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☑ Additional comments / Commentaires supplémentaires:

In Sessional paper No. 7B, pages 140 & 143 are incorrectly numbered pages 40 & 142.

In Sessional paper No. 8, page 57 is incorrectly numbered page 5.

In Sessional paper No. 8, pages 79a-79d are inserted between pages 79-80.

SESSIONAL PAPERS

VOLUME 6

THIRD SESSION OF THE EIGHTH PARLIAMENT

OF THE

DOMINION OF CANADA

SESSION 1898

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST EXCELLENT MAJESTY
1899

VOLUME XXXII.

891028

☞See also Numerical List, page 4.

ALPHABETICAL INDEX

OF THE

SESSIONAL PAPERS

OF THE

PARLIAMENT OF CANADA

THIRD SESSION, EIGHTH PARLIAMENT, 1898.

NOTE.—In order to find quickly whether a paper has been printed or not, the mark (n.p.) has been inserted when not printed; papers not so marked, it may be understood, are printed. Further information concerning each paper is to be found in the List, commencing on page 4.

See also Alphabetical Index, page 1.

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7. Inland Revenues of Canada. Excise, &c., for the fiscal year ended 30th June, 1897. Presented 7th February, 1898, by Sir Henri Joly de Lotbinière.

Printed for both distribution and sessional papers.

7a. Inspection of Weights, Measures, Gas and Electric Llght, for the fiscal year ended 30th June, 1897. Presented 7th February, 1898, by Sir Henri Joly de Lotbinière.

Printed for both distribution and sessional papers.

7b. Report on Adulteration of Food, for the fiscal year ended 30th June, 1897. Presented 16th February, 1898, by Sir Henri Joly de Lotbinière. . .....*Printed for both distribution and sessional papers.*

8. Report of the Minister of Agriculture, for the calendar year 1897. Presented 9th March, 1898, by Hon. S. A. Fisher.....*Printed for both distribution and sessional papers.*

8a. Report of the Director and Officers of the Experimental Farms, for the year 1897. Presented 7th June, 1898, by Hon. S. A. Fisher.....*Printed for both distribution and sessional papers.*

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8d. Criminal Statistics for the year 1897 ... .*Printed for both distribution and sessional papers.*

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9. Annual Report of the Minister of Public Works, for the fiscal year ended 30th June, 1897. Presented 3rd May, 1898, by Hon. J. I. Tarte. .....*Printed for both distribution and sessional papers.*

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Printed for both distribution and sessional papers.

11a. Annual Report of the Department of Marine and Fisheries (Fisheries), for the fiscal year ended 30th June, 1897. Presented 1st March, 1898, by Sir Louis Davies.

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REPORT, RETURNS AND STATISTICS

OF THE

INLAND REVENUES

OF THE

DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED 30TH JUNE

1897

PART I.—EXCISE, &c.

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST EXCELLENT MAJESTY
1897

[No. 7—1898.]

To His Excellency the Right Honourable Lord Aberdeen, 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 30th June, 1897, as prepared and laid before me by the Commissioner of Inland Revenue.

All of which is respectfully submitted.

H. G. JOLY DE LOTBINIÈRE,
Minister of Inland Revenue.

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REPORT

OF THE

COMMISSIONER OF INLAND REVENUE

To the Honourable Sir Henri G. Joly de Lotbinière, K.C.M.G.,
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 30th June, 1897, with the usual information as to the cost of collection and statistics respecting the sources whence those revenues were derived.

The following summary comparison shows the accrued revenue for the years ended 30th June, 1893, 1894, 1895, 1896 and 1897, respectively.

