem short. Season January to April.

Jonathan.

Two trees were planted in the orchard here in 1890. They are fairly vigorous growers, and have fruited heavily for the past three years. The fruit is not large, but matures well. The tree is a great fruiter, and if not thinned the branches are liable to break with the abundant crop. If allowed to bear heavily the fruit is small; judicious thinning is necessary for best results. The fruit is of excellent quality, and makes a good dessert apple. It stands shipment well. This apple is worthy of more attention by orchardists in the maritime provinces and should be of special value for central New Brunswick as it is very hardy. The fruit is of medium size, roundish, conical; skin smooth, clear light yellow, nearly covered with bright red, shaded into rich dark red in the sun, some light yellow dots. The flesh is white, rarely a little stained with red near the surface, very tender, juicy, of a mild sprightly, sub acid character with a vinous flavour; quality good, season December to March. It originated at Kingston, N.Y.

North-western Greening.

Two trees of this variety were planted in the protected orchard in 1897. These have made exceptionally thrifty growth. The trees have a well formed upright open head. They fruited this season for the first time, and over a bushel of fine extra large even sized fruit was obtained. The wood of the tree seems to be rather weak, and many of the branches were broken from the weight of fruit which should have been easily carried by trees of their size. The tree is an early bearer, and is reported as a continuous fruiter. The fruit is large to very large, round, smooth, yellowish green, very attractive. The flesh is greenish white, fine grained, inclined to be dry, mild, pleasant sub-acid and aromatic. Season December to April. This apple is a good shipper, and is grown largely in some parts of the United States as a late winter apple. It is very hardy and vigorous, and should prove of value in many parts of the eastern provinces.

Grimes' Golden.

In the spring of 1890 three trees were planted in orchard No. 1, and in 1892 one tree was planted in orchard No. 2. The tree in the protected orchard has far outstripped those in the heavier soiled unprotected orchard. They have, however, all made good growth. They have fruited heavily the past four years. This tree can carry an

abundant crop of fruit, which is distributed evenly over the whole tree. The head has rather a spreading but compact habit. The wood is exceedingly tough, and will stand a crop that many others would break under. The fruit is of exceptionally good quality. It is not large, and on account of its colour and size is not likely to be valuable for foreign markets. It has a place for local consumption, and should be grown by every farmer for his own use. Excellent specimens of this fruit have been grown in central New Brunswick. The fruit is roundish oblate, slightly conical, medium; colour rich golden yellow, sprinkled moderately with small gray and light dots; cavity rather deep and sometimes slightly russeted; calyx partially open, or closed; basin abrupt, uneven; flesh yellowish, crisp, tender, juicy, rich, fine grained, spicy sub-acid, with a peculiar aroma. Season December to February.

Hurlbut.

Two trees of this variety were planted in the spring of 1897. One of these has made very strong growth the other only fair growth. They fruited this season for the first time, one tree produced a bushel and the other one-half bushel of excellent fruit. The tree is said to be an early and abundant bearer on alternate years. It has a spreading open growth, and the wood is exceedingly tough, and will bear up well under a large crop of fruit. This fruit promises to become a leading early winter sort for market. It is medium to large, oblate, slightly conic, angular; skin yellow, shaded with red striped and splashed with darker red and thinly sprinkled with light dots. Stalk short, inserted in a broad rather shallow cavity, slightly russeted; calyx, closed; basin, shallow. Flesh white, crisp, tender, juicy, mild, sprightly sub-acid. Good to very good. Season December to February.

Gano.

Two trees of this variety were planted in 1897. They have made very strong growth. The tree is a much more upright and regular grower with us than the Ben Davis, which variety the Gano resembles except that the fruit is much darker in colour. The fruit ripens much better here than the Ben Davis does. Generally speaking, it far surpasses the Ben Davis grown in the orchard here. The trees do better and produce a better quality of fruit which would seem to indicate that the Gano is better adapted to a heavy soil than Ben Davis. These trees fruited this season for the first time, and produced three pecks of splendid looking fruit from each tree. It has qualities equal to the Ben Davis for shipment, and in general appearance and quality outside of its colour resembles the Ben Davis from which it is said to be a sport. It is probable that in the future it may largely take the place of Ben Davis. The fruit is round, conical; skin, green at first but entirely covered with dark red when matured. Flesh greenish white, quite juicy, firm, quality fair. Season February to May.

CHERRY ORCHARD.

Forty varieties of cherries are now growing in the experimental orchard. These are, with few exceptions, all making good growth, but unfortunately every year some trees die. This loss is confined largely to the sweet varieties, which, after coming into bearing will die one branch after another until the tree has to be removed. Only from one to three trees of a variety are under test, and the fondness of birds for sweet cherries makes it difficult to get enough ripened fruit for comparative test. Sour varieties of cherries will succeed on a heavier soil than the sweet ones, which like a naturally dry, light, loamy soil. The soil of the cherry orchard which is underdrained, is a clay loam with a very heavy clay subsoil, and probably better success would have been obtained had it been possible to have a lighter soil for this fruit.

The heavy frost of May 19, which caught the sweet cherries just coming into bloom killed the blossoms completely and no fruit was obtained. The sour cherry blossoms

were also largely killed. This frost was sectional and many sour cherry trees in surrounding districts gave a good crop.

The following list will we trust serve a useful purpose in pointing out those varieties best adapted to the maritime provinces. From our experience and observation sweet cherries should be left off the list as profitable sorts for New Brunswick, Prince Edward Island and many sections of Nova Scotia.

Prunus avium and *Prunus cerasus* are the two European species of cherries from which probably all cultivated cherries have originated. Those which have sprung from *Prunus avium* are known by their tall erect growth. The bark is glossy and of a reddish brown colour. The flowers which are borne on lateral spurs generally in clusters appear with the limp, gradually taper pointed leaves. The flesh of the fruit is soft or firm according to the variety. The fruit is yellow, black or red; spherical, heart shaped or pointed and generally sweet. Those from *Prunus cerasus* generally termed the sour cherries are low headed with spreading branches. The flowers, which appear before the stiff, rather abruptly pointed light or grayish green leaves are borne in clusters from lateral buds.

The following classification by Bailey will be found useful to fix different types of this fruit in the mind. Owing to the number of new varieties being constantly introduced, the distinctive lines dividing some of these groups are becoming less marked and intermediate forms between the upright and spreading sorts are numerous.

Prunus avium has four representatives in America:—

I.—The Mazzards or inferior seedlings; fruit of various shapes and colours; common along roadsides. In the middle Atlantic States, the Mazzard trees often attain great age and size.

II.—The Hearts or heart-shaped, soft, sweet cherries, light or dark, represented by Governor Wood and Black Tartarian.

III.—The bigarreaus or heart-shaped, firm-fleshed, sweet cherries like the varieties Napoleon and Windsor.

IV.—The Dukes; light-coloured, somewhat acid flesh, such as May Duke and Reine Hortense.

From *Prunus cerasus* two classes have sprung:—

I.—The Amarelles or light-coloured, sour cherries with colourless juice, represented by Montmorency and Early Richmond.

II.—The Morellos or dark-coloured, sour cherries with dark coloured juice like the English Morello and Louis Philippe.

The Mazzard and Mahaleb cherries are used almost entirely as stock for root grafting. The Mahaleb also of European origin is thought to be hardier, but is smaller and has a dwarfing tendency. It is better adapted to clay soils.

The American wild Red or Bird cherry *Prunus Pennsylvanicum* is also used for root grafting. It is exceptionally hardy and is valuable for this purpose.

Of the Heart cherries the Governor Wood and Black Tartarian are the most successful of those tested here. The former is light yellow shaded and marbled with red. The fruit is nearly sweet, rather tender and of excellent quality. The fruit is ripe soon after the first of July. The tree has fruited well here but after a few years fruiting has died out. The Black Tartarian has very dark red or black fruit, with dark purplish flesh, sweet and very juicy. The fruit is ripe early in July. This is certainly one of the finest cherries which has fruited here, but it is not a heavy bearer, and has seldom lived here more than five or six years.

Of the Bigarreau's the variety Windsor has done the best. It has proven hardier than any of the other sweet cherries. The fruit is mottled dark red, firm, juicy, with pinkish white flesh. It has not borne heavily here, although it is said to be an abundant bearer. It is ripe after the first week in July. This cherry will probably give the best satisfaction of any of the sweet varieties. Napoleon, also of this group, ripens its fruit earlier. It has a light lemon yellow colour with a reddish cheek. The flesh is colourless and very firm. It has not been so vigorous and hardy here as Governor Wood.

From trees of the Duke class we have so far not had any fruit. The trees have not done as well as those of the Bigarreau type.

The Montmorency, Early Richmond and some of the Russian sorts are the best of the Amarelle class.

The Montmorency is probably one of the best of this group. The fruit is bright red, with nearly colourless flesh, moderately sour. The tree is vigorous and productive, ripening its fruit about the last of July.

The Early Richmond is more vigorous than Montmorency but has not proven fruitful here. Trees of this variety are found in almost every part of the provinces and prove in the most of cases to be good bearers. The fruit is bright red, somewhat smaller than Montmorency. The flesh is soft, juicy, and of a rather pleasant flavour when fully ripe. The fruit ripens before Montmorency. The pit adheres to the stalk more firmly than in any other variety.

Of the Russian sorts Spate Amarelle, or Early Amarelle, and Vladimir are the best of those grown here. These are very hardy and will succeed where the above varieties will not.

Spate Amarelle is dark red, with flesh somewhat reddened, juicy and fairly good in quality. It is a strong grower and productive. Vladimir is a strong grower, but has not, so far, been productive here. It is said not to bear well on a clay soil, and probably a lighter soil would remedy this trouble. The fruit is very dark red, quite firm and somewhat acid.

The English Morello and Ostheim are two varieties of the Morello group that have given good satisfaction. The English Morello is not a large growing tree, but is very productive. It does especially well in Prince Edward Island. The fruit is about two weeks later in ripening than Montmorency. When fully ripe the fruit is very dark red, with dark purplish crimson flesh and of a rich flavour, with a slight astringency. The tree has not such an upright head as Montmorency and is more drooping and open.

Ostheim has dark red fruit, dark flesh and juice, with a mild acid character, nearly sweet when fully ripe. The tree is not a large grower, is productive, and considerably like the English Morello, but is more upright. The fruit ripens with the Montmorency.

The Montmorency, English Morello, Ostheim and Early Richmond will probably suit a larger area, and give more satisfaction than any of the other varieties that have so far fruited here.

PLUM ORCHARD.

Seventy varieties of plums are now growing here. Many of these are making only fair growth. One row of plums has been set in orchard No. 2 and these seem to do much better, having protection which plum trees need. The following varieties are those which have fruited and are doing the best here so far. These have all sprung from the European plum *Prunus domestica*. They are grouped according to the classification given by Waugh.

The Diamond Type.—These varieties are characterized by having fruit mostly large, oval, very slightly compressed sideways, dark blue, with heavy blue bloom, flesh generally yellow, very firm and usually clinging to the stone. Such sorts as Moore's Arctic, St. Lawrence, Shipper's Pride and Quackenboss come into this group. They are mostly of inferior quality, but productive, firm fleshed and good shippers.

Moore's Arctic.

Two trees of this variety were planted in 1892. They have made good growth and have fruited heavily since 1896. This is one of the hardiest of the domestica plums, and is one of the most productive of all the plums fruited here. The fruit is rather below medium, roundish, oval; cavity slight; stem medium, rather slender; suture, indistinct; colour purplish black, with a thin blue bloom; flesh yellowish, juicy, tender, very firm, pleasant flavour but not rich. Fit for market the middle of September.

The Reine Claude or Green Gage group.—This group has the following characteristics:—Foliage usually large, leaves broad and rather flat, with very coarse serrations; fruit nearly spherical, in a few varieties slightly elongated, green or tardily turning to a dull, creamy yellow, occasionally with a faint pink blush; flesh rather firm, green, clinging to the stone, or partially free in a few varieties. Such varieties as Imperial Gage, Prince's Yellow Gage, Bryanston's Gage, Washington, Green Gage and Reine Claude de Bavay, come under this group.

Reine Claude de Bavay.

Two trees were planted in 1891. One has made very strong growth and one only fair. This is one of the finest of the Gage plums. It is much later than Imperial Gage or Prince's Yellow Gage, and on this account is much grown, as it can be placed upon the market after many of the other plums are gone. These trees have fruited well, giving the first crop in 1898. The fruit is round, oval; colour greenish yellow, thin bloom, with small violet coloured longitudinal veins; stalk short and stout set in small cavity; suture medium; flesh quite firm, yellow, juicy, with a sugary, rich, excellent flavour, adhering slightly to stone, quality good. Ripens here after October 1. The tree is upright, with a somewhat spreading habit. The fruit is medium sized. This variety is recommended for more general culture.

Washington.

Two trees of this variety were planted in 1891. They are strong, upright growers, very vigorous and fairly productive. They have borne regular crops of fruit since 1898. This is an excellent, early, large, plum, ripening here early in September. It is grown quite extensively for commercial purposes, but with some is said not to be very productive. The fruit is large, nearly round; cavity quite wide, shallow; stem short; suture shallow; colour greenish yellow, often with a pale red blush; dots several, greenish; bloom white; flesh yellow, free from stone, rather firm, sweet, mild, moderately rich; quality good.

Imperial Gage.

Two trees of this variety were planted in 1891. These have made strong growth and fruited abundantly since 1899. The fruit is medium sized, round-oval; cavity shallow, broad, flaring; stem an inch long; suture shallow; colour yellowish green; dots green; bloom whitish; skin tough; flesh greenish yellow, quite free from stone; quality good to best. Ripens here about the middle of September.

Prince's Yellow Gage.

Three trees of this variety were planted in 1891. These have made exceptionally strong and vigorous growth and have fruited abundantly. This seems to have more vigour than the Imperial Gage, and, has fruited more abundantly. The fruit is medium

sized round-oval; cavity broad shallow; stem stout; suture a line; colour golden yellow, a little clouded, bloom white, heavy; flesh deep yellow, stone free; flavour rich, sugary, quality very good. Ripens here soon after the first of September.

Bryanston's Gage.

Two trees of this variety were planted in 1897, have made strong growth and have fruited this season. The fruit is of medium size, roundish; colour dull greenish yellow, with a darker shading in the sun; flesh yellow clinging to stone. The quality is good. It is a late plum about the season of Reine Claude de Bavay, and does not appear superior in any way.

The Dame Aubert group.—The characters of this group are summarized as follows:—'Large growing trees, with large foliage; fruit very large oval, with more or less of a neck; yellow greenish yellow, or purplish; flesh yellow. This includes our largest plums, perhaps excepting one or two hybrids.' In this group are Coe's Golden Drop, Grand Duke and Yellow Egg or Magnum Bonum.

Coe's Golden Drop.

Two trees of this variety were planted in 1891. These have not made very good growth, but have fruited well since 1898. The fruit is very large, oval, with a short neck, the two halves unequal; suture deep; cavity very shallow and abrupt; stem stout, medium in length; apex somewhat depressed; colour golden yellow, dots very many, yellow; bloom yellow; flesh firm adhering partly to stone; quality good. Ripens here towards the last of September. This is a good commercial variety and should prove valuable in this province. It is sometimes called the Silver Prune.

The Prune group.—The group characters which may be assigned to the prunes are as follows:—'Trees and foliage, various; fruit mostly medium to large, always oval or ellipsoid, usually with one side of the oval straighter than the other; compressed; colour, blue or purple; flesh mostly greenish yellow, rather firm; stone usually free in a large cavity.' The varieties belonging to this group and generally known in this province are Fellenburg or Italian Prune, German Prune and Czar.

Fellenberg.

Two trees of this variety were planted in 1893. They have made the most vigorous growth of any plum trees in the orchard, and have borne a large crop of fruit the past two seasons. The tree has a spreading but compact habit. The fruit is borne evenly over the whole tree, which can carry a large crop. To look at the tree, only a small crop would be expected, but its even distribution of large specimens makes this one of the best yielding plums we have. This plum never sets so much fruit as to make thinning necessary. It is a variety well known throughout America and 80 per cent of the prunes grown on the Pacific coast are said to be of this sort. The fruit is large, elliptical, straighter on one side and longer on the other, cavity very shallow; stem nearly as long as the fruit; suture shallow; colour dark blue; dots not many, dull yellow; bloom blue; skin thin; flesh greenish yellow; stone medium sized, and free from the flesh; quality good to extra. Ripens here about the first of October. This is considered an exceptionally good market plum on account of its lateness and good shipping qualities.

GERMAN PRUNE.

Three trees of this variety were planted in 1892. They have made good growth, and are quite productive. They have fruited since 1899. The crop has not been as large as the Italian Prune, nor is the tree so vigorous. The quality of the fruit is not equal to the Italian Prune, nor is it as large. The fruit is above medium, long oval, cavity very shallow, stem rather slender, medium in length; suture hardly more than a line, apex somewhat pointed; colour blue; with a few scattered dots; bloom blue; flesh greenish yellow, free from stone; stone small, quality fair. Ripens the last of September. This plum is largely grown in Germany, and also extensively planted in America.

The Bradshaw type.—'Plums of this type are characterized by having large, slightly obovate fruit which is purplish, and has distinct pinkish dots. They also have a thin skin, and a comparatively soft, juicy flesh.' In this class are Victoria, Pond's Seedling, Field and Bradshaw. We have not fruited Victoria and Bradshaw, but the trees are making splendid growth. These two varieties do well in Prince Edward Island.

POND'S SEEDLING.

Two trees of this variety were planted in 1892. They have not made strong growth and have not fruited much. The fruit is very large; obovate, with a short neck; cavity narrow and shallow; colour violet or purple; dots numerous, brownish; flesh yellow, juicy; skin thick; quality good.

The Lombard group.—'Probably the thinnest distinction of all is to be made betwixt the Bradshaw and the Lombard type. They differ, however, from having fruit generally smaller, more regularly oval, very slightly compressed sideways, pinkish-purple or purplish.' Varieties common to us are Prince of Wales and Lombard. The Prince of Wales is making good growth here but has so far not fruited. It does not appear to have as much vigour as the Lombard.

LOMBARD.

Three trees of this variety were planted in 1891. They have made fairly good growth, and have fruited well since 1897. The tree is an upright grower, but seems more susceptible to black knot here than any other variety, and is not being so largely planted now as formerly. The fruit is of medium size; oval, slightly flattened at the end; stem short; suture shallow; cavity medium deep; colour delicate purplish, or reddish violet; dots several, whitish; bloom blue; flesh yellow, firm, clinging to stone; skin thin, quality only fair. Ripens here the middle of September.

The following varieties were named by two prominent plum growers of this Province as the most profitable to plant for the present market, one suggested Burbank, Grand Duke, Magnum Bonum or Yellow Egg and German Prune, and the other, Bradshaw, Washington, Prince of Wales and Burbank.

STRAWBERRIES.

Forty-eight varieties were under test this season. The crop was a good one, due to the favourable weather at time of ripening. The following table gives the quantity obtained from each plot, and the time of picking. The yield of the same varieties for the years 1901, 1900 and 1899, is also given. The soil on which these were grown is a clay loam, which becomes very hard and compact after the first year. We follow the

practice of taking but one crop off, and then plough up the plants. Generally speaking this will be found the most profitable plan to follow. The varieties found best here are Warfield, Beder Wood, Greenville, Bubach, Saunders, Parker Earle and Haverland. Several new varieties fruited this year for the first time.

STRAWBERRIES.

Name.	Sex.	Date of first picking.	Date of last picking.	Date of largest picking.	Fruit picked to July 22, 1902.	Fruit picked from July 22 to end of season.	Total fruit picked from plot of 99 sq. ft. in 1902.	Total fruit picked from plot of 99 sq. ft. in 1901.	Total fruit picked from plot of 99 sq. ft. in 1900.	Total fruit picked from plot of 99 sq. ft. in 1899.
					Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.	Lbs. oz.
Afton	P	July 17.	July 28.	July 21.	12 15	5 1	18 ..	.. ..	.. ..	.. ..
Beder Wood	B	" 14.	" 28.	" 17.	23 ..	7 1	30 1	34 3	28 12	31 8½
Brandywine	B	" 14.	" 28.	" 24.	11 2	11 7	22 9	16 2	20 ..	11 9½
Buster	P	" 17.	" 31.	" 22.	12 10	8 14	21 8	.. ..	.. ..	.. ..
Bisel	P	" 14.	" 29.	" 21.	18 13	6 9	25 7	40 ..	28 13	32 7½
Beverly	B	" 21.	" 31.	" 26.	6 2	11 8	17 10	33 4	24 12	19 5½
Barton's	P	" 14.	" 28.	" 21.	20 8	9 8	30 ..	32 2	27 3	24 2½
Bubach	P	" 14.	" 31.	" 24.	9 ..	13 8	22 8	39 8	21 13	18 9
Chairs	B	" 17.	" 31.	" 21.	8 2	7 6	15 8	17 1	20 2	15 12
Cosette	P	" 14.	" 31.	" 21.	10 9	3 2	13 11	17 8	.. ..	.. ..
Clyde	B	" 14.	" 29.	" 21.	9 7	10 1	19 8	.. ..	.. ..	.. ..
Capt. Jack	P	" 14.	" 31.	" 21.	27 ..	5 8	32 8	32 4	31 8	17 5
Crescent	P	" 14.	" 28.	" 22.	29 12	9 8	39 4	32 ..	39 12	39 9
Daisy	P	" 14.	" 28.	" 21.	12 14	6 13	19 11	.. ..	.. ..	.. ..
Enhance	B	" 15.	" 31.	" 21.	10 6	16 14	27 4	23 13	22 6	13 9½
Equinox	B	" 14.	" 31.	" 26.	5 9	6 10	12 3	12 8	12 ..	17 4
Eureka	P	" 19.	" 31.	" 25.	3 9	11 2	14 11	25 8	19 5	21 13
Glen Mary	B	" 15.	" 31.	" 22.	11 3	10 15	22 2	.. ..	.. ..	.. ..
Greenville	P	" 15.	" 29.	" 21.	18 ..	6 8	24 8	42 ..	21 14	17 4
Gandy	B	" 14.	" 31.	" 21.	21 14	7 13	29 11	27 12	18 4	19 6
Haverland	P	" 14.	" 31.	" 21.	11 ..	17 1	28 1	34 10	22 9	22 8½
H. W. Beecher	B	" 14.	" 28.	" 21.	23 14	6 ..	29 14	31 8	29 3	37 3
Howard's No. 41	P	" 17.	" 31.	" 22.	12 13	8 15	21 12	.. ..	.. ..	.. ..
Ida	P	" 14.	" 28.	" 21.	14 10	5 5	19 15	20 ..	.. ..	.. ..
Jessie	B	" 15.	" 28.	" 21.	13 4	6 12	20 ..	18 1	.. ..	.. ..
John Little	P	" 14.	" 28.	" 21.	32 7	7 3	39 10	28 2	24 14	22 3
Jas. Vick	B	" 15.	" 31.	" 24.	12 13	20 4	33 1	34 8	20 11	21 9
Lovett	B	" 14.	" 28.	" 21.	27 15	6 2	34 1	36 ..	28 ..	35 13
Mary	B	" 14.	" 31.	" 21.	12 1	8 3	20 4	17 8	17 4	22 4
Otsego	P	" 21.	" 31.	" 26.	6 9	8 13	15 6	28 1	18 5	14 6½
Pearl	P	" 14.	" 28.	" 17.	22 6	3 14	26 4	24 12	21 6	19 6
Paris King	B	" 14.	" 28.	" 17.	8 3	2 9	10 12	17 12	23 8	4 7½
Parker Earle	B	" 14.	" 28.	" 22.	12 14	4 1	16 15	31 1	37 15	21 5
Princess	P	" 14.	" 31.	" 21.	24 13	7 9	32 5	30 ..	.. ..	.. ..
Swindle	P	" 17.	" 31.	" 26.	10 9	19 3	29 12	28 12	19 4	22 8
Seneca Queen	B	" 17.	" 31.	" 21.	15 15	9 9	25 8	27 ..	24 10	17 14
Sharpless	B	" 14	" 31.	" 21.	17 1	12 1	29 2	18 4	20 7	17 7
Shirts	P	" 17	" 31.	" 26.	10 ..	14 14	24 14	16 14	14 1	15 2
Saunders	B	" 14.	" 31.	" 21.	17 8	14 13	32 5	35 8	.. ..	.. ..
Senator Dunlop	B	" 17.	" 28.	" 21.	11 1	6 2	17 3	.. ..	.. ..	.. ..
Thompson's Late	P	" 14.	" 21.	" 14.	9 ..	2 1	11 1	14 14	14 1	9 15
Tennessee Prolific	B	" 15.	" 31.	" 21.	14 14	13 2	28 ..	31 10	.. ..	.. ..
Wm. Belt	B	" 15.	" 31.	" 26.	13 8	10 11	24 3	25 12	8 10	14 4
Woolverton	B	" 14.	" 28.	" 21.	14 8	4 11	19 3	.. ..	37 3	21 14½
Wilson	B	" 14.	" 31.	" 21.	19 1	9 15	29 ..	31 4	20 10	21 4
Warfield	P	" 14.	" 28.	" 19.	22 ..	6 10	28 10	47 8	41 7	40 ..
Williams	B	" 16.	" 28.	" 21.	16 8	5 10	22 2	20 8	28 11	19 15½
1091	P	" 14.	" 31.	" 22.	12 9	8 2	20 11	22 4	.. ..	.. ..

GARDEN PEASE.

Eighty-five varieties of garden pease were grown this year. The soil was a clay loam, and the previous crop was strawberries. No manure was given. The pease were sown in rows 3 feet apart, and the seed dropped $1\frac{1}{2}$ inches apart in the row. Each plot was one row 66 feet long. One-half of each plot was pulled when fit to use green, and the quantity of green pease with pods from that half plot noted. The other half was allowed to ripen seed. The following table gives ten of those varieties which we consider the best. The variety Alaska is one of the earliest green pease grown, and is perhaps the best early one. The three large peas King Edward VII, Prosperity and Gradus, are all good, coming in about the same time. King Edward VII a new English pea sent out by Haszard & Moore, Charlottetown, P.E.I., is in our opinion superior to either Prosperity or Gradus. The varieties Gradus and Prosperity are catalogued as one by many seedsmen, we have found Prosperity more productive than Gradus.

GARDEN PEASE—TEN OF THE BEST VARIETIES.

Name of Variety.	When planted.	First green pease picked.	Last green pease picked.	Total quantity of green pease from plot, 1902.	Total quantity of green pease from plot, 1901.	Total quantity of green pease from plot, 1900.	Length of vine.	Size of pod.	Character of pease.
				Lbs.	Lbs.	Lbs.	In.	Inches.	
Alaska	Apl. 25.	July 16.	July 26.	$26\frac{1}{2}$	30	$13\frac{1}{4}$	28	$2\frac{1}{4}$ to $2\frac{1}{2}$	Medium, smooth, dark green.
Nott's Excelsior	" 25.	" 22.	" 28.	$23\frac{1}{4}$	26	$29\frac{1}{4}$	18	$2\frac{1}{4}$ " $2\frac{3}{4}$	Medium, wrinkled, green.
American Wonder.	" 25.	" 22.	" 29.	$23\frac{1}{2}$	42	20	16	$2\frac{1}{4}$ " $2\frac{3}{4}$	" "
King Edward VII.	" 25.	" 22.	" 30.	$24\frac{1}{2}$	$22\frac{1}{2}$	.....	32	3 " $3\frac{1}{2}$	Large, wrinkled, light green.
Prosperity	" 25.	" 23.	" 31.	$20\frac{3}{4}$	22	.....	30	$2\frac{3}{4}$ " $3\frac{1}{2}$	" "
Gradus	" 25.	" 23.	" 31.	$19\frac{3}{4}$	$16\frac{3}{4}$	$12\frac{1}{2}$	30	3 " $3\frac{1}{2}$	" "
Dwarf Telephone	" 25.	" 31.	Aug. 9.	32	44	$32\frac{3}{4}$	20	3 " $3\frac{1}{2}$	" "
Duke of Albany or American Champion	" 25.	Aug. 1.	" 9.	$37\frac{1}{4}$	53	36	36	3 " $3\frac{1}{2}$	Large, wrinkled, green.
Heroine	" 25.	" 4.	" 12.	34	36	$38\frac{1}{2}$	34	3 " $3\frac{3}{4}$	" "
Stratagem	" 25.	" 4.	" 12.	$36\frac{1}{2}$	.....	.....	32	$2\frac{3}{4}$ " $3\frac{1}{2}$	Large, wrinkled, light green.

GARDEN CORN.

Forty-eight varieties of garden corn were planted May 31 in hills 3 feet apart each way. The soil on which they were grown is a clay loam, and was previously in strawberries. Manure at the rate of 20 one-horse cart loads per acre was scattered broadcast over this in the spring and the ground ploughed and worked up. The corn was thinned to 4 stalks to a hill. The season was not favourable for corn, and many of the varieties did not mature before killed by frost.

The Golden Bantam is a variety of yellow corn, good for home use or special market. It is too small for the general market. It is certainly the most delicious of any corn tested. Fuller's Early Yellow is the earliest and best market variety of the other yellow sorts grown.

The following varieties are probably the best for general market. They matured in the following order: Peep O'Day, and Beverly, are a few days earlier than Early Cory, but the ears are not large, and the plants are not large croppers. Extra Early Cory and Early Marblehead, Ford's Early Sugar, Early Fordhook, Crosby's Early Sugar, Fuller's Early Yellow, Canada Yellow, New Champion, and Metropolitan. A good selection for general planting is Beverly, Extra Early Cory, Crosby's Extra Early, Golden Bantam and New Champion.

EARLY POTATOES.

To test the relative value of some of the best early varieties of potatoes for early market purposes 18 different sorts were planted, in rows 24 inches apart, and one foot apart in the rows, on May 21, and dug August 12. The plots dug consisted each of 1 row 33 feet long. Eight of these varieties have been tested in this way for the past three years. The ground was fertilized with complete fertilizer at the rate of 400 lbs. per acre sown in the drills. The following results were obtained:—

EARLY POTATOES.

Name.	Dug Aug. 12, 1902.		Dug Aug. 19, 1901.		Dug Aug. 10, 1900.		Remarks.
	Marketable.	Unmarketable.	Marketable.	Unmarketable.	Marketable.	Unmarketable.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
Early Sunrise	20¼	2	20¾	5½	33	9	Good, pink.
Early Gem	26	4½	17½	7½			Pink, good.
Burpee's Extra Early	17¼	7¼	18½	5½	28½	4½	Good, pink and white.
Pearce's Extra Early	32¼	5½	21	4	27	4½	Good, pink and white.
Early Ohio	28	4	16½	7	30	9	Good, pink.
Crown Jewel	34	5	24½	4	42	8½	Good, pink and white.
Bovee	29¾	6½	19	6	36	12	Good, pink and white.
Irish Cobbler	28	5½	24	6	40½	6	White, good.
Canadian Beauty	18	3					Pink and white, good.
Early Harvest	23¼	2½					Good, white.
Early Andes	26	4½					Pink, good.
Earliest of all	30	6					Pink and white, good.
Reeve's Rose	28	4					Good, pink.
Early Michigan	36	2					Good, white.
Beauty of Hebron	22	3¼					Pink and white, good.
Rawdon Rose	21½	2					Good, pink and white.
Early Rose	30¼	3					Good, pink.
Early Norther	38	3¼					Good, pink.

ONIONS.

Twenty varieties of onions were tested under similar conditions. The seed of these was sown in the hot-bed April 3, and the plants were planted in the open ground on May 6. The ground into which they were transplanted was a rich loam, the same as that on which the onions were grown the previous season. It was ploughed in the spring, disc and smooth harrowed, after which 200 lbs. of complete fertilizer per acre was sown broadcast and harrowed in with the smoothing harrow. The plants were set

on the level ground in rows one foot apart and 3 inches apart in the rows. They were put in $\frac{3}{4}$ of an inch deep. The yield in the following table is from one row 66 feet long. They matured in the order given :—

ONIONS—TEST OF VARIETIES.

Name.	Pounds matured from plot.	Remarks.
Barletta	47	White, small, round, matured well.
Paris Silverskin	49	White, small, flat, matured well.
White Dutch	37	White, small, flat, matured well.
Paris Silver King	93	White, large, flat, matured well.
Extra Early Pearl	64	White, medium, flat, matured well.
Express	61	Yellow, medium, round, matured well.
Extra Early Red Seal	48	Medium, did not come true.
Extra Early Gold Seal	44	Medium, did not come true.
Australian Brown	53	Brownish, medium to large, round, matured well.
Southport Yellow Globe	84	Yellow, large, globe, matured well.
Wethersfield Large Red	59	Red, large, flat, matured fairly well.
Southport White Globe	75	White, large, globe, matured fairly well.
Pink Prizetaker	59	Not all true pink, large, globe, matured fairly well.
Prizetaker	62	Yellow, large, globe, matured fairly well.
Market Favourite Keeping	52	Large, globe, matured fairly well.
Gigantic Gibraltar	96	Yellowish, large, globe, matured fairly well.
Danver's Yellow Globe	56	Yellow, large, globe, matured fairly well.
Straw-colored White Spanish	52	Yellow, large, matured fairly well.
Spanish King	22	Yellow, large, did not mature well.
James' Keeping	26	Large, did not mature well.

TOMATOES.

Eighty varieties of tomatoes were planted this season. They were started in the hot-bed on March 25, and transplanted one plant to a strawberry box of earth, April 15. These were allowed to grow in these boxes until put out in the open ground June 9. The plants were removed from the boxes by cutting them, and set with the earth attached 4 feet apart each way. The ground was in a fair state of cultivation and no manure or fertilizer was used. On June 28 a tablespoonfull of nitrate of soda was scattered around each plant.

These plots made fair growth, but owing to the cool weather only in a few cases did fruit ripen. The following sorts ripened some fruit and matured in the order named,—Atlantic Prize, South Jersey Quick-sure, Spark's Earliana, Earliest, Earliest of All, Early Leader, Extra Early, Advance, Early Ruby, Brinton's Best, Early Minnesota and Fordhook First.

VEGETABLES FOR THE GARDEN.

The following list has been found the most desirable varieties for general use :—

Pease.—Early, Alaska, Medium, Prosperity, Late, Heroine.

Beans.—Early, Golden Wax, Medium, Extra Early Valentine, Late, Keeney's Rustless Wax.

Corn.—Extra Early, Beverly, Early Cory, Early Marblehead.

Cabbage.—Jersey Wakefield, Early Spring, Large Late Drumhead.

Cauliflower.—Early Dwarf Erfurt.

Onions.—Barletta, Australian Brown.

Carrots.—Chantenay.

Cucumbers.—White Spine, Boston Pickling.

Beets.—Eclipse.

Celery.—White Plume.

Tomatoes.—Atlantic Prize, Earliest of All.

Parsnips.—Hollow Crown.

Squash.—Bay State, Hubbard.

I have the honour, to be, sir,

Your obedient servant,

W. S. BLAIR,

Horticulturist.

EXPERIMENTAL FARM FOR MANITOBA.

REPORT OF S. A. BEDFORD, SUPERINTENDENT.

BRANDON, MAN., November 30, 1902.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my fifteenth annual report, with details of experiments undertaken and work accomplished on the Brandon Experimental Farm during the past year.

The past winter was milder than usual and practically free of storms. From March 14 to 17, however, we experienced one of the worst blizzards ever known here, the wind blowing for many hours at the rate of sixty miles per hour. This was accompanied by a very heavy fall of wet snow which piled up into unusually high banks, and the thawing of this quantity of water-saturated snow, later in the season, did much towards retarding spring seeding.

April was a very backward month, the mean temperature being much below the average.

The weather during May was cloudy and cool and the rainfall excessive, but there was a total absence of injurious frosts. June set in with a deluge of rain on the first of the month, four inches falling on the Experimental Farm, in the space of forty minutes. The effect of such a deluge was to sweep away all loose soil from hilly fields into the hollows. Roads were almost destroyed, and deep water furrows cut on all sloping land. The balance of June was cloudy and the rainfall excessive.

These two months of exceptional rainfall raised the Assiniboine much above the usual level, flooding the valley and destroying the crop in its course. Fortunately the larger portion of the uniform test plots were sown on the higher portions of the farm and escaped injury. The rotation plots and quite a number of other interesting experiments were, however, destroyed, and will have to be taken up again in future years.

July was warm, the early rains had filled the soil with moisture, and growth was unusually rapid, so much so that weeds were crowded out and the heads of grain filled better than usual. Summer fallows on strong and moist land lodged badly, but the grain filled better than was expected, and in spite of the late spring, harvest was only a few days later than usual. Hired help was very difficult to procure throughout the summer and thousands of acres of wheat in this province lay unstooked for weeks for want of harvest hands. Fortunately the weather during harvest and threshing was nearly perfect, otherwise the loss would have been great.

Without doubt the past season has been the most satisfactory one, from an agricultural standpoint, ever experienced in the province, although few districts report abnormal returns. In nearly all portions of the province the yield of all kinds of grain was above the average, and the sample is generally an excellent one.

All the uniform test plots of wheat on the Experimental Farm, with one exception, escaped injury and the returns both in quantity and quality were all that could be desired. The different experiments with Speltz wheat were examined with interest during the summer, and numerous letters are being received from farmers seeking information regarding this newly introduced grain. Flax culture is also receiving increased attention throughout the province and in view of this, experiments with this crop have been extended. Several new varieties have been tried and a test of the suitability of a flax crop on new breaking has also been made.

Farmers supplied, in former years, with pure bred swine from this farm have been requested to express an opinion on them, and, in this year's report will be found extracts from their letters.

The fine crop of crab apples (Pyrus baccata) grown on the farm this year was very gratifying, and encourages us to hope that in the near future crab apples may be grown extensively in all parts of the province.

EXPERIMENTS WITH SPRING WHEAT.

On the Experimental Farm the yield of wheat on the uniform test plots was generally above the average, but some of the larger fields were injured by the flood. As usual the varieties least subject to rust were the most productive. It is evident that this disease is one of the chief factors in reducing the yield of wheat, especially during seasons of abundant rainfall, such as we have had the last two years.

The noticeable productiveness of Goose and Roumanian varieties of wheat can no doubt be largely attributed to their freedom from rust. Speltz wheat is also very free from this disease, which fact no doubt accounts for the palatableness of its straw. Apparently the injury from wheat smut is largely decreasing. There was very little last year, and this year not a trace could be found on the farm, either among the treated or untreated grain.

Owing to the very favourable harvest weather, and absence of frost, the wheat on this farm was unusually bright and plump.

Seventy-one varieties of spring wheat were tested this year. These were sown from the first to the sixth of May on black loam in plots of one-twentieth of an acre each.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs	
Roumanian	Aug. 31	117	48	Weak	2½	Bearded	6,675	46	20	65	None.
Goose	" 31	118	53	"	2½	"	6,665	44	40	64	"
Campbell's White Chaff	" 29	121	53	Stiff	3½	Beardless.	7,800	37	40	61	Slightly.
Countess	" 30	121	48	"	3	"	7,600	37	20	60	Badly.
Australian No. 10.	" 30	121	53	"	3	"	7,200	36	40	60	"
White Fife	" 30	121	52	"	3½	"	7,600	35	20	60	Slightly.
Clyde	" 29	121	55	"	4	"	6,660	35	10	60	"
Speltz	" 27	113	41	"	2	Bearded	3,990	34	40	42	None.
Monarch	" 27	119	55	"	4	Beardless.	6,660	34	40	60	Slightly.
Dawn	" 25	117	45	Fair	3½	"	7,310	34	20	60	"
Benton	" 27	114	45	Stiff	3	"	6,125	34	"	61	"
Herrisson Bearded	" 27	113	47	Weak	2½	Bearded	5,460	34	"	61	"
Chester	" 26	113	48	Stiff	3	Beardless.	5,250	33	50	60	"
Admiral	" 27	119	50	"	4	"	6,660	33	50	60	"
Crown	" 26	113	47	"	3	Bearded	5,920	33	40	60	"
White Russian	" 30	122	50	"	4	Beardless.	7,000	33	20	59	"
Laurel	" 30	122	50	"	4	"	6,670	32	40	59	"
Captor	" 27	119	40	"	3½	"	7,905	32	30	60	"
Mason	" 25	117	48	"	3½	"	5,600	32	30	61	"
Robin's Rust Proof	" 28	119	53	"	3	"	7,200	32	20	60	"
Minnesota 149	" 28	119	53	"	4	"	6,800	32	"	60	"
White Connell	" 27	119	50	"	4	"	5,950	32	"	60	"
Red Fern	" 26	112	45	"	3	Bearded	4,760	32	"	61	"
Angus	" 27	114	50	"	3½	Beardless.	5,280	31	40	60	None.
Stanley	" 27	119	47	"	2½	"	6,355	31	20	60	Considerably
Rideau	" 28	120	44	"	3	"	6,460	31	10	60	Slightly.
Cartier	" 24	111	41	Fair	3	Bearded	4,495	31	"	60	"
Dion's	" 28	115	55	Weak	4	"	4,840	31	"	62	"
Dufferin	" 26	113	51	Fair	3½	"	6,400	31	"	60	"
Red Fife	" 28	120	49	Stiff	3½	Beardless.	6,300	31	"	60	"
Minnesota 169	" 28	119	53	"	4	"	5,920	30	50	59	"
Australian No. 13	" 27	114	49	"	4	"	5,950	30	40	58	"
Colorado	" 26	113	44	"	3	Bearded	5,700	30	20	60	"
Hastings	" 26	113	47	Fair	3	Beardless.	5,610	30	20	61	"
Australian No. 9	" 27	114	50	Stiff	3½	"	5,280	30	20	60	"

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs	
Blenheim	Aug. 27	114	51	Stiff	4	Bearded	5,775	30	20	58	Slightly.
Blair	" 26	113	42	Weak	3	Beardless	4,290	30	..	61	"
Wellman's Fife	" 28	115	53	Stiff.	3½	"	5,280	30	..	60	"
Rio Grande	" 27	114	50	"	3½	Bearded	5,075	29	50	61	"
Alpha	" 28	120	48	"	3½	Beardless	5,330	29	40	60	"
Minnesota 163	" 30	117	49	"	4	"	6,970	29	40	59	Badly.
Percy	" 20	112	50	"	3½	"	6,435	29	20	59	Slightly.
Progress	" 27	119	40	"	3½	"	6,270	29	10	60	"
Red Swedish	" 30	117	51	Fair.	3½	Bearded	5,850	28	40	60	Badly.
Early Riga	" 18	110	45	Weak	3½	Beardless	5,120	28	20	59	Slightly.
Norval	" 25	111	43	"	3	Bearded	4,510	28	20	61	"
Advance	" 27	113	42	Fair.	3	"	4,440	28	20	61	"
Cassell	" 28	115	52	Stiff.	4	Beardless	5,950	28	20	60	"
Essex	" 28	115	50	"	3½	"	5,125	27	50	60	"
Australian No. 19	" 29	120	48	"	3	"	6,045	27	40	60	Badly.
Blue Stem	" 30	122	53	"	3½	"	6,600	27	40	58	"
Beaudry	" 26	113	47	Weak	3	Bearded	6,045	27	20	62	Slightly.
Crawford	" 25	116	51	"	3½	Beardless	4,960	27	..	60	"
Ladoga	" 22	109	48	Fair.	3½	Bearded	4,945	26	40	60	"
Australian No. 27	" 26	116	51	Stiff.	4	Beardless	5,760	26	20	60	Badly.
Bishop	" 25	112	47	Weak	3	"	4,060	25	40	60	Slightly.
Huron	" 28	114	42	Stiff.	4	Bearded	4,070	25	40	60	Badly.
Weldon	" 29	121	55	"	3½	Beardless	5,940	25	..	60	Slightly.
Preston	" 27	113	43	"	3½	Bearded	4,510	25	..	60	"
Byron	" 27	113	41	Fair.	3	"	4,140	24	40	62	Badly.
Ebert	" 20	106	38	Weak	3	Beardless	4,200	24	40	60	Slightly.
Australian No. 23	" 28	115	53	Stiff.	4	"	6,120	24	30	58	"
Pringle's Champlain	" 27	113	39	Weak	2½	Bearded	4,920	24	20	61	Badly.
Beauty	" 26	118	52	Stiff.	4	Beardless	5,735	24	20	59	"
Plumper	" 26	112	37	Weak	3	Bearded	4,550	24	20	60	Slightly.
Australian No. 25	" 28	115	52	Stiff.	4	Beardless	5,320	24	..	57	Badly.
Hungarian	" 28	115	52	Weak	4	Bearded	4,620	23	50	63	Slightly.
Harold	" 26	106	37	"	2½	"	4,050	23	40	58	"
Fraser	" 25	111	41	Fair.	4	"	4,255	23	20	60	Badly.
Japanese	" 20	106	49	Weak	2½	"	3,520	22	..	58	"
Minnesota 181	" 31	117	48	Stiff.	4	Beardless	4,625	18	20	59	"
Vernon	" 27	113	41	"	3½	Bearded	2,775	14	50	59	Slightly.

NOTE.—Vernon was injured by flood.

AVERAGE Results of a Test of Twelve Varieties of Wheat for the past Five Years.

Variety.	Years Included.	Yield per Acre.	
		Bush.	Lbs.
Goose	1898, 1899, 1900, 1901, 1902	42	46
Monarch	1898, 1899, 1900, 1901, 1902	35	24
Crown	1898, 1899, 1900, 1901, 1902	34	30
White Fife	1898, 1899, 1900, 1901, 1902	34	14
Wellman's Fife	1898, 1899, 1900, 1901, 1902	33	14
White Connell	1898, 1899, 1900, 1901, 1902	33	8
White Russian	1898, 1899, 1900, 1901, 1902	33	7
Red Fife	1898, 1899, 1900, 1901, 1902	32	46
Stanley	1898, 1899, 1900, 1901, 1902	31	30
Dufferin	1898, 1899, 1900, 1901, 1902	30	48
Percy	1898, 1899, 1900, 1901, 1902	29	32
Hungarian	1898, 1899, 1900, 1901, 1902	28	38

VARIETIES OF SPRING WHEAT GROWN FROM SELECTED AND UNSELECTED HEADS.

As in former years the largest heads were selected from the standing grain of last year, and the seed was sown this year for a comparison with unselected seed, from the same plots.

The plots were all one-twentieth acre, and each pair was sown in close proximity, the soil was a sandy loam. The accompanying table gives the result of each individual variety. A summary is also given which shows the average yield from the selected wheat fifteen pounds per acre greater than the unselected. Last year the unselected gave slightly the largest return.

WHEAT.

Variety.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Variety.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
	Lbs.	Bush.	Lbs.	Lbs.		Lbs.	Bush.	Lbs.	Lbs.
Goose—Selected	7,350	46	40	64	Progress—Selected	7,175	31	..	60
" Unselected	6,665	44	40	64	" Unselected	6,270	29	10	60
Rideau—Selected	7,020	36	..	60	Blenheim—Selected	6,240	30	50	59
" Unselected	6,460	31	10	60	" Unselected	5,775	30	20	58
Stanley—Selected	6,475	34	20	60	Alpha—Selected	6,475	30	40	59
" Unselected	6,355	31	20	60	" Unselected	5,330	29	40	60
Monarch—Selected	7,200	33	40	60	Crown—Selected	5,760	30	20	60
" Unselected	7,200	33	40	60	" Unselected	5,920	33	40	60
Campbell's White Chaff—Selct'd	5,760	33	40	61	Dawn—Selected	6,120	30	10	59
" Unselected	5,760	33	40	61	" Unselected	7,310	34	20	60
White Russian—Selected	7,995	32	50	59	Beaudry—Selected	6,105	30	..	62
" Unselected	7,000	33	20	59	" Unselected	6,045	27	20	62
Blue Stem—Selected	7,020	32	40	60	White Connell—Selected	7,020	29	50	60
" Unselected	6,600	27	40	58	" Unselected	5,950	32	..	60
Captor—Selected	7,020	32	30	60	Admiral—Selected	6,840	29	50	59
" Unselected	7,900	32	30	60	" Unselected	6,660	33	50	60
Colorado—Selected	6,150	32	20	60	Ladoga—Selected	4,715	28	20	60
" Unselected	5,700	30	20	60	" Unselected	4,945	26	40	60
Red Fife—Selected	4,680	32	10	61	Beauty—Selected	5,655	27	50	59
" Unselected	6,360	31	..	60	" Unselected	5,735	24	20	59
Mason—Selected	5,950	32	..	61	Early Riga—Selected,	5,440	26	40	59
" Unselected	5,600	32	30	61	" Unselected	5,120	28	20	59
Clyde—Selected	6,090	32	..	60	Dufferin—Selected	6,125	26	10	60
" Unselected	6,660	35	10	60	" Unselected	6,400	31	..	60
Dion's—Selected	6,630	31	40	61	Advance—Selected	3,840	26	..	60
" Unselected	4,840	31	..	62	" Unselected	4,440	28	20	61
Red Swedish—Selected	7,200	31	20	60	Hungarian—Selected	4,945	24	40	61
" Unselected	5,850	28	40	60	" Unselected	4,620	23	50	63

SUMMARY.

	Bush.	Lbs.
Average yield of 28 varieties, selected	31	18
" 28 unselected	31	3

A TEST OF FERTILIZERS ON A CROP OF SPRING WHEAT.

With one exception the fertilized plots have this year given the largest returns.

The size of the plots was one-fortieth acre. The soil was a sandy loam, summer-fallowed. All were sown on May 6, and all harvested on Aug. 30. There was no smut and very little rust. The straw on all the plots was quite stiff.

The variety of wheat sown on all the plots was Red Fife. One and one-half bushels of seed per acre.

Red Fife Wheat, Fertilizers Applied.	Length of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
	in.	in.	Lbs.	Bush. Lbs	Lbs.
100 lbs. per acre of nitrate of soda, ½ sprinkled when the grain was 2 in. high, balance when 6 in. high	45	3	3,150	33 20	60
200 lbs per acre of nitrate of soda, ½ sprinkled when the grain was 2 in. high, balance when 6 in. high	45	3	3,780	28 ..	60
No fertilizer used	45	3	3,360	28 ..	60
Superphosphate, 400 lbs. per acre, spread just before sowing	45	3	3,780	35 20	60
Muriate of potash, 200 lbs per acre, spread just before sowing	45	3	3,600	37 20	60
A mixture, 200 lbs. superphosphate, 100 lbs. nitrate of soda, 100 lbs. muriate potash per acre, ½ spread before sowing, ½ when grain was 2 or 3 in. high	45	3	3,840	38 ..	60

FALL WHEAT.

One of the 1-10th acre plots, surrounded by maple hedges, was sown on August 24, 1901, with fall wheat. The variety was New Ontario, grown in the East. The plants grew rapidly and were quite large by winter, but the plot was badly flooded in the spring, and nearly all the wheat killed. Four sheaves only were saved. The seed from these will be sown and tested again.

FALL RYE.

Two of the hedge plots were also sown on August 24, 1901, with fall rye. In one the seed sown was procured from Ontario, and the other was sown with Manitoba grown seed. Both lots wintered successfully. The plot sown with Manitoba seed yielded 62 bushels and 18 pounds per acre, weighing 56 pounds per bushel, and the plot sown with Ontario seed yielded 48 bushels and 16 pounds per acre, weighing 58 pounds per bushel. This last plot was somewhat injured by spring freshets, which, no doubt, largely accounts for the difference in yield.

FIELD PLOTS OF SPRING WHEAT.

Variety.	Character of Soil.	How Land was Prepared.	Size of Plots.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Yield per Acre.
			Acres.				Bush. Lbs.
Preston	Light sandy loam	Spring ploughed.	5	April 16..	Aug. 19..	125	10 24
Stanley	" "	" ..	3	" 19..	" 20.	123	11 43
White Fife	" "	" ..	5	" 23..	" 26..	125	10 24
Red Fife	" "	" ..	3	" 18..	" 26..	130	10 50
White Connell	" "	" ..	2	" 17..	" 25	130	14 55
Wellman's Fife	" "	Corn land	3	" 29..	" 29..	122	22 20
Dawn	Clay loam.	Summer fallow..	2	May 1..	" 25..	116	27 10
Crown	"	" ..	2	" 6..	" 30..	116	18 20
Monarch	"	" ..	1	" 7..	" 30..	115	25 15
Huron	"	" ..	2	" 7..	" 26..	111	30 20
Laurel	"	" ..	1	" 7..	Sept. 3..	119	36 5
White Russian		" ..	1	" 13..	Aug. 29..	108	38 30
Speltz	"	" ..	2	" 13..	" 29..	108	39 6

These results show the great advantage of summer fallow over spring ploughing.

EXPERIMENTS WITH SPELTZ.

Thick and Thin Sowing.

In last year's test the amount of seed was regulated by the drill. This year the seed was weighed, but the result is the same. One and three-quarter bushels giving the largest yield.

Speltz Wheat—Thick and Thin Sowing.

Name of Variety.	Amount of Seed Sown Per Acre.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
			Ins.		Ins.		Bush.	Lbs.	Lbs.
Speltz	50 pounds.	116	32	Stiff	2	Bearded.	42	20	44
"	62½ "	116	32	"	2	"	46	40	45
"	75 "	116	32	"	2	"	52	20	45
"	87½ "	116	32	"	2	"	54	40	45
"	100 "	116	32	"	2	"	50	20	44

SPELTZ, EARLY AND LATE SOWING.

These experiments were undertaken with the object of gaining some information as to the best time for sowing this grain. This will probably need repeating for several years before any satisfactory conclusion can be reached.

SPELTZ WHEAT— EARLY AND LATE SOWING.

Name of Variety.	Character of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
						In,		In.		Lbs.	Bush.	Lbs.	Lbs.
Speltz	Sand loam	1/20 acre	May 6	Aug. 27	113	47	Stiff	2½	Bearded..	4,275	59	..	46
"	"	1/20 "	" 13	" 30	109	42	"	2½	" ..	3,630	52	..	45
"	"	1/20 "	" 20	Sept. 3	106	39	"	2	" ..	5,060	56	20	44
"	"	1/20 "	" 27	" 6	102	41	"	2	" ..	3,460	61	..	43

EXPERIMENTS WITH OATS.

The yield of oats throughout the province has been much above the average. On the Experimental Farm, a few of the varieties were sown at the usual date early in May but owing to the excessive rainfall they were destroyed. A fresh location was selected and the second lot was sown on May 28, much later than is desirable. This late sowing no doubt lessened the yield and reduced the weight per bushel.

The tests were made with sixty-four varieties, on plots of one-twentieth acre each. The soil was a clay loam, summer fallowed, and two bushels of seed were used per acre sown with a drill. All were sown on May 27 and 28.

OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush. lbs.	Lbs	
Early Golden Prolific	Sept. 6	101	40	Stiff	10	Branching	3,562	88 28	34	Slightly.
Buckbee's Illinois	" 8	103	49	"	8	"	7,200	82 12	36	"
Siberian	" 8	103	53	"	11	"	6,475	82 2	35	Badly.
Holstein Prolific	" 6	102	41	"	8½	Sided	5,700	81 6	35	"
Mennonite	" 4	100	41	"	9½	"	4,980	77 2	36	"
Joanette	" 10	105	48	Weak	6	Branching	7,200	74 24	34	"
Wallis	" 6	101	42	Stiff	9	"	6,337	74 24	35	"
Early Maine	" 6	101	51	"	9	"	7,036	74 24	35	Slightly.
Hazlett's Seizure	" 4	99	47	Fair	10	"	5,610	73 28	36	Badly.
Abundance	" 5	101	45	Stiff	7	"	5,320	72 2	37	"
American Triumph	" 7	103	38	"	7	"	4,937	70 30	37	"
Banner	" 6	102	42	"	10	"	5,395	70 20	35	"
Sensation	" 4	99	49	Fair	11	"	5,692	70 ..	36	"
Golden Giant	" 11	106	54	"	12	Sided	3,560	70 ..	32	"
Danish Island	" 7	103	39	Stiff	9	Branching	5,250	67 2	36	"
Bonanza	" 1	97	44	"	9	"	5,655	67 32	39	"
Columbus	" 7	103	44	"	8	"	4,437	66 6	36	"
Lincoln	" 6	102	43	Stiff	10	"	4,255	65 10	38	"
Wide Awake	" 6	102	49	"	9	"	6,300	64 24	37	"
Early Gothland	" 7	102	55	Fair	11½	Sided	6,600	64 24	35	"
Improved American	" 5	100	53	Stiff	12	Branching	4,927	64 4	36	"
Tartar King	" 7	102	59	Fair	11	Sided	6,045	63 8	33	"
Thousand Dollar	" 7	103	49	Stiff	8	Branching	4,680	63 8	36	"
Early Archangel	" 6	102	47	"	7	"	5,735	62 32	37	"
New Zealand	" 8	103	55	Fair	11	Sided	6,570	62 2	35	Slightly.
Cream Egyptian	" 4	99	47	"	10½	"	5,850	61 26	36	Badly.
Newmarket	" 4	99	47	Stiff	8	Branching	5,125	61 6	36	"
American Beauty	" 5	100	43	"	9	"	4,781	61 6	36	"
Bavarian	" 6	102	42	"	10	"	4,937	61 6	34	"
Scotch Potato	" 6	102	41	"	9	"	6,845	61 6	35	"
Irish Victor	" 7	103	42	"	8	"	4,937	60 30	36	"
Brandon	" 7	103	51	"	12	"	5,200	60 20	36	"
Waverley	" 6	101	40	"	12	"	3,690	60 13	35	"
Black Beauty	" 10	105	51	Weak	11	"	6,290	60 ..	33	"
Golden Tartarian	" 14	110	51	Stiff	10	Sided	6,600	59 24	32	"
Oxford	" 7	103	46	"	11½	"	5,040	59 14	35	"
Holland	" 12	108	35	"	9	"	4,305	57 32	32	"
Golden Beauty	" 6	101	45	"	7	Branching	4,440	56 16	35	"
California Prolific Black	" 10	105	58	Fair	11	Sided	6,600	56 16	32	"
Kendal	" 6	102	46	Stiff	7	"	5,610	56 6	36	"
Oderbruch	" 6	101	48	"	10½	"	4,025	55 23	35	"
Pense	" 11	106	58	Weak	10	"	7,095	55 10	34	"
Russell	" 8	104	41	Stiff	11	Branching	7,695	54 24	39	"
King	" 6	102	50	"	10	"	5,400	54 14	37	"
Goldfinder	" 7	102	47	"	10½	Sided	5,220	53 28	33	"
Early Blossom	" 8	103	47	"	10	"	6,300	53 18	32	"
Black Mesdag	" 6	101	40	Weak	13	Branching	3,720	53 18	35	"
Master	" 7	102	48	Stiff	12	"	5,460	53 8	34	"
White Schonen	" 6	102	43	"	8	"	4,995	53 8	35	"
Prolific Black Tartarian	" 13	108	56	Fair	10	Sided	6,555	51 6	33	"
Improved Ligowo	" 6	101	41	Stiff	7	Branching	4,400	51 6	37	"
Milford	" 14	110	48	"	9	Sided	5,330	50 20	30	"
White Giant	" 6	101	43	"	9	Branching	3,832	50 ..	34	"
Miller	" 5	100	44	Fair	9	"	5,510	47 32	33	"
Abyssinia	" 5	100	42	"	9	"	6,360	47 22	33	"
Salines	" 7	103	47	Stiff	10	"	5,100	47 12	34	"
Flying Scotchman	" 4	100	47	"	11	"	4,387	47 2	38	"
Olive	" 12	107	57	"	10	Sided	6,300	45 20	34	"
White Russian	" 5	100	43	"	10½	"	6,935	45 ..	34	"
Salzer's Big 4	" 6	102	41	"	10	Branching	2,635	43 28	36	"
Pioneer	" 10	105	48	"	8	"	4,785	43 8	32	"
Rosedale	" 7	102	31	Fair	8	Sided	4,230	42 22	30	"
Longhoughton	" 7	102	52	Stiff	9	Branching	6,000	36 16	36	"
Cromwell	" 6	102	43	"	11	"	1,360	18 28	34	"

NOTE.—Cromwell was injured by the flood.

AVERAGE results of a test of Twelve Varieties of Oats for the past five years.

Variety.	Years included.	Average yield per Acre.	
		Bush.	Lbs.
Banner	1898-99, 1900-01-02	80	2
American Triumph	1898-99, 1900-01-02	76	16
Bavarian	1898-99, 1900-01-02	75	32
American Beauty	1898-99, 1900-01-02	75	27
Mennomite	1898-99, 1900-01-02	74	12
Danish Island	1898-99, 1900-01-02	73	38
Oxford	1898-99, 1900-01-02	73	12
White Giant	1898-99, 1900-01-02	72	21
White Schonen	1898-99, 1900-01-02	70	41
Thousand Dollar	1898-99, 1900-01-02	67	45
California Prolific Black	1898-99, 1900-01-02	67	23
Newmarket	1898-99, 1900-01-02	66	36

EXPERIMENTS WITH BARLEY.

The selection of the field for this year's uniform test plots of barley was an unfortunate one. A municipal ditch running near the field overflowed its banks during the cloud-burst on June 1, and the flood of water swept the field from end to end, removing the soil in some places down to the roots of the plant The grain never fully recovered, the yield from most of the plots is unusually small, and so uneven that the returns are not given as a correct comparison of varieties, but simply as a matter of information.

Fifty-one varieties of barley were tested. Thirty of the six-rowed sorts and twenty-one of the two-rowed. The size of the plots used for this test was one-twentieth acre. The soil was a light sandy loam which had been summer fallowed. All were sown on May 26 and 27 in the proportion of two bushels of seed per acre.

BARLEY—SIX-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.	Rusted.
			In.		In.	Lbs.	Bush. Lbs.	Lbs.	
Petschora	Sept. 1	98	42	Stiff	4	4,185	43 36	46	Slightly.
Mensury	Aug. 22	88	40	"	4	5,945	42 4	47	"
Rennie's Imp'v'd	" 22	87	40	"	4	3,250	36 12	48	"
White Hulless	Sept. 3	99	35	Weak	2½	4,200	35 30	55	"
Black Hulless	Aug. 27	92	30	Fair	3	3,770	32 34	58	"
Common	" 25	90	31	Stiff	3	1,360	31 2	49	"
Garfield	" 26	91				1,350	30 20	48	"
Odessa	Sept. 2	98	33	Fair	3½	2,422	29 8	45	Badly.
Stella	Aug. 26	91				1,275	26 12	48	Slightly.
Empire	Sept. 4	101	33	Stiff	3½	2,295	25 40	45	Badly.
Phœnix	Aug. 20	86	23	"	2½	1,125	24 28	49	None.
Argyle	" 22	87	36	"	2	1,275	24 8	48	Slightly.
Pioneer	" 20	85	29	Fair	3	840	23 6	50	"
Summit	Sept. 4	101	29	Stiff	3	2,422	22 4	44	Badly.
Nugent	Aug. 24	90	22	"	2	780	20 40	48	None.
Albert	" 19	84	22	"	2½	750	20 20	51	"
Brome	" 20	85	27	"	2½	825	20 20	49	"
Claude	" 25	90	24	"	2½	845	19 18	45	Slightly.
Success	" 20	85	31	"	2	1,050	18 16	47	Badly.
Oderbruch	" 20	85	29	"	2½	600	17 44	49	None.
Mansfield	" 20	85	22	"	3	585	17 4	48	Slightly.
Trooper	" 25	90	24	"	3	700	17 4	48	None.
Excelsior	" 20	85	28	"	3	750	15 40	44	Slightly.
Vanguard	" 20	85	30	Fair	4	630	15 30	47	"
Surprise	Sept. 4	100	32	Stiff	3	1,620	15	43	Badly.
Baxter	Aug. 20	85	23	Fair	2½	525	14 28	49	Slightly.
Yale	20	85	27		3	420	13 16	49	"
Blue Long Head	20	85	25	"	3½	560	13 6	43	"
Champion	Sept. 4	100	32	Stiff	3	1,200	12 24	42	Badly.
Royal	Aug. 20	85	22	Fair	3	325	9 28	49	Slightly.

BARLEY—TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.	Rusted.
			In.		In.	Lbs.	Bush. Lbs.	Lbs.	
Danish Chevalier	Sept. 7	103	23	Fair.....	4	3,500	43 46	47	Slightly.
Harvey.....	" 3	99	30	Stiff.....	3	5,265	37 44	50	"
Standwell	Aug. 31	97	32	"	3½	1,920	36 22	49	None.
Nepean.....	Sept. 3	99	28	"	3½	2,160	34 28	48	Slightly.
Victor..... ...	" 2	99	24	"	3	1,875	32 4	50	"
Kinver Chevalier	" 7	103	28	Fair.. ..	4	3,240	29 28	45	"
Bolton	" 2	99	26	Stiff.....	2½	1,725	29 8	50	None.
Leslie	Aug. 26	92	27	"	3	2,090	28 36	49	Slightly.
Dunham.....	" 30	96	28	"	4	1,350	27 44	48	None.
Gordon...	" 30	95	25	"	3	1,800	27 24	48	"
Invincible	Sept. 3	99	20	"	3½	1,875	27 14	49	"
Logan	Aug. 26	92	29	"	4	1,500	26 12	49	Slightly.
French Chevalier	" 31	97	30	"	4	1,040	26 12	48	None.
Clifford.....	" 26	91	33	"	4	1,920	23 36	49	Slightly.
Fulton	" 30	96	23	"	3	1,680	21 12	48	None.
Beaver.....	Sept. 3	99	29	"	3½	1,800	21 12	50	Slightly.
Prize Prolific....	" 2	98	28	"	4	1,200	20 20	46	None.
Jarvis.....	Aug. 23	89	34	"	4	1,120	19 8	48	"
Newton	Sept. 2	98	23	"	3	975	14 8	47	"
Sidney	Aug. 21	87	21	"	2½	640	14 8	51	Slightly.
Canadian Thorpe	Sept. 1	98	20	"	3	680	7 24	48	None.

EXPERIMENTS WITH PEASE.

The field used for the test of varieties of pease suffered severely from the flooding of the Assiniboine River, and only ten varieties out of the fifty-seven were harvested.

The size of the plots for this test was one-twentieth acre and the soil a rich clay loam, summer-fallowed.

All were sown on May 13 and 14.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of days maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				Inches.	Inches.		Bush. Lbs.	Lbs.
Crown.....	Sept. 14..	124	Weak	50	2	Small	61 ..	65½
French Canner.....	Aug. 25..	104	Fair.....	60	2½	" . ..	56 ..	65
Golden Vine.....	Sept. 7..	117	Weak	66	2	"	54 40	64½
Mummy..... .. .	" 10..	120	Fair.....	48	2	"	52 20	62½
Canadian Beauty.	" 13..	123	Rank.....	48	2½	Large	44 ..	64
Daniel O'Rourke	" 7..	116	Fair.....	58	1¾	Small ...	42 40	65
Creeper.....	Aug. 25..	104	"	69	2¼	"	41 40	65
Carleton.....	Sept. 15..	124	"	52	2¼	" ...	41 20	64
Archer	" 12..	121	"	66	2½	"	40 20	65
Pearl.	" 14..	124	Rank.....	64	2¼	"	40 20	64
Prince Albert.....	" 16..	126	"	64	2⅜	"	38 20	63
Herald	" 13..	122	Fair.....	56	2¼	"	37 40	64
Bedford	" 7..	117	Rank.....	68	2¼	" ...	36 20	65
Elder	" 16..	125	"	54	2¼	"	33 40	64½
King...	" 5..	114	"	54	2½	Medium..	31 20	65
Multiplier.....	" 16..	125	Fair.....	62	2	Small . .	30 40	62½
Fergus.....	" 27..	137	Rank.....	61	2¼	"	26 40	65

NOTE.—Grass Pea did not mature.

EXPERIMENTS WITH FLAX.

Since the increased immigration from the United States more attention has been given to the cultivation of flax, and this year a considerable area of new breaking was sown with this crop.

One of the objections to the sowing of flax is the great difficulty of procuring pure seed. This year several new varieties were tested on the Experimental Farm and in nearly every instance the sample was badly infested with noxious weed seeds. One sample contained no less than six different varieties of mustard, all of which were pulled by hand as they blossomed.

Appended will be found tables giving the result of experiments with flax.

FLAX—THICK AND THIN SOWING.

The size of plots for this test was one-twentieth acre, and the soil was a clay loam which had been summer-fallowed. The sowing was done with a Massey Harris grain drill. It is, however, difficult to sow evenly with this machine if less than twenty pounds of seed per acre are used.

The result of this year's test would indicate that a liberal amount of seed gives the best results. This agrees with the results obtained last year.

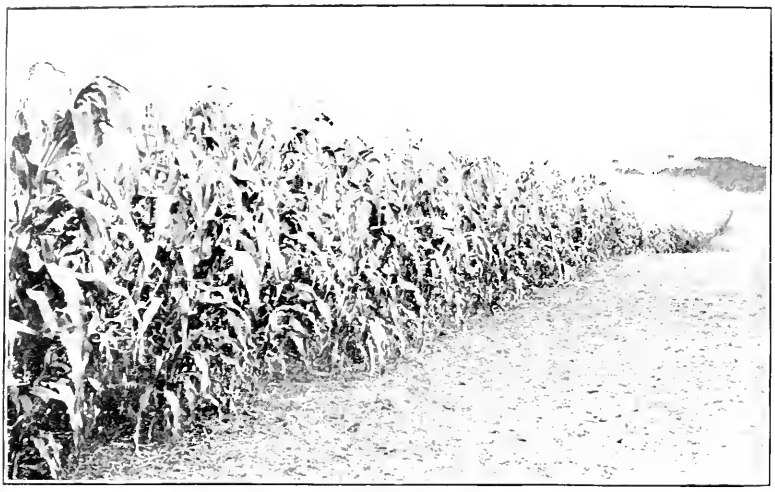
Variety.	Amount of Seed sown per Acre.	Date of Sowing.	Length of Straw.	Yield per Acre.		Weight per Bushel.
	Lbs.		In.	Bush.	Lbs.	Lbs.
Flax	15	June 5....	32	12	8	56
"	20	" 5....	32	16	44	56
"	30	" 5....	32	18	32	56
"	40	" 5....	32	19	16	56
"	50	" 5....	32	21	4	56

FLAX—TEST OF VARIETIES.

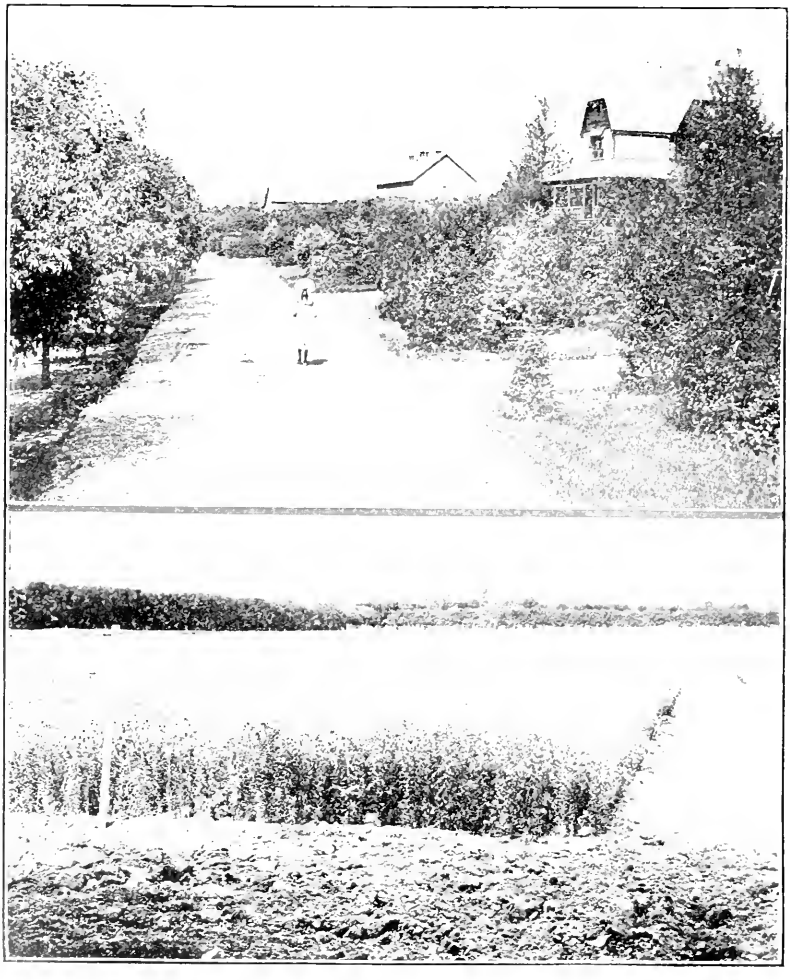
Several varieties of flax have been tested during the year. The amount of seed available of each kind was small, and the sowing was too thin for the best results, but the product of this year's crop has been saved and larger plots can be sown next year.

In addition to the seven varieties given in the following table one was obtained from Calcutta. This proved so short that it was impossible to cut it with a binder. The size of the plots was $\frac{1}{60}$ acre. The soil was a rich clay loam and the previous crop fodder corn.

Variety.	Date Sown.	Date Ripe.	Length of Straw.	Length of Head.	Yield per Acre.	
			In.	In.	Bush.	Lbs.
Novarossick	June 5....	Sept. 10..	29	8	22	28
Russian	" 5....	" 6..	27	7	11	44
Riga	" 5....	" 5..	31	13	9	36
Common	" 5....	" 5..	32	6	9	36
La Plata	" 5....	" 10..	26	10	9	36
St. Petersburg	" 5....	" 4..	37	8	6	24
Bombay	" 5....	" 5..	19	10	5	20



Fodder Corn.



[Photos. by C. E. Saunders.]

Road Planting near Residence of Superintendent.
Experimental Plots of Flax, Brandon, Man.

FLAX ON NEW BREAKING.

As much the largest proportion of flax produced in this country is grown on new breaking, it was thought advisable to give this plan a trial on the Experimental Farm. Owing to the field being flooded for some days the yield is small, but the result agrees with a similar test on cultivated land, viz., that a liberal amount of seed gives the best crop.

The land was broken on May 17 but was not dry enough to sow until June 11. The size of the plots was one-fortieth acre, and the soil was a stiff clay loam.

Variety.	Amount of Seed sown per Acre.	Date Sown.	Date Cut.	Length of Straw.	Yield per Acre.	
	Lbs.			In.	Bush.	Lbs.
Flax	15	June 11...	Sept. 16..	29	5	39
"	20	" 11...	" 16..	29	6	24
"	30	" 11 ..	" 16..	29	6	24
"	40	" 11...	" 16..	29	7	48
"	50	" 11...	" 16..	29	7	8

THE GERMINATING POWER OF GRAIN.

As usual samples of all the plots of grain on the farm were tested at the Central Experimental Farm, for germination, altogether 274 samples were tested with the following result :—

—	No. of samples tested.	Average germinating power.
		Per cent.
Wheat	99	91
Oats	63	98
Barley	56	82
Pease	56	96

EXPERIMENTS WITH INDIAN CORN.

Owing to the almost continuous rain during the latter part of May, corn was not sown until May 31, about two weeks late. This late sowing followed by cool cloudy weather greatly retarded growth, lessened the yield, and prevented the plant reaching its usual stage of maturity.

The corn binder was again used with very satisfactory results.

Thirty-eight varieties were used in this test, and the seed was planted on May 31, in rows thirty inches apart, using about half a bushel of seed per acre. The crop was cut on Sept. 5. The soil was a sandy loam sloping to the south. The previous crop was wheat. The yield in each case was calculated from the weight of two rows each sixty-six feet long.

INDIAN CORN—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Height.	When Tasselled.	In Silk.	Early Milk.	Condition when Cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
		In.					Tons.	Lbs.	Tons.	Lbs.
Salzer's All Gold	Fair	87	Aug. 28	Sept. 4		In silk	16	1,000	19	16
Champion White Pearl	"	86	" 28	" 4		"	18	696	13	665
Mammoth Eight-rowed Flint	Rank.	75	" 10	Aug. 30	Sept. 4	E. milk.	18	432	11	1,760
North Dakota Yellow	Fair.	65	" 25	Sept. 3		In silk.	17	1,904	15	360
Pearce's Prolific	Rank.	79	" 16	" 27	Sept. 3	E. milk.	16	1,528	12	816
North Dakota White	Fair.	80	" 19	Aug. 28	Aug. 30	L. milk.	16	1,264	10	1,120
King of the Earliest	"	84	" 18	" 27	Sept. 3	E. milk.	16	1,000	12	816
Eureka	"	84	" 29			In tassel.	16	736	13	1,720
Early Butler	"	74	" 23	Aug. 30	Sept. 3	E. milk.	16	472	12	816
King Philip	"	84	" 22	" 30	" 4	"	15	1,680	11	704
Superior Fodder	"	79	" 30	Sept. 4		In silk	15	888	8	1,160
Compton's Early	Rank.	94	" 20	Aug. 31	Sept. 4	E. milk.	15	624	15	1,680
Angel of Midnight	Fair.	81	" 20	" 29	" 4	"	15	624	11	440
Mammoth Cuban	Rank.	75	" 25	" 28		In silk.	14	1,832	7	1,840
Early Mastodon	Fair.	84	" 29	Sept. 4		"	14	1,568	11	1,760
Longfellow	Rank.	84	" 20	Aug. 29	Sept. 4	E. milk.	14	1,040	9	1,800
Pride of the North	Fair.	93	" 28	Sept. 3		In silk.	14	1,040	13	400
Evergreen Sugar	Rank.	69	" 27	" 4		"	13	1,720	10	1,120
Early Golden Surprise	Fair.	83	" 26	" 4		"	13	1,192	8	1,424
Rural Thorobred White Flint	Rank.	77	" 28	" 5		"	13	928	11	1,232
Kendal's Early Giant	Fair.	65	" 14	Aug. 20	Aug. 30	L. milk.	13	400	7	520
Country Gentleman	"	61	" 26	Sept. 4		In silk.	13	400	6	1,200
Mitchell's Extra Early	Weak	65	" 12	Aug. 20	Aug. 27	L. milk.	12	1,080	8	1,160
Salzer's Earliest Ripe	"	70	" 14	" 20	" 29	"	11	1,760	8	896
Canada White Flint	Fair.	80	" 20	" 29	Sept. 3	E. milk.	11	1,760	9	480
Early Yellow Long-eared	"	76	" 25	Sept. 3		In silk.	11	1,760	13	400
Selected Leaming	"	78	Sept. 3			In tassel.	11	1,760	11	1,496
Giant Prolific Ensilage	Rank.	70	" 4			"	11	1,760	13	400
Yellow Six Weeks	Fair.	65	Aug. 20	Aug. 27	Sept. 5	E. milk.	11	968	10	328
Extra Early Huron	"	81	" 14	" 20	Aug. 30	L. milk.	11	704	5	1,088
Red Cob Ensilage	Rank.	86	" 3	Sept. 5		In silk.	11	440	11	1,760
Cloud's Early Yellow	Fair.	86	Sept. 1			In tassel.	11	1,760	13	400
Black Mexican	Weak.	68	Aug. 10	Aug. 26	Sept. 4	E. milk.	10	1,648	10	1,120
Wisconsin Earliest White Dent	"	80	" 28	Sept. 3		In silk.	10	1,384	10	328
Early August	"	45	" 12	Aug. 21	Aug. 27	L. milk.	8	1,120	9	160
White Cap Yellow Dent	Fair.	83	Sept. 1			In tassel.	8	896	8	1,424
Sanford		76	Aug. 26	Sept. 1		In silk.	8	104	8	368

Indian Corn at Different Distances Apart.

Name of Variety.	Distance between rows.	Height.	Condition when cut.	Weight per acre, green, in rows.	
	Inches.	Inches.		Tons.	Lbs.
Longfellow	24	76	In silk	8	1,820
"	30	76	"	8	1,160
"	36	76	"	14	1,456
"	42	76	"	17	584
Selected Leaming	24	83	In tassel	11	1,760
"	30	83	"	13	400
"	36	83	"	17	320
"	42	82	"	16	1,000
Champion White Pearl	24	84	In silk	13	796
"	30	84	"	15	1,020
"	36	84	"	13	1,852
"	42	84	"	13	400

Average Yield at Different Distances Apart.	In Rows.	
	Tons.	Lbs.
Average yield of green corn, 24 inches apart	11	792
" " 30 "	12	860
" " 36 "	15	536
" " 42 "	15	1,328

EXPERIMENTS WITH TURNIPS.

Thirty varieties of turnips were tested this year. As usual two sowings were made of each variety. The first on May 25 and the second on June 9. The first sowing was covered by water for some days, which so packed the soil that the yield was materially lessened. The second sowing escaped the flood, and for the first time in the history of the farm nearly all varieties gave a larger yield than those of the early sowing. The roots from both sowings were pulled October 2.

The soil on which the turnips were sown was a clay loam. The previous crop was potatoes. The seed was sown in drills thirty inches apart, and the yield has been calculated from the weight of roots gathered from two rows each sixty-six feet long. All were pulled on October 2.

TURNIPS—TEST OF VARIETIES.

Name of Varieties.	Character of Growth.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Skirving's	Strong	25	424	840	24	18	696	611	36
Champion Purple Top	"	21	1,824	730	24	26	536	875	36
Webb's New Renown	"	21	504	708	24	23	464	774	24
New Arctic	Fair	20	1,976	699	36	21	768	712	48
Bangholm Selected	"	19	1,600	660	..	20	1,184	686	24
Magnum Bonum	Strong	19	544	642	24	20	392	673	12
Good Luck	Fair	19	16	633	36	22	616	743	36
Shamrock Purple Top	"	18	168	602	48	20	920	682	..
Kangaroo	Strong	18	1,224	620	24	21	504	708	24
Perfection Swede	Weak	18	432	607	12	23	1,784	796	24
Sutton's Champion	Fair	17	1,112	585	12	19	280	638	..
Jumbo	Strong	17	56	567	36	15	1,680	528	..
Selected Champion	Fair	16	472	541	12	13	400	440	..
Halewood's Bronze Top	"	15	1,152	519	12	18	1,488	624	48
Marquis of Lorne	"	15	888	514	48	17	1,904	598	24
Prize Purple Top	"	15	888	514	48	20	920	682	..
West Norfolk Red Top	"	15	888	514	48	16	208	536	48
Hall's Westbury	Strong	15	624	510	24	15	1,416	523	36
Giant King	"	15	360	506	..	16	1,264	554	24
Prize Winner	"	15	96	501	36	21	768	712	48
East Lothian	"	14	1,568	492	48	16	1,264	554	24
New Century	"	13	1,984	466	24	17	1,640	594	..
Elephant's Master	Fair	13	1,984	466	24	16	208	536	48
Drummond Purple Top	Strong	13	1,720	462	..	21	504	708	24
Carter's Elephant	"	13	1,456	457	36	15	360	506	..
Selected Purple Top	"	13	400	440	..	19	544	642	24
Monarch	Fair	12	1,344	422	24	16	1,000	550	..
Emperor	"	11	1,760	396	..	17	56	567	36
Mammoth Clyde	Weak	10	1,384	356	24	21	1,560	726	..
Imperial Swede	Fair	9	1,272	321	12	20	1,976	699	36

EXPERIMENTS WITH MANGELS.

Twenty-seven varieties of mangels were tested during the year. Two sowings were made of each variety. The first on May 27 and the second on June 10, and both lots were pulled September 20. The first sown plots of mangels were also injured by water, resulting in a small yield.

The seed was sown in drills 30 inches apart on sandy loam, and the yield has been calculated from the weight of roots gathered from two rows each 66 feet long. All were pulled on Sept. 20.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Half Long Sugar Rosy	16	1,132	552	12	11	704	378	24
Selected Yellow Globe	15	1,944	532	24	17	1,376	589	36
Yellow Intermediate	14	248	470	48	15	96	501	36
Lion Yellow Intermediate	13	1,984	466	24	16	1,792	563	12
Champion Yellow Globe	13	1,456	457	36	14	1,304	488	24
Selected Mammoth Long Red	13	669	444	29	14	1,848	497	29
Sutton's Prize Winner Yellow Globe	13	664	444	24	15	1,152	519	12
Mammoth Long Red	12	1,344	422	24	17	584	576	24
Half Long Sugar White	12	552	409	12	15	96	501	36
Norbiton Giant	12	288	404	48	17	320	572	..
Giant Yellow Intermediate	11	1,892	398	12	15	1,152	519	12
Canadian Giant	11	1,496	391	36	15	360	506	..
Triumph Yellow Globe	11	1,232	387	12	14	1,304	488	24
Gate Post	11	440	374	..	15	888	514	48
Yellow Fleshed Tankard	11	176	369	36	10	1,912	365	12
Prize Mammoth Long Red	11	176	369	36	15	1,152	519	12
Red Fleshed Tankard	11	176	369	36	15	1,152	519	12
Mammoth Oval Shaped	10	1,912	365	12	14	1,832	497	42
Mammoth Yellow Intermediate	10	1,912	365	12	13	1,192	453	12
Leviathan Long Red	10	1,232	354	12	15	96	501	36
Gate Post Yellow	10	1,120	352	..	14	1,040	484	..
Ward's Large Oval Shaped	10	988	349	48	15	1,152	519	12
Giant Sugar	9	1,800	330	..	14	776	479	36
Golden Fleshed Tankard	8	1,952	299	12	13	1,720	462	..
Giant Yellow Globe	7	1,576	259	36	14	1,040	484	..
Giant Yellow Half Long	7	1,048	250	48	17	584	576	24
Warden Orange Globe	5	32	167	12	14	1,304	488	24

EXPERIMENTS WITH CARROTS.

The yield of carrots was again a very irregular one. A few varieties gave good returns while others gave a very small yield.

The soil was a clay loam, in potatoes the previous year. The estimate of yield has been made from the roots produced on two rows each 66 feet long.

Twenty-one varieties were tested. The first sowing was made on May 27. and the second on June 10. The seed was sown in drills 16 inches apart, and the roots were pulled on October 2.

CARROTS—TEST OF VARIETIES.

Name of variety.	Character of growth.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot.		Yield per acre. 2nd plot.	
		Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
New White Intermediate	Strong	16	120	535	20	9	1,800	330	..
Ontario Champion	"	14	160	469	20	11	....	366	40
Carter's Orange Giant	Fair	12	200	403	20	9	1,800	330	..
Green Top White Orthe	Strong	11	1,320	388	40	13	1,280	454	40
White Vosges Large Short	"	11	1,320	388	40	10	680	344	40
Yellow Intermediate	"	11	....	366	40	11	1,320	388	40
White Belgian	"	9	1,800	330	..	9	40	300	40
Half Long Chantenay	Fair	9	1,360	322	40	12	640	410	40
Long Yellow Stump Rooted	"	9	480	308	..	12	640	410	40
Guerande or Ox-heart	"	9	40	300	40	13	840	414	..
Giant White Vosges	"	9	40	300	40	9	1,800	330	..
Iverson's Champion	Strong	8	720	278	40	11	880	381	20
Early Gem	Weak	7	1,840	264	..	9	480	308	..
Half Long White	Strong	7	960	249	20	9	1,800	330	..
Improved Short White	Weak	7	80	234	40	5	1,880	198	..
Scarlet Intermediate	"	6	1,640	227	20	10	240	337	20
Yellow Intermediate	"	6	760	212	40	8	280	271	20
Long Orange or Surrey	"	6	320	205	20	5	1,880	198	..
Mammoth White Intermediate	"	5	120	168	40	14	1,480	491	20
Long Scarlet Altringham	"	3	1,480	124	40	4	800	146	40
Scarlet Nantes	"	3	160	102	40	4	360	139	20

EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were sown. The yield was below the average from the same cause that injured the other field roots. The quality of the roots was excellent.

The soil was a clay loam, and the previous crop was potatoes. The seed was sown on the flat, in drills two feet apart.

The first plots were sown on May 27, and the second on June 10. All were pulled on September 20. The yield has been calculated from the weight obtained from two rows each 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot		Yield per acre. 2nd plot	
		Tons.	lbs.	Bush.	lbs.	Tons.	lbs.	Bush.	lbs.
Red Top Sugar	fair.	13	928	448	48	12	24	400	24
Danish Improved	"	12	24	400	24	14	512	475	12
Royal Giant	"	8	1,424	290	24	14	1,040	484	..
French 'Very Rich.'	"	8	1,160	286	..	9	1,800	330	..
Danish Red Top	"	8	500	275	..	13	1,192	453	12
Wanzleben	"	7	1,048	250	48	12	552	409	12
Improved Imperial	"	6	672	211	12	12	1,344	422	24
Vilmorin's Improved	"	5	296	171	36	12	288	404	48

EXPERIMENTS WITH POTATOES.

The very heavy rain of June 1 cut deep gulleys through the potato field and in other parts the soil was packed so hard that it appeared impossible for the potatoes to grow, but the soil was deeply stirred as soon as dry with a horse cultivator. The growth was then rapid and much to our surprise the yield of most of the varieties was above the average.

The average yield of twelve of the most productive varieties covering a period of five years also is given. Of these we would recommend the following as being both prolific and of good quality: I X L, Dreer's Standard, Clay Rose, Green Mountain, and Rural No. 2.

The previous crop was turnips. There was no injury from rot. The yield has been estimated in each case from the product of one row 66 feet long.

All varieties were planted on rich black loam on May 20 and dug September 30.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Enormous	Strong	Medium	557	20	447	20	110		Roundish white.
Houlton Rose	"	"	487	40	436	20	51	20	Long, round, white.
Burnaby Seedling	"	" to large	476	40	421	40	55		Flat, oval, pink.
White Beauty	Fair	"	473		377	40	95	20	" white.
Cambridge Russet	Strong	"	473		403	20	69	40	Long, round, deep russet.
Empire State	"	" to large	454	40	399	40	55		" white.
Early White Prize	Fair	"	447	20	377	40	69	40	Round, oval, light pink.
Prolific Rose	"	" to large	436	20	315	20	121		" deep pink.
Delaware	Strong	" "	429		396		33		Long, oval, white.
Hale's Champion	Fair	"	432	40	326	20	106	20	Roundish, oval, white.
Seedling, No. 230	"	" to large	432	40	315	20	117	20	" "
Pearce's Extra Early	"	" "	429		341		88		Long, flat, deep pink.
Sharpe's Seedling	"		425	20	352		73	20	Long, oval, light pink.
Maule's Thoroughbred	"	"	421	40	352		69	40	" deep pink.
Seedling, No. 7	Strong	" to large	421	40	330		91	40	" deep red.
Great Divide		Small to medium	418		326	20	91	40	Irregular, white.
American Wonder		Large	403	20	366	40	36	40	Long, round, white.
Pride of the Market	"	Medium to large	392	20	348	20	44		Roundish, oval, white.
Early St. George	Fair	"	381	20	319		62	20	Long, oval, deep pink.
State of Maine	"	Small to medium	381	20	330		51	20	Flattish, oval, white.
New Queen	"	Medium	381	20	311	40	69	40	Long, round, light pink.
Carman, No. 3	"	" to large	374		315	20	58	40	" white.
New Variety, No. 1	Weak	" "	370	20	315	20	55		Irregular, white.
American Giant	Fair	"	363		311	40	51	20	Round, oval, white.
Early Harvest	Strong	" to large	363		311	40	51	20	Roundish, white.
Irish Daisy	"	"	355	40	297		58	40	Long, oval, white.
Rose, No. 9	"	"	355	40	326	20	29	20	Long flat, deep pink.
Country Gentleman	Fair	" to large	352		322	40	29	20	Long, deep pink.
Irish Cobbler	"	" "	352		282	20	69	40	Flattish, white.
I. X. L	Strong	" "	352		304	20	47	40	Long, round, light pink.
Lizzie's Pride	"	" "	348	20	275		73	20	Irregular, white.
Vanier	Fair	Small to medium	348	20	238	40	110		Round, oval, deep pink.
Rural, No. 2	Strong	Medium to large	341		308		33		Flattish, oval, white.
Bill Nye	Weak	Small to medium	337	20	278	40	58	40	Round, oval, white.
Lee's Favorite	Fair	" "	337	20	249	20	88		Long, oval, light pink.
Chicago Market	"	" "	333	40	198		135	40	Long, round, white.
Early Rose	"	"	333	40	271	20	62	20	Round, pink.
Early Sunrise	Weak	Large	330		282	20	47	40	Long, oval, light pink.
Uncle Sam	Fair	Medium to large	330		300	40	29	20	Flattish, oval, white.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Money Maker	Strong..	Small to medium	330	..	234	40	95	20	Round, oval, white.
Quaker City	" ..	Medium to large.	326	20	267	40	58	40	Long, flat, white.
Canadian Beauty	" ..	" " ..	326	20	264	..	62	20	Long, round, light pink.
Polaris	Fair.. ..	Small to medium	322	40	242	..	80	40	Long, oval, deep pink.
Holborn Abundance	Strong..	Medium to large.	319	..	282	20	36	40	Round, white.
Daisy	Fair.. ..	Small to medium	319	..	238	20	80	40	Long, oval, light pink.
Rawdon Rose	" ..	Medium	315	20	238	20	77	..	Round, oval, light pink.
Seattle	" ..	" to large.	315	20	223	40	91	40	Long, flat, light pink.
Early Michigan	Weak ..	"	315	20	245	40	69	40	" white.
Late Puritan	Fair.. ..	" to large.	315	20	275	..	40	20	Long, round, white.
Clay Rose	Strong..	"	315	20	260	20	55	..	Flat, oval, deep pink.
Sabean's Elephant	" ..	" to large.	311	40	249	20	62	20	Long, round, white.
Sir Walter Raleigh	Fair ..	Small to medium	311	40	278	40	33	.	Flat, oval, white.
Brownell's Winner	" ..	Large	308	..	249	20	58	40	Irregular, deep pink.
Earliest of All	Weak ..	Small to medium	304	20	249	20	55	..	Long, oval, light pink.
Clarke's No. 1	Fair ..	Medium to large.	297	..	227	20	69	40	Long, flat "
Vick's Extra Early	" ..	Small to medium	297	..	256	40	40	20	Flat, pink.
Thorburn	" ..	Medium to large.	293	20	256	40	36	40	Roundish, light pink.
Early Six Weeks	Weak ..	" .	293	20	242	..	51	20	" "
Early Puritan	Fair ..	Medium	293	20	238	20	55	..	Long, round, white.
General Gordon	" ..	" to large.	289	40	201	40	88	..	" " deep pink.
Early Andes	Weak ..	Small to medium	289	40	242	..	47	40	Round, oval, white.
Penn Manor	Fair ..	Medium to large.	289	40	234	40	55	.	Long, oval, deep pink.
Maggie Murphy	" ..	" .	286	..	234	40	51	20	Flat, oval, light pink.
Northern Spy	Strong .	Medium	282	20	238	20	44	..	Long, flat, deep pink.
Everett	" .	" to large.	282	20	234	40	47	40	Long, oval "
Dreer's Standard	Fair ..	" " .	282	20	238	20	44	..	Flattish, oval, white.
Pearce's Prize Winner	" ..	Small to medium	278	40	216	20	62	20	" "
McIntyre	Strong .	" .	278	40	245	40	33	..	Long, round, white.
Reeve's Rose	Fair ..	Medium to large.	278	40	220	..	58	40	Flat, oval, light pink.
Early Norther	" ..	" .	275	..	212	40	62	20	Long, flat, pink.
Ohio Junior	Weak ..	Medium	271	20	227	20	44	..	Round, oval, light pink.
Beauty of Hebron	" ..	"	271	20	212	40	58	40	Long, round "
Green Mountain	Fair ..	Small to medium	271	20	227	20	44	..	Flattish, oval, white.
Early Market	Weak ..	Medium to large.	271	20	227	20	44	.	Round, oval.
Rochester Rose	Fair ..	Small to medium	271	20	198	..	73	20	Long, round, light pink.
Flemish Beauty	" ..	Medium to large.	267	40	201	40	66	.	Oval, deep pink.
Swiss Snowflake	" ..	Small to medium	260	20	198	..	62	20	Irregular, white.
Bovee	Weak ..	" .	249	20	176	..	73	20	Long, oval, light pink.
Brown's Rot Proof	Fair ..	Medium to large.	245	40	183	20	62	20	Round, oval, deep pink.
Rural Blush	Strong .	Small to medium	238	20	198	..	40	20	" "
Troy Seedling	" ..	" .	238	20	150	20	88	..	Irregular, white.
Up to Date	" ..	Small	234	40	194	20	40	20	Flat, round, white.
Carman No. 1	" ..	Medium to large.	231	..	183	20	47	40	Flat, white.
Early Ohio	Weak ..	"	231	..	168	40	62	20	Round, oval, light pink.
Dakota Red	Fair ..	Small to medium	223	40	190	40	33	..	Long, flat, deep pink.
Reading Grant	Weak ..	" .	220	..	161	20	58	40	Round, oval, deep pink.
Prize Taker	Fair ..	" .	205	20	146	40	58	40	" "

AVERAGE results of a Five Years' test of twelve varieties of potatoes.