——	1893.	1894.	1895.	1896.	1897.
	$	$	$	$	$
Excise, including Methylated spirits ...	8,444,502	8,364,964	7,829,848	7,956,740	9,182,042
Public Works	5,969	6,132	9,883	5,639	13,632
Culling Timber.....	11,493	11,990	8,334	9,794	10,356
Weights and Measures, Gas and Law Stamps.....	57,246	57,445	56,952	54,184	58,228
Electric Light	....	.....	.....	8,688	6,844
Other Revenues	1,020	964	7,080	6,041	770
Totals.	8,520,230	8,441,495	7,912,097	8,041,086	9,271,872

The great increase of revenue (nearly a million and a quarter of dollars) accrued during 1897, as compared with 1896, must be held to be almost wholly an anticipation of the current year's receipts, inasmuch as up to the 10th of March, 1897, the revenue collected was only five thousand dollars in excess of the amount collected to the same date in the preceding fiscal year.

The following statement exhibits the details of Excise Revenues accrued during the undermentioned years:—

	1.	2.	3.	4.	5.
	1893.	1894.	1895.	1896.	1897.
	$	$	$	$	$
Spirits	4,142,057	4,133,638	3,901,579	4,011,288	4,772,369
Malt liquor	6,628	6,125	6,536	6,748	6,805
Malt	1,008,130	956,691	766,080	781,554	1,032,727
Tobacco	2,446,130	2,448,957	2,369,831	2,351,899	2,557,011
Cigars	692,266	700,535	647,241	660,937	690,280
Petroleum	46,343	41,269	41,389	40,323	42,018
Manufactures in bond	36,050	37,691	47,780	49,269	37,237
Seizures	8,989	3,285	3,280	8,000	3,363
Other receipts	24,792	24,377	26,429	26,150	17,965
Methylated spirits	33,117	12,396	19,703	20,571	22,267
Totals	8,444,502	8,364,964	7,829,848	7,956,739	9,182,042

The quantity of spirits produced during the year was 2,279,958 proof gallons, as compared with 4,382,210 proof gallons produced in the previous fiscal year. The raw material used in its production being as follows:—

Malt	1,836,511
Indian corn	28,837,648
Rye	7,301,410
Wheat	
Oats	353,535
Barley	26,210

The transactions of the several distilleries will be found stated in detail in Appendix A (Statement No. 3), pages 60 and 61.

	Proof galls.
There were on the 1st July, 1896, in process of manufacture	182,329
Manufactured during the fiscal year	2,279,958
Returned to distilleries for re-distillation—Duty paid. 2,227	
In bond....214,212	
	216,439
Received into distilleries from other sources—Duty paid	2,753
Total	2,681,479

This was disposed of as follows :—

	Proof Gallons.
Placed in warehouse under crown lock	2,596,485
Fusel-oil written of	15,402
Deficiency arising from rectification	1,477
Written off, destroyed	59
Remaining in process of mauufacture, 30th June, 1897, by actual stock taking	68,056
Total	2,681,479

The following statement shows the warehousing transactions in spirits during the year ended 30th June, 1897, and the four preceding years :—

Fiscal Years.	1 In Warehouse at beginning of Year.	2 Warehoused during the year. Ex-distillery.	3 Otherwise Warehoused.	4 Taken for Consumption.	5 Exported.	6 Used in Bonded Factories.	7 Otherwise accounted for.	8 For Re-distillation.	9 In Warehouse at end of year.
	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.	Pf. Galls.
1892-93	12,836,079	4,017,403	72,016	2,731,896	51,239	330,459	123,239	185,851	13,502,814
1893-94	13,502,814	1,911,466	45,108	2,749,109	76,098	289,841	171,177	266,337	11,906,826
1894-95	11,906,826	2,803,410	98,542	2,509,019	117,218	333,838	181,823	232,023	11,434,857
1895-96	11,434,857	4,479,209	118,511	2,332,859	140,304	362,453	161,149	166,098	12,869,714
Totals	49,680,576	13,211,488	334,177	10,322,883	384,859	1,316,591	637,388	850,309	49,714,211
Annual average of four years ended 30th June, 1896	12,420,144	3,302,872	83,544	2,530,721	96,215	329,148	149,347	212,477	12,428,443
1896-97	12,869,714	2,596,485	125,692	2,779,946	158,943	340,176	212,500	214,212	11,886,114

The quantities exported being as follows :—

	Proof Gallons.
1892-93	51,239
1893-94	76,098
1894-95	117,218
1895-96	140,304
1896-97	158,943

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. Paid difference between Customs and Excise Duty.	Total Quantities upon which duty was collected.	Memorandum of Revenue accrued including License Fees.
	Paid duty Ex-distillery.	Paid duty Ex-warehsuse.			
	Pf. Gallons.	Pf. Gallons.	Pf. Gallons.	Pf. Gallons.	$
1892-93	15,701	2,731,896	71,817	2,819,414	4,142,057
1893-94	1,206	2,753,401	44,809	2,799,416	4,133,637
1894-95	36,035	2,509,019	95,255	2,640,309	3,901,579
1895-96	11,908	2,332,859	118,291	2,463,058	4,011,287
Totals	64,850	10,327,175	330,172	10,722,197	16,188,560
Annual average of four years ended 30th June, 1896	16,212	2,581,794	82.543	2,680,549	4,072,140
1896-97	2,568	2,779,946	125,378	2,907,892	4,772,370

MALT:

The following statement shows the transactions in malt during the year 1896-97, and the four years preceding:—

Fiscal Years.	1 In Warehouse at beginning of Year.	9 Manufactured during the Year.	3 Increase by absorption.	4 Taken for Consumption.	5 Exported.	6 Otherwise accounted for.	7 In Warehouse at end of Year.	8 Memorandum of Revenue accrued, including License Fees.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	$
1892-93	27,794,592	53,933,419 *1,765,533	.....	50,082,751	307,078	1,064,567	32,039,148	1,008,130
1893-94	32,039,148	47,459,005 *1,794,996	.....	51,311,206	398,551	470,720	29,112,672	956,691
1894-95	29,112,672	43,645,516 *1,826,252	710,168	50,659,627	573,246	991,463	23,070,272	766,080
1895-96	23,070,272	52,919,241 *1,976,661	769,756	51,690,278	379,114	325,308	26,341,230	781,554
Totals	112,016,684	197,957,181 *7,363,442	1,479,924	203,743,862	1,657,989	2,852,058	110,563,322	3,512,455
Annual average of four years ended 30th June, 1896	28,004,171	51,330,146	.....	50,435,965	414,497	713,014	27,640,830	878,114
1896-97	26,341,230	47,544,706 *2,368,763	572,765	68,443,353	377,771	339,698	7,666,642	1,032,727

* Imported.

TOBACCO:

The following table shows the transactions during the Fiscal Years ended 30th June, 1893, 1894, 1895, 1896 and 1897 respectively in Tobacco, Snuff and Cigarettes.

Fiscal Years.	1	2	3	4	5	6	7	8	9
	In Warehouse, 1st July.	Manufactured during the year.	Taken for Consumption.	Exported.	Otherwise accounted for.	In Warehouse, 30th June.	Raw Leaf taken for Consumption.	Total Tobacco taken for Consumption.	Duty collected thereon, including License Fees.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	$
1892-93	1,943,071	10,596,633	10,127,871	409,431	116,801	1,885,601	802	10,128,673	2,446,130
1893-94	1,885,601	10,455,722	10,002,342	292,549	50,430	1,996,002	174	10,002,521	2,448,957
1894-95	1,996,002	9,511,373	9,768,210	302,771	99,826	1,336,568	111	9,768,316	2,369,831
1895-96	1,336,568	10,632,155	9,633,585	231,469	47,090	2,056,579	287	9,633,872	2,351,899
Totals.	7,161,242	41,195,883	39,532,008	1,236,220	314,147	7,274,750	1,374	39,533,382	9,616,817
Average for four years ended 30th June, 1896	1,790,310	10,298,971	9,883,002	309,055	78,537	1,818,688	344	9,883,346	2,404,204
1896-97	2,056,579	8,797,845	10,323,472	197,310	50,622	283,020	105	10,323,577	2,492,016

The following is a statement of Canadian tobacco taken for use during the last five years :—