Variety.	Years included.	Average yield per acre.	
		Bush.	Lbs.
Seedling No. 7	1898-99, 1900-01-02	442	56
State of Maine	1898-99, 1900-01-02	438	54
Delaware	1898-99, 1900-01-02	438	20
I. X. L.	1898-99, 1900-01-02	423	52
Dreer's Standard	1898-99, 1900-01-02	406	16
Quaker City	1898-99, 1900-01-02	399	56
Brown's Rot Proof	1898-99, 1900-01-02	395	16
Late Puritan	1898-99, 1900-01-02	387	56
Clay Rose	1898-99, 1900-01-02	387	56
Green Mountain	1898-99, 1900-01-02	379	8
Chicago Market	1898-99, 1900-01-02	368	52
Rural No. 2	1898-99, 1900-01-02	351	16

COLORADO POTATO BEETLE.

On August 6, numerous potato bugs appeared on about a dozen vines. They were at once sprayed with a liquid composed of a teaspoonful of Paris green mixed with one pail of water. The mixture was kept well agitated while being applied. The treatment was effectual and no further trouble was experienced. This is the third time these beetles have appeared on the Experimental Farm, but in no instance has the injury been serious.

GRASSES AND CLOVERS.

The past season has been a favourable one for all cultivated grasses. The shallower marshes also produced abundant crops of wild hay, but the deeper marshes were too wet for the best results. On the Experimental Farm the more recent sown test plots of grasses and clovers, were destroyed, but the older plots gave a very fair return; considering the length of time they have been sown.

The crop of Austrian Brome Grass is usually a heavy one. It lies very compact and during unsettled weather is difficult to cure properly. A trial has been made of mixing it with western rye grass, with promising results, by mixing the seed in equal proportions and cutting the crop as soon as the rye grass heads out, the mixture lies open in the swarth and cures quickly. It is found however that most horses prefer the brome, and if fed a large quantity of the mixture at a time they will pick out the brome and leave the rye grass.

One plot of alfalfa and brome mixed, was grown. Originally it was one-quarter brome and three-quarters alfalfa, but the brome has gradually crowded out the alfalfa and the plot is now more than one-half brome. Alfalfa has usually proven hardy here, when sown alone. It then forms a strong plant before winter, but when sown with a nurse crop of grain, the plants are stunted and always winter killed. The same rule applies to red clover, alsike and white Dutch clovers.

A large number of fresh test plots of clovers and grasses have been sown and when winter set in nearly all of them had made a good stand. The clovers covered the ground thickly and the larger varieties could have been cut for hay, but it was thought advisable to leave the first years crop to retain the snow. For the same reason it is not a good plan to pasture clover late in the fall.

Between forty and fifty tons of hay were grown on larger fields.

Grasses sown on spring-ploughed stubble, without a nurse crop, size of plots one-tenth acre. Soil a sandy loam.

Variety.	When sown.	Seed per acre.	Yield of cured hay per acre.	
		Lbs.	Tons.	lbs.
Austrian Brome	1898	12	1	100
" "	1899	12	2	500
" "	1900	12	2	500
Timothy	1900	7	1	50
Alfalfa and Brome	1900	15 & 7	2	400

MILLETS.

These useful annual fodder plants have given a very fair return this year. The abundant rainfall and open autumn has been favourable to them.

All the varieties were sown in drills seven inches apart. Most of the millets are quite easy to cure and stack.

The size of the plots was one-twentieth acre and the soil was a rich clay loam and the previous crop was fodder corn. All were sown on June 6 and cut on September 4.

Variety.	Height.	Length of Head.	Stage when Cut.	Yield per Acre, Green.	
				Tons.	Lbs.
Moha Hungarian	43	5 inches...	Fully headed.	7	800
Pearl or Cat Tail	42	None.....	Not headed...	5	800
White Round Extra French	55	"	Not headed...	8	800
Algerian or Early Pearl	69	4½ inches.	½ headed	12	1,600
Italian or Indian	44	12 " .	Few heads....	12	800
Common	36	4 " .	Fully headed.	4	1,800

BROOM CORN.

This was sown in rows three feet apart on June 6 on a rich clay loam. The space occupied was one-twentieth of an acre. The crop grew to a height of 56 inches before cutting on September 4. This was partly headed, to the extent of about five inches and produced at the rate of 14 tons of green fodder per acre.

AMBER SUGAR CANE.

The amber sugar cane was also grown in rows three feet apart on rich clay loam. It was sown June 6 on a one-twentieth acre plot and cut September 4. The plants grew to a height of over five feet but were not headed at time of cutting. This produced at the rate of 10 tons of green fodder per acre.

HORSE BEANS.

The returns from horse beans were above the average, and the plants were well podded.

Two plots were sown of one-fortieth of an acre each. The seed was put in with a garden drill and kept clean by the occasional use of a cultivator. The soil was a clay loam, summer-fallowed.

Both were sown on June 5, and cut on September 6.

——	Height.	Length of Pod.	Condition when Cut.	Yield per Acre.	
				Tons.	Lbs.
Horse Beans	36	4	Green	10	1,200
" "	36	4	"	9	1,900

EXPERIMENTS IN FEEDING STEERS.

SPELTZ STRAW COMPARED WITH BROME GRASS (BROMUS INERMIS) AND WESTERN RYE GRASS (A. TENERUM).

Twelve steers were purchased for this experiment but one of them becoming sick before the test started, only three were used in one of the groups. All were two-year old grades, Shorthorn blood apparently predominating.

When purchased in December, 1901, the steers cost $3.25 per hundred, and they sold in May, 1902, for $5.12½ per hundred pounds. At that time the two lots fed with hay were choice export cattle, but the animals fed with Speltz were not fully finished, and in a discriminating market would not have brought within a cent of the top price.

The result of the experiment would lead us to the following conclusions:—

1st. That Western Rye Grass hay and Brome Grass hay are about equal in feeding value for beef.

2nd. That Speltz straw makes very fair coarse fodder but is only worth one-half as much as well cured hay.

RATION FED.

During the first four weeks, Dec. 30, 1901, to Jan. 27, 1902, each steer received per day:

Either Brome hay, Western Rye hay or Speltz straw	20 pounds
Swede turnips	20 "
Chop	6 "

During second four weeks, Jan. 27 to Feb. 24, 1902, each steer received per day:

Either Brome hay, Western Rye hay or Speltz straw	20 pounds
Swede turnips	20 "
Chop	8 "

During third four weeks, Feb. 24 to March 24, each steer received per day:

Either Brome hay, Western Rye hay or Speltz straw	20 pounds
Swede turnips	20 "
Chop	9 "

During the fourth four weeks, March 24 to April 21, each steer received per day:

Either Brome hay, Western Rye hay or Speltz straw	20 pounds
Swede turnips	20 "
Chop	11 "

DESCRIPTION OF FODDER.

The Brome and Western Rye hay were cut early and well cured. The Speltz straw was cut as soon as the grain was ripe and had a clean and bright appearance. The chop consisted of one-half oats, one-quarter barley and one-quarter wheat screenings.

COMPARATIVE GAINS.

Brome Grass Hay.	Date.	Weight.	Gain.	Total Gain.
Original weight of four Steers	Dec. 30	5,325 lbs.		
Weight end of 1st period	Jan. 27	5,500 "	175 lbs.	
" 2nd "	Feb. 24	5,555 "	55 "	
" 3rd "	Mar. 24	5,770 "	215 "	
" 4th "	Apr. 21	6,000 "	230 "	675 lbs.

Western Rye Grass Hay.	Date.	Weight.	Gain.	Total Gain.
Original weight of four Steers	Dec. 30	5,320 lbs.		
Weight end of 1st period	Jan. 27	5,424 "	104 lbs.	
" 2nd "	Feb. 24	5,530 "	106 "	
" 3rd "	Mar. 24	5,720 "	190 "	
" 4th "	April 21	5,980 "	260 "	660 lbs,

Speltz Straw.	Date.	Weight.	Gain.	Total Gain.
Original weight of three Steers	Dec. 30	3,960 lbs.		
Weight end of 1st period	Jan. 27	4,062 "	102 lbs.	
" 2nd "	Feb. 24	4,072 "	10 "	
" 3rd "	Mar. 24	4,183 "	111 "	
" 4th "	April 21	4,315 "	132 "	355 lbs.

COST OF FEEDING EACH LOT OF STEERS.

Lot 1.—Brome grass hay.

8,480 lbs. at $5 per ton	$21 20
142⅔ bushels turnips at 5 cents per bushel	7 14
3,568 lbs. chop at 75 cents per hundred lbs.	26 76
Total cost for four steers	$55 10
Cost per steer	$13 77

Lot 2.—Western rye grass hay.

8,400 lbs. rye grass hay at $5 per ton	$21 00
141⅓ bushels turnips at 5 cents per bushel	7 07
3,500 lbs. chop at 75 cents per hundred	26 25
Total cost for four steers	$54 32
Cost per steer	$13 58

Lot 3.—Speltz straw.

4,995 lbs. speltz straw at $2.50 per ton	$ 6 25
111 bushels turnips at 5 cents per bushel	5 55
2,832 pounds chop at 75 cents per hundred	21 24
Total cost for three steers	$33 04
Cost per steer	$11 01

SUMMARY OF RESULTS.

——	First Cost per Steer.	Value of Feed Consumed.	Price per Steer Sold for.	Profit per Steer.
	$ cts.	$ cts.	$ cts.	$ cts.
Fed Brome Grass Hay	43 26	13 77	76 87	19 84
Fed Rye Grass Hay	43 22	13 58	76 61	19 81
Fed Speltz Straw	42 90	11 01	73 69	19 78

EXPERIMENTS WITH SWINE—LAMB'S QUARTER SEED AS PIG FEED

This test was made to ascertain whether a ration composed partly of Lamb's Quarter Seed *Chenopodium album* had any advantage over a pure grain ration.

The Lamb's Quarter seed was boiled and then after being well mixed with the chopped grain was fet wet. The grain was a mixture composed of one-half oats, and one-quarter each of barley and wheat screenings.

The four pigs used for this test were Tamworth crosses. They were fed 76 days and sold at $5.50 per hundred pounds, live weight.

From the result of this experiment it would appear that Lamb's Quarter seed has a limited value as food for pigs. The annual report of the Experimental Farms for 1899, page 147, contains an analysis of this seed.

RATION FED.

Amount and value of food consumed by each pen during the 76 days of the test, the grain is valued at 75 cents per hundred pounds.

——	Lamb's Quarter Seed.	Gain.	Value of feed.
	Lbs.		$ cts.
Pen 1, fed Lamb's Quarter Seed	216	950	7 12
Pen 2, without " "	....	1,125	8 43

SUMMARY.

—	Weight when bought.	Value when bought.	Weight when sold.	Value when sold.	Value of food.	Profit per pair.
	Lbs.	$ cts.	Lbs.	$ cts.	$ cts.	$ cts.
Pen 1, fed Lamb's Quarter Seed..	337	18 53	558	30 69	7 12	5 04
Pen 2, without " "	337	18 53	567	31 18	8 43	4 22

POTATOES AND TURNIPS AS PIG FEED.

Potatoes and turnips give large returns in this country and if found profitable for pig feed, the quantity grown could be greatly increased.

Four pigs were used for this test. Two pure bred Yorkshire and two Yorkshire Tamworth crosses, in the test each pair consisted of one pure bred and one cross bred animal.

The grain used was composed of one-half barley, and one-quarter each of oats and wheat screenings, valued at 75 cents per hundred pounds. With this was fed a mixture of two-thirds small potatoes and one-third turnips which are valued at 20 cents per bushel. These were boiled, mashed, and mixed with the ground grain.

It would appear from this test that potatoes and turnips can be used to replace a portion of the grain ration but they are worth less than twenty cents per bushel for that purpose.

RATION fed during the fattening term of 82 days, from August 28 to Nov. 18.

—	Grain fed.	Value.	Roots fed.	Value.	Total value of food.
	Lbs.	$ cts.	Lbs.	$ cts.	$ cts.
Pen 1, fed roots.....	728	5 46	846	2 88	8 28
Pen 2, without roots....	978	7 33	.....	... .	7 33

SUMMARY.

—	Weight when bought.	Value when bought.	Weight when killed.	Value when killed.	Value of food.	Profit on each pair.
	Lbs.	$ cts.	Lbs.	$ cts.	$ cts.	$ cts.
Pen 1, fed roots.....	171	10 26	372	22 32	8 28	3 78
Pen 2, without roots...	177	10 62	372	22 32	7 33	4 37

REPORTS FROM PARTIES SUPPLIED WITH SWINE.

This fall circular letters were sent out to parties supplied in former years with young pure bred pigs. Eleven replies have been received to date. The following extracts will show that the animals have given good satisfaction.

Name of Purchaser.	Address.	Extract from Reports.
J. W. Dimmick	Kerfoot	Boar has given me great satisfaction.
S. T. Smith	Hamiota	I think the sow has no equal.
R. G. Penson	Melita	Sows are doing first rate.
I. Cookman	Basswood	Will make a very fine hog.
G. W. Marsden	Brandon	Has done very well and will make a fine hog.
L. W. Speers	Westwood	She is a fine animal.
G. A. Edwards	Kerfoot	I am well pleased with him.
A. E. Brown	Hamiota	She made a good growth, has eleven pigs in one litter.
H. W. Phillips	Pipestone	The hog has done finely and we are well satisfied with it.
S. A. Coxe, V.S	Brandon	A very fine animal, I am well pleased with it.
J. Kirkcaldy	do	A fine pig and doing well.

BROOD SOWS.

In the early history of this farm the brood sows were kept housed during the winter months in well bedded pens 9 x 9 feet, and only allowed the use of runways during fine weather, with the result that the litters of young pigs were generally small and weak. Of late years all the brood sows are allowed to run at will in a large yard, provided with a stack of straw for their bed; and they are only brought into the barn a week or two before the litters are due. Since this plan has been adopted the sows have averaged ten pigs per litter and nearly every one of them has been strong and vigorous from the start.

POULTRY.

The flock of fowls on this farm have kept in good health during the year. Seventy-three chickens were hatched by hens in the spring, of these only three died during the summer. The flock now consists of 54 Light Brahmas, 24 Barred Plymouth Rocks and 14 White Wyandottes.

Some feeding experiments were commenced this fall but were not completed in time to be included in this report.

BEES.

Of the ten hives placed in the cellar last fall, two died, one strong colony from inadequate stores, the other from some unexplained cause.

They were placed on the stands on April 15 and commenced at once to gather pollen from the willow and hazel. The colonies were weighed in the fall and again in the spring and it was found that they had consumed on an average 14½ pounds of honey per colony.

The spring was too wet and cool for much nectar gathering. It was found that very few of the bees left the hive when the temperature was below 50 degrees Fah. in the shade. We notice that the bee's preference for a particular blossom is not at all constant; one year they work freely on a certain plant and the next year neglect it. This year they worked freely on wild plums and on small fruits, the former being fairly alive with them at times.

The demand for colonies being large the apiary was run for swarms more than for honey and only about 25 pounds of honey per colony were taken. Sixteen swarms were obtained during the season. These found ready sale at five dollars per colony. Twelve hives were placed in the cellar on November 15.

HORTICULTURE.

APPLES.

Orchard of Siberian Crab (Pyrus baccata).—It is with pleasure that we record one of the best crops of this fruit yet harvested on the Experimental Farm. The trees were covered with bloom in the spring and the total absence of spring frosts, resulted in a splendid set of fruit in many instances so heavy was the crop that the branches of the trees were bent down under the weight. The most notable feature of this fruit is its extreme variability, specimens of the same variety ranging in size from that of a fair sized pea to a size nearly as large as the Transcendent Crab. While it is proposed to continue the growing of the larger kinds—the small fruited trees have been reserved for top grafting with improved varieties. The varieties of Pyrus grown in this orchard consist of the following:—

Pyrus baccata edulis, P. b. macrocarpa, P. b. microcarpa, P. b. lutea, P. b. sanguinea, P. b. aurantiaca, P. b. genuina, P. b. cerasiformis and P. b. yellow. Pyrus prunifolia, P. p. xanthocarpa, P. p. intermedia and Pyrus malus No. 529.

The most promising of these which have yet fruited are among *P. b. sanguinea, Pyrus prunifolia* and *Pyrus prunifolia xanthocarpa* and even these show very great variation in individual trees—Following will be found a list of the most promising trees.

Pyrus baccata sanguinea No. 15.—Fruit, rosy red when ripe, and produced in great profusion, depth 1 inch, ripe August 15. Of a mealy consistency though pleasant flavour, sweet, calyx in about 75 per cent of the fruit persistent, makes a first class jelly.

Pyrus baccata sanguinea No. 16.—Colour light red on sunny side light green on opposite. Ripe August 25, flavour pleasantly acid and juicy. Calyx entirely persistent a very good variety.

Pyrus prunifolia xanthocarpa No. 17.—This was the largest of the pyrus yet fruited having a diameter of 1½ inches. The colour of the fruit is a deep green and was not fully ripe before frost.

Pyrus baccata yellow No. 18.—The fruit of this variety is of a deep yellow colour all over, and is about the same size as *Pyrus baccata sanguinea* No. 15. The flesh is pleasantly sub-acid and very juicy.

CRAB APPLE SEEDLINGS.

In the *Pyrus* orchard there has been grown a number of seedlings from the following Crabs—Martha, Transcendent, Rose of Stanstead, Snyder, Gideon, and Jumbo. The four last mentioned having proven too tender for us here, have all been destroyed except one or two of the most promising trees of each variety, left for further test. The Transcendents have shown themselves somewhat hardier, although many of these have repeatedly been killed back. The seedlings of Martha are however most promising. Most of them have been quite hardy since planting, make very shapely trees, and this year three of them fruited—following is a brief description of each of these three sorts.

Martha Seedling No. 1.—Tree a vigorous grower very shapely and hardy. Fruit light yellow in colour when ripe, with the faintest suggestion of red on the sunny side. Shape flattish, calyx persistent, flavour very sweet and juicy, almost comparable to Transcendent; an abundant bearer, about two-thirds the size of the Transcendent crab—altogether a most satisfactory variety. Ripe about the middle of August.

Martha Seedling No. 2.—Tree fairly vigorous, though somewhat more spreading than the former and hardy. Fruit deep yellow in colour with bright red streaks on sunny side. Shape conical or elongated, and slightly ribbed. Calyx persistent. Flavour slightly astringent and drier than the former, rather large seed cavity, fairly productive and of about an equal size with the former. Ripe early in September.

Martha Seedling No. 3.—Tree fairly vigorous and shapely, quite hardy, fruit deep yellow throughout when ripe. Shape quite flat, calyx persistent. Flavour sweet but somewhat dry, small seed cavity (only a few fruits were produced this season) slightly smaller than the preceding varieties. Ripe middle of August.

TONKA APPLE.

One tree of this variety mentioned in last year's report set a few specimens of fruit, which were stolen long before they reached maturity. These incidents are extremely regrettable and make our work in these lines very difficult.

TOP GRAFTING.

A considerable amount of grafting was accomplished during the past spring—and results were very satisfactory. Scions were received from Mr. H. L. Patmore, nurseryman of this city consisting of Duchess, Wealthy, Pride and Transcendent. These were top grafted on the stocks of *Pyrus baccata*, and nearly all made a good union. The seasons growth averaging two to two and one-half feet. The scions were taken from trees which have successfully withstood the test of several winters—and it is hoped they will prove hardy with us. The operation commenced as soon as the wax could be worked in the open, and continued at intervals until the buds expanded. It would appear from the results that early grafting is desirable. Considerable root grafting was also done with Tonka and Wealthy apples on *Pyrus baccata*.

TRANSCENDENT CRAB.

The tree of Transcendent crab growing on Hillside Plot mentioned in previous reports came through the winter of 1901–2 unscathed and a fine crop of fruit was set. The product was an unusually fine sample of this crab, rather above the average Manitoba grown Transcendent in size, and entirely free from any disease. This specimen has now proven hardy for several years, but this is the first time that any fruit has matured. Ripe about August 25.

PLUMS.

Although the plum trees, set exceptionally well the past spring (owing to the absence of spring frosts) a large proportion of the crop was destroyed by the fungus disease (plum pocket). The coolness of the season greatly retarded the ripening, and although a fair crop of the native plum *(Prunus nigra)* was harvested, the imported varieties *(Prunus americana)* failed to produce ripe fruit. A careful examination of

all the bearing trees was made, and undesirable ones were marked for grafting with the more promising varieties.

A particularly fine native plum seedling fruited this year. The fruit is small, light red in colour, flavour good, skin thin, and it ripens earlier than any other variety grown here. It has been named 'Brandon Ruby.'

RASPBERRIES.

Raspberries were again a very poor crop, so much so as to prevent any comparison of yield. The fact has now been clearly demonstrated that their present position (on the hill-side) is entirely unsuited to them, and arrangements have been made to commence a new plantation in a different location. Following will be found a list of varieties under trial, together with notes as to the manner in which they came through the winter of 1901-2. All made good growth this season and on the approach of winter one-half of each variety was laid down and covered, the balance being left standing in order to make comparisons on the two methods of wintering.

Biggar's Seedling, wintered fairly well. Muskingum and H. R. Antwerp, killed to ground. Royal and Clark, wintered well. Sir John, Hansel and Palmer, killed to ground. R. B. Whyte, wintered fairly well. Yellow Antwerp, killed to ground. Lutea, wintered well. Sharpe, wintered fairly well. London, wintered well. Louisa Bonn, wintered fairly well. Large Red, wintered well. Kenyon's Seedling, wintered fairly well. Phœnix, Parnell, Niagara, Thompson's Early and Trusty, wintered well. Hebner, killed back one-half. Schaffer's Colossal, killed to ground. Champion, wintered well. Fontenay, wintered fairly well. Garfield, Carleton, Empire, Cuthbert and Sarah, killed to ground. Turner, killed back one-half. Hilborn and Philadelphia, wintered well. Caroline, killed back one-half. Marlboro, Golden Queen and Dr. Reider, wintered well. Mary, killed back three-quarters.

CURRANTS.

The currant crop was again a small one. The present position of the plantation seems unsuitable and a new plot will be commenced next spring. While some of the red and white varieties gave a fair yield, the black currants produced hardly any fruit. Following will be found a list of varieties on trial, together with notes on their condition in the spring of 1902 :

BLACK CURRANTS.

Climax, wintered well. Standard, killed to ground. Stirling, killed back one-half. Black Champion, Lee's Prolific and Prince Albert, wintered well. Madoc wintered fairly well. Monarch, killed to ground. Eagle and Ontario, wintered well. Eclipse, killed back one-half. Orton killed to ground. Perth wintered fairly well. Beauty, wintered well. Oxford, killed back one-half. Victoria, wintered well. Charmer, killed to ground. Clipper, wintered well. Winona, killed back one-fourth. Ethel, killed back three-fourths. Lewis, killed to ground. Stewart and Crandall's Black, wintered well. Black Naples, killed back one-half. Perry, wintered fairly well. Black Champion, killed back three-fourths. Lee's Prolific, wintered fairly well. Of the red and white varieties North Star, Fay's Prolific, Cherry, Raby Castle and Red Dutch, wintered well. Fertile D'Angers and La Versailles, wintered fairy well. Victeria, killed to ground. Charter, Pomona, Red Grape, Mammoth Red, White Imperial, White Dutch and White Grape, wintered well.

CURRANTS.

The following table shows the comparative yields of the varieties which fruited :—

Variety.	Colour.	Yield per Bush.
		Lbs.
Victoria	Red	5
Raby Castle	"	3½
Red Cherry	"	14
White Dutch	White	9½
Charter	Red	3
North Star	"	7
La Versailles	"	½
Fertile D'Angers	"	2¼
Pomona	"	11
Victoria	"	5
White Grape	White	5½
Fay's Prolific	Red	1½

Currant.—Crandall or Missouri Tree Currant. This variety is a strong growing and large fruited sort, which has proven very desirable for Manitoba. The bush is thoroughly hardy producing in profusion large black berries (about twice the size of the ordinary black currant) of good flavour, which make an excellent preserve. Owing to the shyness in fruiting of some of the black varieties here, and to the fact that they are somewhat tender, we would recommend this variety for more general trial in Manitoba. It has the disadvantage of ripening unevenly.

GOOSEBERRIES.

The Gooseberry crop was not a large one the past season. The Native Sand Hill Gooseberry gave a fair crop of small berries, and the following varieties produced a small quantity of fruit, viz :—Houghton, Columbus and Red Jacket.

SAND CHERRIES (*Prunus pumila*).

This crop was a total failure the past season. All the fruit being destroyed by the fungus known as 'pocket.'

TREES AND SHRUBS IN ARBORETUM.

Very few additions were made to the Arboretum during the past season on account of the pressure of other work at planting time. During the past few years the growth of trees and shrubs has been so luxuriant that it was again found necessary to remove some hundreds of the trees to prevent overcrowding. In doing this work care was taken to leave the most valuable species. We regret that the Russian Poplar hitherto one of our fastest growing, and most satisfactory trees is now showing signs of degeneration. The limbs are affected with canker, which, first appearing as an excrescence, gradually rots through the limb, which then breaks off with the first heavy wind storm. Nearly all the specimens in the Arboretum are more or less affected.

Owing to the absence of spring frosts, the flowering shrubs made a magnificent display, the Lilacs especially calling forth the admiration of visitors.

Following will be found some brief notes on a few of the best varieties of flowering shrubs not already noticed in former reports.

Berberis purpurea.—Though not perfectly hardy this shrub does fairly well when partially protected, and is well worth a trial, its purple foliage and orange red flowers, making a beautiful effect when interposed with other shrubs. Four or five feet high.

Spiraea ulmifolia.—This spirea made a beautiful show during the past season, the shrubs being literally covered with racemes of beautiful white flowers. Three to four feet high, quite hardy.

Spiraea sorbifolia.—A very fine late blooming spirea. The foliage is very ornamental, this coupled with the symmetry of the plant and the large spikes of pinkish white flowers, make it one of the best low growing flowering shrubs. Three to four feet high. Hardy.

Lonicera sempervirens.—A spreading variety of the honeysuckle of the trumpet type. The flowers of a brilliant scarlet are very striking and are produced for a considerable length of time, hardy.

Diervilla lutea.—Though this is not thoroughly hardy, partially killing back each season yet as it invariably flowers it is worthy of cultivation. The yellow trumpet flowers, together with its handsome foliage make it very attractive. One to two feet in height.

Rosa villosa pomifera.—A large flowering single rose of a deep red colour, the flowers being succeeded by large and handsome fruit. Height 3 to 4 feet. Hardy.

Philadelphus.—For the first time in the history of the farm two varieties of this beautiful shrub produced a few flowers—viz., *P. deutziflorus* and *P. grandiflorus*. The flowers of these two varieties are almost identical except in size *P. grandiflorus* being about twice the size of the former, and possesses a most delicate perfume. These shrubs always kill back to near ground, and an effort has been made this autumn to bring them through the winter by protection.

AVENUES.

The avenue trees made a fair growth during the season of 1902. The maples however were badly infested with a variety of Aphis during the latter part of the season, which somewhat checked growth—and caused an unusually early ripening of the wood —The trees were heavily laden with seed, a small percentage of which was damaged by the fungus disease first noticed last year, the bulk of the seed however is of good quality. The spruce trees on the east avenue made an exceptionally luxuriant growth.

PLANTING OF SPRUCE.

The bluff immediately south of the Barn which was cleared of undergrowth two years ago, and which consists principally of Native Oak (*Quercus macrocarpa*) was improved this season by the planting of a number of Spruce (*Picea alba*) which were brought from the Carberry swamp in 1900. The young trees appear to be well established and if they succeed well in a few years will add to the beauty of this plantation.

PROPAGATION.

Cuttings of the following which were made in the fall of 1901, were planted the past spring.

	Percentage struck.
Salix laurifolia	90 per cent.
" Nicholsonii purpurascens	25 "
" pentandra	20 "
Populus bereolinensis	55 "
" argentea	5 "
Vitis quinquefolia	85 "

PROPAGATION OF TREES AND SHRUBS FOR DISTRIBUTION.

An increased number of trees and shrubs have been grown for free distribution. In most cases the seed or cuttings have been grown on the Experimental Farm. The seed of the larger trees and shrubs was sown in the open field, in drills three feet apart. The smaller shrubs were grown in seed beds and the drills made one foot apart. The following list includes most of the varieties grown: Native Ash-Leaf Maple, Caragana, Bush Honeysuckle, Sand Cherries, Lilacs.

PROPAGATION OF TREES FOR THE FORESTRY BRANCH OF THE DEPARTMENT OF THE INTERIOR.

The 110,000 trees grown here for the above department were distributed last spring, and I understand have given very general satisfaction. This year a much larger area was sown with various tree seeds, and the following list gives the number of trees raised from seed. These are nearly all large enough for distribution next spring.

Ash Leaf Maple (native)	512,000
Green Ash	310,000
White Elm	50,000
	876,000

HEDGES.

The large maple hedges surrounding the shelter blocks, made good growth during the past season and show no signs of deterioration. This also applies to the large hedges of Native Spruce (*Picea alba*) and *Caragana arborescens* (Siberian Pea Tree). The Lilac hedge surrounding the Pyrus orchard south of the barn flowered heavily last spring, and was a source of admiration to all passers by. The following varieties have proven unsuitable for hedge purposes and they have been destroyed:—

Rosa Rugosa, Ligustrum amurense (Amur Privet), Spiraea Douglasii (Douglas' Spirea), Lonicera Albertii (Albert's Honeysuckle), Populus deltoida (Cottonwood), Salix laurifolia (French Laurel-leaved Willow), Rosa rubrifolia (Red Leaved Rose).

From the results obtained since planting the sample hedges in 1898, the following appear to be the most satisfactory as ornamental hedges:—

Pyrus baccata aurantiaca (Siberian Crab), Shepherdia argentea (Buffalo Berry), Syringa Josikea (Josika's Lilac), Crataegus coccinea var. Sullivantii (Native Thorn), Acer Ginnala (Asiatic Maple). Rhamnus frangula (Breaking Buckthorn), Salix Brit-

zensis (Willow), Larix americana pendula (Tamarack), Caragana arborescens (Siberian Pea Tree), Picea alba (Native White Spruce), Salix laurifolia (true) (Laurel-leaved Willow). Prunus pennsylvanica (Pin Cherry), Cornus sto'onifera (Dogwood), Syringa vulgaris (Common Lilac).

CATERPILLAR ON WILLOWS.

Early in August a number of willows in the propagating beds were attacked by a dark caterpillar, with bright spots along its body, probably the larva of a saw fly. Some of the branches were completely stripped of leaves before the insects were noticed. The plants were sprayed with a mixture of one teaspoonful of paris green to one pail of water. This destroyed the insects at once and the plants soon recovered.

THE VEGETABLE GARDEN.

Despite the drawbacks resulting from the flood experienced on the farm this season, together with a disastrous cloudburst which occurred on June 1, the vegetable garden suffered comparatively little and the crops were quite up to the average. The month of April being very cool and dull with several snowfalls, outside sowing did not commence until May 25, when onions were sown, closing on May 28 with cucumbers and corn. The soil being very moist, the germination was exceptionally good, the rows showing a continuity (with the exception of some of the pease of weak vitality) not always experienced here. Following the custom adopted some years ago, three kinds of vegetables were tested in large variety, viz.:—Pease, Tomatoes and Cucumbers. The coolness of the season prevented the tomatoes from ripening, but the others named did exceptionally well, Onions, Beets, Cabbage, Cauliflower, Turnips, Lettuce, Carrots, Squash, Pumpkins and Corn, all gave good returns, and altogether the season was a favourable one for the vegetable garden.

Following will be found a record of portions of the work undertaken in this department:—

PEASE.

Forty-seven varieties of Garden Pease were sown on May 12 and 13, with hoe, in rows four feet apart, and the crop as a whole, was very satisfactory The worst feature of the test was the lack of germinating power in many of the varieties due to Pea Weevil, especially those not grown extensively. This has been a source of annoyance, for some years past, with imported seed and emphasizes the desirability of growing our own seed, which is always free from this trouble. All varieties ripened, and the product has been harvested for use next season, the sample being a fine one. The earliest variety proved to be Extra Early Exonian. Champion of England being the last ready for table.

Appended is the result of the test arranged in order of earliness.

All were sown on May 12 and 13.

The germination of the following varieties was poor:—Thos. Laxton, Admiral Dewey, C.P.R., Yorkshire Hero, Telephone, Shropshire Hero, Champion of England, Laxton's Prolific, Long Pod, Rennie's Perfection and Duke of York.

Variety.	Length of Pod.	Length of Vine.	No. of Peas in Pod.	Productiveness.	Flavour.
	In.	In.			
Extra Early Exonian	2	18	4 to 5	Very productive..	Sweet.
S. B. Co.'s Extra Early	2	14	4 " 5	Fairly " ..	Fairly sweet.
Alaska	2¼	30	6 " 7	" " ..	"
McLean's Little Gem	2	18	5 " 6	" " ..	"
Bruce's Early Conquerer	2	26	4 " 5	Poor	Poor.
Extra Early Daniel O'Rourke	2	32	4 " 6	Very productive ..	"
Philadelphia Extra Early	2½	36	6 " 7	Fairly " ..	"
Carter's First Crop	2½	24	5 " 6	" " ..	Fairly sweet.
Tom Thumb	2¼	26	6 " 7	" " ..	"
Wm. Hurst	3½	16	7 " 8	Very " ..	Very sweet.
American Wonder	2¾	15	6 " 7	Fairly " ..	Sweet.
Blue Beauty	2¼	18	5 " 6	" " ..	Fairly sweet.
Laxton's Alpha	2½	28	6 " 7	" " ..	Sweet.
Prosperity or Gradus	3	36	4 " 5	Poor	Very sweet.
Gregory's Surprise	2½	34	6 " 7	Fairly productive.	Fair.
Blue Imperial	2¾	24	5 " 6	" " ..	Poor.
Burpee's Profusion	2¾	36	7 " 8	Very " ..	Very good.
Horsford's Market Garden	2¾	34	6 " 7	" " ..	Good.
Large Crooked or Scimitar	6	60	Edible podded variety.		"
Early Dwarf Brittany	5¾	30	"	"	"
Allen's Dwarf Telephone	3½	20	8 to 9	Fairly productive.	Very good.
C.P.R	3	18	5 " 6	Very productive..	"
Surprise	2¼	30	4 " 5	Poor	Sweet.
Admiral	2¾	36	6 " 7	Very productive..	Fairly sweet.
Rennie's Queen	3¼	30	8 " 9	Fairly " ..	Good.
Nott's Excelsior	2½	12	7 " 8	Very " ..	Sweet.
McLean's Advancer	2¾	30	5 " 6	Fairly " ..	Fairly sweet.
Premium Gem	2¼	12	5 " 6	" " ..	Good.
Admiral Dewey	3¾	37	8 " 9	" " ..	Very fine.
Bliss' Everbearing	3¼	24	7 " 8	Very " ..	Fairly sweet.
McLean's Blue Peter	2¾	12	5 " 6	Fairly " ..	Sweet.
Laxton's Supreme	3¼	40	8 " 9	" " ..	Good.
Thomas Laxton	3¼	32	6 " 7	" " ..	Very sweet.
Fillbasket	2¾	37	6 " 7	Very " ..	Good.
Rural New Yorker	2¾	30	5 " 6	Fairly " ..	Fair.
Pride of the Market	2½	30	6 " 8	" " ..	Poor.
Laxton's Prolific Long Pod	3¼	24	7 " 9	Very " ..	Good.
Rennie's Perfection	3	30	6 " 7	Fairly " ..	Very good.
Telephone	3¾	36	7 " 8	" " ..	"
Stratagem	3¼	24	7 " 9	Very " ..	"
Juno	3	28	8 " 9	" " ..	"
Prince of Wales	3¼	36	8 " 9	" " ..	Excellent.
Duke of Albany	3	40	7 " 8	Fairly " ..	Very good.
Yorkshire Hero	3½	30	8 " 9	" " ..	Good.
Duke of York	3½	36	8 " 9	Very " ..	Very good.
Shropshire Hero	3¾	32	8 " 9	Fairly " ..	"
Champion of England	3½	40	8 " 9	" " ..	"

During the summer representatives of two extensive seed firms visited the farm for the express purpose of inquiring into the capabilities of the country for supplying seed pease on a large scale. After examining the large collection of varieties growing on the farm, and noticing the absence of pea weevil in the mature samples, they appeared favourably impressed with the prospects of the industry here.

CUCUMBERS.

Thirty-six varieties of this vegetable were sown in open ground on May 23, in hills three by five feet apart. With one exception the germination was good and a large crop of fruit was harvested. It is pleasing to note that on the Experimental Farm this crop is invariably a good one although the seed is sown directly in the open (the plan of starting the plants in the hotbed and transplanting not being resorted to). Following will be found a result of this test arranged in order of earliness, together with some notes, on those varieties that proved specially suitable.

Variety.	Flavour and Texture.	Length.	Diameter.	Colour.	Smoothness.	Productiveness.
		In.	In.			
Siberian	Fair..	5¼	2	Light green.	Spined	Very productive.
Early Frame	"	4⅝	2¼	"	Sparsely spined	"
Paris Prolific	"	7¼	2	Dark green.	Densely spined	"
Early Green Cluster	"	6	2¼	Light green.	Moderately spined.	"
Boston Pickling	"	5¼	2	Dark green.	Densely spined	Fairly productive.
Moronian or Russian	Poor.	4	2	Light green.	"	"
Short Green Gherkin	Fair..	4⅜	2	"	"	Very productive.
Extra Early Long Green	Very good	8	2	Dark green.	Sparsely spined	Moderately productive.
English Gherkin	Fair..	4¼	2¼	Light green.	"	Very productive.
Westerfield's Chicago Pickling		5½	2	Dark green.	Densely spined	"
White Wonder	Very good	6½	2½	White	Sparsely spined	"
Cool and Crisp	"	8¼	2½	Dark green.	Heavily spined.	Fairly productive.
Cumberland	"	8	2½	Light green.	Densely spined	Very productive.
B's. Evergreen	"	7⅜	2⅜	"	Sparsely spined	"
Short Green	Fair..	4⅝	2⅜	"	Densely spined.	
Boston Market	Good	6¾	2¼	Dark green.	Sparsely spined	"
Green Prolific	Very good	6	2½	"	Densely spined.	"
Prize Prolific	"	9	2	"	"	"
Pride of Canada	"	9	2½	White.	Moderately spined.	"
Improved Long Green	"	7⅜	2½	Dark green.	Sparsely spined	Moderately productive.
Commercial Pickle	Good	6½	2	Light green.	Moderately spined.	Very productive.
Early Arlington White Spine	"	6	2⅜	"	Sparsely spined	Moderately productive.
Early White Spine	Very good	7⅜	2⅜	"	"	"
New Orleans Market	"	7½	2⅜	"	Densely spined.	Very productive.
Emerald	"	5½	2½	Dark green.	Spineless	"
Hill's Forcing White Spine	"	7⅜	3	Light green.	Sparsely spined	"
Thorburn 1896 Pickler	Good	6¾	2⅜	Dark green.	Moderately spined.	Fairly productive.
Jersey Pickling	Fair..	5	1⅝	"	Densely spined.	Very productive.
New Toronto Pickling	Very good	6½	2¼	"	Heavily spined.	Fairly productive.
Giant Pera	"	13	2½	Light green.	Smooth	Not productive.
Japanese Climbing	Poor.	6½	2⅜	Deep green.	Sparsely spined	Moderately productive.
Stockwood Ridge	Good	9	2⅜	White	Moderately spined.	Very productive.
Long Green Turkey	Very good	8¼	2⅜	Dark green.	Sparsely spined	Moderately productive.
White Pearl	"	10½	2½	White	Heavily spined.	Fairly productive.
Extra Early Long Green						
*Tailby Hybrid						

* Did not germinate.

Siberian.—This is one of the earliest sorts in cultivation. The fruit is not large (averaging only about five inches) but is invariably produced several days ahead of any other variety yet tested and is withal very productive.

Early Frame.—Another extremely early variety, the fruit being slightly larger than the preceding one.

Cumberland.—This is a variety of comparatively recent introduction, of the white spine type, but is much more densely spined than that variety. A vigorous grower, very productive and combines the qualities essential both for pickling and slicing in a degree not attained by any other sort.

Pride of Canada.—Is a new white variety, larger than the White Wonder and more attractive in appearance.

Paris Prolific.—Continues to merit its reputation as one of the best pickling varieties tested here.

TOMATOES.

Sixty-one varieties of tomatoes were tested during 1902. Of these four failed to germinate, the germination of many of the others also showing poor vitality. It is to be regretted that with such a comprehensive list of varieties the season was not more favourable for this vegetable, as only one variety produced ripe fruit, viz., Red Currant, and the yield of green fruit was unusually below the average, three varieties not producing any fruit whatever. Representatives of all the varieties were grown both in rows three feet apart and also on a wire trellis, but there was practically no difference in the results by either method.

Earliest of All as in former years heads the list, giving the largest amount of green fruit.

Dominion Day, a comparatively new variety, coming next. It would appear from our tests with this vegetable that in order to produce ripe fruit every season, it would be necessary to start the plants very early (say middle of March) in hotbed, and carry them along in pots until quite large plants, well hardened off are obtained, giving plenty of water when planted outside, so that no check results.

Following will be found result of the test arranged in the order of their yield.

All were sown in boxes in hotbed on April 1, transplanted on April 15 and planted out on June 11.

Variety.	Amount of Fruit from average Plant.	Appearance.	Germination.
	Lbs.		
Earliest of All	7 1/16	Very wrinkled	Very good.
Dominion Day	5 3/4	Slightly "	"
Early Conqueror	5 5/16	" "	"
Democrat	4 1/2	Smooth	Fair.
Livingston's Favorite	3 5/8	Slightly wrinkled	Poor.
Thorburn's Earliest	3 1/2	" "	Fair.
Ponderosa	3 1/4	" "	Good.
Thorburn's Long Keeper	3	Smooth	Fair.
Honor Bright	2 3/4	"	Poor.
Earliana	2 1/2	Wrinkled	Good.
Dwarf Scarlet Champion	2 1/2	Smooth	Very good.
New Enormous	2 1/4	"	"
Optimus	2 1/4	"	Very poor.
Success	2 1/4	Slightly wrinkled	Good.
Thorburn's Lemon Bush	2 1/4	Smooth	Fair.
Imperial	2 1/4	"	Good.
Aristocrat	2	"	Fair.
Freedom	2	"	Good
Lorillard	2	"	"
Creekside Glory	1 3/4	"	"
Crimson Cushion	1 3/4	Slightly wrinkled	Very poor.
Early Ruby	1 1/2	" "	"
Fordhook Fancy	1 1/2	Smooth	"
Mikado	1 1/2	"	Fair.
Waldorf	1 1/2	"	Good.
Acme	1 1/2	"	Fair.
Combination	1 1/2	"	Poor.
Livingston's Beauty	1 1/2	"	Fair.
Pear Shaped	1 1/2	Pear shaped	Good.
Red Cherry	1 1/2	Smooth	Poor.
Atlantic Prize	1 1/4	Wrinkled	"
Dwarf Golden Champion	1 1/4	Smooth	Good.
Ignotum	1 1/4	"	Very good.
Matchless	1 1/4	"	Poor.
New Stone	1 1/4	"	Very good.
Niagara	1 1/4	Wrinkled	"
Pear Shaped Yellow	1 1/4	Pear shaped	Poor.
Plentiful	1 1/4	Smooth	Good.
Red Currant	1 1/4	Small, round	Very good.
Thorburn's Terra Cotta	1 1/4	Smooth	Fair.
Century	1	"	Poor.
Golden Queen	1	"	Fair.
Mayflower	1	Wrinkled	Very poor.
Trophy	1	Smooth	"
Livingston's Magnus	3/4	Wrinkled	Good.
New Yellow Peach	3/4	Pear shaped	Fair.
Royal Red	1/2	Smooth	Poor.
Thorburn's Rosalind	1/2	"	Good.
Yellow Cherry	1/2	"	Very good.
Yellow Plum	1/2	"	"
Buckeye State	1/4	"	Good.
Perfection	1/4	"	Poor.
Upright Station Tree	Did not	produce fruit.	
Thorburn's Novelty	"	germinate	
Thorburn's 1902	"	produce fruit	
Table Queen	"	germinate	
Sutton's Best of All	"	"	
Strawberry	"	"	
New Dwarf Champion	"	"	

RHUBARB.

On page 437 of last year's report, a descriptive list was given of the nineteen varieties of rhubarb now growing on this farm, together with the weight of a single plant of each variety, pulled on a certain date. This was repeated during the past season, and the following list gives the weight from the plants taken on June 10, 1902:—

	Lbs.		Lbs.
Early Scarlet	10½	Scarlet Nonpareil	16
Early Prince	15½	General Taylor	4¾
Sangster's Prince of Wales	11½	Royal Linnaeus	12¼
Tobolsk	16½	Giant	12¼
Paragon	11¾	X. L. C. R. (new)	2
Prince Albert	13½	Royal Albert	9¾
Magnum Bonum	16¼	Strawberry	10¼
Brabant's Colossal	12¼	Tottle's Improved	14
Early Crimson	16	Victoria	10½

It will be seen by comparing this list with last year's report, that the weight is considerably less this season. This was no doubt occasioned by excess of water. A test is in progress to determine the amount of rhubarb that can profitably be pulled during the season without injuring the vigour of the plant. This will be reported on later.

POTATOES—TEST OF SETS.

This test was continued during 1902, in order to obtain information regarding the most suitable size of set, with the following results:—

Size of Set.	Weight of large.	Weight of small.	Total weight.	Productiveness.
	Lbs.	Ozs.	Lbs.	
Seed ends	10½	5	10 13/16	Moderately regular.
One eye	7 1/16	7	7½	"
Two eyes	11½	12	12¼	Very regular.
Three eyes	11½	11	12 9/16	Moderately regular.
Four eyes	12¾	10	13⅝	Regular.
		Lbs.		
Whole	14½	3½	18	Very regular.

THE FLOWER GARDEN.

The flower garden this season unfortunately suffered severely from the excessive floods prevalent in this locality. A considerable portion of the lower lands was under water until well into the middle of July which occasioned very late planting, and the sour condition of the soil after the water had receded, rendered the successful growing of bedding plants impossible. A large number of perennials which were planted in this location were completely destroyed, which greatly spoiled the effect and altogether the garden was much below the average. Forty varieties of annuals were sown in the hotbed between April 1 and 14, and although the weather during April was very unpropitious for hotbed work, on account of coolness and lack of sunshine, the plants turned out well and were in good shape by planting out time.

For the reasons given it was impossible to sow those annuals which are sown in the open, in the flower garden, hence one of the hillside plots was devoted to this purpose and forty-nine varieties were sown in this location on May 14, together with thirty varieties of named sweet pease. All these did exceptionally well and proved a source of interest to visitors in addition to providing plenty of cut flowers which would otherwise have been very scarce.

Following will be found short notes on some of the most noticeable of the annuals:

Lupins.—Six varieties sown outside on May 14. These flowers were exceptionally free in blooming, and of most delicate colours, besides having the merit of flowering for a long period.

Godetia.—Four varieties sown outside on May 14. This is one of the most beautiful of our annuals, their large flowers, of diversified colouring, showing to splendid advantage when massed. Should always be sown outside as they do not transplant readily.

Abronia Umbellata.—Sown outside on May 14; is a very showy annual trailer. Though not grown extensively it deserves more general recognition.

Annual Larkspur.—This well known annual was specially noticeable on account of its long period of blooming, continuing in flower until quite late in the season.

Asters, Salpiglossis, Stocks, Petunias, Scabiosa, &c., were all very fine and made an excellent display throughout the season on those portions of the garden that had not been inundated.

PERENNIALS (HERBACEOUS).

The perennials which were moved to location on hillside in 1900 (*see* page 451 of last year's report) have become well established, and made a fine and continuous display of bloom throughout the past season. The following are worthy of special mention:

Spiraea filipendula.—The Herbaceous spireas are among the most beautiful of hardy perennials. This variety has very fern-like serrated leaves which lie close to the ground from the centre of which large flattened panicles of pure white flowers arise making a fine effect; 18 inches high.

Spiraea filipendula fl. pl.—This is a double form of the above and is much superior, the flower spikes being much denser and of a purer white colour; 18 inches high.

Pyrethrum uliginosum.—Produces large white daisy like flowers in profusion late in the autumn; height 2 feet.

Geranium platypetalum.—A charming plant about 10 inches high which produces large flowers of a purplish red, a very desirable acquisition.

Hemerocallis variegata.—Similar in every respect to the Common Day Lily, but having beautifully variegated green and white leaves making it very striking. Height 3½ feet.

Thermopsis Caroliniana.—A showy perennial producing long dense spikes of pea shaped yellow flowers very striking; height 2½ feet.

Coreopsis delphinifolia.—A pretty variety of coreopsis with foliage resembling the Delphinium and producing in abundance its yellow rayed flowers with dark centre; height 1½ feet.

There are many other eminently satisfactory varieties included in this collection, which have not yet been touched upon in these reports, particulars of which will be given from year to year.

BULBOUS PERENNIALS.

This class of flowers was very satisfactory during the past season, many varieties, which have hitherto succumbed to the winter, coming through in good condition and flowering well. The following brief notes will give an idea of the number of varieties tested together with special mention of some of the more meritorious ones.

Tulips.—In addition to the number of these bulbs which are planted for decorative purposes around the Superintendent's house and other portions of the farm, forty-seven named varieties were received from the Central Experimental Farm and planted on the perennial plot on hillside in the fall of 1901. All came through in fine condition, there being scarcely a break in any of the rows. They consisted chiefly of the following classes, viz.:—

Single Early.	Double Early.
Parrot (mixed).	Bizarre.
Byblœmen.	Late Double (mixed).

Of the Single Early.—Those specially worthy of notice were Rose Grisdelin, Coleur de Cardinal, Albion and Gold Finch.

Of the Double Early.—Couronne d'Or, Rose Aimable, Tournesol and Salvator Rosa.

Of Bizarre Varieties.—Trafalgar, Negress, Sword of Holland and Sultan Osman.

Of the Byblœmens—Henry IV.—Quadricolour, Grande Monarque and Bella Donna.

The Parrot varieties with their peculiarly twisted petals and variable colouring were much admired. The *Late Double* mixture also contained many fine varieties. Special mention should also be made of the following :—*Tulipa gesneriana, T. gesneriana spathulata, Bouton d'Or, Picotee, Golden Crown, T. viridiflora, T. Greigi.*

The latter are not included under any of the first mentioned classes, but are well worthy of cultivation.

Crocus.—Six varieties of Crocus were planted in the fall of 1901, and were given a slight winter covering of manure and for the first time since they have been tried here came through in the spring and flowered freely. The following varieties were represented :—Queen Victoria, Baron Brunos, Madame Mina, Sir Walter Scott, Prince Albert.

It is to be hoped that this hardiness will prove permanent as the fact of their flowering so early in the spring renders them specially valuable for Manitoba.

Snowdrops (Galanthus Elwesii).—A number of these bulbs were planted in the fall of 1901, and though not given any special covering, came through the winter in good condition and flowered well, the first occasion since testing here.

Scillas (Squills).—Three varieties of Squills were planted in the fall of 1901, and came through the winter and flowered well. The varieties were as follows :—*S. sibirica, S. sibirica alba, S. bifolia.*

Ornithogalum.—Two varieties of this bulb were planted in the fall of 1901, viz., *O. arabicum* and *O. umbellatum.* and both came through the winter well and flowered. This was the first test of this bulb at the Experimental Farm, and we consider it a valuable acquisition to our list of spring flowering bulbs.

Puschkinia.—Two varieties of this bulb were planted in the fall of 1901, for the first time on this farm, viz., *P. libanotica* and *P. scilloides.* The first mentioned did not survive the winter, but *P. scilloides* flowered freely, its pretty scilla-like flowers being much admired.

Chionodoxa.—Two varieties of this bulb, viz., *C. luciliæ* and *C. gigantea*, were planted in the fall of 1901, and survived the winter, both flowering freely. As a spring flowering bulb it proved very acceptable.

Leucojum.—Five varieties of this bulb were planted in the fall of 1901, viz., *L. vernum*, *L. vernum carpathicum*, *L. autumnale*, *L. pulchellum* and *L. æstivum*. None of these survived the winter, and on examination all the bulbs were found to be decayed.

Fritillaria.—Eleven varieties of Fritillaria representing the following varieties were planted in the fall of 1901, viz., *F. Orange Brilliant*, *F. lutea*, *F. Persica*, *F. lutea maxima*, *F. Crown upon Crown*, *F. aurora*, *F. recurva*, *F. biflora*, *F. aurea*, *F. pluriflora* and *F. lanceolata*. Two bulbs survived the winter, one each of the following varieties *F. Orange Brilliant* and *F. Crown upon Crown*, but did not produce flowers. On examination the remainder of the bulbs were found in a decayed condition.

Colchicum autumnale.—Several bulbs of this pretty autumn flower were planted in the fall of 1901. They gave no indication of life until we had been visited with several severe frosts and a light fall of snow when they appeared in full flower above the snow. In general appearance they resemble the Crocus and are to be desired on account of their very late period of blooming.

Iris.—Ten varieties of *Iris Hispanica* were received from the Central Experimental Farm and planted in the fall of 1901, together with a few bulbs of each of the following: *Iris pavonia*, *Iris persica*, and *Iris alata*. None of these survived the winter, and on examination were found to be in a decayed condition.

The following varieties of Lilies were received from the Central Experimental Farm in the fall of 1901, arriving here too late for planting as the soil was solidly frozen:—*Lilium dauricum Gretchen*, *L. Hansoni*, *L. dauricum atrosanguineum*, *L. Tottenhammi*, *L. dauricum incomparabile*, *L. Sensation*, *L. dauricum Brittanicum*, *L. elegans aureum*, *L. elegans Van Houttei*, *L. dauricum grandiflorum L. incomparabilis.*

To bring them through the winter the following plan was adopted. The bulbs were placed in small cotton bags, with a liberal mixture of sand and tied securely. A small trench was made into which the bags were placed, and given a light covering of sand, the whole being covered with three feet of fresh manure. On opening them up the following spring all were found to be in splendid condition and were planted in permanent location on April 10, 1902. All flowered exceptionally well and maintained a succession of bloom for two months. This is the first time they have been tested here and they will form a valuable addition to our list of hardy lilies.

Hyacinthus candicans.—Six bulbs of this beautiful flower were received from the Central Experimental Farm and planted on May 5, in perennial plot on hillside. They made vigorous growth, and their long spikes of white flowers were much admired at our annual exhibition here, numerous inquiries being made regarding them.

DAHLIAS.

The following varieties of Dahlias were received from the Central Experimental Farm in April, 1902, and planted outside on May 3, three feet apart. These are all new varieties for this farm, and consist chiefly of the Cactus and Pompon classes:—

Kingfisher
Prince Imperial
Ernest Glasse
Austin Cannell
Mrs. Leopold Seymour
Mrs. H. Turner
Grand Duke Alexis
American Flag
Gilt Edge
Lady H. Grosvenor
Louis Hariot*
Capstan*
Prince of Orange
Matchless
Blanche Keith*
Stella
Miss Finch
Starfish*
Harry Stredwick*
Prof. Baldwin*
Queen of Primroses
Standard Bearer
Kynerith*

Those marked * failed to start, but the balance made strong plants and flowered well, and for an unusual length of time. The varieties specially noted were :—

Grand Duke Alexis	Stella
Gilt Edge	Matchless
American Flag	Prince of Orange
Queen of Primroses	

All were lifted before frost and stored in root cellar in boxes of sand.

DISTRIBUTION OF GRAIN, POTATOES, ETC.

The usual distribution was made of potatoes, maple seed, rhubarb seed, flower seeds and grain. The following quantities were sent out to applicants :—

Grain of all kinds in 3-pound bags	401
Seedling trees and shrubs, packages	485
Potatoes in 3-pound bags	237
Maple seed in ½-pound bags	216
Rhubarb seed, packages	107
Flower seed, packages	206
Brome grass seed, 1-pound packages	74

Box Elder or Manitoba Maple Seeds.

The following reports have been received from parties to whom Manitoba Maple Seeds were sent in 1-pound packages during the spring of 1901 :—

No. of applicants supplied	471
No. of reports received	91

	Successes.	Failures.
Seeds sown on summer fallow	50	7
" spring ploughing	11	1
" fall ploughing	6	1
" breaking	12	1
" garden (dug with spade)	2	0

Maximum number of trees grown from one packet, 2,500.

Reports of Distributions of Collections of Trees, Spring 1901.

Only thirteen per cent of parties supplied with trees reported on them. Eighty-eight per cent of these reported having received the packages in good condition.

Number of applicants supplied	423
" reports received	32
" report success	27
" " partial success	3
" " failure	2

SAMPLES FOR EXHIBITION PURPOSES.

Several cases of samples were sent to the exhibitions at Cork, Ireland, and Wolverhampton, England, where they were exhibited along with samples from the other experimental farms.

A small exhibit was also sent with the North-west Press Association car, which travelled through the Western States.

Fourteen cases of samples have been prepared for the Japanese Exhibition to be held in Osaka next year.

The usual exhibits were made at the Brandon Agricultural and Horticultural Shows, and a small display was made at the Western Horticultural Exhibition at Winnipeg.

VISITORS.

Although the conditions were not as favourable as usual the number of visitors to the experimental farm during the year approximated six thousand. Amongst these were the Methodist Board of Missions, the Boer delegates sent to Canada by the Imperial Government, and a very large number of delegates from the United States.

There were two excursions to the farm during the summer, one from the C. P. R. Glenboro branch and one from the C. P. R. Pembina branch. Three other excursions were arranged for, but had to be abandoned owing to the bridges over the Assiniboine river being impassable.

FARMERS' MEETINGS.

During the year farmers' meetings were attended and addresses given at the following places:—

	1902.		1902.
Rapid City	Dec. 21	Glenboro	Mar. 11
Brandon	Feb. 1	Cypress River	Mar. 11
Bradwardine	Feb. 12	Holland	Mar. 12
Winnipeg	Feb. 20, 21	Treherne	Mar. 13
Wawanessa	Mar. 10	Carman	Mar. 14

METEOROLOGICAL TABLES.

—	Highest temperature.		Lowest temperature.		Total rainfall.	Total snowfall.	Total amount of sunshine.
1901.	Day.	Deg.	Day.	Deg.	In.	In.	Hr.
December	28	39	13	—33	.....	7	68·6
1902.							
January	6	40	27	—37·3	.....	1	134·1
February	21	41·9	4	—28	.....	8	97·2
March	9	42	17	—18	·65	21	106
April	9	58	1	—15	·43	2	189·3
May	30	85	9	28	3·37	....	198.1
June	8	77	21	35·5	9·97	....	207·2
July	23	87	27	42	1·84	....	316·6
August	27	89	30	35	·67	....	278·1
September	7	82	17	20	·61	....	184·6
October	5	74	9	15	·38	....	132·2
November	3	56	30	—15	.....	12	76·1
					17·92	51	1988·1

CORRESPONDENCE.

This year 4,464 letters were received and 2,969 despatched, irrespective of 2,755 circulars sent out.

I have the honour to be, sir,

Your obedient servant,

S. A. BEDFORD,

Superintendent.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

REPORT OF ANGUS MACKAY, SUPERINTENDENT.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.,
November 30, 1902.

DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit herewith the fifteenth annual report of the operations on the Experimental Farm for the North-west Territories, at Indian Head, Assiniboia, during the year 1902.

The past season, like 1901, has been a most successful one throughout the Territories, and although in some districts the yield of the present year was surpassed by that of 1901, the ease and dispatch, rendered possible by the magnificent weather, with which the crop was handled, has compensated in a large degree for any decrease that may have occurred in the yield. The weather for harvesting, threshing, teaming and all out-door work could not have been excelled.

The winter of 1901-2 was unusually mild and fine, and the snow-fall was below the average. Several cold dips occurred but they were of short duration, and no bad storms were experienced during the winter. Spring however was backward, and although in some districts grain was sown about the middle of April, on account of snow and rain, and the consequent wet condition of the soil, very little was done until about May 15. Heavy rains fell during May and with the already soaked condition of the land, seeding was a difficult matter and all growth was extremely backward. June was wet and the temperature was below the average; but the crops made rapid progress. Rains ceased early in July and from that time to the present no rain of any consequence has fallen.

From the time harvest commenced, about August 20, practically no time was lost through rain until all grain was cut, stacked and threshed. Frost overtook some of the late sown grain before it came to maturity, but in proportion to the bountiful crop of good wheat the loss from this cause is very small. The cold, backward spring caused late seeding and consequent late ripening.

Rust, which has hitherto been almost unheard of in the territories, did a small amount of damage this year.

The year throughout has been most favourable for stock and excellent reports are being received from the ranching districts.

EXPERIMENTAL FARM CROPS.

The crops on the Experimental Farm, while satisfactory in the majority of cases, averaged much below those of 1901. A large decrease will be noticed in the yields of potatoes and field-roots, with the exception of carrots. The long drouth following a wet spring caused the ground to bake, and small roots were the result.

The seed on a number of plots of oats and barley rotted and the plots had to be resown, resulting in somewhat later and smaller crops than would otherwise have been the case.

Hay gave good returns and was well secured. The fruit crop was abundant; currants and raspberries being particularly good. Plums, although a heavy crop, were

caught by frost before they came to maturity, and were destroyed. The crop of crab-apples, (Pyrus), was very satisfactory. Native fruit was a complete failure.

EXPERIMENTS WITH SPRING WHEAT.

Seventy-one varieties were tested on 1–20 or 1–40 acre plots; eight of the same varieties on plots ranging from 1 acre to 9½ acres. Red Fife was used in the test of fertilizers; rotation test; test of selected, well cleaned and small seed, and in the test of blue-stone as a preventive of smut.

TEST OF VARIETIES IN UNIFORM PLOTS.

Seventy-one varieties were sown on April 19, on 1–20 or 1–40 acre plots of well prepared fallow. The soil was clay loam. The seed was sown by hoe-drill, at the rate of 1½ bushels per acre.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs
Goose	Aug. 26..	129	52	Strong..	2¾	Bearded..	4,900	51	40	65¼
Rio Grande	" 29..	132	52	" ..	4	" ..	4,400	49	..	63
Preston	" 25..	128	50	" ..	3¼	" ..	4,860	48	40	63½
Red Fern	" 29..	132	51	" ..	3½	" ..	5,280	48	..	63½
Roumanian	" 28..	131	51	" ..	2½	" ..	4,440	47	..	66
Colorado	" 29..	132	42	" ..	2¾	" ..	4,400	45	40	65
Plumper	" 25..	128	39	Weak ..	3	" ..	4,520	44	40	65½
Percy	" 26..	129	53	Strong..	3	Bald	3,800	44	..	62
Dion's	" 28..	131	48	" ..	4	Bearded..	2,760	44	..	64½
Herisson Bearded	" 29..	132	42	Weak ..	2	" ..	3,800	44	..	66
Stanley	" 26..	129	49	Strong..	3	Bald	3,320	42	40	62½
Pringle's Champlain	" 28..	131	49	" ..	3¼	Bearded..	2,900	42	20	64
Weldon	" 26..	129	50	" ..	2½	Bald	3,240	42	..	63
Admiral	" 25..	128	46	" ..	3	Bearded..	4,100	41	20	63¾
Vernon	" 28..	131	51	" ..	3	" ..	3,140	41	..	63
Huron	" 22..	125	44	" ..	3	Bald	2,780	40	..	63
Hungarian	" 28..	131	52	Weak ..	3	Bearded..	2,120	40	..	64¼
Dufferin	" 28..	131	48	Strong..	2½	" ..	2,100	39	20	63½
Wellman's Fife	" 27..	130	46	" ..	3½	Bald	3,760	39	20	62
Red Swedish	" 28..	131	52	Weak ..	2¾	Bearded..	4,380	39	..	62½
Ladoga	" 25..	128	48	Strong..	2½	" ..	4,160	38	20	62
Progress	" 25..	128	44	" ..	3	Bald	2,880	38	20	63
Byron	" 26..	129	45	Weak ..	3½	Bearded..	3,140	37	40	65
Minnesota No. 149	" 30..	133	39	Strong..	3	Bald	3,560	37	20	63
Mason	" 26..	129	42	Weak ..	2	"	5,160	37	..	64¾
Speltz	" 28..	131	42	" ..	2	"	3,180	36	20	....
Alpha	" 26..	129	47	Strong..	3	Bearded..	3,800	36	..	63½
Minnesota No. 163	" 30..	133	40	" ..	3	Bald	3,260	35	40	64
Monarch	" 28..	131	49	" ..	3	"	2,580	35	40	62½
Australian No. 27	" 27..	130	45	" ..	3½	"	4,260	35	..	61
Beaudry	" 28..	131	39	" ..	3	Bearded..	2,520	35	..	65
Dawn	" 24..	127	42	Weak ..	2½	Bald	3,660	35	..	64
Fraser	" 25..	128	37	Strong..	2½	Bearded..	2,680	35	..	64
Crown	" 27..	130	40	" ..	3	Bald	2,300	34	40	63
White Fife	" 27..	130	44	" ..	3¼	"	5,120	34	40	62½
Cartier	" 26..	129	45	Weak ..	3	Bearded..	3,440	34	20	65½
Early Riga	" 20..	123	37	" ..	2	Bald	2,080	34	20	64
Norval	" 26..	129	44	" ..	2½	Bearded..	3,160	34	..	64
White Connell	" 28..	131	46	Strong..	3¼	Bald	2,840	34	..	63
Blair	" 26..	129	36	Weak ..	2	"	4,100	33	40	63½
Minnesota No. 169	" 30..	133	46	Strong..	3¼	"	3,060	33	..	59¼

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs
Rideau	Aug. 27..	130	38	Weak..	2½	Bald.....	3,620	33	..	63
White Russian	" 27..	139	44	Strong..	3½	"	3,280	32	40	59
Minnesota No. 181	" 30..	130	44	" ..	3	"	3,080	32	40	61½
Australian No. 19	" 27..	130	38	Weak..	3	"	2,540	32	20	63½
" No. 25	" 27..	130	42	Strong..	3	"	3,340	32	20	62
" No. 13	" 27..	130	44	Weak..	2¾	"	4,140	31	20	62
" No. 10	" 27..	130	39	" ..	3	"	3,360	31	20	61½
Blenheim	" 27..	130	40	Strong..	3¼	Bearded..	2,460	31	..	63
Bishop	" 26..	129	41	Weak..	2½	Bald	2,960	30	40	64
Cassel	" 27..	130	43	Strong..	3	"	3,200	30	40	62½
Ebert	" 25..	128	40	" ..	2¾	"	2,160	30	40	64
Advance	" 28..	131	48	" ..	3	Bearded..	3,560	30	40	63
Beauty	" 27..	130	41	" ..	3	Bald	3,220	30	40	60
Clyde	" 26..	129	48	" ..	3¼	"	3,020	29	40	63½
Red Fife	" 27..	130	45	" ..	3	"	3,200	29	20	62½
Australian No. 23	" 27..	130	38	Weak..	3¼	"	2,260	29	..	62½
Captor	" 27..	130	39	" ..	2¾	"	3,720	29	..	63
Countess	" 27..	130	48	Strong..	2¾	"	2,360	29	..	63
Essex	" 29..	132	41	" ..	2¾	"	3,320	29	..	63
Chester	" 27..	130	36	Weak..	3	"	2,680	28	40	65
White Chaff, Campbell's	" 27..	130	44	Strong..	3	"	3,520	28	20	64
Robin's Rust-proof	" 28..	131	42	Weak..	3	"	3,960	28	20	62
Australian No. 9	" 27..	130	44	Strong..	3	"	3,500	28	..	62½
Laurel	" 29..	132	41	Weak..	3¼	"	3,160	27	40	58
Hastings	" 26..	129	36	" ..	2¼	"	2,860	27	20	65
Harold	" 25..	128	40	Strong..	2½	Bearded..	2,440	27	20	62
Angus	" 27..	130	48	" ..	3	Bald	2,540	27	20	63½
Japanese	" 25..	128	39	Weak..	2½	Bearded..	3,180	26	20	62½
Crawford	" 25..	128	40	Strong..	3	Bald	2,640	26	..	63½
Benton	" 27..	130	36	Weak..	3	"	2,460	25	40	65

WHEAT.

TEST OF VARIETIES IN FIELD LOTS.

Four varieties of wheat were sown on new land broken and backset in 1901; five varieties on fallow and three varieties on root land of 1901.

The new land was broken two inches deep, back-set, two inches deeper and well cut up by disc-harrow.

The fallow was ploughed seven inches deep during the latter part of May and cultivated during the summer as often as the weeds required attention.

The root land, which had produced a crop of potatoes, mangels, turnips, carrots, sugar beets and corn in 1901 was well ploughed and harrowed after the root crop had been taken up, and in the fall of 1900 a heavy coating of manure had been applied to the field.

Fair crops were secured from the fallow and back setting, but on the root land the crop of straw was abnormal and rust striking the field early in the season, made a serious reduction in the yield and quality.

SPRING WHEAT—FIELD LOTS.

Variety.	Cultivation.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.
		Acres.				In.		In.		Bu. lbs
Huron	Fallow	3	May 6	Aug. 26	112	50	Strong	3	Bald	39 20
Red Fife	Back-setting, native sod	9½	April 14	" 25	133	48	"	3¼	"	38 30
Red Fern	Fallow	3	" 27	" 29	124	52	"	3½	Bearded	36
Wellman's Fife	"	4	" 30	" 30	122	48	"	3¾	Bald	36
Stanley	"	1	" 30	" 26	118	50	"	3¼	"	34
Stanley	Back-setting, native sod	4	" 17	" 20	125	45	"	3¾	"	34
Red Fife	Fallow	4½	" 27	" 30	125	53	"	3	"	32 40
Percy	Back-setting, native sod	4	" 16	" 22	128	48	"	3½	"	32 30
*Red Fife	Root land, 1901	1¾	" 30	" 29	121	42	"	3	"	29
Preston	Back-setting, native sod	2½	" 17	" 22	127	44	"	3¾	Bearded	29
*Preston	Root land, 1901	3¼	" 30	" 22	114	54	"	3¼	"	25 30
*White Russian	"	2	" 30	" 29	121	48	"	3½	Bald	23 45

*Rusted badly.

Total area occupied, 40¼ acres.

Total yield of grain, 1,346 bushels, an average of 33 bush. 25 lbs. per acre.

SPRING WHEAT—TEST OF BLUE STONE AS A PREVENTIVE OF SMUT.

Sown on May 12, on 1-40th acre plots of fallow, by hoe-drill, at the rate of 1½ bushels per acre.

Seed.	Condition.	Treatment.	On 25 square feet.	
			Good heads.	Smutty heads.
Red Fife	Good seed	Treated 1 lb. of blue stone to 10 bush. seed. Dipped 5 minutes	Bush. 900	None.
"	"	Untreated	863	12

SPRING WHEAT—COMPARATIVE TEST OF SOWING SELECTED, WELL-CLEANED AND SMALL SEED.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
			In.		In.	Lbs.	Bush. Lbs.	Lbs.
Red Fife, selected seed	Aug. 27	130	44	Strong	3	3,440	37 20	63½
" well-cleaned seed	" 27	130	45	"	3	3,360	32 20	63
" small seed	" 27	130	45	"	3	3,120	29 20	63½

In the above test the selected seed used was hand picked when ripe and before being cut in 1901, and thoroughly cleaned by mill; the well-cleaned seed was our best Red Fife, run twice through the fanning mill and was a large, plump sample. The small seed was what was taken out of the well-cleaned seed.

The seed was sown on 1-20th acre plots of fallowed land, by hoe-drill, at the rate of 1½ bushels per acre on April 19.

SPRING WHEAT.

TEST OF FERTILIZERS.

Six plots of 1-40th acre each were sown May 12. Five of these were treated with artificial manures and the sixth used as a check-plot. They were sown with Red Fife Wheat, by hoe-drill, at the rate of 1½ bushels per acre.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.	Lbs.	Bush.	Lbs.	Lbs.
Plot No. 1— Nitrate of soda, 100 lbs. per acre (half sown when grain was 2 inches high, balance when 6 inches high)	Aug. 28	108	45	Strong..	3	3,160	28	..	61
Plot No. 2— Nitrate of soda, 200 lbs. per acre (half sown when grain was 2 inches high, balance when 6 inches high)	" 28	108	47	" ..	3	3,880	30	40	62
Plot No. 3— Superphosphate, No. 1, 400 lbs. per acre (sown before grain and harrowed)	" 27	107	44	" ..	3	3,200	26	40	61½
Plot No. 4— Check-plot. Unfertilized	" 28	108	44	" ..	3	3,760	29	20	61½
Plot No. 5— Muriate of potash, 200 lbs. per acre (sown before grain and harrowed)	" 27	107	44	" ..	3	3,200	30	40	63
Plot No. 6— Superphosphate No. 1, 200 lbs. per acre; muriate of potash, 100 lbs. per acre; nitrate of soda, 100 lbs. per acre (half sown before grain and harrowed, and the balance when the grain was 2 inches high)	" 28	108	44	" ..	3	3,160	32	..	62½

SPELTZ.

Sown on fallow by hoe-drill, at the rate of 2 bushels per acre.

One-fortieth acre.—Sown April 19. Ripe August 28. Days to mature, 131. Length of straw, 42 inches. Straw, weak. Length of head, 2 inches. Bearded. Weight of straw, 3,180 lbs. per acre. Yield, 36·20 bushels per acre.

One acre.—Sown May 12. Ripe August 28. Days to mature, 108. Weight of straw, 3,000 lbs. per acre. Yield, 34 bushels 10 lbs. per acre.

FALL WHEAT.

The seed sown on August 7 by hoe-drill as deep as the drill would work, was obtained in the Pincher Creek and Mountain View districts of Alberta, and was no doubt as hardy as any that could be had.

When the first killing frost came in the fall, the wheat had attained a height of 8 inches, and formed a thick mat entirely covering the ground.

The crop, however, was a complete failure, not a single plant being alive in May.

In the Pincher Creek district and the Mormon settlements of Southern Alberta, fall wheat proved very successful and some large yields were secured; while from the more northerly portions of that territory, reports of about an equal number of successes and failures have been received.

This fall the test is being continued by the seeding of Choice Club and Blue-stem on fallow on October 7.

EXPERIMENTS WITH OATS.

Sixty-five varieties of oats were tested on plots of 1-20th acre each; twelve of the same varieties on plots of $\frac{3}{4}$ to $9\frac{1}{4}$ acres. Banner oats was used in the rotation test. With the exception of Banner sown on stubble, all oats were sown on fallowed land.

The fallow was ploughed early in June and cultivated or harrowed, 2 to 3 inches deep, several times during the season. The stubble land was ploughed 4 inches deep immediately before seeding.

On account of the cold, wet spring, the seed where sown too deep, failed to germinate. In low places a great deal of the seed rotted and in a few cases the land had to be resown. The uniform trial plots of 1-20th acre each were sown May 12 on clay loam summer-fallowed. Sown by hoe-drill at the rate of 2 bushels per acre.

OATS—FIELD LOTS.

Name of Variety.	Cultivation of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
		Acres.				In.	In.		Bush. Lbs.	
Goldfinder	Fallow	4	May 13	Sept. 2	112	46	10	Sided	89 17	37
Banner	"	$9\frac{1}{4}$	" 6	Aug. 21	107	56	$10\frac{1}{2}$	Branching	87 ..	$40\frac{1}{2}$
Wide-awake	"	5	" 7	" 23	108	49	9	"	87 ..	44
Tartar King	"	6	" 7	" 20	105	56	$10\frac{1}{2}$	Hlf. brchg.	85 ..	$43\frac{1}{2}$
Waverley	"	6	" 8	" 25	109	51	$10\frac{1}{2}$	Branching	82 ..	$39\frac{1}{2}$
Black Beauty	"	$\frac{3}{4}$	" 12	Sept. 5	116	50	9	"	81 12	$37\frac{1}{2}$
Abundance	"	5	" 6	Aug. 23	109	49	$9\frac{1}{4}$	"	80 ..	42
Improved Ligowo	"	5	" 7	" 25	110	49	10	"	77 20	$44\frac{1}{2}$
Early Archangel	"	1	" 12	Sept. 2	113	53	11	"	74 4	41
Lincoln	"	1	" 12	" 2	113	53	9	"	65 30	39
Thousand dollar	"	1	" 12	" 2	113	52	10	"	64 8	$41\frac{1}{2}$
Bavarian	"	1	" 12	" 2	113	51	12	"	52 32	39
Banner	Stubble-land	8	" 14	Aug. 26	104	35	9	"	46 17	37

Total area occupied, 53 acres. Total yield of grain, 4,077 bushels 28 lbs., an average of 76 bushels 32 lbs. per acre.

OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Danish Island	Aug. 25	105	44	Strong	13	Sided	3,060	89	14	42½
Banner	" 27	107	46	"	11	Branching	3,660	88	8	41½
Tartar King	" 26	106	49	"	11	Sided	3,320	86	16	42½
Golden Tartarian	Sept. 1	112	48	"	13	"	3,560	83	18	38
Golden Giant	" 1	112	48	"	12	"	3,580	82	32	38
Improved American	Aug. 26	106	50	"	11	Branching	3,180	82	20	41
Holstein Prolific	" 26	106	50	"	12	"	3,800	82	2	38½
Wide Awake	" 25	105	50	"	12	"	3,460	80	20	44
Abundance	" 25	105	44	"	10	"	3,020	80	20	37
Columbus	" 28	108	48	"	10	"	3,640	80	20	39
Thousand Dollar	" 26	106	50	"	11	"	3,480	78	24	43½
Oxford	" 26	106	52	"	12	"	3,100	78	8	38
Siberian	Sept. 1	112	50	"	13	Sided	3,720	77	2	35
New Zealand	" 1	112	45	"	13	"	3,060	75	10	40
Oderbruch	Aug. 26	106	50	"	9	"	3,380	75	10	43½
Golden Beauty	" 25	105	44	"	11	Branching	3,600	75	10	41
Waverley	" 30	110	50	"	10	"	3,840	75	10	41
Irish Victor	Sept. 1	112	48	"	11	"	3,300	74	24	35
King	Aug. 28	108	49	"	12	"	3,780	74	24	41½
Salines	Sept. 1	112	48	"	13	"	3,580	74	24	36
Bavarian	Aug. 25	105	41	"	10	"	2,900	74	24	41
Goldfinder	" 30	110	45	"	10	Sided	3,020	74	4	40½
Improved Ligowo	" 26	106	49	"	12	Branching	3,500	72	24	40
Salzer's Big Four	" 30	110	42	"	11	"	3,060	72	2	38
Miller	" 28	108	42	"	12	"	3,560	71	26	38
Wallis	" 30	110	46	"	12	"	3,320	71	26	39
Early Archangel	" 24	104	40	"	12	"	3,200	71	26	40½
Buckbee's Illinois	" 24	104	50	"	10	Sided	3,310	68	28	42
White Russian	" 25	105	51	"	12	Branching	3,900	68	28	44½
Twentieth Century	Sept. 1	112	44	"	11	"	3,780	68	14	40
American Beauty	Aug. 26	106	48	"	12	"	3,200	68	8	39
Milford	" 30	110	46	"	12	Sided	3,540	67	22	40½
Joanette	Sept. 1	112	38	"	10	Branching	3,980	66	16	38½
Lincoln	Aug. 25	105	50	"	11	"	3,760	66	16	41½
Rosedale	Sept. 1	112	47	"	12	Sided	3,740	66	16	39
Abyssinia	Aug. 26	106	48	"	12	Branching	3,500	66	16	41
Black Beauty	" 28	108	45	"	11	"	3,100	66	16	37½
Newmarket	" 25	105	44	"	12	"	3,960	65	30	44½
Mennonite	" 26	106	48	"	10	"	3,860	65	10	39
Early Golden Prolific	" 26	106	50	"	9	"	3,220	65	10	38½
Kendal	Sept. 1	112	44	"	12	"	3,900	64	24	39
Hazlett's Seizure	Aug. 24	104	40	"	12	"	3,210	64	4	46
Prolific Black Tartarian	Sept. 3	114	47	"	11	Sided	3,820	63	18	36½
California Prolific Black	" 5	116	47	"	13	"	3,620	63	18	36½
Sensation	Aug. 29	109	50	"	11	Branching	3,060	63	18	39
Olive	Sept. 2	113	48	"	11	Sided	3,840	62	32	39
Pense	" 6	117	44	"	10	"	3,100	62	32	34½
White Schonen	Aug. 24	104	42	"	12	Branching	3,060	62	12	42
Master	" 30	110	48	"	13	Sided	3,340	61	26	37½
Brandon	" 28	108	50	"	11	Branching	4,200	60	..	37½
Early Blossom	Sept. 1	112	48	"	11	Sided	3,760	59	18	35
American Triumph	Aug. 30	110	48	"	10	Branching	3,730	57	22	37½
Black Mesdag	Sept. 1	112	38	"	10	"	3,840	57	22	39½
Flying Scotchman	Aug. 24	104	38	"	12	"	3,760	57	2	41½
Scotch Potato	" 30	110	45	"	12	"	3,520	56	16	38
Cromwell	Sept. 1	112	44	"	13	"	4,340	56	16	40¼
Early Gothland	" 1	112	48	"	11	Sided	3,680	56	16	38
White Giant	Aug. 24	104	42	"	12	Branching	4,680	55	10	34½
Russell	" 26	106	51	"	13	"	3,240	54	24	40½
Early Maine	" 26	106	48	"	9	"	4,100	54	4	34
Longhoughton	" 30	110	48	"	12	"	3,400	54	4	40
Bonanza	" 24	104	38	"	11	"	3,800	49	14	46½
Holland	" 28	108	50	"	12	Sided	3,560	49	14	36½
Pioneer	Sept. 2	113	45	"	10	Branching	3,280	46	20	40½
Cream Egyptian	Aug. 25	105	39	"	11	"	3,360	42	12	44½

OATS.—COMPARATIVE TEST OF SELECTED, WELL CLEANED AND SMALL OATS FOR SEED.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	
			Inches.	Inches.	Lbs.	Bush.	Lbs.
Banner, selected seed	Aug. 26	106	50	11	3,720	86	16
" well cleaned	" 26	106	50	11	3,800	80	20
" small seed	" 26	106	46	11	3,840	72	2

The seed sown in the above test was procured in the same manner as that used in a similar test with wheat.

Sown May 12 on 1-20th acre plots of fallow, by hoe-drill, at the rate of 2 bushels per acre.

EXPERIMENTS WITH BARLEY.

Thirty varieties of six-rowed, and twenty-two varieties of two-rowed barley were sown on plots of 1-20th acre each, and six of the same varieties on plots of $\frac{1}{3}$ to 5 acres each. The land was fallowed and was prepared in the same manner as that for wheat and oats.

As with the oats, the barley seed wherever sown deep, rotted in low places, and a number of the plots had to be resown. The yields, however, were very satisfactory. The uniform trial plots were all sown May 17 on clay loam by hoe-drill, at the rate of 2 bushels per acre.

BARLEY—SIX-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening	Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.	Lbs.	Bush.	Lbs.	Lbs.
Claude	Aug. 26	101	38	Strong	3	2,920	66	32	52
Odessa	" 24	99	40	"	2¾	3,180	65	..	53½
Empire	" 26	101	39	"	2¾	3,440	62	44	52½
Blue Long Head	" 26	101	38	"	3	3,020	62	24	53
Summit	" 28	103	39	"	3	3,400	60	40	50
Royal	" 24	99	38	"	3¼	2,040	58	36	53
Mansfield	" 24	99	40	"	3	3,260	57	44	50
Nugent	Sept. 4	110	40	Weak	3½	3,500	53	36	52½
Surprise	Aug. 26	101	38	Strong	3	2,340	53	36	52
Garfield	" 24	99	40	"	3	3,160	52	4	52½
Mersury	" 24	99	45	"	3	3,020	51	12	52
Common	" 26	101	37	"	3	2,480	50	..	53
Brome	" 26	101	38	"	3	2,100	49	28	50
Oderbruch	" 24	99	37	Weak	3	2,460	49	8	51
Stella	" 26	101	36	Strong	3¼	2,280	48	36	54
Trooper	" 24	99	38	"	3	2,120	48	16	53
Yale	" 24	99	40	"	2¾	3,600	48	16	52
Hulless, Black	Sept. 1	107	28	Weak	2	2,320	47	24	64½
Rennie's Improved	Aug. 24	99	37	Strong	3	2,400	46	32	53
Argyle	" 24	99	37	"	3	3,020	45	20	53
Pioneer	" 27	102	39	"	4	2,580	44	8	53
Petschora	" 24	99	37	"	3	2,120	42	4	50½
Albert	" 24	99	37	"	3	2,700	42	4	52½
Baxter	" 24	99	38	"	3	2,700	40	20	53
Vanguard	" 24	99	37	"	3	2,700	40	20	51
*Phœnix	" 24	99	39	"	3	2,120	40	..	52½
Excelsior	" 24	99	36	"	3½	2,790	38	16	50½
Success	" 24	99	33	"	3	2,690	37	24	45½
Champion	" 24	99	36	"	3¼	2,720	36	32	49
Hulless, White	Sept. 1	107	28	Weak	2½	2,380	35	..	63½

BARLEY, TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Inches.		Inches.	Lbs.	Bush.	Lbs.	Lbs.
Sidney	Aug. 24	99	42	Strong	3¼	2,760	59	4	51½
Invincible	Sept. 1	107	37	"	3½	3,520	57	44	53¾
Standwell	" 4	110	37	Weak	4	2,580	55	24	53
Clifford	Aug. 27	102	50	Strong	4	3,500	55	..	52½
Danish Chevalier	Sept. 4	110	36	Weak	5	3,080	53	36	52
Jarvis	Aug. 26	101	48	Strong	4	3,020	52	24	52½
Kinver Chevalier	Sept. 4	110	36	Weak	5	2,560	51	32	51
Beaver	" 4	110	35	"	4	3,200	51	32	51½
Canadian Thorpe	Aug. 28	103	38	Strong	3½	2,760	49	8	51½
Harvey	" 27	102	50	"	4	3,800	48	36	54
Leslie	" 23	98	42	"	4	3,000	48	36	54
Newton	Sept. 4	110	35	Weak	4	3,480	47	24	52½
Prize Prolific	" 4	110	36	"	4¼	2,480	47	24	51
Bolton	Aug. 26	101	38	Strong	4	3,000	45	40	53½
Gordon	" 23	98	43	"	3½	3,080	45	40	53½
Victor	Aug. 26	101	36	Strong	3½	2,520	43	36	51
French Chevalier	Sept. 4	110	34	Weak	5	2,940	43	16	51½
Fulton	Aug. 27	102	40	Strong	3	3,840	42	44	54
Logan	" 26	101	40	"	3¾	3,720	42	24	53
Dunham	" 24	99	40	"	4	2,880	42	4	52
Nepean	" 28	103	38	"	4	2,240	37	44	52½

BARLEY—FIELD LOTS.

Name of Variety.	Cultivation.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
		Acres.				Ins.		Inches.		Bush.	Lbs.	Lbs.
Canadian Thorpe	Fallow	2	May 17	Sept. 1	107	40	Strong	3¼	2-rowed.	68	36	52½
Sidney	"	5	" 17	" 1	107	41	"	3½	"	66	..	53½
Invincible	"	¾	" 26	" 6	103	42	"	3¾	"	63	16	53½
Royal	"	1	" 26	" 4	101	38	"	3½	6-rowed.	56	..	52½
Rennie's Imprv'd	"	4¾	" 16	Aug. 20	96	42	"	3¼	"	51	..	53
Standwell	"	1 to 3	" 26	Sept. 6	103	36	Weak	3½	2-rowed.	49	24	52½

The Canadian Thorpe was badly rusted. Total area occupied 13⅝ acres. Total yield of grain 829 bushels, 36 pounds, an average of 59 bushels 47 pounds per acre.

EXPERIMENTS WITH PEASE.

Fifty-seven varieties of pease were under trial in 1902. They were sown in plots of one-twentieth acre each, soil clay loam summer fallowed. Sown by hoe-drill at the rate 2 bushels of small pease, 2½ bushels medium and 3½ bushels of large pease per acre.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				In.	In.		Bush. Lbs.	Lbs.
Alma	Sept. 8	104	Strong	52	3	Medium	57 20	63
Daniel O'Rourke	" 1	97	"	59	2¼	Small	50 ..	65
Prince	" 8	104	"	53	3	Large	48 40	63
Centennial	" 9	105	"	46	3	Small	46 ..	63
Crown	" 12	108	"	42	2½	"	45 20	65
Chancellor	" 12	108	"	48	2	"	45 20	64⅓
White Wonder	" 12	108	"	36	2⅜	Medium	45 ..	64
Harrison's Glory	" 8	104	Medium	44	2½	Large	42 40	65
Macoun	" 10	106	Strong	38	3	"	40 40	63
Paragon	" 12	108	"	39	3	Medium	40 20	63
Lanark	" 9	105	"	44	3	Large	40 ..	63
Arthur	" 4	100	"	40	2⅛	"	39 ..	63
Early Britain	" 7	103	"	39	2⅛	"	38 20	63½
English Grey	" 6	102	"	41	2¼	"	37 40	64½
Carleton	" 5	101	"	53	2½	Medium	37 ..	64
New Potter	" 9	105	"	40	3	Large	37 ..	63½
Gregory	" 12	108	"	43	3	Medium	36 40	64
French Canner	" 12	108	"	45	3	Small	36 40	65
Mummy	" 8	104	"	54	2⅜	Medium	35 40	65
Perth	" 13	109	"	46	3	Large	35 20	62½
Cooper	" 8	104	"	42	2¼	Medium	35 20	64
Prussian Blue	" 8	104	"	46	2½	"	35 ..	64
Pride	" 7	103	"	42	2½	Large	34 40	64
Mackay	" 10	106	"	43	3	"	34 20	63¼
Picton	" 9	105	"	41	2⅜	"	33 40	63½
Canadian Beauty	" 12	108	"	50	3	"	33 40	63
Oddfellow	" 12	108	"	46	3	"	33 20	64
Bruce	" 12	108	"	50	2¼	"	33 ..	63½
Prince Albert	" 10	106	"	45	2	"	33 ..	64½
Fenton	" 10	106	"	46	3	"	32 40	64½
Black Eyed Marrowfat	" 9	105	"	39	3	"	32 20	63½
Creeper	" 6	102	Medium	42	2	Small	32 ..	65½
Pearl	" 9	105	Strong	38	3	Large	30 20	62½
King	" 12	108	"	50	3	"	30 ..	64
Nelson	" 12	108	"	44	2⅜	Medium	30 ..	63½
Victoria	" 10	106	"	40	3	Large	30 ..	65
Bright	" 8	104	"	44	2½	"	30 ..	62
Herald	" 12	108	"	40	3	Medium	28 40	63½
Fergus	" 12	108	"	36	3	Large	28 20	64
Multiplier	" 12	108	"	44	3	Small	28 20	64½
Elliot	" 10	106	"	48	2¼	Large	28 ..	65
Kent	" 12	108	"	49	2⅜	"	27 40	63½
Duke	" 10	106	"	42	3	"	27 40	63½
Agnes	" 12	108	"	50	3	"	26 40	65
Wisconsin Blue	" 12	108	"	36	2½	Small	26 20	64½
Elder	" 13	109	"	41	2½	Medium	25 40	63½
Golden Vine	" 12	108	"	43	2¼	Small	25 20	64
Vincent	" 10	106	"	37	2	Large	25 ..	63
Bedford	" 12	108	Small	43	3	Medium	24 20	61½
Trilby	" 12	108	"	45	3	Large	22 20	61
German White	" 12	108	"	50	3	"	21 ..	64½
Chelsea	" 13	109	"	46	3	Small	19 20	64
Elephant Blue	" 7	103	"	44	2	Medium	18 40	64
Dover	" 12	108	"	44	3	Large	18 20	62½
Large White Marrowfat	" 10	106	"	41	3	"	17 40	66
Archer	" 13	109	"	40	3	Medium	17 ..	63½
*Grass Pea	.....	.....	.....	.....	.....	.....	.....	.....