Fiscal Years.	Leaf and Twist paid duty.	Taken for use in Manufactories.	Totals.
	Lbs.	Lbs.	Lbs.
1892-93	78,427	505,010	583,437
1893-94	88,110	816,725	904,835
1894-95	65,710	531,031	596,741
1895-96	51,903	538,380	590,283
1896-97	78,370	831,666	910,036

The following statement shows the quantity of Canadian roll tobacco which paid duty, and the divisions within which such duty was collected. The quantities shown are included in the foregoing statement (column 3) :—

Divisions.	Licenses.		Tobacco paid Duty during Year ended 30th June, 1897.	Duty collected, including License Fees.
	No.	Fees.		
		$ cts.	Lbs.	$ cts.
Cornwall	1	2 00	360	20 00
Ottawa	4	8 00	1,370	76 50
Prescott	1	2 00	220	13 00
Joliette	21	35 00	23,980	1,234 00
Montreal	21	42 00	14,029	743 45
Terrebonne	23	46 00	38,411½	1,986 58
Totals	71	135 00	78,370½	4,053 53
Totals for previous year	84	159 00	51,903½	2,754 18

CIGARS :

The following statement shows the transactions in Cigars during the fiscal year ended 30th June, 1897, and the four preceding years :—

Fiscal Years.	1. In Warehouse 1st July.	2. Manufactured during the Year.	3. Assessment to bring production up to Standard.	4. Taken for Consumption.	5. Exported.	6. Otherwise accounted for.	7. In Warehouse 30th June.	8. Memorandum of Revenue accrued including License Fees.
	No.	No.	No.	No.	No.	No.	No.	$
1892-93	14,183,170	114,340,490	30,759	114,668,809	526,510	152,400	13,206,700	692,266
1893-94	13,206,700	120,345,137	44,623	115,440,480	480,825	875	17,674,280	700,535
1894-95	17,674,280	103,832,388	6,786	106,131,294	166,625	259,750	14,955,785	647,241
1895-96	14,955,785	106,171,691	20,949	108,290,260	161,025	12,950	12,684,190	660,940
Totals	60,019,935	444,689,706	103,117	444,530,843	1,334,985	425,975	58,520,955	2,700,982
Annual average of four years ended 30th June, 1896	15,004,984	111,172,426	25,779	111,132,711	333,746	106,494	14,630,239	675,245
1896-97	12,684,190	109,234,900	5,575	113,276,105	145,425	.....	8,503,135	690,280

Inland Revenues—Excise.

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

1892–93	$36,050
1893–94	37,691
1894–95	47,780
1895–96	49,269
1896–97	37,237

INSPECTION OF PETROLEUM.

The following statement shows the number of packages of each kind of petroleum inspected during the year, and the fees collected thereon, by the Department of Inland Revenue:

	Packages.	Fees.
Canadian	290,416	$25,606 60
Imported	251,003	16,392 83
Mixed	174	8 70
Total	541,593	$42,008 13

PUBLIC WORKS:

The revenue from this source was as follows:—

	1895–96	1896–97.
Hydraulic and other rents	$3,469	$4,195
Minor public works	2,170	9,436

CULLING TIMBER:

The amount accrued upon culling of timber was during 1896–97, $10,355.97; the cost of the service (including $6,083.34 for annuities to retired cullers) having been $16,618.75.

WEIGHTS AND MEASURES AND GAS:

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

The revenue accrued from these services and from law stamps of the Supreme and Exchequer Courts was $58,228.58.

ELECTRIC LIGHT INSPECTION:

This being a new service the outlay for standardizing instruments, swells the expenditure considerably beyond what will be required after the equipment is complete.

The revenue for 1896-97 was $6,844.50.

The expenditure including payments on account of instruments, $8,998.71.

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.

INSPECTION OF STAPLES :

The usual statistics in relation to the service will be found in Appendices B and C.

METHYLATED SPIRITS :

The quantity of methylated spirits manufactured during the year was 119,541 proof gallons; 117,236 gallons were sold. A statement of details appears on pages 52 and 101.