*Destroyed by frost.

EXPERIMENTS WITH INDIAN CORN.

Thirty-seven varieties of Indian corn were sown on May 29, in rows thirty-six inches apart, by grain drill; and for comparison planted by hand in hills three feet apart on the same date.

Both plots were cut for ensilage on September 8. The yield was computed from the weight of corn on two rows, each sixty-six feet long.

The land used was a well prepared summer-fallow a clay loam.

On account of the cold, wet spring, the growth was very backward, and the crop was one of the lightest ever grown on the farm.

INDIAN CORN—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Height.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
		In.		Tons.	Lbs.	Tons.	Lbs.
Salzer's All Gold	Medium	50	Not in tassel	9	1,800	5	32
Selected Leaming	Strong	47	Tassel	9	348	4	1,900
King Philip	"	55	"	8	1,820	7	1,700
Pearce's Prolific	"	45	"	8	1,688	3	732
Early Butler	Medium	46	Not in tassel	8	1,028	5	1,748
Rural Thoroughbred White Flint	Strong	44	"	8	368	6	936
Compton's Early	"	43	Tassel	8	368	6	1,200
Champion White Pearl	"	50	Not in tassel	8	206	4	1,900
King of the Earliest	Medium	40	"	7	1,972	5	824
Giant Prolific Ensilage	Strong	47	"	7	1,840	4	580
Pride of the North	Medium	50	"	7	1,708	3	1,128
Mitchell's Extra Early	Strong	46	Early milk	7	124	2	1,412
Eureka	"	56	Not in tassel	7	124	4	1,108
Early Yellow Long Eared	"	50	Tassel	6	1,860	5	956
Black Mexican	Medium	39	Early milk	6	1,596	3	336
Mammoth Cuban	"	38	Not in tassel	6	1,464	4	448
Red Cob Ensilage	Strong	54	Tassel	6	1,332	5	692
Yellow Six Weeks	Medium	36	Early milk	6	1,200	3	1,920
Sanford	Strong	45	Tassel	6	1,068	5	1,352
White Cap Yellow Dent	Medium	47	Not in tassel	6	804	5	296
Wisconsin Earliest White Dent	"	51	Tassel	6	672	5	1,880
North Dakota Yellow	"	47	"	6	408	3	1,128
Evergreen Sugar	Weak	41	Not in tassel	6	12	4	448
Cloud's Early Yellow	Strong	50	"	5	1,088	5	1,220
Longfellow	"	47	Tassel	5	296	4	580
Angel of Midnight	Medium	49	"	4	1,960	3	336
Superior Fodder	"	48	Not in tassel	4	1,768	4	712
Extra Early Huron	"	43	Tassel	4	1,636	3	1,656
North Dakota White	"	39	"	4	184	3	204
Salzer's Earliest Ripe	Weak	33	Not in tassel	3	1,920	3	204
Early Golden Surprise	Medium	48	"	3	1,656	6	936
Kendall's Early Giant	Weak	46	Tassel	3	468	2	1,148
Canada White Flint	Medium	43	"	3	72	3	996
Mammoth Eight-rowed Flint	Weak	36	"	3	72	4	844
Early Mastodon	Medium	44	Not in tassel	2	356	1	640
Early August	Weak	23	Early milk	1	1,696	1	244
Country Gentleman	"	33	Not in tassel	1	1,300	1	1,564

INDIAN CORN.—TEST OF SEEDING AT DIFFERENT DISTANCES.

Sown in rows by grain seeder on May 29. Cut September 8. Cultivation of the land the same as for the preceding test.

Name of Variety.	Distance between rows.	Character of Growth.	Height.	Weight per Acre grown in rows.	
	Inches.		Inches.	Tons	Lbs.
Selected Leaming	21	Strong	47	4	712
"	28	"	49	2	1,412
"	35	"	53	5	692
"	42	"	57	5	428
Longfellow	21	Medium	45	4	52
"	28	"	46	5	32
"	35	"	46	5	560
"	42	"	49	5	428
Champion White Pearl	21	"	41	3	1,656
"	28	"	48	3	1,656
"	35	"	49	7	1,576
"	42	"	49	7	1,920

ROTATION OF CROPS.

The plan inaugurated in 1899 for a rotation of crops was again carried out as follows:—

No.	1899.	1900.	1901.	1902.
1	Wheat	Oats	Soja Beans	Wheat.
2	Wheat	Wheat	Pease	Wheat.
3	Wheat	Oats	Tares	Wheat.
4	Wheat	Wheat	Red Clover	Wheat.
5	Wheat	Barley	Alsike and Lucerne	Wheat.
6	Pease	Wheat	Wheat	Pease.
7	Tares	Wheat	Oats	Tares.
8	Soja Beans	Wheat	Oats	Soja Beans.
9	Red Clover	Wheat	Wheat	Red Clover.
10	Alsike and Lucerne	Wheat	Barley	Alsike and Lucerne.
11	Rape	Wheat	Summer-fallow	Rape.
12	Wheat	Wheat	Summer-fallow	Wheat.
13	Wheat	Oats	Summer-fallow	Wheat.
14	Wheat	Barley	Summer-fallow	Wheat.
15	Wheat	Wheat	Oats	Wheat.
16	Wheat	Barley	Oats	Wheat.
17	Oats	Soja Beans	Wheat	Oats.
18	Wheat	Pease	Wheat	Wheat.
19	Oats	Tares	Wheat	Oats.
20	Wheat	Red Clover	Wheat	Wheat.
21	Barley	Alsike and Lucerne	Wheat	Barley.
22	Rye	Summer-fallow	Wheat	Rye.

ROTATION TEST—Results obtained in 1902. Plots ½-acre each. Soil, clay loam.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
					In.	In.	In.		Bush. Lbs.	Lbs.
1	Wheat, Red Fife.....	April 28..	Aug. 27..	121	43	Strong....	3	Bald ...	25 ..	60
2	"	" 28..	" 27..	121	43	"	3	" ...	24 30	60
3	"	" 28..	" 27..	121	45	"	3¼	" ...	27 ..	59
4	"	" 28..	" 27..	121	45	"	3¼	" ...	27 15	58½
5	"	" 28..	" 27..	121	42	"	3	" ...	20 45	58
6	Pease.....	May 30..	Ploughed under, 7 inches deep, on August 13.							
7	Tares.....	" 30..	"		"		"			
8	Soja Beans	" 30..	"		"		Sept. 5.			
9	Red Clover	" 30..	"		"		" 6.			
10	Alsike and Lucerne..	" 30..	"		"		" 8.			
11	Rape.....	" 30..	"		"		" 8.			
12	Wheat, Red Fife.....	April 28..	Aug. 28..	122	36	Strong....	2¾	Bald ...	18 45	53½
13	"	" 28..	" 28..	122	38	"	3	" ...	22 30	54
14	"	" 28..	" 28..	122	38	"	3	" ...	20 50	54½
15	"	" 28..	" 28..	122	44	"	3	" ...	27 15	58
16	"	" 28..	" 28..	122	40	"	3	" ...	22 45	57
17	Oats, Banner	May 7..	" 24..	109	47	"	9	Brane'g.	31 16	36
18	Wheat, Red Fife.....	April 28..	Sept. 1..	126	43	"	3	Bald ...	25 ..	58
19	Oats, Banner	May 7..	Aug. 29..	114	50	"	9¼	Brane'g.	32 26	38½
20	Wheat, Red Fife	April 28..	Sept. 1..	126	44	"	3	Bald ...	27 ..	59½
21	Barley, Rennie's Improved	May 17..	Aug. 21..	96	36	"	2	6 rowed.	26 12	53
22	Rye, Spring	April 28..	Sept. 1..	126	42	"	3	.....	25 ..	61

ROTATION OF CROPS.—Summary of results for three years.

Number.	Variety.	Yield.		Variety.	Yield.		Variety.	Yield.	
	1900.	Bush.	Lbs.	1901.	Bush.	Lbs.	1902.	Bush.	Lbs.
1	Oats, Banner.....	11	2	Soja Beans, ploughed under Aug. 21.....	.....		Wheat, Red Fife.....	25	..
2	Wheat, Red Fife.... ..	4	20	Pease, ploughed under July 26.....	.....		"	24	30
3	Oats, Banner.....	11	..	Tares, ploughed under July 10.....	.....		"	27	..
4	Wheat, Red Fife... ...	5	..	Red Clover, ploughed under Sept. 3	.....		"	27	15
5	Barley, Canadian Thorpe	9	44	Clover, Alsike and Lucerne, ploughed under Sept. 5.....	.....		"	20	45
6	Wheat, Red Fife.....	16	50	Wheat, Red Fife.....	38	52	Pease, ploughed under Aug. 13	.....	
7	"	19	30	Oats, Banner	97	32	Tares, ploughed under Aug. 13	.....	
8	"	18	20	"	91	8	Soja Beans, ploughed under Sept. 5.....	.....	
9	"	11	20	Wheat, Red Fife.....	38	..	Red Clover, ploughed under Sept. 6.	.....	
10	"	8	20	Barley, Sidney.....	50	36	Alsike and Lucerne, ploughed under Sept. 8	.....	
11	"	10	40	Summer-fallow.....	.....		Rape, ploughed under Sept. 8	.....	
12	"	7	40	"	.....		Wheat, Red Fife.....	18	45
13	Oats, Banner.....	9	14	Summer-fallow, ploughed June 5.....	.....		"	22	40

ROTATION OF CROPS—Summary of results for three years—*Concluded.*

Number.	Variety.	Yield.		Variety.	Yield.		Variety.	Yield.	
	1900.	Bush.	Lbs.	1901.	Bush.	Lbs.	1902.	Bush.	Lbs.
14	Barley, Canadian Thorpe	4	32	Summer-fallow			Wheat, Red Fife	20	50
15	Wheat, Red Fife	4	30	Oats, Banner	80	26	"	27	15
16	Barley, Canadian Thorpe	9	4	"	98	8	"	22	45
17	Soja Beans, ploughed under Aug. 3			Wheat, Red Fife	43	44	Oats, Banner	31	16
18	Pease, ploughed under July 28			"	43	18	Wheat, Red Fife	25	..
19	Tares, ploughed under July 28			"	43	2	Oats, Banner	32	26
20	Clover, Common Red, ploughed under Sept. 10			"	42	16	Wheat, Red Fife	27	..
21	Alsike and Lucerne, ploughed under Sept. 10			"	43	12	Barley, Rennie's Impr'vd	26	12
22	Summer-fallow			"	44	40	Rye	25	..

EXPERIMENTS WITH FLAX.

Sowing different quantities of seed per acre and at different dates. Soil, clay loam, summer-fallowed. Sown by hoe-drill in plots of 1-20th acre each.

Seed per acre.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Weight of Straw.	Yield per Acre	
				Inches.	Lbs.	Bush.	Lbs.
25 pounds	May 17	Aug. 21	96	27½	1,900	14	8
60 "	" 17	" 19	94	28½	2,500	16	16
40 "	" 17	" 20	95	30	2,000	13	8
40 "	" 26	" 28	94	28	1,980	14	
80 "	" 26	" 30	96	26	1,620	12	28
80 "	" 17	" 21	96	27	2,440	15	

EXPERIMENTS WITH MILLETS.

Five varieties were sown on May 30, on 1-20th acre plots of fallow. When cut green for ensilage on September 9, no seed had formed.

Variety.	Height.	Green Fodder per Acre.	
		Tons.	Lbs.
Italian	38	15	1,353
Moha Hungarian	40	11	646
Algerian	36	8	1,420
White Round French	42	8	1,420
Cat-tail	36	4	710

EXPERIMENTS WITH SOJA BEANS.

Sown on May 30, on 1-20th acre plots of fallowed land, clay loam. Cut for ensilage on September 9. Did not form seed.

Variety.	Rows Distance apart.	Height.	Yield per Acre. (Green)
	Inches.		Tons. Lbs.
Soja Beans	21	33	3 336
"	28	35	3 1,656
"	35	36	4 184

EXPERIMENTS WITH HORSE BEANS.

Sown May 20 on 1-20th acre plots of fallowed land, clay loam. Cut for ensilage September 9, About half of beans ripe when cut.

Variety.	Rows Distance Apart.	Height.	Yield per Acre, Green.
	Inches.	Inches.	Tons. Lbs.
Horse beans	21	48	10 592
"	28	52	11 176
"	35	52	11 176

EXPERIMENTS WITH SPRING RYE.

Sown April 19, on 1-20th acre plot of fallow.

Cut August 20. Days to mature, 123. Straw, strong, 43 inches long. Heads 3 inches. Yield, 23 bushels 40 lbs. per acre.

EXPERIMENT WITH CANARY GRASS.

(Phalaris canariensis.)

Sown May 17 on 1-20th acre plot of fallow. Cut September 3. Days to mature, 109. Yield, 21 bushels 30 lbs. per acre.

EXPERIMENT WITH SUNFLOWERS.

Variety, Russian. Sown May 19, on 1-20th acre plot of fallow. No seed had formed when frost came, and the crop was a total failure.

HAY CROP.

A good average crop was secured in excellent condition from the various seedings of Brome and Western Rye Grass.

YIELDS.

BROME GRASS. *(Bromus inermis).*

1st crop.—Left for seed.

2nd crop.—25 acres, 1 ton 1,950 lbs. per acre.

2nd crop— 4 acres, 2 tons 805 lbs. per acre.
3rd crop.— 3 acres, 3 tons 15 lbs. per acre. (Manured.)

WESTERN RYE GRASS. *(Agropyrum tenerum).*

1st crop.—12¾ acres, 2 tons 297 lbs. per acre.
1st crop.— 1½ acres. 4 tons 235 lbs. per acre.
2nd crop.— 2½ acres, 3 tons 153 lbs. per acre.

MIXED BROME AND WESTERN RYE GRASS.

1st crop.—5 acres, 2 tons 66 lbs. per acre.
2nd crop.—½ acre, 2 tons 1,580 lbs. per acre.

1902 SEEDING.

Brome grass.—23 acres of stubble land was ploughed 4 inches deep on June 1, and sown with Brome grass. Abundant rainfall at the time of seeding and afterwards caused one of the best catches ever secured on the farm.

Western Rye Grass.—4 acres of land was prepared in the same manner as mentioned above, and sown with Western Rye grass. An exceptionally good catch was secured.

SEEDING AND CULTIVATION OF BROME GRASS.

For information regarding the seeding and cultivation of Brome grass the following is quoted from the report of 1896 :—

'This grass is better sown alone ; at least it should not be sown with a grain crop. The grain takes too much moisture from the young grass-plants, only the most vigorous of which will survive the dry weather in September ; whereas, if sown alone all the plants have an equal chance.

'It is advisable to sow the seed on land that does not blow. Summer-fallow would be the best preparation, but on account of its liability to drift it is not safe in many parts of the Territories to use this kind of land. Stubble-land ploughed three or four inches deep in April or May, and well harrowed after the seed is sown is found to be quite safe from winds, as the stubble harrowed to the top prevents all drifting.

'Ten or twelve pounds of seed is required per acre. More seed will give a better crop the first year, but less afterwards, as the roots thicken up each year, and in three or four years this grass makes better pasture than hay.

'The seed being light, long and thin, seeding by hand is the only practicable method unless seeders constructed for the purpose are available. To seed properly a calm day should be chosen, so that all parts of the land may be evenly sown.

'While the plants are young, weeds are sure to make great headway, and it is necessary to keep them at least from going to seed. The quickest way to accomplish this is to go over the field with a mower, cutting just above the grass plants. If this operation has to be repeated it will be necessary to cut the tops of the grass, but this will not injure the plants, in fact it is an advantage in the way of giving the roots a firmer hold.

'The first crop of hay can be cut the next year after seeding, and will, in ordinary years, be ready early in July. Twenty days after being ready to cut for hay it will be fit to cut for seed if so desired.

'On this farm it has always been cut in first bloom for hay, and twenty days from this time it is considered in proper condition to cut for seed.

'In cutting for seed, a binder is used and the grass is cut, tied and stooked the same as wheat or other grain. In a week or ten days after cutting it is ready to thresh or store away.

'For threshing small quantities, the old-fashioned flail is suitable, but for large lots a threshing machine should be used on which the wind has been shut off as much as practicable. From three to six hundred pounds of seed may be expected from an acre.'

CLOVERS AND GRASSES.

LUCERNE AND RED CLOVER.

One-half acre was sown with lucerne and the same area with red clover on June 7. Good catches were secured and the growth made was quite satisfactory.

TIMOTHY.

One-half acre was sown with timothy on June 7. A splendid catch was secured. When frost came the plants were 12 inches high and nearly all in head.

ORCHARD GRASS.

One-half acre was sown with orchard grass on June 7. About 75 per cent of the seed failed to germinate. Growth, weak.

EXPERIMENTS WITH FIELD ROOTS.

Fallowed land, clay loam, was used for all tests with field roots. All varieties came up evenly and made a good showing in the early part of the season, but the crop, with the exception of the first seeding of carrots, was seriously affected by the dry weather of July, August and September.

The roots, though small, were sound and of good quality. The yield was computed from two rows each 66 feet long and 33 inches apart.

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties were under trial in 1902. The first sowing was on May 28, the second on June 7, and the roots were all pulled October 5.

TURNIPS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Good Luck	17	680	578	..	13	880	448	..
Webb's New Renown	17	440	574	..	18	1,680	628	..
Halewood's Bronze Top	17	320	572	..	12	1,440	424	..
Imperial Swede	16	1,960	566	..	12	1,920	432	..
Banghol'm Selected	16	880	548	..	10	1,600	360	..
Giant King	16	160	536	..	11	800	380	..
Perfection Swede	16	160	536	..	14	800	480	..
New Arctic	16	160	536	..	12	720	412	..
Prize Winner	15	1,920	532	..	11	1,040	384	..
Mammoth Clyde	15	1,800	530	..	12	960	416	..
East Lothian	15	1,680	528	..	13	640	444	..
Sutton's Champion	15	1,320	522	..	10	1,600	360	..
Shamrock Purple Top	15	480	508	..	11	1,520	392	..
Hall's Westbury	15	480	508	..	11	80	368	..
Magnum Bonum	15	120	502	..	10	640	344	..
Drummond Purple Top	14	1,640	494	..	12	1,200	420	..
Monarch	14	1,640	494	..	11	80	368	..
Emperor Swede	14	1,520	492	..	12	1,680	428	..
Champion Purple Top	14	1,400	490	..	12	960	416	..
Jumbo	14	1,400	490	..	13	400	440	..
New Century	14	1,280	488	..	13	1,600	460	..
Kangaroo	14	1,160	486	..	12	..	400	..
Carter's Elephant	14	1,040	484	..	14	320	472	..
Elephant's Master	14	920	482	..	6	480	208	..
Prize Purple Top	14	920	482	..	12	920	432	..
Marquis of Lorne	14	560	476	..	12	240	404	..
Selected Purple Top	13	1,960	466	..	11	80	368	..
Skirving's	13	280	458	..	9	720	312	..
West Norfolk Red Top	12	1,560	426	..	9	960	316	..

EXPERIMENTS WITH MANGELS.

Twenty-seven varieties of mangels were under trial. Two sowings were made in each case, the first on May 28 the second on June 2 and the roots were pulled from both on October 3.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Giant Yellow Intermediate	15	600	510	..	8	1,040	284	..
Ward's Long Oval-shaped	15	240	504	..	6	240	204	..
Giant Yellow Half-long	14	1,640	494	..	8	1,520	292	..
Yellow Intermediate	14	320	472	..	10	400	340	..
Selected Yellow Globe	14	200	470	..	10	1,600	360	..
Triumph Yellow Globe	13	1,600	460	..	11	80	368	..
Mammoth Long Red	13	1,480	458	..	9	480	308	..
Prize Mammoth Long Red	13	1,240	454	..	6	1,680	228	..
Leviathan Long Red	13	1,000	450	..	10	160	336	..
Half-long Sugar White	13	880	448	..	9	1,200	320	..
Golden Fleshed Tankard	13	880	448	..	7	880	248	..
Mammoth Yellow Intermediate	13	760	446	..	7	1,840	264	..
Half-long Sugar Rosy	13	520	442	..	6	1,440	224	..
Lion Yellow Intermediate	13	280	438	..	9	..	300	..
Yellow Fleshed Tankard	13	280	438	..	7	160	240	..
Prize Winner Yellow Globe	13	40	434	..	8	1,760	296	..
Gate-post	12	1,440	424	..	8	1,280	288	..
Gate-post Yellow	12	1,320	422	..	9	1,440	324	..
Red Fleshed Tankard	12	1,200	420	..	9	960	316	..
Selected Mammoth Long Red	12	480	408	..	9	960	316	..
Giant Yellow Globe	12	240	404	..	8	1,040	284	..
Warden Orange Globe	11	1,040	384	..	5	1,280	188	..
Mammoth Oval-shaped	11	1,040	384	..	7	1,600	260	..
Canadian Giant	11	1,040	384	..	9	..	300	..
Norbiton Giant	11	920	382	..	8	560	276	..
Champion Yellow Globe	11	320	372	..	9	..	300	..
Giant Sugar	10	1,840	364	..	8	800	280	..

EXPERIMENTS WITH CARROTS.

Twenty varieties of carrots were under trial during 1902. The first sowings were made on April 30, the second on May 28, and the roots from both were pulled on October 5.

CARROTS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre, 1st Plot.		Yield per Acre, 1st Plot.		Yield per Acre, 2nd Plot.		Yield per Acre, 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Iverson's Champion	17	1,280	588	..	10	160	336	..
Giant White Vosges	16	1,120	552	..	8	1,040	284	..
New White Intermediate	15	960	516	..	7	880	248	..
Green-top White Orthe	14	1,760	496	..	8	1,760	296	..
Ontario Champion	14	1,520	492	..	8	560	276	..
Half-long White	14	800	480	..	10	1,360	356	..
Half-long Chantenay	14	560	476	..	9	..	300	..
Long Yellow Stump-rooted	14	80	468	..	8	560	276	..
Improved Short White	13	1,840	464	..	10	400	340	..
Early Gem	12	600	410	..	7	400	240	..
Mammoth White Intermediate	11	1,760	396	..	7	1,600	260	..
White Belgian	11	1,760	396	..	6	960	216	..
Guerande or Ox-heart	11	1,280	388	..	5	1,520	192	..
Long Orange or Surrey	11	200	370	..	6	480	208	..
Carter's Orange Giant	10	1,360	356	..	7	640	244	..
Yellow Intermediate	10	1,000	350	..	5	1,760	196	..
White Vosges Large Short	9	1,680	328	..	5	1,760	196	..
Scarlet Intermediate	8	680	278	..	7	400	240	..
Long Scarlet Altringham	7	640	244	..	5	1,040	184	..
Scarlet Nantes	6	120	202	..	4	640	144	..

EXPERIMENTS WITH SUGAR BEETS.

Nine varieties of sugar beets were tested in 1902. The first sowing was made on May 28, the second on June 7, and the roots from both were pulled on October 3.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Imperial	11	1,400	390	..	8	1,040	284	..
Danish Improved	10	1,720	362	..	8	1,040	284	..
Royal Giant	10	400	340	..	9	480	308	..
Danish Red Top	9	1,200	320	..	5	1,520	292	..
Vilmorin's Improved	8	680	278	..	5	320	172	..
Red Top Sugar	8	560	276	..	9	..	300	..
Wanzleben	7	1,480	258	..	6	1,920	232	..
French Very Rich	5	1,880	198	..	6	960	216	..

EXPERIMENTS WITH POTATOES.

Eighty-nine varieties of potatoes were under trial during 1902. These were planted on May 7 in drills 2½ feet apart with the sets about 14 inches apart. The soil was clay loam, summer-fallowed. The potatoes were dug October 2, and the yield per acre has been estimated from the weight of tubers in one row 132 feet long. There was no rot observed in any of the varieties.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.	Yield per Acre of Marketable.	Yield per Acre of Unmarketable.	Form and Colour.
			Bush. Lbs	Bush. Lbs.	Bush. Lbs.	
Country Gentleman	Strong	Medium	301 24	272 48	28 36	Long, pink.
New Queen	"	"	288 12	268 24	19 48	Oval "
Beauty of Hebron	"	Large	286 ..	277 12	8 48	Long "
Brownell's Winner	"	Medium	281 36	250 48	30 48	" red.
New Variety No. 1	"	Large	275 ..	259 36	15 24	Round, white.
Carman No. 1	"	"	274 24	253 ..	21 24	Oval "
Seedling No. 7	"	"	272 48	255 12	17 36	" red.
Lee's Favourite	Medium	Medium	270 36	242 ..	28 36	" "
Earliest of All	"	"	268 24	253 ..	15 24	Long, pink.
American Giant	Strong.	"	266 12	250 48	15 24	" white.
Early Harvest	"	"	266 12	250 48	15 24	Oval "
Moneymaker	Medium	"	266 12	250 48	15 24	Long "
Pride of the Market	Strong	Large	266 12	261 48	4 24	Oval "
Seattle	"	Medium	266 ..	246 12	19 48	Long "
Reeve's Rose	Medium	"	261 48	250 48	11 ..	" red.
Carman No. 3	Strong	Large	259 36	250 48	8 48	Oval, white.
Rose No. 9	"	"	257 24	244 12	13 12	Long, red.
Vick's Extra Early	Medium	Medium	255 12	242 ..	13 12	Oval, pink.
Maule's Thoroughbred	Strong	Large	255 12	228 48	26 24	Long, red.
Columbus	"	"	253 ..	222 12	30 48	" "
Great Divide	"	Medium	253 ..	239 48	13 12	" white.
Northern Spy	"	Large	250 36	237 24	15 24	Oval, red.
Lizzie's Pride	Medium	"	248 36	239 48	8 48	Long, white.
Burnaby Seedling	Strong	Medium	248 36	228 48	19 48	" pink.
Green Mountain	"	"	246 24	231 ..	15 24	" white.
Hale's Champion	"	Small	246 24	217 48	28 36	Round "
Dreer's Standard	"	Medium	242 ..	228 48	13 12	Oval "
Early Michigan	"	"	242 ..	231 ..	11 ..	" "
General Gordon	"	Large	242 .	226 36	15 24	Long, red.
State of Maine	"	Medium	239 48	217 48	22 ..	Oval, white.
Troy Seedling	"	Small	237 36	213 24	24 12	" "
Bovee	"	Medium	235 24	224 24	11 ..	" pink.
Sharpe's Seedling	Strong.	Large	235 24	206 48	28 36	Long, red.
Uncle Sam	"	Medium	235 24	215 36	19 48	Oval, white.
Holborn Abundance	"	"	233 12	217 48	15 24	" "
Sabean's Elephant	"	"	233 12	217 48	15 24	Long, white.
Flemish Beauty	Medium	Large	231 ..	215 36	15 24	Long, red.
Swiss Snowflake	Strong.	Small	231 ..	224 24	6 36	Round, white.
Prolific Rose	"	Medium	231 ..	213 24	17 36	Long, pink.
Clay Rose	"	Small	231 ..	217 48	13 12	Round, red.
Rochester Rose	"	Medium	228 48	213 24	15 24	Long, red.
Seedling No. 230	Medium	Small	228 48	215 36	13 12	Oval, white.
Chicago Market	"	Medium	228 48	211 12	17 36	" "
I.X.L.	Strong.	"	228 48	215 36	13 12	Long, pink.
Maggie Murphy	"	"	228 48	222 12	6 36	" "
Wonder of the World	Medium	"	226 36	202 24	24 12	Oval, pink.
Quaker City	Strong.	Small	226 36	217 48	8 48	" white.
American Wonder	"	Large	226 36	213 24	13 12	" "
Dakota Red	"	"	226 36	217 48	8 48	" red.
Prize Taker	"	Medium	224 12	213 24	11 ..	Long, red.
Penn Manor	"	"	222 12	206 48	15 24	Oval, pink.
Early Rose	"	Small	217 48	193 36	24 12	" "
Pearce's Extra Early	"	Medium	216 12	192 ..	24 12	Long, pink.
Pearce's Prize Winner	"	"	215 36	202 24	13 12	" white.
Late Puritan	"	"	213 24	200 12	13 12	" "
Early St. George	"	"	211 12	200 12	11 ..	" pink.
Burpee's Extra Early	"	Small	211 12	195 48	15 24	Oval, pink.
Canadian Beauty	Medium	Medium	209 ..	191 24	17 36	Long, pink.
Early Norther	"	Small	209 ..	191 24	17 36	" red.
Up-to-Date	Strong.	"	206 48	189 12	17 36	Oval, white.
Daisy	"	Medium	206 48	171 36	35 12	Round, pink.
Rawdon Rose	"	"	206 48	195 48	11 ..	Oval, pink.
Empire State	"	"	204 36	184 48	19 48	" white.
McIntyre	"	Small	204 36	184 48	19 48	" pink.
Early Sunrise	"	"	202 24	187 ..	15 24	" "

POTATOES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.	Yield per Acre of Market-able.	Yield per Acre of Un-market-able.	Form and Colour.
			Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	
Cambridge Russet	Medium	Medium	202 24	189 12	13 12	Long, russet.
Delaware	Strong..	" .	202 24	195 48	6 36	Oval, white.
Irish Daisy	" ..	Small ..	195 48	176 ..	19 48	Round, white.
Early White Prize	" ..	Large ..	193 36	176 ..	17 36	Oval, white.
Thorburn	" ..	Medium	191 24	180 24	11 ..	" pink.
Irish Cobbler	" ..	Small ..	189 12	176 ..	13 12	" white.
Bill Nye	" ..	" ..	187 ..	169 24	17 36	Long, white.
Polaris	Medium	Medium	187 ..	171 36	15 24	Oval, white.
White Beauty	" .	" .	184 48	167 12	17 36	" "
Early Market	Strong..	Small ..	182 36	165 ..	17 36	" pink.
Early Puritan	" ..	" ..	182 36	165 ..	17 36	" white.
Everett	Medium	Medium	182 36	171 36	11 ..	Long, red.
Rural Blush	Strong..	" .	182 36	176 ..	6 36	Oval, red.
Early Ohio	" ..	" .	180 24	162 48	17 36	" pink.
Rural No. 2	" ..	" .	180 24	162 48	17 36	" white.
Enormous	" ..	" .	169 24	156 12	13 12	" "
Vanier	" ..	" .	169 24	154 ..	15 24	Long, red.
Sir Walter Raleigh	" ..	" .	154 ..	138 36	15 24	Oval, white.
Reading Giant	" ..	" .	149 36	121 ..	28 36	" red.
Early Six Weeks	" ..	Small ..	149 36	140 48	8 48	" pink.
Ohio Junior	" ..	" ..	145 12	132 ..	13 12	" "
Houlton Rose	Medium	" ..	145 12	134 12	11 ..	Long, pink.
Early Andes	Strong..	Medium	140 48	129 48	11 ..	" "
Brown's Rot-proof	" ..	" .	112 12	105 36	6 36	" red.

VEGETABLE GARDEN.

ASPARAGUS.

Old beds of Barr's Mammoth, Barr's Elmira and Conover's Colossal produced an excellent crop during the season. In use from May 23 to July 22.

BEANS.—Sown May 14.

Variety.	In use, Green.	Ripe.	Remarks.
Haricot Inexhaustible	Aug. 5	Sept. 16	Green; good cropper.
Matchless	" 5	" 16	" fair cropper.
Black Speckled	July 30	" 16	" good cropper.
Golden Skinless	" 30	" 3	Wax or butter; good cropper.
Emperor of Russia	Aug. 2	" 16	Green; good cropper; late.
Early Six-weeks	July 30	" 3	" " early.
Valentine Wax	" 5	" 16	" fair cropper.
Challenge Black Wax	Aug. 2	" 3	Wax; good cropper.
Stringless Wax	" 5	" 16	" " late.
Fame of Vitry	July 30	" 16	Green; good cropper.
Dwarf Kidney	Aug. 2	" 16	Wax; good cropper.
Golden Wax	" 2	" 3	" fair cropper.
Detroit Wax	July 30	" 3	" good cropper.
Extra Early	" 30	" 3	Green; good cropper; early.
Early Mohawk	" 30	" 16	" early.
Currie's Rust-proof	" 30	" 3	Wax; good cropper.

BEETS.

Sown May 16; in use July 25; pulled October 3.
Nutting's Dwarf Improved, 422 bushels per acre.
Flat Egyptian, 365 bushels per acre.
Long Smooth Blood, 309 bushels per acre.
Early Black Red Turnip, 293 bushels per acre.

BROCOLI.

Sown April 7; transplanted April 22; set out May 23.
Extra Early White, did not mature.
Dwarf Improved, did not mature.

CELERY.

Giant Pascal, Large Red Ribbed, Rose Ribbed Paris, Paris Golden Yellow, White Plume and White Walnut were sown in hot-house March 31; transplanted April 30; set out in trenches June 20; in use September 27; taken up October 8.

Giant Pascal and Large Red Ribbed did not do well; but the other varieties produced an excellent crop of very fine, crisp celery.

CAULIFLOWER.

Sown in hot-house April 2; transplanted April 22; set out May 22.
Earliest Dwarf, in use July 17; average weight, 4 lbs.
Half Early Paris, in use July 17; average weight, 4 lbs.
Early Snowball, in use July 28; average weight, 4½ lbs.
Large Algiers, in use August 5; average weight, 6 lbs.

CARROTS.—Sown, May 8; Lifted, October 3.

Variety.	In use.	Bushels per Acre.	Remarks.
Early Gem	Aug. 30	405	Large; Good shape.
Long Blood	" 30	394	Large; rough.
Half Long Luc	July 30	363	Good variety.
Parisian Forcing	" 30	363	"
French Horn	" 30	343	"
Scarlet Nantes	Aug. 30	202	Small; smooth.

CABBAGE.—Sown in Hot-house, April 2; Transplanted to frame, April 22; Set out, May 23; Taken up, October 8.

Variety.	In use.	Average Weight.	Remarks.
		Lbs.	
Winningstadt Early	Aug. 5	7	Good; early.
Extra Early Express	" 5	7	"
Extra Early Etampes	July 20	5	"
St. Denis	Aug. 5	10	
Paris Market	" 5	5	
Early Jersey Wakefield	" 5	6	
Fottler's Drumhead	" 5	13	
Large Red Drumhead	July 15	9	Good.
Green Globe Savoy	Aug. 5	6	

CORN.—Planted, May 27.

Ring-leader, in use Sept. 6 ; did not ripen.
First of All, in use Sept 1 ; did not ripen.
Extra Early White Cory, in use Sept. 6 ; did not ripen.
Adam's Extra Early, in use Sept. 1 ; did not ripen.
Mitchell's Extra Early, in use Sept. 6 ; did not ripen.
White Cory, in use Sept. 1 ; did not ripen.
Squaw, in use Aug. 20 ; ripe, Sept. 6.

Pop-corn.

White Rice ; did not ripen.
White Pearl ; did not ripen.

CUCUMBERS.—Planted in hot-house, March 10 ; set out, May 28.

London Long Green, ripe, Sept. 5 ; very poor crop.
Prize Pickling ; no fruit set.
White Wonder ; no fruit set.
New Giant Pera, ripe, Sept. 5 ; very poor crop.

CITRONS.—Sown in cold-frames in garden, May 28.

Preserving : fruit small.
Colorado ; fruit small.

LETTUCE.—Sown, May 28.

Cabbage Neapolitan, in use June 6 ; very fine.
Early Ohio, in use June 6 ; good.
Blonde Stone-head, in use June 6 ; good.
All the Year Round, in use June 9 ; good.
Trocadero Red Edged, in use June 9 ; good.
Cos, Green Paris, in use July 6 ; good heads.
Cos, Trianon, in use July 6 ; good heads.

ONIONS.—Sown in Hot-house, April 7 ; set out, May 28 ; lifted, Sept. 18 ; also sown in open, May 8.

	Bush. per acre, transplanted.	Bush. per acre, sown in open.
Large Red Wethersfield	221	120
Yellow Globe Danvers	201	180
Market Favourite	170	180
Paris Silver-skin	...	170

All varieties were smaller than usual but the bulbs were very fine and solid.

MELONS.

Musk.—Sown in hot-house, May 10; set out, May 28.
Earliest of All, no fruit matured.
Hackensack, no fruit matured.
Extra Early Netted Gem, no fruit matured.
Water.—Sown in hot-house May 10; set out May 28; Fordhook, no fruit matured; Early Canada, no fruit matured.

PUMPKINS.

Sown in hot-house May 10; set out May 28.
Sweet or Sugar, ripe, Aug. 30; weight, 16 lbs.; light crop.
Large Yellow or Field, ripe, Aug. 30; weight, 28 lbs.; light crop.

SQUASH.

Sown in hot-house May 10; set out May 28.
Early Vegetable Marrow, light crop set and did not mature.

TURNIPS.

Sown May 27; in use July 30; pulled October 17.
Early Stone, bushels per acre, 523; good.
Extra Early White Milan, bushels per acre, 490; coarse.
Early White Strapleaf, bushels per acre, 483; bad shape.
Robertson's Golden Ball, bushels per acre, 400; very good.

PEASE.—Sown May 14.

Variety.	In use.	Ripe.	Size.	Remarks.
Surprise	July 19	Aug. 9	Small	Fair cropper.
Stratagem	" 30	Sept. 12	Large	Good cropper; late.
Shropshire Hero	" 31	Aug. 22	"	"
Alaska	" 25	" 22	Small	Good; early.
American Wonder	" 19	Sept. 14	"	"
Anticipation	" 20	" 14	Large	Fair cropper; late.
Admiral	Aug. 5	" 14	Small	" "
Burpee's Profusion	July 30	Aug. 9	Large	Good cropper.
Extra Early	" 19	" 9	Small	"
Ever-bearing	" 28	" 9	Medium	"
First of All	" 19	" 9	Small	"
First and Best	" 21	" 9	"	"
Laxton's Charmer	Aug. 5	" 9	Large	" late.
Gradus	July 25	" 22	"	"
Champion of England	" 30	" 22	Medium	"
Horsford's Market Garden	Aug. 7	" 9	"	"
William Hurst	July 26	" 9	Small	"
Rural New Yorker	" 10	Sept. 14	"	Fair cropper; early.
Prince of Wales	Aug. 5	" 14	Medium	Good cropper.
Premium Gem	July 20	Aug. 14	"	"
Yorkshire Hero	" 31	" 9	"	"
Nott's Excelsior	" 19	" 9	"	"
Harrison's Glory	Aug. 10	Sept. 14	Small	" late.
C. P. R.	" 5	" 14	Large	" "
Queen	" 80	.....	Medium	" "

RADISH.

First seeding, May 8; in use June 7. Second seeding, June 1; in use June 24.
Ne Plus Ultra; Early Scarlet White Tipped; French Breakfast; Olive-shaped Deep Scarlet; Early Scarlet Turnip.
Both seedings did well. All good varieties.

PARSNIPS.

Sown May 8; lifted October 4.
New Intermediate, bushels per acre, 180. Medium size.
Elcomb's Giant, bushels per acre, 160. Small; medium quality.
Hollow Crown, bushels per acre, 120. Small; medium quality.

TOMATOES.

Sown in Hot house, April 3; Transplanted to Cold-frame, April 30; Set out May 28.

——	Green. — In use.	First ripe.	Remarks.
Atlantic Prize	July 18..	Aug. 30..	Small; smooth.
Early Ruby	" 18..	" 30..	Small; rough.
Earliest of All	" 21..	" 30..	Medium; smooth.
Earliana	" 18..	Sept. 5..	Large "
Success	" 24..	" 5..	Medium "
Canada	" 20..	" 5..	" "
Peach	" 30..	" 5..	Small; rough.

PEPPERS.

Sown in hot-house, April 3; transplanted, April 30; set out May 28.
Ruby King, did not ripen.

PARSLEY.

Sown May 28. Champion Moss-curled– Did well late in the season.
Triple curled—Did well late in the season.

RHUBARB—OLD BEDS.

Victoria, in use May 23; good crop; fine stalks.
Linnaeus, in use May 23; good crop; fine stalks.

SAGE—WINTER SAVORY.

Sown May 28; did fairly well.

SPINACH.

Sown May 28; good crop.

FLOWER GARDEN.

ANNUALS—Propagated in Hot-house. Sown March 31.

Variety.	Set out.	In Bloom. From	In Bloom. To	Remarks.
Aster, 12 varieties	June 4	July 27	Sept. 22	Very fine show.
Amarantus, 2 varieties	" 6			Did not bloom.
Arabis Alpina Compacta	" 6			Fine plants.
Ageratum	" 4	July 11	Sept. 10	Good border.
Œnothera Drummondii	" 4	" 26	" 10	Good show.
Aquilegia Chrysantha Nana	" 6	" 26	" 10	Did well.
Antirrhinum, 3 varieties	" 4	" 11	" 10	Some fine flowers.
Clarkia, 2 varieties	" 6	" 16	" 10	Bloomed freely.
Chrysanthemum, 2 varieties	" 6	" 15	" 17	Flowers small.
Calendula	" 6	" 7	" 17	Very fine.
Centaurea	" 6	" 16	" 10	Large and fine.
Celosia, 2 varieties	" 6			Did not bloom.
Coreopsis, 3 varieties	" 6	July 5	Sept. 10	Good show of bloom.
Dianthus, 7 varieties	" 4	" 10	" 17	Very fine.
Dahlia, Single	" 4	" 20	" 10	Did well.
Eschscholtzia	" 4	" 20	" 17	Very fine.
Godetia, 3 varieties	" 4	" 24	" 10	Good show of bloom.
Gaillardia, 2 varieties	" 4	" 8	" 17	Did well.
Gypsophila Elegans	" 4	Aug. 4	" 10	"
Helianthus	" 4	" 4	" 10	"
Helichrysum, 2 varieties	" 4	July 2	" 10	"
Hollyhock	" 4	" 2	" 10	"
Iberis Gibraltica	" 4			Did not bloom.
Lychnis Haageana	" 8	July 8	Sept. 10	Did fairly well.
Lobelia	" 8	" 8	" 10	Did well.
Larkspur	" 8	" 10	" 10	"
Linum	" 8	" 10	" 10	"
Lupinus	" 8	Aug. 8	" 17	"
Mignonette	" 4	July 12	" 10	"
Marigold	" 4	" 16	" 10	Made fine show.
Nasturtium, 2 varieties	" 4	" 20	" 10	Very fine.
Nigella	" 4	" 24	" 10	Very pretty.
Nicotina	" 4	" 26	" 10	Large and fine.
Sweet Alyssum	" 6			Did not bloom.
Stocks, 2 varieties	" 6	July 15	Sept. 17	Very fine show.
Salpiglossis, 2 varieties	" 6	Aug. 5	" 10	Did well.
Verbena	" 4	July 26	" 10	Very fine.
Scabiosa, 2 varieties	" 6	" 28	" 10	Good show of bloom.
Petunia	" 30	" 8	" 17	Large fine bloom.
Phlox, 5 varieties	" 4	" 4	" 17	Very fine show.
Portulaca	" 4	" 4	" 17	Did well.
Poppies, 3 varieties	" 4	" 22	" 10	Very fine.
Zinnia, 3 varieties	" 4	" 23	" 10	Good.

ANNUALS—SOWN IN THE OPEN.

The following Annuals were sown in the open from May 17 to May 27. All did well and bloomed freely, but were about two weeks later than the same varieties sown in the hot-house and transplanted.

Amarantus.
Ageratum
Antirrhinum.
Aster.
Agrostemma.
Candytutt.
Centaurea.
Chrysanthemum.
Godetia.
Helichrysum.
Iberis Gibraltica.
Mignonette.
Marigold.
Nigella.
Phlox.
Poppies.

Calendula.
Coreopsis.
Dianthus.
Celosia.
Eschscholtzia.
Gaillardia.
Petunias.
Scabiosa.
Salpiglossis.
Sweet Alyssum.
Sweet Peas, 25 varieties.
Zinnia.

PERENNIALS.

The old beds of Perennials, including Pansies, Larkspur, Sweet William, Columbine, Lychnis and Everlasting Pea, came through the winter in good condition and flowered well during the season.

BULBS.

Gladioli—3 varieties. Set out June 4. In flower August 1 to Sept. 10. Very fine.

Dahlia.—Set out June 4. In flower July 16. Flowers large and fine but about two weeks later than usual.

Tulips.—In bloom May 15. Very fine showing. Flowers large and regular.

Cannas.—In bloom July 20. Later than usual, but the flowers were very fine.

Iris.—Planted in 1900. Maintained a good succession of bloom from June 5 to July 25.

PÆONIES.

Planted in 1900. Magnificent flowers.

OTHER PERENNIALS.

Planted 1900. The majority of a large list, including Achillea, Aster, Clematis Centaurea, Funkia, Geranium, Hemerocallis, Helianthus, Lysimachia, Rudbeckia. Thermopsis and Veronica, came through the winter in good condition and flowered freely. The plot was an attractive one during the whole season.

TREES AND SHRUBS.

The trees and shrubs on the farm made satisfactory progress during the season. The winter of 1901–2 was very favourable, and nearly all the specimens living in the fall of 1901 were found to be in good condition this spring.

Growth started somewhat later than usual, but the large amount of moisture in the early part of the season more than made up for the loss of time.

A large number of the shrubs fruited this season, and as the seed was carefully collected, it is hoped that a good variety of home-grown seedlings will soon be available for distribution. The crop of maple seed on the farm was again practically destroyed by the fungus which ruined the crop last year, but the trees in the Qu'Appelle valley, north of Indian Head, were free from disease, and a quantity of seed sufficient for the distribution of 1903 has been secured from there.

The Evergreen trees made good progress during the season, the growth of White Spruce, Rocky Mountain Spruce, Scotch Pine and Mountain Pine being particularly noticeable.

ARBORETUM.

Forty-five species and varieties of trees and shrubs were added to the Arboretum last spring. The specimens had been grown one year in nursery rows in a sheltered position on the farm, and the weather being favourable at the time of transplanting, the moving caused very little set-back.

The clump of Syringa Vulgaris, numbering 23 varieties, is growing well, and in another year or two will, no doubt, be very attractive.

Appended is a short list of the varieties of trees and shrubs that have proved conspicuously successful in the past few years :

Botanical name—	Common name—
Acer Negundo.	Box Elder.
Acer Tataricum Ginnala.	Ginnalian Maple.
Alnus Glutinosa.	Common Alder.
Betula Populifolia.	White Birch.
Caragana Arborescens.	Siberian Pea Tree.
Cornus Stolonifera.	Red Osier Dogwood.
Cotoneaster Integerrima.	Common Cotoneaster.
Crataegus Chlorosarca.	
" Coccinea.	Scarlet Haw.
" Crus Galli.	Cockspur Thorn.
Fraxinus Americana.	White Ash.
" Pennsylvanica Lanceolata.	Green Ash.
Lonicera Alberti.	Albert Regel's Honeysuckle.
" Tatarica.	Tartarian Honeysuckle.
Populus Balsamifera.	Balsam Poplar.
" Deltoidea.	Cottonwood.
Rhamnus Cathartica.	Common Buckthorn.
" Frangula.	Breaking Buckthorn.
Ribes Aureum.	Missouri Currant.
" Sibirica.	Siberian Currant.
Salix Pentranda.	Laurel Leaved Willow.
" Purpurea Pendula.	Pendulous Purple Willow.
" Voronesh.	Voronesh Willow.
Syringa Chinense.	Rouen Lilac.
" Josikea.	Josika's Lilac.
" Vulgaris.	Common Lilac.
Ulmus Americana.	American Elm.
Viburnum Opulus.	Highbush Cranberry.

FRUIT TREES AND BUSHES.

The crop of fruits, with the exception of crab apples, currants and raspberries, was most disappointing. The native and American plums set a heavy crop of fruit, which was immediately affected with plum-pocket, and any plums that escaped injury from this cause were frozen before they came to maturity. The trees blossomed somewhat later than last year, and the growth of fruit was retarded by the cool wet weather in the early part of the season. The crab apples (*Pyrus Baccata* and *Pyrus Prunifolia*) fruited freely and ripened before the frost on September 12. Currants were a fair crop of excellent quality. Raspberries were above the average, and the fruit of nearly all the varieties was of exceptional quality. Very little fruit set on the gooseberries. Strawberries were, as usual, almost a total failure.

SEEDLING APPLES.

The two seedlings each of Tonka and Arctic, planted in 1899, came through the winter in good condition, but did not blossom. The Wealthy, Blushed Calville and Hibernal, planted in 1900, were unfortunately nearly all destroyed by rabbits during the winter. Any trees that were not barked made strong growth during the season.

GRAFTING.

The grafting of scions of hardy apples and crab apples grown in Manitoba, commenced in 1901, was continued this spring, and scions of the more promising varieties of American seedling plums were grafted on some of the trees of the Manitoba native plums which have proved inferior in size and quality.

Seventy-five per cent of the grafts on crab apples which struck in 1901 came through the winter in good condition and grew well during the season.

PLANTING.

In the orchard laid out in 1901 the following seedlings of hybrid crab apples were planted this year :—

36	seedlings of	Novelty,	14	seedlings of	Charles,
18	"	Progress,	8	"	Belmont,
18	"	Prairie Gem,	9	"	Eastman,
36	"	Aurora,	11	"	Eaton.
4	"	Belmont,			

FRUIT CROP.

Pyrus.

INDIAN HEAD SEEDLINGS.

Pyrus Baccata Genuina, Pyrus Baccata Cerasiformus, Pyrus Baccata Macrocarpa Pyrus Baccata Sanguinea and *Pyrus Prunifolia*, bore heavy crops of fruit, nearly all of which ripened before the frost on September 12. The fruit generally was small, but one of the trees of *Pyrus Baccata Macrocarpa* produced the largest crabs that have, so far, been grown on the farm.

SEEDLINGS RECEIVED FROM THE CENTRAL EXPERIMENTAL FARM.

Pyrus Baccata Sanguinea, Pyrus Baccata Aurantiaca, Pyrus Baccata Macrocarpa Pyrus Baccata Cerasiformus, Pyrus Baccata Genuina and *Pyrus Prunifolia intermedia* fruited, and the average size, though small, was considerably larger than last year's crop.

PLUMS.

The trees were badly injured by a heavy snow storm on September 23, 1901, some of the best trees being entirely ruined.

All varieties came safely through the winter and made strong growth during the season.

Seedlings of Hungarian Plum—Planted 1894.—Heavy crop of fruit set, but was frozen long before it came to maturity.

Seedlings of Speer—Planted 1895.—Fruited lightly, but were caught by frost.

Seedlings of Weaver—Planted 1894.—Wintered well and set a heavy crop of fruit. Fruit destroyed by frost.

Seedlings of De Soto—Planted 1895.

Seedlings of Rollingston—Planted 1897.—Medium crop of fruit set, but did not ripen in time to escape frost.

Aikin Plum—Planted 1897.—Wintered well, but set a very light crop. The fruit was further advanced when frost came than any of the native or seedling varieties, but was not fit for use.

MANITOBA NATIVE PLUMS.

The trees generally wintered in good condition, and set a heavy crop of fruit. Struck by plum-pocket, which destroyed 50 per cent of the fruit and the balance was frozen.

American Seedling Plum trees, received from Chas. Luedloff, Cologne, Minnesota. Wintered well and fruited heavily. Crop destroyed by plum-pocket and frost.

CHERRIES.

Seedling of Carnation—Planted 1896.—Wintered well, but did not fruit.

Seedling of Lithaur Weichsel—Planted 1894.—Wintered in good condition, but no fruit set.

Seedling of Olivet—Planted 1895.—The only surviving tree wintered well and made a strong healthy growth, but did not fruit.

Mahaleb—Planted 1895.—Wintered well. Made strong growth. Blossomed, but no fruit set.

Seedling of Wild Cherry from Nebraska. –Fruited lightly. Fruit small and of poor quality.

Rocky Mountain Cherry—Planted 1895.—Fruited heavily. Fruit small and much too late.

PRUNUS PUMILA,

Hardy. Very light crop. Small. Poor quality.

SMALL FRUITS.

WHITE CURRANTS.

White Grape, White Dutch, White Imperial and White Transparent were under test. All were hardy, made strong growth and produced excellent crops of very fine fruit.

RED CURRANTS.

Fay's Prolific, Raby Castle, Red Dutch, La Conde, Knight's Early Red, New Red Dutch, Native Red, London Red, Victoria, Fertile d'Angers, Cherry, Prince Albert, La Fertile, Versailles, North Star, Pomona, and Wilder under test. Came through the winter in good condition. A large crop of fruit set and ripened evenly. Quality, exceptionally good.

BLACK CURRANTS.

Lee's Prolific, Black Naples, Prince of Wales, Crandall, and the following of Saunders' Seedlings, Stewart, Orton, Clipper, Kerry, Eagle, Monarch, Charmer, Beauty, Winona, Ontario, Standard, Lewis, Ethel, Stirling, Star, Madoc, Perry, Eclipse, Oxford, Climax, all wintered in good condition and made strong growth. A very light crop of fruit set.

RASPBERRIES.

Dr. Reider, Philadelphia, Turner, Caroline, Lady Anne, Garfield, Miller's Red and Kenyon came out of winter covering in good condition and blossomed very freely. The crop was much above the average in quantity and quality.

GOOSEBERRIES.

Smith's Improved, Lancashire Lad, Governess, Columbus, Houghton, Native, Pearl, and Keepsake under test. All hardy. Fruited very lightly. Made strong growth.

STRAWBERRIES.

Captain Jack, New Dominion, Windsor Chief and Pineapple under test. Crop a failure.

SUMMER-FALLOWS.

It is very gratifying to know that throughout the Territories, summer-fallowing is rapidly becoming general. No matter where farming is carried on, the farmers realize that to be sure of a crop they must prepare a portion of their land the year before the crop is grown, and apart from the value of the stored moisture, there is the inestimable advantage of keeping weeds from over-running the farm.

The true worth of properly prepared fallows has been clearly demonstrated in past years in every grain-growing district of Assiniboia.

The work of preparing land for crop by fallowing is carried on in so many ways in different parts of the Territories, that perhaps a few words on some of the methods employed may be of help to at least some of the new settlers.

It has been observed in Alberta and Saskatchewan that the land to be fallowed is not, as a rule, touched until the weeds are full-grown and in many cases, bearing fully matured seed. It is then ploughed.

By this method, which, no doubt, saves work at the time, the very object of a summer-fallow is defeated. In the first place, moisture is not conserved because the land has been pumped dry by the heavy growth of weeds; and, secondly, instead of using the summer-fallow as a means of eradicating weeds, a foundation is laid for years of labour and expense by the myriads of foul seeds turned under.

The endless fields of yellow-flowered weeds, generally Ball Mustard (*Neslia paniculata*), testify to the indifferent work done in many districts, and while no weed is more easily eradicated by a good system of fallows, there is no weed that is more easily propagated or takes greater advantage of poor work on fallows or of fall or spring cultivation.

As has been pointed out in my previous reports, early and thorough work on fallows is absolutely necessary to success, and I here repeat the methods and results of tests carried on for some years past.

First Method—Ploughed deep (6 to 8 inches) before last of June; surface cultivated during the growing season, and just before or immediately after harvest ploughed 5 or 6 inches deep.

Result.—Too much late growth if season was at all wet; grain late in ripening, and a large crop of weeds if the grain was in any way injured by winds.

Second Method.—Ploughed shallow (3 inches deep) before the last of June; surface cultivated during the growing season, and ploughed shallow (3 to 4 inches deep) in the autumn.

Result.—Poor crop in a dry year; medium crop in a wet year. Not sufficiently stirred to enable soil to retain the moisture.

Third Method.—Ploughed shallow (3 inches) before the last of June; surface cultivated during the growing season, and ploughed deep (7 to 8 inches) in the autumn.

Result.—Soil too loose and does not retain moisture. Crop light and weedy in a a dry year.

Fourth Method.—Ploughed deep (7 to 8 inches) before the last of June; surface cultivated during the growing season.

Result.—Sufficient moisture conserved for a dry year, and not too much for a wet one. Few or no weeds, as all the seeds near the surface have germinated and been killed. Surface soil apt to blow more readily than when either of the other methods is followed. For the past fourteen years, the best, safest and cleanest grain has been grown on fallow worked in this way, and the method is therefore recommended.

Fallows that have been ploughed for the first time after the first of July, and especially after July 15, have never given good results; and the plan too frequently followed of waiting till weeds are full grown, and often ripe, and ploughing under with the idea of enriching the soil, is a method that cannot be too earnestly advised against.

In the first place, after the rains are over in June or early in July, as they usually are, no amount of work, whether deep or shallow ploughing, or surface cultivation, can put moisture in the soil. The rain must fall on the first ploughing and be conserved by surface cultivation.

Weeds, when allowed to attain their full growth, take from the soil all the moisture put there by the June rains, and ploughing under weeds with their seeds ripe or nearly so, is adding a thousand-fold to the myriads already in the soil, and does not materially enrich the land.

BREAKING AND BACK-SETTING.

In view of the fact that every year brings to the Territories, many new settlers, who are unacquainted with the methods of breaking up and preparing new land for crop, a few suggestions with regard to this very important work may not be amiss.

In all sections where the sod is thick and tough, breaking and back-setting should be done; while in districts where scrub abounds and the sod is thin, deep breaking is all that is necessary.

The former is generally applicable to Assiniboia, and the latter to Alberta and Saskatchewan, especially to the northern parts of these Territories where the land is more or less scrubby.

SHALLOW BREAKING.

(To be back-set).

The sod should be turned over as thin as possible, and for this purpose a walking plough with a 12 or 14 inch share, is the best. When the breaking is completed (which should not be latter than the second week in July), rolling will hasten the rotting process and permit back-setting to commence early in August.

BACK-SETTING.

Back-setting is merely turning the sod back to its original place, and at the same time bringing up two or three inches of fresh soil to cover it. The ploughing should be done in the same direction as the breaking and the same width of furrow turned. Two inches below the breaking is considered deep enough but three or four inches will give better results.

After back-setting, the soil cannot be made too fine and the use of disc or Randall harrow to cut up every piece of unrotted sod, will complete the work.

DEEP BREAKING.

Deep breaking, which in many sections of the country is the only practicable way of preparing new land, and which is, unfortunately, done in some instances where breaking and back-setting would give more satisfactory results, consists in the turning over of the sod as deep as possible; usually from 4 to 5 inches.

When the sod has rotted, the top-soil should be worked and made as fine as possible. The use of harrow or disc will fill up all irregularities on the surface, and make a fine, even seed bed.

Whether the land is broken shallow or deep, it is necessary to have the work completed early, so as to take advantage of the rains which usually come during June or

early in July. These rains cause the sod to rot, and without them or if the ploughing is done after they are over, the sod remains in the same condition as when turned, and no amount of work will make up for the loss.

To some districts near the foot-hills of the mountains and in districts where scrub abounds, and the sod is thin, these remarks may not apply, but, as a rule, throughout the Territories, early breaking, whether deep or shallow is advisable.

WORKING LAND AFTER FIRST CROP.

Inquiries are often made as to what should be done after taking off the first crop on new land, the question being as to whether the land should be ploughed, or cultivated, or sown without any cultivation whatever.

This, however, can only be determined by circumstances. In districts with heavy clay soil, a satisfactory crop may be expected from burning the stubble of the former crop and sowing with or without cultivation; although a shallow cultivation after the stubble is burnt usually gives the best results.

In districts with light soils and especially with gravelly subsoil, cultivation before seeding is necessary.

After taking the second crop from breaking or back-setting, there can be no doubt that the land should be well fallowed to put it in proper condition for succeeding crops. If the fallow is well made and the process is repeated every third year, the settler will have started on the right road to future success.

CATTLE.

The herd on the farm at present consists of 15 short-horn females and 2 males, and 1 male each of the Guernsey and Ayrshire breeds. There are also 17 grades.

During the past year 4 short-horn males have been sold to farmers or ranchers in the Territories for breeding purposes.

FEEDING TEST.

Fifteen 3-year old steers were purchased from ranchers on November 20, 1901, and fed for 48 days on a uniform ration preparatory to a 16 weeks' comparative test of Brome hay, Western rye grass and cut straw as fodders.

From November 20 to December 10, each animal received per day—18 lbs. cut straw (wheat), 16 lbs. ensilage (corn), 4 lbs. meal (1 part wheat to 3 parts barley).

On December 10, the 15 head were divided into three lots of approximately equal weight and fed for 28 days on a uniform ration consisting of 14 lbs. cut straw, 16 lbs. ensilage, 5 lbs. meal, 12 lbs. mangels.

The test commenced on January 9, 1902, and the three lots were fed as follows:—4 weeks, January 9 to February 6. Each animal per day.

Lot No. 1.—Fourteen lbs. Western rye grass hay, 16 lbs. ensilage, 6 lbs. meal, $\frac{1}{4}$ lb. ground linseed.

Lot No. 2.—Fourteen lbs. cut straw, 16 lbs. ensilage, 6 lbs. meal, $\frac{1}{4}$ lb. ground linseed.

Lot. No. 3.—Fourteen lbs. Brome-grass hay, 16 lbs. ensilage, 6 lbs. meal, $\frac{1}{4}$ lb. ground linseed.

Four weeks, February 7 to March 5, same ration, with the exception of meal, which was increased to 8 lbs. daily.

Four weeks, March 6 to April 2, same ration, with the exception of meal, which was increased to 10 lbs. daily.

Four weeks, April 3 to April 30, same ration, with the exception of meal, which was increased to 12 lbs. daily, and linseed increased to $\frac{1}{2}$ lb. daily.

From the completion of the test until the steers were sold on May 9 (nine days), the same ration was fed as during the last four weeks of the test.

The steers were fed three times daily and watered twice, and were sold for export on May 9.

Following will be found a statement of the monthly and total weights and gains of each lot of steers during the period of test; weights and gains made by the total number during the whole period (November 20 to May 9); the total amount and estimated value of the feed consumed during the same time; and a summary of the financial results of the transaction.

MONTHLY and total weights and gains of each lot of steers during the period of test.

Lot.	Weight at start of test.	1st 4 weeks.		2nd 4 weeks.		3rd 4 weeks.		4th 4 weeks.		Total Gain.
		Weight.	Gain.	Weight.	Gain.	Weight.	Gain.	Weight.	Gain.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Lot No. 1.....	5,630	5,810	180	6,050	240	6,180	130	6,460	280	830
Lot No. 2.....	5,690	6,000	310	6,190	190	6,570	380	6,730	160	1,040
Lot No. 3.....	5,660	5,860	200	6,070	210	6,370	300	6,570	200	910

TOTAL weight and gain made during the whole period, November 20 to May 9.

Lot.	Weight when Bought, November 20.	Weight when Sold, May 9.	Gain.
	Lbs.	Lbs.	Lbs.
Lot No. 1	5,463	6,610	1,147
Lot No. 2	5,473	6,890	1,417
Lot No. 3	5,454	6,660	1,206
	16,390	*20,160	3,770

*Sold less 5 per cent shrinkage, leaving net weight 19,152 lbs.

TOTAL weight and estimated value of the feed consumed during the whole period, Nov. 20 to May 9. Preparatory feeding, each lot (5 steers), 48 days.

Cut Straw—

18 lbs. per day for 20 days = 1,800 lbs.
14 " " 28 " = 1,960 " } = 3,760 lbs. at $1 per ton ..... $ 1 88

Ensilage—

16 lbs. per day = 3,840 lbs. at $2 per ton 3 84

Meal—

4 lbs. per day for 20 days = 400 lbs.
5 " " 28 " = 700 " } = 1,100 lbs. at 3c 7 33

Mangels—

12 lbs. per day for 28 days = 1,480 lbs. at 10c. per bushel 2 46

Or for the three lots, $46.53. $ 15 51

DURING TEST (112 days).

Lot No. 1.

Western Rye Grass, 7,840 lbs. at $5 per ton	$ 19 60
Ensilage, 8,960 lbs. at $2 per ton	8 96
Meal, 5,040 lbs. at $\frac{2}{3}$c. per lb.	33 60
Ground Linseed, 175 lbs. at 2c. per lb.	3 50
	$65 66

Lot No. 2.

Cut Straw, 7,840 lbs. at $1 per ton	$ 3 92
Ensilage, 8, 960 lbs. at $2 per ton	8 96
Meal, 5,040 lbs. at $\frac{2}{3}$c. per lb.	33 60
Ground Linseed, 175 lbs. at 2c. per lb.	3 50
	$49 98

Lot No. 3.

Brome Hay, 7,840 lbs. at $5.00 per ton	$19 60
Ensilage, 8,960 lbs. at $2.00 per ton	8 96
Meal, 5,040 lbs at $\frac{2}{3}$c. per lb	33 60
Ground Linseed, 175 lbs. at 2c. per lb	3 50
	$65 66

FROM END OF TEST TO DATE OF SALE (9 days).

Lot No. 1.

Western Rye Grass, 630 lbs. at $5.00 per ton	$1 57
Ensilage, 720 lbs. at $2.00 per ton	72
Meal, 540 lbs. at $\frac{2}{3}$c. per lb.	3 60
Ground Linseed, 22½ lbs. at 2c. per lb.	45
	$6 34

Lot No. 2.

Cut-straw, 630 lbs. at $1.00 per ton	$ 32
Ensilage, 720 lbs. at $2.00 per ton	72
Meal, 540 lbs. at $\frac{2}{3}$c. per lb.	3 60
Ground Linseed, 22½ lbs. at 2c. per lb.	45
	$5 09

Lot No. 3.

Brome Hay, 630 lbs. at $5.00 per ton	$1 57
Ensilage, 720 lbs. at $2.00 per ton	72
Meal, 540 lbs. at $\frac{2}{3}$c. per lb.	3 60
Ground Linseed, 22½ lbs. at 2c. per lb.	45
	$6 34

SUMMARY OF COST OF FEEDING.

Lot No. 1.

Preparatory	$15 51
During test	65 66
From end of test till sold	6 34
	$87 51

Lot No. 2.

Preparatory	$15 51
During test	49 98
From end of test till sold	5 09
	$70 58

Lot No. 3.

Preparatory	$15 51
During test	65 66
From end of test till sold	6 34
	$87 51

SUMMARY of the Financial results of the Transaction.

Lot No.	Weight bought.	At	Amount paid.	Add Cost of Feed.	Total Cost.	Weight sold.	At	Amount received.	Gain on each Lot	Gain per Head.
	Lbs.	$ cts.	$ cts.	$ cts.	$ cts.	Lbs.	cts.	$ cts.	$ cts.	$ cts.
No. 1.....	5,463	3 11¾	170 35	87 51	257 86	6,280	5	314 00	56 14	11 23
No. 2.....	5,473	3 11¾	170 66	70 58	241 24	6,546	5	327 30	86 06	17 21
No. 3.....	5,454	3 11¾	170 06	87 51	257 57	6,326	5	316 30	58 73	11 74
	16,390	.. ..	511 07	245 60	756 57	19,152	. ...	957 60	200 93	*

* Or an average net gain of $13.39 per head.

SWINE.

Three breeds, Tamworth, Berkshire and Yorkshire White are kept on the farm. Since last report, 8 Berkshire boars and 6 sows; 3 Tamworth boars and 9 sows, and 1 Yorkshire White boar, have been sold to farmers for breeding purposes.

POULTRY.

There are at present, three breeds kept, viz., Light Brahmas, White Wyandottes and Black Minorcas. The Light Brahmas were received last spring from the Experimental Farm at Brandon, Man., and have done well.

HORSES.

No change has taken place in the working force since my last report, and the health of the horses has been uniformly good throughout the year.

EXHIBITIONS.

An exhibit of the products of the farm was made at the Central Assiniboia Agricultural Society's Exhibition at Indian Head; and samples of fruits and vegetables were taken to the Western Horticultural Society's Exhibition in Winnipeg.

A large collection of grain in straw and threshed grain was shipped to Japan for the use of the Exhibition Department of Canada, at the exhibition to be held at Osaka, Japan, in 1903. An exhibit for the St. Louis, Mo., World's Fair, in 1904, is now in preparation.

DISTRIBUTION OF SAMPLES.

During the months of March April and May, the following distribution of samples of the products of the farm was made to applicants throughout the territories of Alberta, Assiniboia and Saskatchewan.

GRAIN.

Wheat	265	bags,	3 lbs. each.
Oats	380	"	
Barley	264	"	
Peas	230	"	
Sundries	111	"	
Potatoes	725	"	
Tree seeds. Maple	756	"	1 lb. each.
Ash	520	"	
Grass seed. Brome	659	"	
Western Rye	400	"	
Small seeds	464	packages, containing 5,568 pkts. shrub-seed, flower-seed, root-seeds, garden-seeds and corn.	
Fruit bushes	163	packages.	
Tree and shrub seedlings	452	"	
Rhubarb	51	"	

CORRESPONDENCE.

During the 12 months ending October 31, 1902, 5,210 letters were received, and 5,357 mailed from this office. In letters received, circular reports on grain and other samples, are not counted; and in letters mailed, circulars of instruction sent with grain and other samples are not included.

METEOROLOGICAL.

Month.	Temperature. Maximum.		Temperature. Minimum.		Snow-fall.	Rain-fall.		Hours of Sunshine.
	Date.	Degrees	Date.	Degrees	Inches.	No. of days.	Inches.	
1901.								
November	28	52	4	—4				81.2
December	29	43	14	—34	5			56—
1902.								
January	6	40	26	—35				106·8
February	20	39	4	—30	14			74·2
March	23	40	17	—24	9	2	·45	77·2
April	30	67	1	5	8	1	·07	174·9
May	28	83	9	27	3	7	3·57	191·
June	8	79	4	34		8	4·96	167·6
July	22	87	7	36		1	·67	248·
August	15	90	30	35		2	·59	258·
September	23	77	30	21		2	·42	143·3
October	4	76	20	10				138·4
					39	23	10·73	1,716 6

I have the honour to be, sir,

Your obedient servant,

ANGUS MACKAY,

Superintendent.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

REPORT OF THOMAS A. SHARPE, SUPERINTENDENT.

AGASSIZ, B.C., November 30, 1902.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to present my report of the work done and progress made on the Experimental Farm at Agassiz, B.C., for the year 1902. The season has been a favourable one and crops of all sorts have been good and the weather suitable for securing them in good condition. The winter was mild, the lowest temperature registered being five above zero, and that only for one day. February and March were very mild and the snowfall for the whole winter very light. The spring was not so favourable, being cold and wet up to the last of May when it became warmer, when growth was more rapid and the haying season was favourable. Fine bright weather with occasional showers continued through August and September which was excellent for harvest as well as favourable to a rapid growth in corn and root crops. October was mild with an average rainfall and November, in addition to a heavy rainfall, gave us early in the month the heaviest snowfall at any one time for several years, which however soon melted away.

FRUIT CROP.

The fruit crop especially that of the larger fruits has been fairly good and the bright autumn ripened the fruit well.

HEDGES.

The sample hedges continue to make a fine growth and are one of the most attractive features on the farm.

FOREST AND TIMBER PLANTATIONS.

The forest trees planted in the shelter belt continue to make a vigorous growth. The photograph shown in this report shows a portion of the forest belt. The land having been seeded to clover some years since costs nothing to keep it clean, the trees being able to take care of themselves.

ORNAMENTAL TREES AND SHRUBS.

These continue to thrive vigorously and bloom profusely and are very much admired. Their vigorous growth and handsome appearance has induced many people to plant such shrubs and trees in many places.

NUT TREES.

The heart shaped walnut and Spanish and Japanese nut trees gave a full crop this year, and the English and American walnuts gave a few nuts each. The butternut, hardshell hickory and pecan trees have grown vigorously but have not yet fruited. The accompanying photograph shows some of the Japan walnut and hickory trees in this plantation.

DITCHING.

The deep cuts spoken of in my last report as having to be boxed are in some places completed and the land levelled up and ploughed. More of this work will be done as opportunity offers and the ditches extended.

CLEARING.

About 8 acres of the land cleared last year have been ploughed and if the winter is favourable about 15 acres more will be broken and got in order for a crop before next spring. An additional 10 acres have been cleared of brush and timber.

LIVE STOCK.

Since my last report, 4 shorthorn cows, a grade cow and a young bull have been sold, also 1 grade steer sold for beef. The stock now on hand are all pure bred except one grade steer. Seven pure bred cows, 1 bull, 3 heifer calves and 4 bull calves constitute the herd at present.

SHEEP.

Since my last report several young rams have been sold as breeders and a fine ram has been added to our flock to succeed the one imported last year. Eleven ewes, 2 stud rams and 2 ram lambs constitute the stock of Dorset horned sheep at present (see photograph).

PIGS.

The stock consists of 1 Berkshire boar, 1 sow and 5 small pigs, also one Tamworth sow and a large Yorkshire boar recently received from the Central Experimental Farm at Ottawa.

HORSES.

The horses having been in service since 1889, are now getting old, and as the area of land under cultivation has become rather large, much of it being in orchard and on that account requiring cultivation, it was thought necessary to increase the number somewhat, especially as one of the heaviest horses had become so helpless in his legs that he was unable to work and had to be destroyed. A very good team of young horses has been secured which promise to be very useful.

BEES.

The 4 swarms carried into winter last season have increased to 7 strong swarms this year. These are well supplied with honey to carry them through the winter.

FOWLS.

There are at present 5 breeds of poultry here. Light Brahmas, White Wyandottes, Silver-laced Wyandottes, Black Minorcas and Barred Plymouth Rocks. The Rocks are perhaps the most generally useful of those, which have been tested. The incubator was only run twice last season and out of 182 fertile eggs, 120 strong healthy chicks hatched. The Plymouth rocks are the hardiest and healthiest chicks and grow rapidly. The Minorcas are healthy, but as they feather very quickly they are a little tender until they are about half grown. The Rocks and Minorcas are very satisfactory layers.

EXPERIMENTS WITH OATS.

Sixty-four varieties of oats were under trial in 1902. They were all sown on April 21, on plots of one-fortieth of an acre each at the rate of $2\frac{1}{2}$ bushels per acre. The soil was a sandy loam which has not yet been entirely cleared of the roots of the bracken or fern which is so troublesome as a weed in this country. The fern stalks were heavy and juicy and as they could not be separated from the straw in harvesting the weight of the straw which was thus very much increased, is not given, as it would be misleading. The yield of grain has been very satisfactory and there was no rust or smut on any of the plots.

OATS.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Straw.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
				In.	In.		Bush.	Lbs.	Lbs.
Golden Giant	Aug. 13..	114	Stiff	44	8	Sided	77	22	35½
Waverley	" 14..	115	"	46	10	Branching	75	30	36
Hazlett's Seizure	" 13..	114	Medium	40	8	"	74	4	36½
Golden Tartarian	" 15..	116	Stiff	42	12	Sided	73	18	36
Tartar King	" 9..	110	"	46	10	Branching	72	32	35
Columbus	" 12..	113	"	43	9	"	72	32	35½
Black Beauty	" 8..	109	"	48	11	"	72	22	36½
Master	" 13..	114	"	40	10	"	72	12	35½
Holland	" 12..	113	"	50	10	"	72	2	34½
Danish Island	" 12..	113	"	46	10	"	71	16	34
Early Gothland	" 14..	115	"	38	10	"	71	6	35
Banner	" 13..	114	"	44	11	"	70	30	35½
Pioneer	" 9..	110	Medium	40	10	"	70	20	34
Early Maine	" 11..	112	Stiff	42	10	"	70		35
Lincoln	" 11..	112	"	50	10	"	69	14	35
Oxford	" 9..	110	Medium	40	10	"	69	14	36
Cream Egyptian	" 14..	115	Stiff	44	10	"	68	28	34
Golden Beauty	" 14..	115	Medium	50	10	"	67	6	34
White Schonen	" 11..	112	Stiff	42	9	"	66	20	34½
Kendal	" 11..	112	Medium	40	9	Sided	66	10	34
California Prolific Black	" 12..	113	"	48	9	"	66	10	35
Improved Ligowo	" 12..	113	Stiff	48	10	Branching	65	30	35
Goldfinder	" 14..	115	"	42	10	Sided	65	10	34½
Bonanza	" 12..	113	"	44	10	Branching	65		34
Rosedale	" 13..	114	Medium	42	8	Sided	65		34½
New Zealand	" 22..	123	"	42	9	"	64	24	34
Joanette	" 19..	120	"	40	10	Branching	64	24	34½
Siberian	" 15..	116	"	42	10	"	64	4	35
Black Tartarian	" 11..	112	"	48	10	Sided	63	28	34
Buckbee's Illinois	" 13..	114	Stiff	42	10	Branching	63	18	34½
Brandon	" 12..	113	"	38	9	Sided	62	32	34
American Beauty	" 15..	116	"	44	11	Branching	62	22	34
Mennonite	" 9..	110	Medium	42	10	"	62	12	34
Early Archangel	" 12..	113	"	42	10	"	62	12	34
Early Blossom	" 12..	113	Stiff	42	10	Sided	62	12	35
Twentieth Century	" 11..	112	Medium	44	11	Branching	61	26	34½
Abyssinia	" 12..	113	Stiff	43	10	"	61	26	35
White Giant	" 12..	113	"	44	8	Sided	61	16	34
Holstein Prolific	" 11..	112	"	40	9	Branching	61	16	35
Milford	" 12..	113	Medium	34	8	Sided	61	6	34
Newmarket	" 15..	116	"	38	8	Branching	60	30	34
Scotch Potato	" 14..	115	Stiff	40	10	"	60	30	35
Abundance	" 14..	115	Medium	42	9	"	60	10	34½
Early Golden Prolific	" 14..	115	"	38	9	"	60	10	33
Flying Scotchman	" 9..	110	Stiff	42	10	"	59	14	34½
Thousand Dollar	" 12..	113	"	44	10	"	59	14	34
Cromwell	" 14..	115	"	42	9	"	59	4	34
Miller	" 11..	112	Weak	38	8	"	59	4	33
Black Mesdag	" 8..	109	Medium	48	10	"	58	28	34
Oderbruck	" 14..	115	Stiff	42	11	Sided	58	18	34
White Russian	" 12..	113	"	43	10	Branching	58	18	34½
King	" 12..	113	Medium	40	10	"	57	32	34½
Olive	" 12..	113	Stiff	42	8	Sided	57	22	34
Bavarian	" 14..	115	"	42	10	Branching	56	16	34
Longhoughton	" 14..	115	"	40	10	"	56	16	34
Sensation	" 11..	112	"	42	9	"	55	10	34
Salines	" 9..	110	Medium	44	8	"	55	10	34
American Triumph	" 14..	115	Stiff	48	9	"	55		34½
Wallis	" 13..	114	Medium	46	8	"	54	14	34
Improved American	" 12..	113	Stiff	44	9	"	54	14	34
Russell	" 11..	112	"	42	10	"	52	2	34
Pense	" 11..	112	"	48	8	Sided	50	6	34½
Wide Awake	" 12..	113	Weak	40	9	Branching	48	8	33
Salzer's Big Four	" 13..	114	Medium	43	9	"	47	12	32

EXPERIMENTS WITH BARLEY.

Fifty-one varieties of barley were under trial in 1902. Twenty-one of these were two-rowed sorts and thirty six-rowed. They were all sown at the rate of two bushels per acre on April 19 on plots of one-fortieth acre each. The land was adjoining that on which the oats were sown and was of similar character. This crop was also troubled with a considerable quantity of fern growth, hence the yield of straw is not given. The Barleys were all free from rust and smut.

BARLEY, TWO-ROWED.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.	Weight per Bushel.
			In.		In.	Bush. Lbs.	Lbs.
Dunham	Aug. 13..	116	42	Stiff & bright.	3	52 44	49
Invincible	" 8..	111	40	"	2½	48 26	49½
Kinver Chevalier	" 11..	117	42	Weak	3½	48 16	48¾
Canadian Thorpe	" 9..	112	46	Stiff & bright.	2½	46 32	49
Prize Prolific	" 9..	112	38	Medium	3½	43 16	48
Harvey	" 8..	111	42	Stiff & bright.	4	40 30	48½
Newton	" 9..	112	40	"	3	40 20	48¾
Sidney	" 13..	116	41	Medium	3½	39 8	49
Gordon	" 8..	111	42	Stiff & bright.	2½	38 6	48½
Standwell	" 12..	115	40	Medium	3	37 44	49½
Danish Chevalier	" 13..	116	38	Weak	3	37 24	48
Nepean	" 12..	115	42	Stiff & bright.	3½	36 32	48¾
Clifford	" 8..	111	44	"	3½	36 2	48½
Leslie	" 13..	116	40	"	2½	35 20	48
Jarvis	" 8..	111	44	"	3¼	33 36	48¾
French Chevalier	" 15..	117	28	Weak	3½	33 16	48
Beaver	" 11..	114	36	"	3¼	33 6	49
Victor	" 9..	112	41	Medium	3	31 4	48
Fulton	" 9..	112	40	"	2½	30 ..	48
Bolton	" 6..	109	41	"	2½	29 28	48
Logan	" 9..	112	40	Weak	3½	25 10	47¾

BARLEY, SIX-ROWED.—TEST OF VARIETIES.

Summit	Aug. 6..	109	42	Medium	3	55 ..	49¾
Rennie's Improved	" 4..	107	48	Stiff & bright.	3	52 24	49½
Oderbruch	" 4..	107	44	"	2½	50 40	49
Surprise	" 6..	109	44	Medium	3	50 40	49
Yale	" 5..	108	36	Stiff & bright.	2	40 10	49
Nugent	" 8..	111	44	"	3	40	48½
Pioneer	" 4..	107	33	Weak	2	39 38	48
Royal	" 4..	107	42	Stiff & bright.	2½	39 28	49
Vanguard	" 6..	109	38	"	2	39 18	48
Claude	" 6..	109	36	Medium	2	39 8	48½
Hulless White	" 9..	112	36	Weak	2	39 8	60
Mansfield	" 6..	109	40	Stiff & bright.	2	38 46	50
Mensury	" 6..	109	42	"	2½	38 36	49¼
Odessa	" 4..	107	40	"	2½	38 16	49
Champion	" 2..	105	48	Medium	4	38 6	49¼
Garfield	" 6..	109	40	"	3	37 44	48
Brome	" 8..	111	42	Stiff & bright.	3½	37 34	48½
Albert	" 4..	107	40	Medium	2	37 24	48
Stella	" 9..	112	36	Weak	2	37 4	48
Hulless Black	" 6..	109	34	Medium	1½	36 32	58
Trooper	" 9..	112	31	Weak	2½	36 22	48½
Phœnix	" 4..	107	42	Medium	2½	35 40	49½
Baxter	" 4..	107	40	"	2	35 30	49
Petschora	" 4..	107	38	Stiff & bright.	3	35 10	48½
Excelsior	" 2..	105	46	Medium	3½	35	49
Success	" 2..	105	42	"	3½	34 18	48
Argyle	" 6..	109	40	Stiff & bright.	3	34 8	48
Blue Longhead	" 8..	111	30	Weak	2½	32 44	47¾
Empire	" 6..	109	38	Stiff & bright.	3	32 34	48½
Common	" 4..	107	33	Medium	2	30 20	48

EXPERIMENTS WITH SPRING WHEAT.

Seventy-one varieties of spring wheat were under trial all sown on plots of one-fortieth of an acre each. The land devoted to these plots was adjoining that on which the oats and barley were grown and was of similar character. The straw at harvest time was mixed in this case also with a considerable quantity of fern and on this account the weight of straw has been omitted. These plots were all sown on April 18, using grain in the proportion of 1½ bushels per acre. There was no rust or smut on any of the varieties.

SPRING WHEAT.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Character of Straw.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
				Inches.	Inches.		Bush.	Lbs.	Lbs.
Rio Grande	Aug. 19	123	Stiff & bright	46	3½	Bearded..	59	15	60
Colorado	" 15	119	" " ..	42	4	" ..	57	30	60
Ladoga	" 11	115	" " ..	44	4	" ..	57		60
Minnesota, No. 181	" 19	123	" " ..	46	3½	Beardless.	56	30	60½
Progress	" 15	119	Medium....	44	3½	" .	52		61
Campbell's White Chaff	" 16	120	Stiff & bright	40	3½	" .	51		60½
Minnesota, No. 149	" 20	124	" " ..	40	3	" .	50	30	61
Dawn	" 11	115	" " ..	46	3	" .	50		61
Captor	" 11	115	" " ..	44	3½	" .	49	30	60½
Early Riga	" 9	113	Weak	40	3	" .	49	15	60
Clyde	" 18	122	Medium....	40	3	" .	49		60
Red Swedish	" 20	124	Stiff & bright	46	3½	Bearded..	48	45	61
Australian, No. 27	" 14	118	Medium....	44	3	" ..	48	30	61
Red Fife	" 19	123	Stiff & bright	40	3	Beardless.	48	15	61
Australian, No. 10	" 15	119	" " ..	42	3	" .	48		60
Admiral	" 19	123	" " ..	48	3½	" .	47	30	60½
Plumper	" 19	123	Medium....	42	3	" .	47	15	60
Goose	" 16	120	Stiff & bright	42	3	Bearded..	47		60
Preston	" 11	115	" " ..	44	3½	" ..	46	45	60½
Beaudry	" 16	120	" " ..	42	3½	" ..	46	15	61
Bleuheim	" 16	120	" " ..	46	3	" ..	46		60½
Essex	" 20	124	Medium....	46	4	Beardless.	45	45	60
Monarch	" 15	119	Stiff & bright	42	3	" .	45	30	60
Laurel	" 16	120	Medium....	46	3	" .	45	30	61
White Fife	" 18	122	Weak	42	3	" .	45	15	60
Stanley	" 12	116	Stiff & bright	46	3½	" .	45		60½
Advance	" 11	115	" " ..	46	3	Bearded..	44	45	60
Benton	" 20	124	Weak	44	4	Beardless.	44	30	60
Crown	" 12	116	Stiff & bright	46	3	Bearded..	44	15	60
White Russian	" 19	123	Medium. .	42	3	Beardless.	44		60
Herrison Bearded	" 16	120	Stiff & bright	42	3½	Bearded..	43	45	60
Chester	" 18	122	Medium....	42	3½	Beardless.	43	30	60
Blair	" 16	120	"	38	3½	" .	43		50
Minnesota, No. 163	" 18	122	Weak	36	3½	" .	42	30	60
Rideau	" 18	122	"	42	2½	Bearded..	41	45	60
Roumanian	" 20	124	Stiff & bright	40	2½	" ..	41	30	60½
Australian, No. 19	" 18	122	" " ..	48	3	Beardless.	41	15	61
Fraser	" 11	115	Medium....	40	3	Bearded..	41	15	60
Dufferin	" 11	115	Stiff & bright	40	3	" ..	41		60½
Angus	" 19	123	Weak	44	4	Beardless.	40	45	60
Australian, No. 23	" 18	122	Stiff & bright	50	5	" .	40	30	60
Hastings	" 11	115	Weak	42	3½	" .	40	15	60
Australian, No. 25	" 18	122	"	44	4	Bearded..	40		60
Hungarian	" 18	122	Stiff & bright	46	3½	" .	40		61
Percy	" 16	120	" " ..	44	3	Beardless.	39	45	60
White Connell	" 15	119	Weak	38	2½	" .	39	30	60
Bishop	" 11	115	"	40	3	" .	39	15	60

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Straw.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
				In.	In.		Bush.	Lbs.	Lbs.
Vernon	Aug. 12	116	Medium	42	3½	Bearded	39		60
Byron	" 12	116	"	36	3	"	38	45	60
Minnesota, No. 169	" 18	122	Stiff & bright	48	3½	Beardless.	38	30	60½
Mason	" 20	124	Weak	40	2½	"	38	15	60
Pringle's Champlain	" 20	124	Stiff & bright	40	3	Bearded	38		60
Beauty	" 19	123	" "	44	3½	Beardless.	37	45	60
Red Fern	" 18	122	" "	40	3½	Bearded	37	45	60
Crawford	" 11	115	Weak	40	2⅔	"	37	30	60
Robin's Rust Proof	" 20	124	Medium	40	3½	Beardless.	37	15	60
Speltz	" 20	124	Weak	40	2	Bearded	37		59
Australian, No. 9	" 19	123	Stiff & bright	41	3	Beardless.	37		60
Harold	" 9	113	Medium	40	3½	Bearded	36	45	60
Dion's	" 16	120	Stiff & bright	42	3½	"	36	30	60
Countess	" 18	122	Weak	42	2½	Beardless.	36	15	60½
Cartier	" 15	119	Medium	40	3	Bearded	36		61
Cassel	" 14	118	"	48	3½	Beardless.	35	45	60
Huron	" 12	116	Stiff & bright	40	3	Bearded	35	30	60
Alpha	" 15	119	Medium	44	3½	Beardless.	35	15	60½
Wellman's Fife	" 15	119	Stiff & bright	44	3	"	35		61
Ebert	" 11	115	Weak	38	3	"	34	30	60
Australian, No. 13	" 18	122	Medium	43	2½	"	33		60
Weldon	" 15	119	"	42	3	"	32		60
Norval	" 11	115	Stiff & bright	42	3	Bearded	31		60
Japanese	" 11	115	Medium	36	2½	"	30		60

PEASE.

Fifty-seven varieties of field pease were sown April 22 in plots of one-fortieth of an acre. They were sown in one of the apple orchards and a strip of six feet on each side of the rows of trees was left, yet the shade cast by the trees retarded ripening and made curing the crop very difficult. The vines made a vigorous growth and blossomed profusely, but the late bloom did not fill well. The soil was a light loam and had a crop of clover turned under in spring and was thoroughly disked and harrowed before the seed was sown. There was no mildew on the vines, and as we had no insect pests, the sample of grain is a good one.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				Inches.	Lbs.	Inches.		Bush.	Lbs.	Lbs.
Prince	Aug. 15	115	Strong	40	6,680	2½	Large	45	20	62½
Large White Marrow fat	" 15	115	"	48	6,480	2½	"	43	..	62
White Wonder	" 15	115	"	60	6,400	2½	Medium	42	30	62½
Agnes	" 11	111	Medium	60	5,280	3	"	41	40	61
Golden Vine	" 15	115	Strong	60	6,400	2½	Small	41	20	62
Mummy	" 20	120	"	45	5,520	2½	Medium	40	30	61½
Mackay	" 19	119	"	56	5,600	2½	"	40	10	61
Trilby	" 14	114	"	60	5,200	2½	"	39	30	62
Nelson	" 11	111	Medium	60	5,280	3	"	39	10	61
Centennial	" 18	118	Strong	50	5,000	2	"	38	50	60½
Prince Albert	" 16	116	Medium	50	5,600	2½	Small	38	40	62½
Harrison's Glory	" 13	113	Strong	70	4,800	3½	Large	38	30	61½
Pearl	" 18	118	"	78	4,640	2½	"	38	20	60½
Pride	" 14	114	"	56	6,200	2	"	38	10	61½
King	" 18	118	"	54	5,600	3	"	38	..	61
Arthur	" 13	113	"	48	4,720	2	"	37	50	61
Fenton	" 14	114	Medium	46	5,200	2½	"	37	40	60
Bedford	" 26	126	"	58	5,440	2	Medium	37	30	61
Picton	" 16	116	Strong	52	6,080	2½	"	37	20	61½
Cooper	" 14	114	Medium	52	5,000	3	Large	37	10	62
Prussian Blue	" 15	115	"	50	4,800	2½	Medium	36	30	62½
Paragon	" 19	119	Strong	60	4,080	2½	"	36	..	61
Bruce	" 20	120	"	50	4,640	2½	Large	35	40	60
Kent	" 18	118	"	52	4,480	2½	"	35	30	60
Alma	" 14	114	"	56	5,740	3	"	35	20	60½
Multiplier	" 15	115	"	54	5,680	2	Small	35	20	61½
Canadian Beauty	" 19	119	"	56	5,250	2½	Large	35	10	62
Bright	" 14	114	"	48	5,120	2½	"	35	..	61
Black-eyed Marrow-fat	" 14	114	"	54	5,200	3	"	34	40	60
Creeper	" 12	112	"	63	4,960	3	Small	34	30	61
Vincent	" 16	116	"	60	4,320	2½	Large	33	40	60
Victoria	" 21	121	Medium	52	5,040	3	Medium	33	20	60½
Early Britain	" 13	113	Strong	53	4,400	3	Large	33	10	61
Lanark	" 14	114	"	44	5,520	2½	"	33	..	60
Macoun	" 21	121	Medium	52	5,520	2	"	32	50	60½
Gregory	" 14	114	Strong	54	4,800	2½	Medium	32	40	61
Fergus	" 18	118	"	48	4,560	2½	"	32	30	60
New Potter	" 14	114	"	72	4,800	3	Large	32	..	60
Crown	" 19	119	"	52	4,480	2½	Small	31	40	60½
Elephant Blue	" 15	115	"	54	5,120	2½	Large	31	..	61
Oddfellow	" 18	118	Medium	44	4,600	3	Medium	30	50	61½
Perth	" 14	114	Strong	48	4,640	2½	"	30	40	60
Archer	" 21	121	"	50	4,200	2½	Medium	30	..	61
Duke	" 25	125	"	60	4,720	2½	Large	29	40	60
English Gray	" 14	114	"	56	5,740	3	"	29	30	60
Herald	" 25	125	"	52	5,403	2½	"	29	20	60
Chancellor	" 18	118	"	54	5,080	3	Medium	29	10	61
Elliot	" 18	118	"	62	4,000	2½	"	29	..	60
Chelsea	" 26	126	"	46	4,800	3	"	28	40	60½
Daniel O'Rourke	" 11	111	"	56	4,080	2	Small	28	..	62
Dover	" 14	114	"	72	5,200	3	Large	27	40	60
German White	" 11	111	"	50	4,080	2½	Medium	27	20	60
Wisconsin Blue	" 21	121	"	64	4,320	2½	Small	27	..	62½
Elder	" 19	119	Medium	52	4,240	2½	Medium	24	40	60
French Canner	" 16	116	Strong	60	4,120	2½	"	24	20	60
Carleton	" 22	122	"	72	4,240	2½	"	22	10	60
Grass Pea	Sept. 5	136	Poor	30	4,000	1¼	Small	19	30	60

TEST OF FERTILIZERS ON OATS.