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

Appendix E 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,

E. MIALL,
Commissioner.

OTTAWA, 20th August, 1897.

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.	$	$	$	$	$
1869	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	·096	2·051	1·103	·949	·109	·057	·446	·084
1878	·960	2·169	·096	1·976	.....	·927	·147	·052	·439	.....
1879	1·131	2·209	·104	1·954	.....	1·005	·125	·057	·449	.....
1880	·715	2·248	·077	1·936	.....	·772	·081	·055	·428	.....
1881	·922	2·293	·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	2·052	.....	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	·110	·066	·509	.....
1889	·776	3·263	·097	2 153	.....	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	·101	2·291	.....	1·156	·211	·075	·680	.....
1893	·740	3·485	·094	2·314	.....	1·235	·218	.070	·691	.....
1894	·742	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	·723	3·469	·084	2·243	.....	1·341	·213	·041	·671	.....
Average	1·026	2·920	·130	2·173	.....	1 091	·125	·066	·485	.....

APPENDIX B.

List of Inspectors and Deputy Inspectors of Staple Articles of Canadian Commerce who are empowered to act under the Inspection Acts Revised Statutes, chap. 99, and amending Acts, made up to the 30th June, 1897; also showing the Districts for which they are appointed, and the Territory comprised in each District.

Districts.	Territory comprising Districts.	Date of Order in Council.	Articles.	Names.	Office.	Residences.
Ontario.						
Brant and Haldimand	Counties of Brant and Haldimand	Sept. 27, 1873	Leather and raw hides.	Wm. G. Culbard	Inspector	Paris.
Bruce and Grey	do Bruce and Grey	do 27, 1873	Fish and fish oils	John Campbell	Dep. Inspector	Kincardine.
do	do do	do 27, 1873	do	Geo. S. Miller	do	Owen Sound.
Carleton and Russell	do Carleton and Russell	do 27, 1873				
Essex, Kent and Lambton	do Essex, Kent and Lambton	do 27, 1873	Leather and raw hides.	Jos. W. Barringer	Dep. Inspector	Windsor.
Frontenac, Leeds and Addington	do Frontenac, Leeds & Addington	do 27, 1873				
Grenville, Dundas and Stormont	do Grenville, Dundas & Stormont.	do 27, 1873				
Glengarry and Prescott	do Glengarry and Prescott.	do 27, 1873	Leather and raw hides.			
Hamilton	All that territory lying south of the main line of the Grand Trunk Railway (not incorporated in the Division of Toronto) and east of the Port Dover and Lake Huron Railway	Nov. 10, 1885	Wheat and other grain.	Edward Adamson	Inspector	Hamilton.
do	City of Hamilton	Aug. 29, 1873	Leather and raw hides.	James Brown	do	do
Kingston	Comprising all that portion of Ontario lying west of Kingston and Pembroke Railway, and east of the eastern boundaries of the Counties of Ontario, Muskoka and Parry Sound	Nov. 10, 1885	Wheat and other grain.	Wm. Bletcher	do	Port Hope.
do	City of Kingston	Aug. 29, 1873	Leather and raw hides.	Peter McKim	do	Kingston.
Lanark and Renfrew	Counties of Lanark and Renfrew	Sept. 27, 1873	Beef and pork	Wm. Gardner	do	Dalhousie.
Lennox and Prince Edward	do Lennox and Prince Edward	do 27, 1873				
Lincoln and Welland	do Lincoln and Welland	do 27, 1873	Leather and raw hides.	Michael Cairns	Inspector	St. Catharines.
London	All that territory lying south of the line of the Grand Trunk Railway and west of the line of the Port Dover and Lake Huron Railway	Nov. 10, 1885	Wheat and other grain.			
do	City of London	Aug. 29, 1873	Leather and raw hides.	Simpson Thompson	Inspector	London.
Middlesex and Elgin	Counties of Middlesex and Elgin	Sept. 27, 1873				