Six plots of one-fortieth of an acre each, were included in this trial. The soil was the same as for the other oat plots.

Plot. 1.—Received 100 lbs. nitrate of soda, 50 lbs. per acre, sown broadcast when the plants were well above ground, and the other 50 lbs. when the plants were about 6 inches high.

Plot 2.—Two hundred lbs. nitrate of soda, one-half sown as soon as the plants were well up, and the other half when they were about 6 inches high.

Plot 3.—Check plot to which no fertilizers were applied.

Plot 4.—Four hundred lbs. superphosphate of lime sown broadcast and lightly harrowed just before the grain was sown.

Plot 5.—Four hundred lbs. muriate of potash sown broadcast and harrowed before the seed was sown.

Plot 6.—Two hundred lbs. superphosphate of lime, 100 lbs. muriate of potash, and 100 lbs. of nitrate of soda. One-half of this mixture was sown before the seed was put in, and the other half when the plants were about 2 inches high.

The straw on the check plot was weak and soft, also that where nitrate of soda alone was used, and both were badly lodged. There was no rust or smut on any of these plots.

OATS—FERTILIZER TEST.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				Lbs.	Bush.	Lbs.	Lbs.
Banner, Plot 1, 100 lbs. nitrate of soda	May 1..	Aug. 18	109	5,120	74	4	35
" " 2 200 lbs. "	1..	18	109	5,560	79	14	35
" 3, check plot, no fertilizer	1..	18	109	4,160	71	16	35
" " 4, 400 lbs. superphosphate	1..	18	109	5,680	90	..	35
" " 5, 400 lbs. muriate potash	1..	18	109	5,600	86	1	35½
" " 6, 100 lbs. muriate potash							
200 lbs. superphosphate, 100 lbs. nitrate soda	May 1..	Aug. 18	109	5,920	96	16	35½

CORN.

Thirty-six varieties of corn were tested this year. All the test plots were planted May 23, and cut for ensilage on October 10. Most of the land was comparatively new, having only produced two crops since the timber was taken off, and the subsoil being very gravelly, it was very uneven in character on account of the excavations where large fir stumps had been taken out. This land was sown with clover in 1900, and with pease in 1901, May, June and the early part of July was very wet and cold, and the corn was very late, having made but little growth up to July, but when bright, warm weather set in, the growth was rapid, but it was too late for any but the earliest varieties to produce well grown ears. All varieties were tested both in hills and drills. The drills were 36 inches apart and thinned to average six inches apart in the drill. The hills were 36 inches apart each way and thinned to three strong plants in each hill. The yield was calculated in each case from the weight of two rows each 66 feet long.

CORN.—TEST OF VARIETIES.

Name of Variety.	When Tasselled.	In Silk.	Early Milk.	Late Milk.	Condition when Cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
						Tons.	Lbs.	Tons.	Lbs.
Thoroughbred White Flint.	Sept. 6..	Oct. 4	.....	.....	In silk.....	30	1,600	25	1,040
Pride of the North.....	" 1..	Sept. 10	Oct. 6	.....	Early milk..	25	1,480	22	440
Extra Early Huron.....	Aug. 12..	Aug. 28	Sept. 20	.....	Roasting ...	24	1,500	21	1,780
Giant Prolific Ensilage.....	Sept. 1..	Sept. 20	.....	.....	Ears forming	22	1,760	25	660
Salzer's All Gold	" 6..	Oct. 6	.....	.....	In silk.....	22	1,320	26	360
Champion White Pearl.....	" 3..	Sept. 20	Oct. 10	.....	Early milk..	22	880	22	220
Superior Fodder.....	" 1..	" 20	.....	.. ....	Ears formed.	22	660	22	..
Red Cob Ensilage....	Aug. 20..	" 4	Sept. 20	Oct. 10	Late milk...	22	440	21	240
Early Mastodon..... ..	Sept. 6..	Oct. 1	.....	.....	In silk..	22	220	25	1,920
Early Yellow Long Eared..	Aug. 8..	Aug. 20	Sept. 25	Oct. 2	Glazed	22	..	16	1,520
Early Butler	" 24..	Sept. 10	Oct. 4	.....	Early milk.	21	680	17	980
King of the Earliest	Sept. 1..	" 28	.....	.....	Ears formed.	21	460	20	700
Mammoth Cuban.....	Aug. 26..	" 10	Oct. 3	. .....	Early milk..	20	1,600	19	1,820
Wisconsin Earliest Ripe....	" 19..	Aug. 28	Sept. 20	.....	Late milk...	19	1,160	21	1,560
Mammoth 8-rowed Flint...	Sept. 1..	Sept. 20	.....	.....	Early milk..	19	830	19	60
Country Gentleman.....	" 1..	" 28	.....	.....	Ears formed.	18	1,950	16	120
King Philip.....	Aug. 14..	Aug. 28	Sept. 20	Oct. 4	Late milk...	18	1,840	17	1,640
Cloud's Early Yellow.....	" 26..	Sept. 12	Oct. 10	.....	Early milk..	18	1,400	17	1,200
Pearce's Prolific	" 14..	Aug. 24	Sept. 20	Oct. 10	Late milk..	18	1,180	16	1,880
Evergreen Sugar	Sept. 1..	Sept. 20	.....	.....	Ears formed.	18	960	16	1,990
Compton's Early.....	Aug. 18..	Aug. 23	Sept. 18	... . ..	Roasting ear	18	520	16	1,220
Kendall's Early Giant.....	" 18..	" 20	" 6	Oct. 10	Late milk...	17	760	18	960
Early Golden Surprise.....	Sept. 1..	Sept. 20	.... ..	. .. ..	Ears formed.	17	650	20	1,860
North Dakota White	Aug. 24..	" 8	Sept. 30	... ...	Early milk..	17	320	17	1,200
Selected Leaming.....	" 28 ..	" 8	" 28	Oct. 10	Late milk...	17	100	16	1,880
Angel of Midnight.....	" 28..	" 12	Oct. 4	....	Early milk..	16	1,660	17	760
Sanford.....	" 20..	Aug. 28	Sept. 15	Oct. 4	Dough.....	16	780	14	1,700
Canada White Flint.....	" 12..	" 23	" 10	" 1	Nearly glzd.	16	450	18	300
White Cap Yellow Dent....	" 22..	" 30	" 15	Sept. 30	Late milk...	16	230	16	560
Black Mexican.....	" 20..	Sept. 8	" 26	....	Roasting...	16	120	15	1,460
Salzer's Earliest Ripe.....	" 7..	Aug. 18	Aug. 26	Sept. 20	Glazed.....	15	1,900	15	1,240
North Dakota Yellow .. .	" 24..	Sept. 10	Oct. 6	....	Early milk..	15	140	17	100
Longfellow.....	" 28 .	" 13	Sept. 20	.....	Late milk...	14	1,040	14	1,480
Eureka	" 24..	" 18	" 28	.... ..	Early milk..	13	1,500	15	800
Yellow Six Weeks.....	" 8..	Aug. 18	" 21	Sept. 24	Glazed	11	1,760	13	1,280
Mitchell's Extra Early.....	" 11..	" 20	" 4	" 20	"	11	1,650	11	110
Very Early August	Only a few	plants	grew fro	m 10-12	in. high.				

CORN—AT DIFFERENT DISTANCES APART.

Three varieties were used in this test again this year.

The plants in the rows were thinned to six inches apart and to three strong plants in the hills. The conditions of soil and the treatment were the same in every case. The corn in the wide rows was in each instance more matured, the ears larger and better filled and in every way better for ensilage. In each test four rows were planted and the two inside rows were weighed to obtain the yield. The corn was planted May 23 and cut October 10.

CORN.—AT DIFFERENT DISTANCES APART.

Name of Variety.	Distance in Rows.	In Hills.	Condition when cut.	Weight per Acre grown in rows.		Weight per Acre grown in hills.	
	Inches.	Inches.		Tons.	Lbs.	Tons.	Lbs.
Champion White Pearl	21	21	Early milk	28	571	25	537
" "	28	28	"	23	356	19	520
" "	35	35	"	22	1,257	17	1,456
" "	42	42	Late milk	19	1,600	17	1,074
Selected Leaming	21	21	Early milk	28	41	22	1,120
"	28	28	"	25	1,627	25	165
"	35	35	"	18	1,111	18	432
"	42	42	Late milk	18	1,800	15	1,374
Longfellow	21	21	Early milk	19	469	18	205
"	28	28	"	18	139	18	1,429
"	35	35	"	14	965	15	1,168
"	42	42	Late milk	11	73	12	943

TEST OF SUPERPHOSPHATE OF LIME ON INDIAN CORN.

These test plots were on land that had been in clover in 1900 and in pease in 1901, and the superphosphate was applied broadcast alongside of the hills when the corn was three or four inches high.

CORN.—WITH FERTILIZER.

Name of Variety.	Date of Sowing.	Cut.	Weight per Acre grown in rows.	
			Tons.	Lbs.
Longfellow—100 lbs. superphosphate per acre	May 24	Oct. 10	15	1,460
" 150 " "	May 24	Oct. 10	16	450
" 200 " "	May 24	Oct. 10	17	210
" No fertilizer	May 24	Oct. 10	14	920

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties of turnips have been under trial during the past season. Two sowings of each sort were made; the first on May 22, the second on June 5, in rows two feet apart, and all were pulled on October 24.

The soil was sandy loam on which grain had been grown the previous year. After the grain was harvested the land was disc-harrowed, and later a dressing of barn-yard manure was applied and thoroughly worked into the soil. In the spring it was ploughed and harrowed and brought into a good condition of tilth before sowing.

The yield per acre has been calculated from the weight of roots gathered from two rows, each 66 feet long.

TURNIPS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Carter's Elephant	31	40	1,034	..	32	1,670	1,094	30
Jumbo	28	265	937	45	28	1,420	957	..
Hall's Westbury	28	100	935	..	30	720	1,012	..
Skirvings	27	440	924	..	26	140	869	..
Prize Winner	27	120	902	..	28	430	940	30
Marquis of Lorne	26	1,955	899	15	26	470	874	30
Drummond Purple Top	26	1,130	885	30	28	1,090	951	30
Kangaroo	26	800	880	..	25	160	836	..
Champion Purple Top	26	470	874	30	30	70	1,001	10
Emperor Swede	26	140	869	..	28	1,420	957	..
Perfection Swede	25	1,448	858	..	24	840	814	..
Prize Purple Top	25	820	847	..	26	140	869	..
Good Luck	25	160	836	..	28	1,420	957	..
Selected Purple Top	25	160	836	..	27	1,440	924	..
New Century	24	1,500	825	..	30	70	1,001	10
New Arctic	24	840	814	..	26	140	869	..
Monarch	24	675	811	15	20	920	882	..
Magnum Bonum	24	675	811	15	27	120	902	..
Giant King	23	1,850	797	30	23	1,530	792	10
Imperial Swede	23	1,520	792	..	29	740	979	..
Halewood's Bronze Top	23	1,355	789	15	27	1,440	924	..
Elephant's Master	23	860	781	..	26	1,460	891	..
Shamrock Purple Top	22	880	748	..	30	60	1,001	..
Sutton's Champion	21	240	704	..	28	1,090	951	30
East Lothian	20	920	682	..	27	780	913	..
Bangholm Selected	20	590	676	30	26	1,865	897	45
West Norfolk Red Top	20	425	673	45	21	240	704	..
Webb's New Renown	19	160	660	..	16	1,330	555	30
Selected Champion	16	1,660	561	..	19	1,600	660	..

EXPERIMENTS WITH MANGELS.

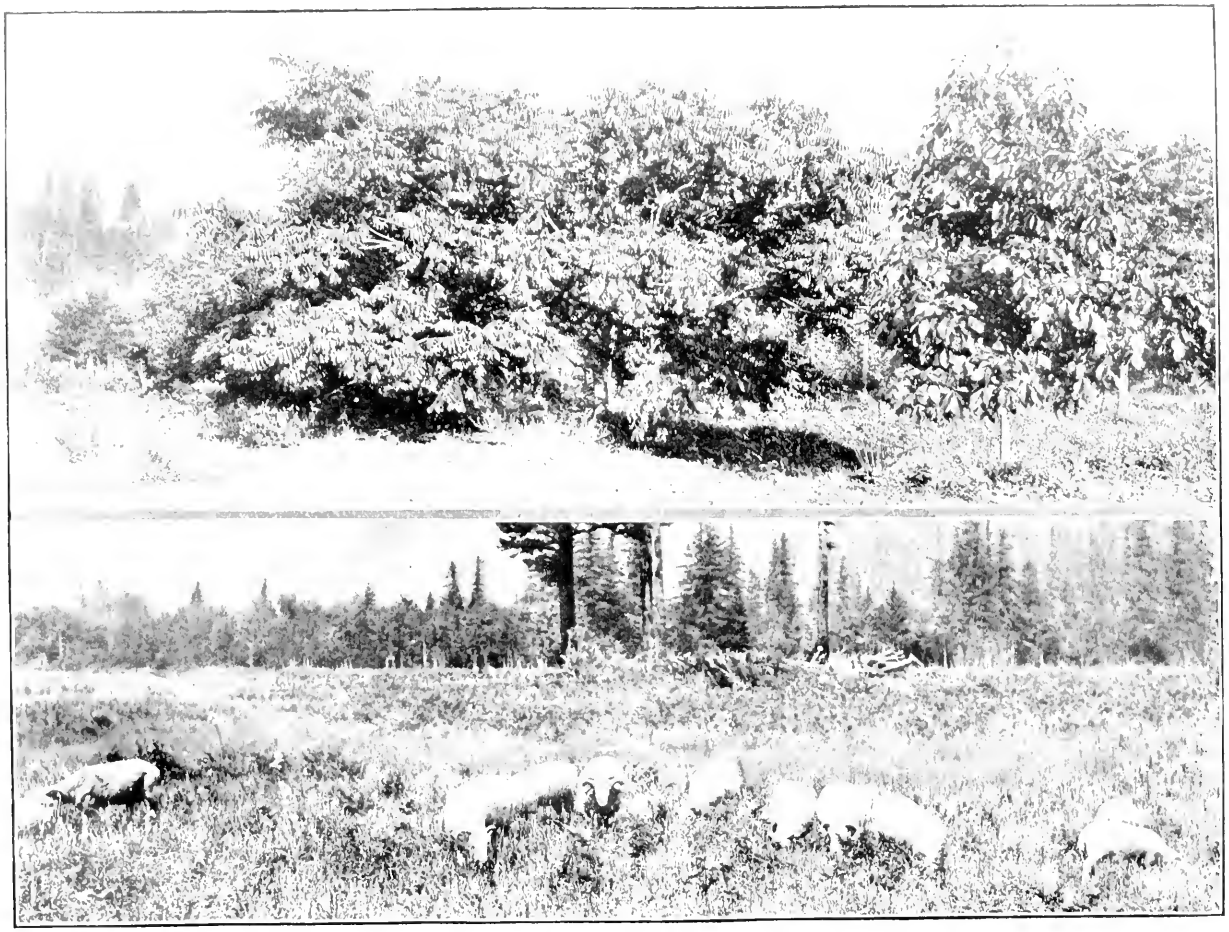
Twenty-seven varieties of mangels were tested alongside, sown in drills thirty inches apart The soil was a clay loam, a heavy clover sod had been ploughed under in the spring of 1901 and a crop of mixed grain for feed grown. In the winter of 1901–1902 it was dressed with farm-yard manure, which was well mixed with the soil and turned under in April and thoroughly harrowed every few days until May 6, when the first sowing was made. Four rows of each variety were sown and on May 20 a similar plot alongside was sown with the same variety in each case. All these test plots were pulled October 22, and the yield per acre computed from the produce of 66 feet of the two centre rows in each plot.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre, 1st Plot.		Yield per Acre, 1st Plot.		Yield per Acre, 2nd Plot.		Yield per Acre, 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Mammoth Long Red	51	1,620	1,727	..	37	580	1,243	
Warden Orange Globe	48	360	1,606	..	34	1,630	1,160	30
Lion Yellow Intermediate	47	1,700	1,595	..	38	890	1,231	30
Half Long Sugar White	46	400	1,540	..	36	1,920	1,232	..
Giant Yellow Intermediate	45	1,080	1,518	..	36	1,590	1,226	30
Selected Mammoth Long Red	45	750	1,512	30	37	1,900	1,265	..
Ward's Large Oval Shaped	43	1,285	1,454	45	38	230	1,270	30
Champion Yellow Globe	42	1,860	1,430	..	32	1,505	1,091	45
Yellow Intermediate	42	1,140	1,419	..	38	1,220	1,287	..
Canadian Giant	42	975	1,416	15	34	970	1,149	30
Prize Mammoth Long Red	41	1,820	1,397	..	36	270	1,204	30
Mammoth Oval Shaped	41	830	1,380	30	27	285	904	85
Giant Yellow Globe	41	500	1,375	..	32	680	1,078	..
Giant Sugar Mangel	40	685	1,344	45	28	100	935	..
Half Long Sugar Rosy	40	25	1,333	45	42	1,800	1,430	..
Norbiton Giant	38	1,220	1,268	..	31	40	1,034	..
Prize Mammoth Long Red	38	1,055	1,284	15	33	330	1,105	30
Selected Yellow Globe	38	890	1,281	30	28	430	940	30
Gate Post	37	1,570	1,259	30	36	1,920	1,232	..
Yellow Fleshed Tankard	36	1,920	1,232	..	26	800	880	..
Prize Winner Yellow Globe	36	1,590	1,226	30	26	800	880	..
Golden Fleshed Tankard	36	1,260	1,221	..	32	1,670	1,094	30
Giant Yellow Half Long	36	600	1,210	..	26	1,460	891	..
Mammoth Yellow Intermediate	32	1,670	1,094	30	33	330	1,155	..
Gate Post Yellow	32	1,340	1,089	..	31	1,690	1,061	30
Triumph Yellow Globe	31	700	1,045	..	26	865	881	5
Leviathan Long Red	31	40	1,034	..	30	1,050	1,017	30

EXPERIMENTS WITH CARROTS.

Twenty varieties of carrots were tested alongside of the turnips and mangels. The land was similar and its preparation and treatment were the same. Two sowings of each sort were made, four rows each, the first on May 6, the second on May 20, and both were pulled October 28 The yield per acre has been calculated fro. the weight of roots produced from two centre rows each 66 feet long. All were pulled October 22.



PLANTATION OF NUT TREES. DORSET HORNED SHEEP, EXPERIMENTAL FARM, AGASSIZ, B.C.

CARROTS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Giant White Vosges	46	400	1,540	..	38	1,640	1,294	..
White Belgian	42	1,860	1,430	..	39	1,200	1,320	..
Mammoth White Intermediate	40	520	1,342	..	31	370	1,039	30
White Vosges	40	400	1,340	..	31	310	1,038	30
Improved Short White	40	190	1,336	30	39	540	1,309	..
Green Top White Orthe	39	540	1,309	..	34	1,795	1,163	15
Iverson's Champion	38	1,220	1,287	..	32	680	1,078	..
New White Intermediate	38	1,055	1,284	15	34	970	1,149	30
Ontario Champion	33	660	1,111	..	25	820	847	..
Carter's Orange Giant	31	700	1,045	..	30	1,710	1,028	30
Half Long White	29	1,520	992	..	29	1,730	995	30
Half Long Chantenay	27	285	901	45	22	395	739	45
Early Gem	25	160	831	20	21	1,890	731	30
Yellow Intermediate	23	1,190	786	30	21	1,890	731	30
Guerande or Ox-heart	22	1,870	764	30	21	1,560	726	..
Long Yellow Stump Rooted	20	920	682	..	17	1,970	599	30
Scarlet Intermediate	20	590	676	30	18	1,620	627	..
Long Orange, or Surrey	18	960	616	..	16	1,660	561	..
Scarlet Nantes	17	320	572	..	16	505	641	45
Long Scarlet Altringham	16	1,990	566	30	16	670	544	30

EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were tested on plots adjoining those of the turnips and mangels. The soil was similar and its treatment and preparation were the same. Two sowings of each sort were made, the first on May 7, the second on May 21, and both were pulled on October 22. Four rows of each sort were sown and the yield has been calculated from the weight of roots gathered from the two centre rows, each 66 feet long.

SUGAR BEETS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Danish Improved	38	230	1,270	30	26	1,460	891	..
Royal Giant	37	580	1,243	..	26	140	869	..
Danish Red Top	29	1,730	995	30	25	1,580	859	40
Red Top Sugar	27	1,935	932	15	26	305	871	45
Wanzleben	26	1,460	891	..	27	780	913	..
French 'Very Rich'	26	635	877	15	26	800	880	..
Improved Imperiat	26	470	874	30	19	1,600	670	..
Vilmorin's Improved	23	200	770	..	24	840	814	..

POTATOES.

Ninety varieties were included in this test. The soil was a sandy loam, part of which had been in rape and part sunflowers in 1901. It was fairly even in character, and the crop looked very vigorous in June and July, but later on suffered somewhat from the dry hot weather. The vines made a medium growth.

Four rows of 100 feet in length were planted, the rows being 2½ feet apart and the sets 1 foot apart in the row, and the yield per acre computed from the yield of 66 feet of the two centre rows.

POTATOES.—TEST OF VARIETIES.

Name of Variety.	Planted.	Dug.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Maule's Thoroughbred.	May 14	Sept. 24	386	36	371	36	15	..	320	..	51	36	Long rose.
Irish Daisy	" 14	" 25	385	..	369	30	17	30	256	..	113	30	Round white.
Early Norther	" 14	" 22	383	18	356	30	16	48	292	30	74	..	Long pink.
American Giant	" 14	" 24	381	40	364	10	17	30	323	..	41	30	" white.
Prolific Rose	" 14	" 29	374	30	374	30	None	..	336	30	38	..	" rose.
Carman No. 1	" 14	" 23	372	54	372	54	"	..	298	24	74	30	Round white.
Early Market	" 14	" 22	369	36	369	36	"	..	277	6	92	30	Oval rose.
Columbus	" 14	" 23	369	..	352	30	17	30	262	30	91	..	Long flat rose.
Money Maker	" 14	" 30	369	..	369	..	None	..	271	..	98	..	" white.
General Gordon	" 14	" 23	367	37	367	37	"	..	313	..	54	37	Oval pink.
Sharpe's Seedling	" 14	" 24	367	4	367	4	"	..	294	4	73	..	Long round rose.
Rose No. 9	" 14	" 25	366	51	366	51	"	..	313	23	53	28	" rose.
Everett	" 14	" 25	363	..	363	..	"	..	326	30	36	30	" round red.
White Beauty	" 14	" 24	363	..	363	..	"	..	291	..	72	..	Flat long white.
Irish Cobbler	" 14	" 24	361	54	361	54	"	..	306	54	55	..	Round white.
Early Puritan	" 14	" 30	361	54	361	54	"	..	310	54	61	..	Long white.
Dakota Red	" 14	" 29	360	48	360	48	"	..	324	48	36	..	" red.
Bill Nye	" 14	" 27	358	36	358	36	"	..	305	48	42	48	Oblong white.
Brownell's Winner	" 14	" 25	357	30	357	30	"	..	300	18	57	12	Long red.
Seedling No. 230	" 14	" 30	356	24	356	24	"	..	299	36	56	48	Round red.
Troy Seedling	" 14	" 30	355	51	355	51	"	..	274	..	88	51	Long red.
McIntyre	" 14	" 24	354	12	354	12	"	..	248	12	106	..	" pink.
Northern Spy	" 14	" 25	353	6	353	6	"	..	282	6	71	..	" "
Country Gentleman	" 14	" 27	352	..	352	..	"	..	295	30	56	30	" " and white.
Canadian Beauty	" 14	" 22	351	27	351	27	"	..	263	37	87	50	" flat.
Sabean's Elephant	" 14	" 22	350	54	350	54	"	..	280	54	70	..	" " white.
Houlton Rose	" 14	" 23	350	21	350	21	"	..	298	..	52	21	" " rose.
Vanier	" 14	" 23	349	58	349	58	"	..	175	58	174	..	" red.
Early Michigan	" 14	" 29	348	42	348	42	"	..	295	12	53	30	" white.
Early St. George	" 14	" 30	348	9	348	9	"	..	293	17	54	48	" "
Burnaby Seedling	" 14	" 25	347	50	347	50	"	..	296	20	51	30	" rose.
Chicago Market	" 14	" 23	347	36	347	36	"	..	343	20	104	16	" dark red.
Swiss Snowflake	" 14	" 22	347	..	347	..	"	..	234	..	113	..	" white.
Pearce's Extra Early	" 14	" 25	347	..	331	30	15	30	282	15	49	15	Oblong rose.
State of Maine	" 14	" 25	346	30	346	30	None	..	276	30	70	..	Long pink.
Clay Rose	" 14	" 27	345	57	345	57	"	..	259	7	86	50	" rose.
Earliest of All	" 14	" 25	345	24	345	24	"	..	276	24	69	..	Round white.
Cambridge Russet	" 14	" 25	345	24	345	24	"	..	234	24	111	..	" russet.
Polaris	" 14	" 25	344	18	344	18	"	..	282	28	61	50	Long pink.
Early Harvest	" 14	" 25	342	12	342	12	"	..	282	12	60	..	" white.
Early Six Weeks	" 14	" 22	342	12	342	12	"	..	256	42	85	30	Oblong rose.
Great Divide	" 14	" 23	341	..	341	..	"	..	238	30	102	30	Round white.
Uncle Sam	" 14	" 23	339	54	339	54	"	..	238	54	101	..	" "
Prize Taker	" 14	" 25	334	22	334	22	"	..	269	22	65	..	" red.
Wonder of the World	" 14	" 25	333	16	333	16	"	..	283	30	49	45	Long rose.
Penn. Manor	" 14	" 27	332	12	332	12	"	..	259	12	73	..	" red.
Early White Prize	" 14	" 22	331	6	331	6	"	..	239	6	92	..	Oblong white.
Early Rose	" 14	" 22	330	..	330	..	"	..	280	10	49	50	" rose.

POTATOES.—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Planted.	Dug.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
American Wonder	May 14	Sept. 22	328	54	328	54	None	..	263	..	65	54	Long flat white.
Early Ohio	" 14	" 25	328	51	318	21	10	30	212	51	166	..	Oblong rose.
Enormous	" 14	" 23	327	48	327	48	None	..	245	48	82	..	Long white.
Holborn Abundance ..	" 14	" 24	326	42	326	42	"	..	278	..	48	42	Round white.
Rural Blush	" 14	" 27	325	36	325	36	"	..	209	36	116	..	" rose.
Pride of the Market...	" 14	" 30	324	30	311	52	12	48	246	48	78	..	Long flat white.
Beauty of Hebron	" 14	" 30	323	24	323	24	None	.	258	54	64	30	" white.
Early Andes.....	" 14	" 24	322	51	322	51	"	..	290	..	32	51	Round rose.
Seedling No. 7.....	" 14	" 29	322	18	322	18	"	..	276	18	46	..	Long red.
Peaere's Prize Winner.	" 14	" 22	321	45	321	45	"	.	257	75	64	30	" pink and white.
Burpee's Extra Early ..	" 14	" 23	321	12	321	12	"	..	192	32	128	40	" rose.
Sutton's Invincible....	" 14	" 24	319	..	319	..	"	..	254	..	65	..	" white.
Sir Walter Raleigh ...	" 14	" 29	317	54	317	54	"	..	279	54	38	..	Flat "
Quaker City	" 14	" 29	316	48	316	48	"	..	177	48	139	..	" "
Bovee.....	" 14	" 30	313	20	313	20	"	..	266	32	46	48	Long rose.
Flemish Beauty	" 14	" 30	311	18	311	18	"	..	218	..	93	18	" flat rose.
Reeves' Rose.....	" 14	" 29	310	12	310	12	"	..	247	12	63	..	" rose.
New Queen.....	" 14	" 30	309	39	309	39	"	..	247	39	62	..	" round red.
Empire State.....	" 14	" 25	309	6	309	6	"	..	247	18	61	48	" pink and white.
Rawdon Rose.....	" 14	" 25	308	..	308	..	"	..	255	24	52	36	" rose.
Seattle	" 14	" 29	308	..	308	..	"	..	210	..	98	..	" round white.
Delaware.....	" 14	" 29	306	54	306	54	"	..	213	54	93	..	Round white.
Early Sunrise.....	" 14	" 24	302	30	302	30	"	..	224	30	78	..	Long rose.
Vick's Extra Early ...	" 14	" 25	302	30	302	30	"	..	197	..	105	30	Round pale rose.
Ohio Junior.....	" 14	" 23	299	12	299	12	"	..	239	24	59	48	Long pink.
Lee's Favourite.....	" 14	" 24	298	6	298	6	"	..	232	10	65	56	" rose.
Late Puritan.....	" 14	" 29	297		297	..	"	..	237	36	59	24	" white.
Lizzie's Pride.....	" 14	" 27	293	22	293	22	"	..	234	46	58	36	" red.
Rochester Rose	" 14	" 25	289	18	289	18	"	..	203	..	86	18	" rose.
Clarke's No. 1.....	" 14	" 29	286	..	286	..	"	..	243	30	42	30	" pink.
Daisy.....	" 14	" 29	284	54	284	54	"	..	194	6	90	48	" pink and white.
Brown's Rot Proof	" 14	" 30	281	36	281	36	"	..	225	..	56	36	" red.
Hale's Champion	" 14	" 24	275	..	261	15	13	45	196	35	64	40	Round white.
Maggie Murphy	" 14	" 23	243	6	243	6	None	..	170	24	72	42	Long rose.
New Variety No. 1 ...	" 14	" 29	240	54	240	54	"	..	169	24	71	30	Round pale rose.
Rural No. 2	" 14	" 25	238	42	238	42	"	..	180	42	58	..	Oblong white.
I X L...	" 14	" 25	235	24	235	24	"	..	164	14	71	10	Long flat pink and white.
Green Mountain	" 14	" 30	232	6	232	6	"	..	181	6	51	..	" white.
Thorburn.	" 14	" 24	228	48	228	48	"	..	114	48	114	..	Oblong pink.
Up to Date.....	" 14	" 24	225	10	225	10	"	..	191	25	33	45	Oval white.
Carman No. 3	" 14	" 25	216	42	216	42	"	.	171	..	45	42	Oblong white.

POTATOES—TEST OF FERTILIZERS.

A test was made of superphosphate of lime on three plots, and a check plot of same size was planted at the same time alongside.

The rows were two and a half feet apart and the sets one foot apart in the row. Four rows of 100 feet each were planted for each test plot and for the check plot, and the yield computed from the crop of 66 feet of the two centre rows in each case.

TEST OF SUPERPHOSPHATE OF LIME.

Name of Variety.	Planted.	Dug.	Total Yield per Acre.	Yield per Acre of Sound.	Yield per Acre of Rotten.	Yield per Acre of Marketable.	Yield per Acre of Unmarketable.
			Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.
Dakota Red, untreated.....	May 15..	Oct. 1..	355 18	355 18	None.....	320 18	35 ..
" 100 lbs. per acre.	" 15..	" 1..	371 48	371 48	"	335 18	36 30
" 150 " "	" 15..	" 1..	391 36	391 36	"	350 36	41 .
" 200 " "	" 15..	" 1..	409 12	409 12	"	365 42	43 30

FODDER PLANTS.

The following fodder plants were tested again this year. The conditions here do not appear to be suitable for a heavy production of any of the millets, perhaps the cool wet weather in the early period of growth is unfavourable. All the millets were sown on May 25, on a warm loam that was in a good state of fertility and well prepared.

Plot 1.—Cat-Tail Millet :—

A poor uneven stand, stalks 24 to 28 in. long ; length of head 3 to 4 inches. Yield per acre when cut, 2 tons 1,440 lbs.

Plot 2.—Algerian Millet :—

An uneven stand ; stalk 36 to 38 inches long and moderately leafy, heads 3½ to 4½ inches long ; yield per acre, 3 tons 640 lbs.

Plot 3.—Italian or Indian Millet :—

Stalks 28 to 34 inches long ; heads 4 to 4½ inches ; yield per acre 3 tons 40 lbs.

Plot 4.—Moha Hungarian Millet :—

Stalks 30 to 36 inches long ; heads 3 to 4 inches ; yield per acre 2 tons 1,920 lbs.

Plot 5.—Round White Extra French Millet :—

Stalks 26 to 30 inches long ; heads 2 to 2½ inches ; yield per acre 4 tons 160 lbs.

Plot 6.—Soja Beans sown May 1 :—

Drills 21 inches apart ; length of stalk 24 to 30 inches ; very leafy and well podded, pods 1¼ in. long ; yield per acre 4 tons 40 lbs.

Plot 7.—Soja Beans sown May 1 :—

Drills 28 inches apart ; length of stalk 30 inches, very leafy and well furnished with pods ; weight per acre when cut 4 tons 760 lbs.

Plot 8.—Soja Beans sown May 1 :—

Drills 35 inches apart ; length of stalk 30 inches, very leafy and well podded, pods 1¼ in. long, and containing 2 to 3 seeds in the late dough stage when cut Oct. 4 ; yield per acre 4 tons 480 lbs.

Plot 9.—Horse Beans planted May 1 :—

Drills 21 inches apart ; length of stalk 28 to 30 inches, not well podded and many blank pods ; length of pod 1 to $1\frac{1}{4}$ inches ; yield per acre 2 tons 1,440 lbs.

Plot 10.—Horse Beans planted May 1 :—

Drills 28 inches apart ; length of stalk 30 inches, not well podded nor were the pods plump or well filled ; yield per acre 2 tons 1,920 lbs.

Plot 11.—Horse Beans planted May 1 :—

Drills 35 inches apart ; stalks 32 inches long but very few pods ; yield per acre 2 tons 640 lbs.

DWARF ESSEX RAPE.

The plots mentioned in my report for 1901 commenced to grow vigorously in November, and made strong growth with very little interruption between the short spells of frost during the winter and furnished green feed for the sheep, which were allowed to feed off the plots alternately. The land where these plots were, gave a very much better crop this year than land alongside which was under other crops in 1901, but which was under same kind of crop this year. In one case the crop was potatoes. In 1901 the crop was rape and alongside, sunflowers, both hoed crops. In the other rape with mangels alongside. This year the potatoes were a better colour, more vigorous, and the yield considerably heavier where the sheep had pastured on the rape. In the other plots mixed grains for feed were sown over all the plots, and that on the rape plot averaged nearly one-third heavier yield than where roots had been grown. This season rape was drilled in between the rows of corn on a few plots, sown early in August, and at this date promises to give a considerable quantity of green feed for the sheep, on land that otherwise would be unproductive all winter, and judging from experience of one year it will be a decided benefit to the next crop.

SUNFLOWERS.

A plot of the Mammoth Russian sunflower was sown May 16. They grew well and made fine heads, some of which measured 15 inches across. The seed is very good feed for hens, especially in the autumn when they are moulting.

AMBER SUGAR CANE AND BROOM CORN.

A plot each of the seed of these products was sown in drills 3 feet apart and the plants thinned to about 5 inches apart in the drill. The cold wet spring delayed growth so that neither tasseled out and very few stalks grew more than $2\frac{1}{2}$ feet. These crops do not appear to be adapted to the mild moist summers of this coast.

VEGETABLES.

The cold rains in spring kept the soil cold and retarded the germination and growth of small seeds. Radishes and lettuce were not so crisp and juicy on this account.

RADISHES.—Sown May 7.

Variety.	Fit for use.	Remarks.
Early Scarlet Turnip	June 5	Crisp and good.
Olive Shaped Scarlet	" 7	Medium crisp.
White Tipped Early Scarlet Turnip	" 7	Crisp and juicy.
French Breakfast	" 10	Crisp, juicy and sweet.
Forcing Olive Shaped Short Leaf	" 10	Crisp and sweet.
Ne Plus Ultra	" 10	Crisp; slightly bitter.

LETTUCE.—Sown May 7.

Trocadero Red Edged	June 20	Tough and bitter.
Trianon Early White	" 24	Medium crisp.
Cabbage, All the Year Round	" 20	Tender, crisp and good.
Cabbage, Early Ohio	" 10	Crisp, tender, very good.
Blond Stone Head Cabbage	" 10	Crisp and good.
Neapolitan Cabbage	" 7	Tender, sweet, very good.
Paris Green Cos	" 20	Tough and bitter.

CARROTS—Sown April 26.

Parisian Forcing	July 8	Crisp, sweet, very good.
French Horn	" 16	Sweet; fine flavoured.
Luc Half Long	" 23	Crisp and good.
Long Blood Red	" 30	Fine quality; good.

TURNIPS—Sown April 29.

Extra Early White Milan	June 16	Crisp, juicy, sweet, good.
Early White Strap Leaved	" 20	Crisp, juicy, sweet, fine flavour.
Early Stone	" 28	Solid, crisp, sweet, good.
Robertson's Golden Ball	" 30	Very good.

CABBAGE.—Seed sown in garden April 14; transplanted May 27.

Paris Market	Aug. 8	Heads small but firm, white and of very good quality.
Early Jersey Wakefield	" 14	Heads medium size, firm, good.
Savoy Green Globe	" 28	Heads medium large, firm, solid, crisp; of very fine quality.
Early Winningstadt	Sept. 3	Heads large, solid; of very fine quality.
Large Red Drumhead	" 15	Heads medium large, very solid, crisp; good quality.
Fottler's Drumhead	" 20	Heads large, solid, crisp; of fine flavour.

BROCCOLI.—Seed sown in garden April 10; transplanted May 27.

Extra Early White	Sept. 28	Heads of medium size and good flavour, fit for use.

BRUSSELS SPROUTS—Sown April 10; transplanted May 27.

Dwarf Improved		Vigorous growth, infested with aphis and unfit for use.

CAULIFLOWER.—Sown April 14; transplanted May 27.

Selected Earliest Dwarf Erfurt	July 28	Very white, solid, crisp heads.
Snowball	Aug. 8	Very firm, solid, crisp, good.
Half Early Paris	" 16	Heads medium size, soft, open; of good flavour.

WINTER RADISH.—Sown May 7.

Variety.	Remarks.
Winter Black Long Spanish	Long, crisp, good quality.
Winter Scarlet China	Medium size, crisp, pleasant, tender.

ONIONS.—Sown April 15.

Danvers Yellow Globe	Medium size, uniform growth, firm and solid.
Market Favourite Keeping	Seed did not germinate.
Large Red Wethersfield	Medium large, solid, mild flavour.
Paris Silverskin	Seed germinated poorly but those that grew were of uniform size and solid in bulb.

BEETS.—Sown April 15.

Variety.	Fit for use.	Remarks.
Egyptian	July 2	Firm, dark red, sweet, good.
Nutting's Dwarf Improved	" 4	Crisp, good colour, sweet, pleasant.
Early Blood Red Turnip	" 10	Quick grower, crisp and sweet.
Long Smooth Blood Red	" 29	A smooth, clean root; a good keeper and of good quality.

CELERY.—Sown in hotbed April 14; transplanted to garden June 10.

Rose Ribbed Paris	Sept. 8	Crisp but not good flavour.
Paris Golden Yellow	" 10	Crisp, sweet, good flavour.
Giant Pascal	" 26	Crisp, nutty, good.
Red Large Ribbed	" 26	Coarse, stringy, poor.
Dwarf White Solid	" 26	Large, firm, crisp, nutty, good.

BEANS.—Planted April 29.

Name.	Fit for Use.	Remarks.
Dwarf, Golden Skinless	July 14	Stalks short, moderately productive; pods, 2 to 3½ in. long; crisp, pleasant flavour; ripe, Sept. 12.
Dwarf, Matchless	" 14	Dwarf and very productive; pods, 4 to 6 in. long; crisp, sweet, pleasant flavour; ripe, Sept. 8.
Extra Early Edible Podded	" 16	Vigorous, bushy and productive; pods, 4 to 6 in. long; crisp, good and of pleasant flavour; ripe, Sept. 4.
Dwarf, Emperor of Russia	" 18	Dwarf, bushy grower, productive; pods, 3 to 4 in. long, excellent flavour and quality; ripe Sept. 14.
Inexhaustable	" 18	Strong, vigorous grower, productive; pods, 3 to 4½ in. long; very crisp, sweet, pleasant, good; ripe, Sept. 20.
Fame of Vitry	" 20	Growth strong and plant productive; pods, 4 to 6 in. long; crisp, pleasant flavour, good; ripe, Sept. 10.
Dwarf, Black Speckled	" 26	Strong grower, productive; pods, 3 to 5 in. long; plump, fleshy, crisp, pleasant flavour, good; ripe, Sept. 14.

GARDEN PEASE.—Sown April 21.

Name of Variety.	Fit for Use.	Size of Pea.	Length of Pod.	Remarks.
			Ins.	
American Wonder	June 28	Medium	2	Vines well loaded, pease very good quality, pods well filled.
Alaska	" 28	Small ..	3	" " "
Notts' Excelsior	July 2	" ..	2½	" " "
McLean's Advance	" 4	Medium	2⅝	Vines fairly well loaded, " pods not well filled.
Telephone	" 8	Large ..	2¾	" " pods well filled.
Duke of Albany	" 12	" ..	3	" " "
Admiral	" 12	Small ..	2½	Vines well loaded, medium quality, "
Pride of the Market	" 17	Large ..	3	" very fine quality, "
Shropshire Hero	" 17	" ..	3	" " "
Stratagem	" 18	" ..	3	" " "
Heroine	" 16	" ..	3½	" " "
New Dwarf, Telephone	" 10	" ..	3	" " "
Gradus	" 16	" ..	4	" " "
Champion of England	" 26	" ..	3	" " "

DISTRIBUTION OF SEEDS AND SCIONS.

There is an increasing interest in this department of the work as shown by the larger demand and also by the increasing percentage of those who report the results and ask for further samples for next spring. A very widespread interest is being taken in planting nut and shade trees as evidenced by the amount of call for seeds of these useful things. The following were distributed during the past season :—

Packages of cuttings and scions	374
Nuts and bulbs	144
3 lb. samples of potatoes	268
3 " pease	123
3 " oats	147
3 " barley	113
3 " wheat	209
Total	1,378

CORRESPONDENCE.

Letters received, 2,586; letters despatched, 2,464.

APPLES.

The crop of apples has been a fairly good one this year, and owing to favourable weather in autumn the quality has been very good. Twenty acres of land were planted during 1902 with varieties not before tested, and not more than two trees of a sort were planted in this orchard. The following fruited for the first time this year.

Beauty of Bath.—Tree a vigorous grower and a free producer. Fruit of medium size, flat, skin greenish yellow with a clear red cheek. Flesh white, firm, crisp, pleasant, mildly acid. Of good flavour; season last of July and early in August.

Vargulek.—Tree a strong grower. Fruit of medium size, conical, skin greenish white with a red cheek and numerous streaks and splashes of red. Flesh white, tender juicy; a mild acid with a pleasant flavour. Season August.

Forest Plantation, Showing Growth of White Pine, Experimental Farm, Agassiz, B.C. —Photo. by C. E. Saunders.

Early May.—Tree a slow grower. Fruit small oblate, skin yellowish green with a slight blush. Flesh, white, crisp, mildly sub-acid, not juicy. Flavour poor. Season August.

Family.—Tree a medium grower. Fruit of medium size, conical, skin greenish yellow, striped with red and sprinkled with yellowish dots. Flesh white, tender, moderately juicy, of a pleasant acid character and good flavour. Season August.

Jefferis.—Tree a moderate grower. Fruit of medium size, flattish, conical, Skin yellow, splashed with bright red and many whitish dots. Flesh white, tender, juicy, a mild pleasant acid, with a good flavour. Season September.

Druyken.—Tree a medium grower. Fruit above medium size, oblate. Skin yellow with a dull red cheek. Flesh white, crisp, juicy, of a mild pleasant acid character with a good flavour. Season September.

Dove.—Tree a vigorous grower. Fruit of medium size, conical. Skin yellowish white with a few stripes of bright red. Flesh white, firm, juicy, sprightly, with a pleasant flavour. Season September.

Caroline Augusta.—Tree a vigorous grower. Fruit medium to large in size, oblong, conical, ribbed and irregularly shaped. Skin greenish with splashes of dull red and many gray dots. Flesh white, firm, crisp, juicy, mildly acid, flavour pleasant. Season September.

Beauty of Kent.—Tree a vigorous grower. Fruit above medium size, roundish, tapering to calyx. Skin greenish yellow with stripes of dull red. Flesh yellowish, crisp, juicy, mildly acid and of good flavour. Season October.

Delaware Red.—Tree a poor grower. Fruit below medium size, flattish. Skin yellow with a red cheek. Flesh white, firm, not juicy, of poor quality, liable to scab. Season October.

Brabant Bellflower.—Tree a strong and spreading grower. Fruit above medium in size oblong conical. Skin yellowish white with many gray dots and striped with bright red. Flesh yellowish, firm, juicy, pleasant, mildly acid and of good flavour. Season November.

Loy.—Tree a medium grower. Fruit of medium size, round flattish, skin green with a dull red cheek. Flesh whitish, not juicy, mildly acid. Quality poor and liable to scab. Season December.

Winter Sweet Paradise.—Tree a strong grower. Fruit of medium size, roundish. Skin greenish yellow with a dull red cheek. Flesh white, juicy, sweet, fine grained with a pleasant flavour. Season November and December.

Whitman.—Tree a strong grower. Fruit above medium size, conical, skin greenish yellow with russet about the stem. Flesh white, firm, not very juicy, sweet; not of high quality. Season November and December.