Northumberland & Hastings.	do Northumberland and Hastings.	do	27, 1873	Leather and raw hides.	John Hodge	Inspector	Belleville.
Ontario and Durham	do Ontario and Durham	do	27, 1873	Flour and meal	Wm. Bletcher	do	do
Oxford and Norfolk	do Oxford and Norfolk	do	27, 1873				
Ottawa	Comprising all that portion of Ontario lying east of the Kingston and Pembroke Railway.	Nov.	10, 1885	Wheat and other grain	W. J. McNeil	Inspector	Kingston.
do	City of Ottawa	Aug.	29, 1873	Leather and raw hides.	Francis McCullough.	do	Ottawa.
Perth and Huron	Counties of Perth and Huron	Sept.	27, 1873	do do	John Meyers	do	Stratford.
Peterborough and Victoria	do Peterborough and Victoria	do	27, 1873				
Stratford	Comprising all that territory lying north of the Grand Trunk Railway between Guelph and Sarnia, and west of the western boundary of the Toronto Division; also all stations upon the line of the Grand Trunk and Georgian Bay Extension between Stratford and Wiarton.	Nov.	10, 1885	Wheat and other grain.			
Toronto	City of Toronto	Aug.	20, 1890	Flour and meal	John Todd	Inspector	Toronto.
do	Beginning at the western boundary of the Kingston Division, thence westerly along the north shore of Lake Ontario to Burlington, thence northerly along the route of the Hamilton and Northwestern Railway to Georgetown, thence westerly to Guelph, along the line of the Grand Trunk Railway, and thence north-westerly by the westernmost route of the Wellington, Grey and Bruce Railway to Kincardine, excepting thereout all stations upon the line of the Grand Trunk and Georgian Bay Extension, which shall be deemed to be within the Inspection Division of Stratford	Nov.	10, 1885	Wheat and other grain.	Edward Adamson	Inspector	Toronto.
do	City of Toronto and Counties of York and Peel	April	26, 1875	Flour and meal	James Rough	do	do
do	do do	do	26, 1875	Leather and raw hides.	E. A. Thompson	do	do
Port Arthur	Town of Port Arthur and the territory adjacent thereto and comprised within a radius of 15 miles	Sept.	11, 1885	Wheat and other grain.	Frank E. Gibbs	do	Port Arthur.
Simcoe and Algoma	Counties of Simcoe and Algoma	do	27, 1873	Fish and fish oils			
Wellington and Waterloo	do Wellington and Waterloo	do	27, 1873				
Wentworth and Halton	do Wentworth and Halton	do	27, 1873				
Quebec.							
Drummond and Arthabaska	Counties of Drummond and Arthabaska	do	13, 1877				
Gaspé and Bonaventure	do Gaspé, Bonaventure and the Magdalen Islands	Oct.	19, 1877				
District of Montreal	County of Hochelaga	May	5, 1896	Leather and raw hides.	J. H. Mooney Flavien Genest	Inspectors.	Hochelaga.

List of Inspectors and Deputy Inspectors of Staple Articles of Canadian Commerce, &c.—*Concluded.*