Reinette Plate de Champagne.—Tree a vigorous grower. Fruit of medium size, roundish oblate. Skin greenish yellow with a few gray dots. Flesh white, juicy, firm, pleasantly acid with a rich flavour. Season December.

Reinette Thouin.—Tree a moderate grower. Fruit small conical. Skin greenish white with many gray dots. Flesh white, moderately juicy, firm, mildly acid with a pleasant flavour. Season December.

Hawthornden d'Hiver.—Tree a vigorous grower and an early bearer. Fruit of medium size, roundish, a little flattened. Skin greenish yellow with a light blush in the sun. Flesh white crisp, juicy, mildly acid with a pleasant flavour. Season November and December.

Api Noir. Tree a moderate grower. Fruit small round, flat. Skin very dark purple or nearly black. Flesh greenish white, crisp, moderately juicy with a pleasant flavour. Season December.

Golden Reinette.—Tree a feeble grower. Fruit small, roundish. Skin smooth dull yellow with a little pale red on the cheek and patches of russet. Flesh yellow crisp, mildly acid and of fine flavour. Season December.

Reine des Reinettes.—Tree a strong grower. Fruit of medium size, conical. Skin green with a dull red cheek and many gray dots. Flesh yellowish firm crisp, moderately juicy, mildly acid with a rich pleasant flavour. Season winter.

Fenouillet Gris Anis.—Tree a moderate grower. Fruit small roundish conical. Skin greenish yellow with a little red and a few small gray dots. Flesh yellowish, firm crisp, juicy, nearly sweet of fine flavour. Season winter.

Archduke Louis.—Tree a moderate grower. Fruit small oblong conical. Skin green with a dull bronze cheek. Flesh white crisp not very juicy, mildly acid with a pleasant flavour. Season winter.

Azeroly Anise.—Tree a moderate grower. Fruit small round. Skin green with a red blush in the sun. Flesh crisp, juicy and sprightly with a pleasant flavour. Season winter.

Creme de Samogitie.—Tree a vigorous grower. Fruit of medium size, conical. Skin greenish white with a few white dots. Flesh white, firm, not juicy, a mild sub acid with a pleasant aromatic flavour. Season winter.

Duke of Devonshire.—Tree a slow grower. Fruit small to medium, in size, round. Skin yellow with a dull red cheek. Flesh yellow crisp, juicy and sweet with a fine rich flavour. Season winter.

D'Ile.—Tree a medium grower. Fruit of medium size, roundish flat. Skin greenish yellow with patches of russet about the stem and a few brown dots, a bronze cheek. Flesh white crisp, not juicy, mildly acid with a pleasant flavour. Season Winter.

Calville Boisbunel.—Tree a vigorous grower. Fruit small conical. Skin greenish yellow with a red cheek. Flesh white, moderately juicy of a pleasant sub-acid character and good flavour. Season winter.

Reinette Grise Royale.—Tree a moderate grower. Fruit below medium size, conical. Skin russet bronze. Flesh white, juicy, firm, sub-acid with a good rich flavour. Season winter.

Ridge Pippin.—Tree a moderate grower. Fruit above medium size, roundish conical, ribbed. Skin yellow with a little russet about the stem and a few reddish dots. Flesh yellow, juicy, crisp, nearly sweet, slightly aromatic. Season winter.

Golden Queen.—Tree a medium grower. Fruit below medium size, conical. Skin greenish yellow, with a clear red cheek and sprinkled with white dots. Flesh white, crisp, juicy, mildly acid and of high quality. Season winter.

Reinette de Gomont.—Tree a vigorous grower. Fruit of medium size, roundish conical. Skin greenish yellow, with a brownish red cheek and patches of russet. Flesh white, firm and juicy and liable to scab. Season winter.

Madame Galopin.—Tree a vigorous grower. Fruit above medium size, oblong, conical. Skin yellowish with a faint blush. Flesh white, crisp, juicy, nearly sweet, with a fine flavour. Season winter.

Francater.—Tree a vigorous grower. Fruit small, roundish, flat. Skin greenish yellow with a red cheek and a few whitish dots. Flesh whitish, crisp, moderately juicy, a pleasant sub-acid of good quality. Season winter.

The report on a variety of fruit is made the first season that it produces, and is only a description of the fruit for that season and should not be taken as a report on its value for this country and a guide to intending planters. I append a list of apples that are desirable in this climate, having been fruited for a number of years and found to be

valuable in their season, and the trees vigorous and productive:—Beauty of Bath, Yellow Transparent, Duchess of Oldenburg, William's Favourite, St. Lawrence, Maiden's Blush, Hawley, Ruby Gem, Blenheim Orange, Wealthy, Mother, Ribston Pippin, Grimes Golden, Belle de Boskoop, Sutton Beauty, Jonathan, Canada Red, Cooper's Market, Salome, Stuart's Golden.

PEARS.

The pears blossomed freely, but most of the bloom fell off and the crop was light. A few varieties gave full crops. Bartlett, Dr Jules Guyot, Bosc, Boussock, Fertility and La France gave full crops, but most of the other trees gave but a few specimens, and in many cases none.

The following varieties fruited for the first time:—

Manning's Elizabeth.—Tree a moderate grower. Fruit of medium size, obtuse, pyriform. Skin a clear yellow with a bright blush. Flesh white, juicy, sweet and tender, flavour very pleasant. Season late in August.

Nina.—Tree a slow grower. Fruit small, obtuse pyriform. Skin yellow with a bronze russet cheek. Flesh yellowish, sweet, juicy, with a rich, pleasant flavour. Season August.

Beacon.—Tree a strong grower. Fruit below medium size, obtuse, pyriform. Skin clear orange yellow sprinkled with gray dots. Flesh yellowish, juicy, nearly sweet, gritty at the core, not of high quality. Season August.

Ansault.—Tree a medium grower. Fruit of medium size, roundish, oblate. Skin pale greenish yellow with patches of russet. Flesh white, fine grained, juicy, melting, sweet and of fine flavour. Season early in September.

Beurre Beucke.—Tree a strong grower. Fruit of medium size, obtuse pyriform. Skin russet green splashed with yellow and sprinkled with gray dots. Flesh white, juicy, melting, nearly sweet, with a pleasant flavour. Season last of August.

Edmunds.—Tree a strong grower. Fruit above medium size, obtuse pyriform. Skin yellow, with a dull red cheek and patches of russet and a few gray dots. Flesh white, fine grained, juicy, sweet, with a very fine flavour. Season September.

Duchesse Precoce.—Tree a medium grower. Fruit of medium size, oblong pyriform. Skin a greenish yellow, with a little red on sunny side, and many gray dots. Flesh slightly coarse, juicy, slightly astringent, sweet with a pleasant flavour. Season September.

Leipsic Radish.—Tree a strong grower. Fruit small, obtuse pyriform. Skin greenish yellow, with a few russet patches and many russet dots. Flesh white, juicy, sweet, slightly granular, of medium quality. Season September.

Delices de Jodoigne.—Tree a slow grower. Fruit small, acute pyriform. Skin russet yellow with bronze reddish cheek. Flesh white, juicy, fine grained, sweet, of good flavour, but liable to crack. Season September.

Napoleon.—Tree a vigorous grower. Fruit of medium size, obtuse pyriform. Skin russet green with a bronze russet cheek. Flesh white, juicy, sweet, with a pleasant flavour. Season September.

Thirriot.—Tree a vigorous grower. Fruit large, oblong, obtuse pyriform. Skin pale greenish yellow with a few brown dots. Flesh whitish, fine grained, melting, juicy, nearly sweet, with a pleasant flavour. Season early October.

Beurre Brown.—Tree a slow grower. Fruit of medium size, oblong pear shaped, tapering to stalk. Skin bronze russet with a reddish cheek. Flesh white, juicy, buttery, mildly acid with a rich pleasant flavour. Season October.

Dr. Lucien.—Tree a strong and vigorous grower. Fruit large, obtuse pyriform. Skin greenish yellow with many russet dots. Flesh white, juicy, fine grained, melting, with a pleasant aromatic flavour. Season October.

Madame Favre.—Tree a strong grower. Fruit medium to large, obovate obtuse. Skin dull yellow with patches of russet and many gray dots. Flesh white, juicy, not fine grained, not of fine quality. Season October.

Tougard's Flask.—Tree a moderate grower. Fruit below medium size, oblong pyriform. Skin russet with a reddish cheek and a few brown dots. Flesh white, a little coarse, moderately juicy, slightly astringent, not high flavoured. Season October and November.

Zepherin Gregoire.—Tree a strong grower. Fruit of medium size, roundish pyriform. Skin greenish yellow with many russet dots. Flesh whitish, juicy, melting, with a pleasant flavour. Season November.

Katzinkop.—Tree a vigorous grower. Fruit large, turbinate. Skin greenish yellow with a brownish red cheek. Flesh hard, not juicy nor pleasant; only fit for cooking. Season November.

Pastor.—Tree a strong grower. Fruit above medium size. Oblong pyriform. Skin yellowish with many brown dots. Flesh juicy, melting, nearly sweet, with a pleasant flavour. Season November and December.

Orpha.—Tree a vigorous grower. Fruit of medium size, obtuse pyriform. Skin a smooth russet yellow with a few gray dots. Flesh whitish, juicy, buttery, sweet, perfumed, with a pleasant flavour. Season November and December.

Admiral Cecile.—Tree a vigorous grower. Fruit of medium size, roundish obtuse. Skin greenish yellow with a bronze russet cheek and many gray dots. Flesh white, sweet, juicy, melting, very often a little gritty at core, of pleasant flavour. Season November and December.

Col. Wilder.—Tree a strong grower. Fruit large, oblong pyriform. Skin yellow with large patches and dots of russet. Flesh whitish, juicy, sweet and good. Season November and December.

Williams' Winter.—Tree a moderate grower. Fruit of medium size, obtuse pyriform. Skin greenish yellow freely splashed and dotted with russet. Flesh white, moderately juicy, not melting. Season December and January.

PLUMS.

The plum crop, with some varieties, was an average one this season and in many other instances very light. The plum rot was very prevalent and many sorts could not be shipped on account of it. A few varieties, such as Mallard, Sultan, Lincoln, Blue Apricot of Berlin, Monarch, Anna Spath, are nearly free from the disease and others would be if not planted alongside of sorts that are very subject to it.

Berckman's.—Tree a medium grower. Fruit of medium size, heart shaped. Skin deep red with a little whitish bloom. Flesh yellow, juicy, sweet and of good flavour. Season early August.

Tragedy Prune.—Tree a vigorous grower. Fruit of medium size, roundish oval. Skin dark purple with a light bluish bloom. Flesh yellowish, juicy, sweet and good. Season August.

Monsieur jaune.—Tree a medium grower. Fruit of medium size, round with a wide shallow suture. Skin pale yellow. Flesh yellowish, juicy, sweet, tender and very pleasant. Season, August.

Lyons Apricot.—Tree a strong grower. Fruit of medium size, oval with a shallow suture. Skin purple red with a thin whitish bloom. Flesh firm, moderately juicy, sweet and pleasant. Season August.

Prune de Delices.—Tree a vigorous grower. Fruit of medium size, oval, with a shallow suture. Skin, purple with a thin bluish bloom. Flesh greenish, firm moderately juicy, sweet and good. Season August.

Large Reine Claude.—Tree a vigorous grower. Fruit medium to large, roundish. Skin greenish white. Flesh firm, juicy, sweet and pleasant. Season September.

Hungarian Damson.—Tree a moderate grower. Fruit of medium size, oval, tapering to stem. Skin deep purple with a bluish bloom. Flesh, greenish, juicy, sweet and pleasant. Season September.

Sugar Damson.—Tree a slow grower. Fruit, small, roundish somewhat pointed. Skin deep blue with a white bloom. Flesh greenish, not juicy but sweet. Season September.

CHERRIES.

The cherry crop like that of the plums suffered from the cold wet spring and from the brown rot, as well as from wet weather when the earlier sorts were maturing, which caused them to crack. A number of the young trees blossomed but in most cases the bloom fell off. There is only one new sort to report on this year, Montmorency de Sauvigny. Tree a moderate grower. Fruit of medium size, round, compressed, stem medium and sunk in a small basin. Skin clear, glossy, red. Flesh tender, juicy, sprightly with a very pleasant flavour. Season early July.

PEACHES, APRICOTS AND NECTARINES.

As usual all these fruits bloomed freely but the trees on the mountain were the only peach trees that produced fruit. The Amsden, Foster, Early Crawford and Hilborn trees on the mountain had light crops which ripened and were very fine in quality.

ALMONDS.

These nut trees having been cared for until they were large trees and although they bloomed every year, yet failed to fruit, have been removed as useless and the land devoted to other crops.

QUINCES.

Portuguese. Tree a bushy vigorous grower; fruit large globular with a neck; skin pale golden yellow. Flesh mild flavour, good and cooks nearly crimson.

MEDLARS.

All the medlars produced a crop this year. The variety known as the large fruited is the best, the fruit being as good in quality as any and much larger and smoother.

GRAPES.

The spring was wet and cold and in consequence the grapes were so late in blooming that only a very few ripened before frost; Moore's Early and Worden (Black), Brighton, Delaware and Wyoming (Red), Diamond, Martha and Saunders Seedling No. 1 white were the only ones which ripened fruit.

MULBERRIES.

All the mulberry trees fruited this year. New American and Downing are the largest and best sorts.

MOUNTAIN ORCHARDS.

The fruit trees on the mountain have grown well and many of the trees produced a little fruit this season. Owing perhaps to the dry August and September, the fruit was not quite so large as the same sorts grown on the level but was cleaner skinned and brighter coloured.

SMALL FRUITS.

The crop of small fruits was uniformly fairly good. The cold rains in June injured the strawberry crop somewhat, but raspberries, blackberries and currants were a good crop. The gooseberries suffered from mildew so much that the fruit was worthless except a few bushes at about 600 ft. elevation on the mountain. These, although not sprayed, have not suffered from mildew and the fruit although not so large as the same sorts grown down on the level is clean and well flavoured.

RED AND YELLOW RASPBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Hansel	June 24	Vigorous	Small	Crumbly, light red, good flavour.	Moderately productive.
Phœnix	" 26	"	Large	Firm, bright red, good flavour	Productive.
White Antwerp	" 26	Feeble	Small	Soft, poor quality.	Not productive.
Carter's Prolific	" 28	Moderately vigorous.	"	Firm, sweet, not of much value.	Moderately productive.
Crimson Beauty	" 28	"	Medium	Firm, dark red, good flavour.	" "
Yellow Antwerp	" 28	Feeble	Small	Crumbly, sweet, not of much value.	Not productive.
Ballard's Perpetual	" 30	Vigorous	Large medium	Crumbly, sweet, good flavour.	Productive.
New Fastolf	July 3	"	Large	Firm, red, sweet, good quality	"
Yellow Spineless	" 3	Feeble	Small medium	Soft, sweet, not good	Moderately productive.
Malta	" 3	Moderately vigorous.	"	Soft, yellow, good flavour.	" "
Pauline	" 3	Vigorous	Large medium	Crumbly, dark red, sweet, good flavour.	Productive.
Herrenhauser Red Perpetual.	" 3	"	Medium	Firm, dark red, sweet, fair flavour.	Moderately productive.
Duke of Brabant	" 3	"	Large	Firm, bright red, sweet, good flavour.	Productive.
Nonpareil	" 3	"	Small	Not good quality	Not productive.
Turner	" 3	"	"	Crumbly, sweet, not much good.	Moderately productive.
Hudson River Antwerp.	" 3	Feeble	Very small	Soft, red, sweet.	" "
Thompson	" 4	"	Small	"	Not productive.
Franconia	" 4	Vigorous	"	Of no value	"
Northumberland Fill Basket.	" 4	"	Very large	Firm, dark red, good quality.	Productive.
Belle de Fontenay	" 4	"	Large medium	" "	"
Champlain	" 4	Moderately vigorous.	Small	Yellow, poor quality.	Not productive.
Battler's Giant	" 4	Vigorous	Medium	Crumbly, dark red, fair flavour.	Productive.

RED AND YELLOW RASPBERRIES—*Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Arnold's Hybrid.	July 4	Moderately vigorous.	Small	Crumbly, light red, not much good.	Not productive.
Red Herrenhauser.	" 4	Vigorous....	Medium.....	Firm, dark red, sweet.....	Moderately productive.
Sugar of Metz...	" 4	Moderately vigorous.	Large medium	Soft, yellow, sweet, not of much value.	Productive.
Baumforth's Seedling.	" 4	" ..	Small medium	Moderately firm, dark red, sweet, but rather flat.	Moderately productive.
Sarah.....	" 5	Vigorous....	Large medium	Firm, red, sweet, very good quality.	Very productive.
Carleton	" 5	" ...	Medium	Firm, red, sweet, good flavour.	Moderately productive.
Empire.....	" 5	Feeble.....	Small	Firm, acid, not very good....	Not productive.
Lord Beaconsfield	" 5	Vigorous...	Large	Firm, bright red, good quality.	Productive.
Golden Queen...	" 5	" ...	"	Firm, sweet, good; one of the best yellow raspberries.	"
Sharpe.....	" 5	Feeble.....	Small	Crumbly, red, sweet.....	Moderately productive.
Muriel.... .. .	" 5	Vigorous....	Large medium	Firm, dark red, good flavour	Moderately productive.
Craig.	" 5	" ...	Small	Rather soft, red, sweet, good flavour.	" "
Autumn Surprise	" 5	" ...	Medium.....	Soft, yellow, not very good..	" "
Knevit's Giant..	" 6	" ...	Large	Crumbly, bright red, sweet, good flavour.	Productive.
La Mercier.....	" 6	Moderately vigorous.	"	Crumbly, red, sweet, good flavour.	"
Guinea.	" 6	Feeble.....	Small	Poor quality...	Not productive.
Large Yellow....	" 7	Vigorous....	Large	Firm, sweet, good flavour....	Productive.
Cuthbert.....	" 7	" ...	"	Firm, dark red, sweet, good quality.	"
Garnet....	" 7	" ...	Small	Purplish-red, poor quality....	"
Mary.	" 7	Moderately vigorous.	"	Poor quality.....	Not productive.
Queen of the Market.	" 7	Vigorous....	Large	Firm, sweet, good quality....	Productive.
Lady Anne.....	" 7	" ...	"	Soft, yellow, not good.	"
Percy	" 7	Moderately vigorous.	Medium.....	Firm, purplish red, sweet.. .	Not productive.
Hornet.	" 7	Feeble.....	"	Moderately firm, a little acid but fair flavour.	Moderately productive.
All Summer.....	" 7	Vigorous....	Large medium	Firm, red, sweet, continues in bearing a long time.	Productive.
Muskingum.....	" 7	" ...	Small	Crumbly, sweet, not of any merit.	Moderately productive.
Fastolf.	" 8	Moderately vigorous.	Medium.....	Firm, red, sweet..... .	" "
Marlboro'... .	" 8	Vigorous....	Very small....	"	Productive.
R. B. Whyte.. .	" 8	" ...	Large	Firm, dark red, good quality.	"
Clarke.....	" 8	" ...	Medium.....	Moderately firm, sweet, fair flavour.	Moderately productive.
Hebner.	" 8	" ...	"	Soft, red, sweet, not of much value.	Not productive.
Norwich Wonder	" 8	Feeble.....	Very small...	Crumbly, purplish red, poor..	"
King.	" 8	Moderately vigorous.	Medium.....	Firm, crimson, pretty good..	Moderately productive.

RED AND YELLOW RASPBERRIES—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Chili	" 8	Vigorous	Large medium	Moderately firm, sweet, good flavour.	" "
French Vice-President.	" 8	"	Large	Firm, dark red, sweet, good quality, but adheres tightly to the core.	Productive.
Garfield	" 8	"	Small	Crumbly, red, good flavour	Moderately productive.
Shaffer's Colossal.	" 8	"	Large	Firm, purplish red, acid	Productive.
Barnet	" 8	Moderately vigorous.	Small	Soft, red, sweet, not very good.	Not productive.
Queen Victoria	" 8	Vigorous	Large medium	Crumbly, red, fair flavour	Moderately productive.
Sir John	" 8	"	Small	Crumbly, red, acid, not of much value.	" "
Semper Fidelis	" 8	"	Medium	Dark red, sweet, fine flavour.	Productive.
Cariboo Wild	" 8	"	Small	Soft, acid, good flavour	Not productive.
Wilder	" 9	Moderately vigorous.	"	Not good quality	"
Brinkle's Orange	" 10	Vigorous	Large medium	Soft, sweet	Productive.
Goliath	" 10	"	"	Moderately firm, dark red, sweet, good flavour.	"
Prince of Wales	" 10	"	Medium	Firm, dark red, sweet	Moderately productive.
Lizzie	" 10	Feeble	"	Firm, red, sweet	" "
Millar	" 12	Vigorous	"	Firm, red, sweet	" "
Bee Hive	" 13	"	Large medium	Crumbly, sweet, good flavour	" "
Oregon Late	" 13	Moderately vigorous.	Medium	Firm, sweet fair flavour	" "
Minnie	" 14	Feeble	Very small	Crumbly, purplish red, poor.	Not productive.

RED AND WHITE CURRANTS.

Knight's Early (red.)	June 28	Moderately vigorous.	Small	Cluster short, fairly well filled, sweet, good quality.	Moderately productive.
La Fertile	July 4	Vigorous	Medium	Cluster medium in length, well filled, sweet, good flavour.	"
London Red	" 4	"	Large medium	Cluster long, a pleasant acid, good quality.	Productive.
Raby Castle	" 4	"	"	Cluster long, well filled, mildly acid, good quality.	"
White Transparent.	" 4	Moderately vigorous.	Small medium	Cluster short, fairly well filled, sweet, good flavour.	Moderately productive.
La Hative	" 4	"	Small	Cluster short, not very well filled, a pleasant acid.	"
White Gondoin	" 4	Feeble	"	Cluster medium in length, sweet, good flavour.	"
White Dutch	" 4	Moderately vigorous.	"	Cluster short, fairly well filled, acid, good flavour.	Not productive.
Pomona	" 4	Vigorous	Large medium	Cluster long, fairly well filled, sweet, good flavour.	Productive.
White Grape	" 4	Feeble	Medium	Cluster short, not very well filled, sweet, good flavour.	Moderately productive.
Red Cherry	" 4	Moderately vigorous.	"	Cluster medium in length, fairly well filled, quality good.	"

RED AND WHITE CURRANTS—*Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Moore's Ruby...	July 5	Moderately vigorous.	Small	Cluster short, not well filled, quality poor.	Not Productive.
Large White....	" 5	"	Medium.....	Cluster medium in length, well filled, sweet, good flavour.	Moderately productive.
La Conde.....	" 5	Vigorous....	"	Cluster long, fairly well filled, quality good.	Productive.
Red Dutch. ...	" 5	Moderately vigorous.	"	Cluster short, well filled, acid but good quality.	Moderately productive.
North Star.....	" 6	"	"	Cluster medium long, acid, good flavour.	"
New Red Dutch.	" 6	"	" ..	Cluster medium in length, fairly well filled, rather acid	Productive.
Prince Albert...	" 6	Vigorous....	"	Cluster long, moderately well filled, quality good.	"
Fay's Prolific....	" 6	Moderately vigorous.	"	Cluster medium in length, fairly well filled, good flavour.	Moderately productive.
No. 51 L.S.....	" 6	"	Small.....	Cluster short, fairly well filled, sweet, pleasant flavour.	"
Rankin's Red ...	" 7	"	"	Cluster short, not well filled, acid, pleasant flavour.	Not productive.
Eyatt's New White.	" 7	"	Medium	Cluster medium in length, fairly well filled, good flavour.	Moderately productive.
Versailles.....	" 8	"	Small medium	Cluster medium in length, well filled, good quality.	"
White Esperens.	" 8	"	Small.... ...	Cluster short, fairly well filled, mild acid.	Not productive.
Frauendorfer ...	" 8	"	Medium....	Cluster medium, not well filled, quality fair.	"
Verrier's White..	" 8	Feeble.....	Small	Cluster short, not well filled, quality poor.	"
Beauty of St. Giles.	" 8	"	"	Cluster short, not well filled, quality poor.	"
White Cherry...	" 8	Vigorous....	Medium.....	Cluster medium in length, well filled, sweet, good quality.	Productive.
English Red....	" 8	Moderately vigorous.	"	Cluster medium in length, well filled, good quality.	Moderately productive.
Rouge Admirable	" 9	"	"	Cluster short, fairly well filled, mild acid, poor flavour.	"
De La Rochepoze	" 9	Feeble	Small.... ...	Cluster short, not well filled, acid, fair flavour.	Not productive.
La Turinaise....	" 10	Moderately vigorous.	Medium	Cluster medium in length, well filled, good quality.	Productive.
Red Gondoin....	" 10	Vigorous....	"	Cluster medium in length, fairly well filled, rather acid.	Moderately productive.
Champaigner....	" 10	Moderately vigorous.	"	Cluster medium in length, fairly well filled, good flavour.	"
Large Red.....	" 10	"	"	Cluster medium in length, well filled, acid.	"
Kaiser.....	" 10	"	Small	Cluster short, moderately well filled, sweet, good flavour.	"
Large White Dessert.	" 10	"	Medium.....	Cluster medium in length, well filled, good quality.	"
Large White Brandenburger	" 10	Vigorous....	"	Cluster medium long, well filled, sweet, good flavour.	"
Victoria.....	" 10	"	"	Cluster medium in length, fairly well filled, mild, sweet.	Productive.
White Pearl.....	" 10	"	"	Cluster medium in length, not very well filled, sweet, good flavour.	"
White Imperial .	" 10	Moderately vigorous.	"	Cluster medium in length, not well filled, sweet, good quality.	Not productive.
Ringen's.....	" 12	"	"	Cluster medium in length, fairly well filled, good flavour.	Moderately productive.

BLACK CURRANTS.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Dominion.....	July 10	Vigorous....	Medium.....	Cluster short, mild, good flavour.	Moderately productive.
Lennox	" 10	Moderately vigorous.	Small	Cluster short, not very good quality.	Not productive.
Merveille de la Gironde.	" 10	Vigorous ...	Medium.....	Cluster medium, slightly acid, but good flavour.	Moderately productive.
Bang Up..	" 10	Moderately vigorous.	"	Cluster long, mild, pleasant flavour.	" "
Gewohnliche....	" 10	" ..	" ...	Cluster short, mild, fair flavour.	" "
Eclipse	" 10	" ..	Small medium	Cluster medium in length, pleasant flavour.	Productive.
Middlesex	" 10	" ..	Medium.....	" "	Moderately productive.
Stirling.....	" 10	" ..	"	Cluster medium in length, rather rank in flavour.	" "
Kerry	" 10	" ..	"	Cluster long, sweet, fine flavour.	Productive.
Boskoop Giant..	" 10	Vigorous ...	Large	Cluster long, sweet, mild flavour.	"
Perry	" 12	Moderately vigorous.	Small	Cluster short, flavour rank, acid.	Not productive.
Ruler.....	" 12	" ..	Medium.	Cluster medium in length, good flavour.	Moderately productive.
Madoc....	" 12	" ..	Small	Cluster short, quality poor.	Not productive.
Kentish Hero. ..	" 12	" ..	Medium.....	Cluster medium in length, acid, fair flavour.	Moderately productive.
Ambrafarbige...	" 12	" ..	"	Cluster medium in length, pleasant acid, good flavour.	" "
Charmer.....	" 12	Moderately vigorous.	Small	Cluster short, quality fair.	Not productive.
Beaudry	" 12	" ..	"	Cluster short, pleasant flavour.	"
Ontario.....	" 12	Vigorous ...	Large medium	Cluster long, acid, quality fairly good.	Moderately productive.
Eagle	" 12	" ...	Medium.....	Cluster medium in length, flavour rank.	" "
Lanark.....	" 12	Moderately vigorous.	Small	Cluster short, fairly good quality.	" "
Baldwin	" 12	Feeble grower.	Medium.....	Cluster short, pleasant flavour.	Productive.
Wood.....	" 12	Vigorous ...	"	Cluster medium in length, flavour a little rank.	Moderately productive.
Louise....	" 12	" ...	Small	Cluster medium in length, quality fairly good.	"
Prince of Wales.	" 12	" ...	Large	Cluster long, very good flavour.	Productive.
Stewart	" 12	Moderately vigorous.	Medium.....	Cluster medium in length, pleasant flavour.	Moderately productive.
Kentville.	" 12	" ..	"	Cluster short, quality fairly good.	" "
Success...	" 12	Feeble grower.	Small	Cluster short, sweet, mild flavour.	Not productive.
London	" 12	Vigorous ...	Medium.....	Cluster medium in length, mild, sweet.	Moderately productive.
Star.....	" 12	Moderately vigorous.	"	Cluster medium in length, sweet, pleasant flavour.	" "
Victoria	" 12	Vigorous ..	Large medium	Cluster medium in length, sweet, mild, pleasant flavour	Productive.
Champion.... .	" 12	Moderately vigorous.	" ..	Cluster medium in length, acid, but pleasant flavour.	"
Black Naples....	" 12	Vigorous....	" ..	Cluster long, sweet, pleasant flavour.	Moderately productive.
Lee's Prolific....	" 12	" ...	Medium.....	Cluster medium in length, sweet, pleasant flavour.	" "

BLACK CURRANTS—*Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Ethel	July 12	Moderately vigorous.	Medium	Cluster medium in length, pleasant, mild, acid.	Moderately productive.
Parker	" 12	"	Small medium	Cluster short, acid.	Not productive.
Monarch	" 14	Vigorous	"	Cluster short, acid, a little rank.	Productive.
Pearce	" 14	"	Medium	Cluster medium in length, mild, pleasant flavour.	"
Bella	" 14	"	Small	Cluster short, fair flavour.	Not productive.
Norton	" 14	"	"	Cluster medium in length, acid, but good flavour.	Productive.
Oxford	" 14	Moderately vigorous.	Small medium	Cluster medium in length, sweet, pleasant flavour.	Not productive.
Climax	" 14	Vigorous	Medium	Cluster long, medium, fairly good quality.	Productive.
Orton	" 14	Moderately vigorous.	Small	Cluster short, sweet, fair flavour.	Not productive.
Pomona	" 14	Vigorous	Large	Cluster long, sweet, good flavour.	Productive.
Henry	" 15	Moderately vigorous.	Medium	Cluster long, medium, sweet, pleasant flavour.	Moderately productive.
Hansel	" 18	"	"	Cluster long, medium, sweet, firm, good flavour.	Productive.

BLACK CAP RASPBERRIES.

Carman	July 6	Moderately vigorous.	Small	Quality poor	Moderately productive.
Smith's Prolific	" 6	Vigorous	Medium	"	" "
Early Ohio	" 6	"	Small medium	Quality fair	Productive.
Cromwell	" 6	"	Medium	Fairly good quality	"
Nemaha	" 8	"	Large	Good quality	"
Conrath	" 8	"	Large medium	Good quality, fine flavour	"
Older	" 8	"	"	Good quality	"
Lovett	" 8	Moderately vigorous.	Small medium	Fair quality	"
American Yellow Cap.	" 8	Vigorous	Small	Sweet, good flavour	"
Kansas	" 8	"	Large medium	"	"
Palmer	" 9	"	Medium	"	"
Gregg	" 9	"	Large	Sweet, good quality	"
Progress	" 9	"	Medium	Good quality	"
Jackson's May King.	" 9	"	Small	Poor quality	Moderately productive.
Hopkins	" 9	Moderately vigorous.	"	"	" "
Mam. Cluster	" 12	Vigorous	Large	Sweet, fair quality	" "
Diamond	" 15	"	Small	Poor quality	Not productive.

BLACKBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Lovett's Best....	Aug. 10	Vigorous....	Large with many small.	Glossy black, sweet, good flavour, no core.	Not productive.
Oregon Everbearing.	Aug. 6 to Oct. 10	" ...	Large medium	Brownish black, drupes medium and compact. Fairly good quality when fully ripe.	Very productive.
Early King	July 15	Vigorous....	" .	Glossy black, firm, sweet, good quality.	Productive.
Snyder.....	" 22	" ...	" .	Glossy black, drupes medium large, sweet, without a core when ripe.	"
Eldorado.....	" 22	" ...	Large	Glossy black, firm, sweet, without a core when ripe, one of the best.	"
Dallas	" 23	Moderately vigorous.	Large medium	Glossy black, with a distinct, pleasant flavour, has no core, very good.	"
Erie...	" 24	Vigorous....	" .	Glossy black, drupes large, sweet, fine flavour, without a core.	"
Agawam.....	" 26	" ...	Medium.....	Drupes small and compact, firm, sweet and pleasant, without a core when fully ripe.	Very productive.
Stone's Hardy ..	" 26	" ...	Large	Drupes large, fruit of a very high quality.	Productive.
Maxwell..... ..	" 28	" ...	" .	Glossy black, thimble shaped firm, sweet, juicy, pleasant.	"
Wilson's Early..	" 28	" ...	Large medium	Berry long, drupes medium in size, sweet, pleasant flavour.	"
Ohmer	" 30	" ...	Large	Glossy black, oblong, drupes large, good flavour, slightly acid.	Moderately productive.
Brunton	" 30	Feeble growth.	Small	Not good quality...	Not productive.
Tecumseh	" 30	Vigorous....	Large medium	Glossy black, conical, drupes medium and compact, juicy sweet and pleasant, soft core.	Productive.
Kittatinny. .. .	" 31	" ...	Small and large	Glossy black, drupes large, sweet, good, core small.	Moderately productive.
Crystal White...	Aug. 6	" ...	Small	Glossy black, sweet and pleasant to taste, but too small and imperfect.	" "
Lawton..... ...	" 6	" ...	Large	Glossy black, sweet	" "
Minnewaska	" 6	" ...	Medium ...	Glossy black, drupes large. sweet.	" "

METEOROLOGICAL RECORD.

Date of Highest Temperature.	Degrees.	Date of Lowest Temperature.	Degrees.	Rainfall.	Snowfall.	Sunshine.	
1901.		1901.		Inches.	Inches.	Hours.	Minutes.
December 24	48	December 12	25	4·76		49	54
1902.		1902.					
January 14	49	January 25	1	2·88	8	72	54
February 15	58	February 1 and 2	22	6·46	2	45	24
March 31	60	March 27	26	5·55		68	06
April 11	70	April 4	30	3·05		104	36
May 26	87	May 4-12-23-30	40	4·17		93	36
June 21	89	June 30	45	2·43		141	24
July 19	95	July 12	46	2·58		170	54
August 6	86	August 27	38	3·30		239	00
September 13	84	September 26	37	2·79		141	42
October 2 and 7	67	October 17	36	3·55		118	
November 3 and 4	58	November 8 and 20	26	8·62	12	27	
		Totals		53·54	22	1,272	30

This record, as compared with preceding years, shows that the season has been about an average one in rainfall, temperature and sunshine.

I have the honour to be, sir,

Your obedient servant,

THOS. A. SHARPE.

STATEMENT OF EXPENDITURE ON THE DOMINION EXPERIMENTAL FARMS FOR THE YEAR ENDING JUNE 30, 1902.

CENTRAL EXPERIMENTAL FARM—EXPENDITURE, 1901-1902.

Live stock, including special importation of dairy animals	$	7,900 26
Feed for stock, including supplies from experimental plots, $550.69; also veterinary services		3,759 85
Seed grain, seeds, trees, &c.		1,235 33
Implements, tools, hardware and supplies		1,110 58
Drainage and drain tiles		1,288 67
Manure and fertilizers for experimental plots and horticultural department		180 04
Travelling expenses		1,776 49
Exhibition expenses, including value of grain held over for exhibitions		520 80
Blacksmithing, harness supplies and repairs		1,124 64
Bee department		189 73
Salaries of officers engaged in the general work of the farms, proportion chargeable to the Central Farm		1,935 48
Wages, farm work, including experimental work with grain and other farm crops; also salaries of officers in charge		6,058 73
Wages, care of stock		2,612 27
Chemical division, proportion chargeable to the Central Farm		1,247 60
Botanical and Entomological division, proportion chargeable to the Central Farm		1,312 60
Horticultural division, including salary of officer in charge		5,094 13
Poultry division, including all supplies; also salary of officer in charge		2,111 29
Forestry division and care of grounds		1,407 11
Arboretum, including drawing and spreading of 520 loads of gravel on roads		1,973 99
Distribution of trees and tree seeds, including $20.40 value of tree seeds supplied by Brandon and Indian Head Farms		107 70
Office help, correspondence branch and messenger service		3,905 41
Printing of office supplies and stationery		1,012 39
Seed testing and care of greenhouses		1,126 39
Dairy branch, including wages of dairyman		800 79
Contingencies, including $725.11 for 590 loads gravel and work on roads		1,184 01
Books and newspapers		86 82
Telegrams and telephones		238 69
Steers purchased for feeding experiments		3,366 89
		54,668 68
LESS—Proceeds of sale of steers purchased for feeding experiments		6,060 81
	$	48,607 87

EXPERIMENTAL FARM, NAPPAN, N.S., EXPENDITURE. 1901-1902.

Live stock, including special importation of dairy animals	1,429 39
Feed for stock, including veterinary services	2,685 47
Seed grain, seeds, trees, &c.	371 09
Implements, tools, hardware and supplies	311 97
Manure and fertilizers	191 67
Travelling expenses	127 41
Exhibition expenses	151 29
Blacksmithing, harness supplies and repairs	124 26
Salary of Superintendent, including proportion of salaries for general work, Ottawa	2,579 02
Wages, farm work, including experimental work with farm crops	2,554 20
Wages, care of stock	1,410 00
Chemical division, proportion chargeable to each branch farm	727 75
Botanical and Entomological division, proportion chargeable to each branch farm	539 59
Poultry branch	104 09
Horticultural division, including experimental work with vegetables, fruits, forest and ornamental trees and flowers; also care of grounds and salary of officer in charge	1,356 80
Distribution of seed grain, potatoes, &c.	203 29
Contingencies, including postage, $42; mail delivery, $97.50	182 37
Printing and stationery	30 42
Books and newspapers	21 50
Telegrams and telephones	53 85
Steers purchased for feeding experiments	720 00
Drainage and drain tiles	102 00
	15,977 43
LESS—Proceeds of sale of steers purchased for feeding experiments.	1,441 00
	14,536 43

EXPERIMENTAL FARM, BRANDON, MANITOBA—EXPENDITURE, 1901-2.

Live stock		43 60
Feed for stock, including veterinary services		125 25
Seed grain, trees, seeds, &c.		138 67
Implements, tools, hardware and supplies		697 51
Travelling expenses		72 95
Exhibition expenses		246 70
Blacksmithing, harness supplies and repairs		425 02
Bee department		20 82
Salary of Superintendent, including proportion of salaries for general work, Ottawa		2,629 02
Wages, farm work, including experimental work, with farm corps, &c.		3,267 96
Wages, care of stock		953 75
Chemical division, proportion chargeable to each branch farm		727 75
Botanical and Entomological division, proportion chargeable to each branch farm		539 59
Horticultural branch, including experiments with vegetables, fruits and flowers, also care of Arboretum and grounds		381 11
Forestry branch, including care of hedges		596 50
Poultry branch		63 50
Office help, including delivery of mail, $143		766 50
Distribution of seed grain, potatoes, &c.		746 91
Distribution of trees and tree seeds		441 70
Contingencies, including postage, $80		147 58
Printing and stationery		25 54
Books and newspapers		28 50
Telegrams and telephones		80 86
Steers purchased for feeding experiments		385 93
Drainage and drain tiles		24 00
Manure and fertilizers		15 00
	$	13,502 22
LESS—Proceeds of sale of steers purchased for feeding experiments	$ 858 64	
Value of grain supplied for seed distribution at Ottawa	319 09	
		1,177 73
	$	12,324 49

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.—EXPENDITURE, 1901-2.

Live stock		41 40
Feed for stock, including veterinary services		114 10
Seed grain, seeds, trees, &c		143 73
Implements, tools, hardware and supplies		507 07
Travelling expenses		70 25
Exhibition expenses		76 90
Blacksmithing, harness supplies and repairs		194 65
Salary of Superintendent, including proportion of salaries for general work, Ottawa		2,629 02
Wages, farm work, including experimental work with farm crops		4,034 75
Wages, care of stock		871 50
Chemical division, proportion chargeable to each branch farm		727 75
Botanical and Entomological division, proportion chargeable to each branch farm		539 58
Horticultural branch		441 21
Poultry branch		62 95
Forestry branch, including hedges		233 50
Office help, including delivery of mail		600 00
Distribution of seed grain, potatoes, &c		550 44
Distribution of trees and tree seeds		258 15
Contingencies, including postage, $119.44		199 81
Printing and stationery		147 50
Telegrams and telephones		42 72
Books and newspapers		12 75
Steers purchased for feeding experiments		511 07
		$ 13,019 80
LESS—Proceeds of sale of steers purchased for feeding experiments	$ 1,185 15	
Value of grain supplied for grain distribution at Ottawa	1,316 89	
		2,502 04
		$ 10,508 76

EXPERIMENTAL FARM, AGASSIZ, B.C.—EXPENDITURE, 1901-1902.

Live stock, including special purchase of short horn cattle in Ontario	1,238 84
Feed for stock, including veterinary services	50 98
Seed grain, seeds, trees, &c	206 68
Implements, tools, hardware and supplies	319 90
Manure and fertilizers	102 70
Travelling expenses	179 20
Exhibition expenses	141 61
Blacksmithing, harness supplies and repairs	122 02
Salary of Superintendent, including proportion of salaries for general work, Ottawa	2,579 02
Wages, farm work, including experimental work with farm crops, vegetables, fruit trees, vines, &c	3,122 37
Wages, care of stock	504 40
Chemical division, proportion chargeable to each branch farm	727 75
Botanical and Entomological division, proportion chargeable to each branch farm	539 58
Poultry branch	99 48
Forestry branch, including care of hedges	215 40
Office help	120 00
Distribution of seed grain, potatoes, &c	135 87
Distribution of trees and tree seeds	17 89
Clearing land	514 65
Contingencies, including postage, $78.81	134 13
Printing and stationery	36 41
Books and newspapers	23 00
Telegrams	0 50
Drainage and drain tiles	60 00
	11,192 38
LESS—Proceeds of sale of steers purchased in 1900 for feeding experiments	393 35
	$ 10,799 03

SUMMARY OF EXPENDITURE, 1901-1902.

Central Experimental Farm		$ 48,607 87
Nappan	"	14,536 43
Brandon	"	12,324 49
Indian Head	"	10,508 76
Agassiz	"	10,799 03
Distribution of seed grain, potatoes, &c., from Central Experimental Farm, including value of grain supplied from Brandon and Indian Head Experimental Farms		5,223 42
Printing bulletins and distribution of bulletins and reports	$4,000 00	
Less special sum in estimates for this item	4,000 00	
		$ 102,000 00

SUMMARY OF STOCK, MACHINERY, IMPLEMENTS, &c., ON HAND DECEMBER 31, 1902.

CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

18 Horses	$ 2,500 00
11 Ayrshire cattle	1,900 00
12 Guernsey cattle	1,655 00
11 Durham cattle (Shorthorns)	2,450 00
5 Canadian cattle	650 00
21 Grade cattle	875 00
43 Yorkshire swine	731 00
21 Berkshire swine	485 00
12 Tamworth swine	200 00
15 Grade swine	120 00
16 Large black swine	167 50
16 Shropshire sheep	770 00
10 Leicester sheep	255 00
3 Grade sheep	15 00
Farm machinery and implements	2,811 25
Vehicles, including farm wagons and sleighs	1,228 70
Hand tools, hardware and sundries	1,216 00
Harness	556 95
Dairy department, machinery, &c	524 50
Horticultural and forestry departments, implements, tools, &c	582 35
Botanical department, implements, tools, &c	7 65
Poultry department, 282 fowls	196 00
Poultry department, implements, furnishings, &c	93 52
Bees and apiarian supplies	454 10
Chemical department, apparatus and chemicals	1,670 00
Books in several departments	398 30
Greenhouse plants, supplies, &c	1,912 00
Furniture at Director's house	1,100 00
Office furniture and stationery	1,170 95
	26,497 77

EXPERIMENTAL FARM, NAPPAN, NOVA SCOTIA.

7 Horses	$ 895 00
4 Guernsey cattle	760 00
4 Holstein cattle	275 00
11 Ayrshire cattle	785 00
2 Jersey cattle	150 00
47 Grade cattle	1,390 00
3 Yorkshire swine	65 00
3 Berkshire swine	70 00
1 Tamworth pig	25 00
53 Grade swine	380 00
17 Sheep	264 00
30 Fowls	27 00
Bees and apiarian supplies	27 40
Vehicles, including farm wagons and sleighs	310 00
Farm machinery	526 00
Farm implements	178 00
Hand tools, hardware and sundries	333 20
Harness	171 50
Furniture for reception room and bedroom for visiting officials	155 00
Furniture supplies and books for office	90 00
	6,877 10

EXPERIMENTAL FARM, BRANDON, MANITOBA.

12 Horses	$ 1,100 00
3 Ayrshire cattle	110 00
4 Durham cattle	425 00
2 Guernsey cattle	50 00
5 Grade cattle	277 00
1 Tamworth pig	15 00
16 Berkshire swine	75 00
12 Yorkshire swine	67 00
11 Grade swine	36 00
85 Fowls	85 00
Bees and apiarian supplies	123 95
Vehicles, including farm wagons and sleighs	430 00
Farm machinery	1,212 00
Farm implements	701 00
Hand tools, hardware and sundries	666 50
Harness	218 50
Furniture for reception room and bedroom for visiting officials	161 55
Furniture supplies and books for office	286 30
	6,039 80

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

13 Horses	$ 1,280 00
1 Ayrshire bull	75 00
17 Durham cattle	1,520 00
1 Guernsey bull	75 00
17 Grade cattle	545 00
10 Berkshire swine	105 00
11 Tamworth swine	128 00
2 Yorkshire White swine	45 00
73 Fowls	60 50
Bees and apiarian supplies	33 75
Vehicles, including farm wagons and sleighs	576 00
Farm machinery	1,094 15
Farm implements	735 50
Hand tools, hardware and sundries	590 60
Harness	144 00
Furniture for reception room and bedroom for visiting officials	217 50
Furniture supplies and books for office	370 00
	7,595 00

EXPERIMENTAL FARM, AGASSIZ, B.C.

6 Horses	$ 725 00
15 Durham cattle	1,020 00
2 Grade cattle	50 00
16 Dorset horned sheep	192 50
7 Berkshire swine	80 00
1 Tamworth sow	25 00
1 Yorkshire White boar	35 00
63 Fowls	48 00
Bees and apiarian supplies	115 75
Vehicles, including farm wagons	220 00
Farm machinery	540 50
Farm implements	112 50
Hand tools, hardware and sundries	168 45
Harness	95 75
Furniture for reception room and bedroom for visiting officials	173 90
Furniture supplies and books for office	135 00
	3,737 35

THOS. M. CRAMP, *Accountant.*

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