Districts.	Territory comprising Districts.	Date of Order in Council.	Articles.	Names.	Office.	Residences.
Quebec—Concluded.						
District of Sherbrooke	Counties of Stanstead, Compton and Wolfe and town of Sherbrooke	July 5, 1897	Leather and raw hides.	P. Bégin	Inspector	Sherbrooke.
Lévis	Counties of Lévis, Lotbinière, Bellechasse and Dorchester	March 15, 1886	Leather and raw hides.			
Montreal, District of		Sept. 14, 1896	do	A. Bissonnette	Inspector	Montreal.
Montreal	City of Montreal	Aug. 29, 1873	Flour and meal			
do	do	do 29, 1873	Wheat and other grain.	Hospice Labelle	Inspector	do
do	do	do 29, 1873	do	W. E. Scott	Dep. Inspector	do
do	do	do 29, 1873	Beef and pork	James Doheney	Inspector	do
do	do	do 29, 1873	Ashes	Edward J. Major	do	do
do	do	do 29, 1873	Fish and fish oils			
do	do	do 29, 1873	Leather and raw hides.	Antoine Masson	Inspector	do
do	do	do 29, 1873	do	D. Sykes	Dep. Inspector	do
Ottawa, County of	County of Ottawa, including City of Hull	Feb. 5, 1884	do	B. Simard	Inspector	Hull.
Quebec	City of Quebec	Aug. 29, 1873	Flour and meal	Philéas Rousseau	Dep. Inspector	Quebec.
do	do	do 29, 1873	Beef and pork	David Nolan	Inspector	do
do	do County of Quebec, Montmorency, Charlevoix, Saguenay and Chicoutimi, for the purposes of inspection of fish and fish oils	April 29, 1878	Fish and fish oils	Louis Côté	Dep. Inspector	do
do	City of Quebec	do 29, 1878	Leather and raw hides.	Aldéric Fortin	Inspector	do
do	do	do 29, 1878	do	Joseph Légaré	Dep. Inspector	do
do	do	do 29, 1878	Butter	Pierre Patoine	Inspector	do
Shawville, Que		do 26, 1897	Wheat and other grain.	Jos. R. Horner	do	Shawville.
Témiscouata and Kamouraska	Counties of Témiscouata and Kamouraska	do 1, 1875				
New Brunswick.						
Carleton	That portion of the County of St. John, including Town of Carleton, lying to the west of the river	March 18, 1876	Fish and fish oils	S. L. Brittain	Inspector	Carleton.
Gloucester	County of Gloucester	Oct. 12, 1875	do	Fred Witzel	do	Gloucester.
do	do do	do 12, 1875	do	P. J. Comeau	Dep. Inspector	Petit Rocher.
Northumberland	do Northumberland	April 26, 1880				
Restigouche	do Restigouche	May 23, 1882	Fish and fish oils			
St. John	That portion of the City and County of St. John lying to the east of the river	March 18, 1876	do	F. W. Thomson	Inspector	St. John.
do	do do	do 18, 1876	Leather and raw hides.	Geo. Murdock	Dep. Inspector	do

do	do	do	Sept. 4, 1897	do	John Lennehan	Inspector	do
do	do	do	March 18, 1876	do			
York	County of York		Dec. 27, 1883	do	Israel Atherton	Inspector	Fredericton.
Nova Scotia.							
Annapolis	County of Annepolis		June 25, 1877	Fish and fish oils	Israel Letteny	Inspector	Granville
Antigonish	do Antigonish		Oct. 16, 1873	do			
Argyle	Township of Argyle for fish and fish oils only		April 25 1879	do			
Barrington	do Barrington		do 20, 1876				
Cape Breton	County of Cape Breton		July 8, 1874	Fish and fish oils			
Colchester	do Colchester			do			
Guysborough	do Guysborough			do			
Halifax	City and County of Halifax		July 30, 1897	do	D. J. Melvin		
do	do	do	Oct. 16, 1873	do	Jos. Reyno	Dep. Inspector	Herring Cove
do	do	do	do 16, 1873	do	Chas. Fulker	do	Devil's Head.
do	do	do	do 11, 1894	do			
Pictou	County of Pictou		do 16, 1873	Leather	John Sutherland	Inspector	Pictou.
do	do		do 16, 1873	Hides	Charles Wilson	do	do
Queen's	County of Queen's		Feb. 23, 1891	Fish and fish oils			
Shelburne	Township of Shelburne		April 20, 1876	do			
Victoria	County of Victoria		Oct. 16, 1873	do	J. A. Matheson	Inspector	S. Bay, Ingonish.
do	do		do 16, 1873	do	Geo. Fader	Dep. Inspector	Englishtown.
do	do		do 16, 1873	do	John McNeil	do	Ingonish.
do	do		do 16, 1873	do	Hugh McQueen	do	North Shore.
do	do		do 16, 1873	do	Isaac Roper	do	Ingonish.
do	do		do 16, 1873	do	Murdock McDonald	do	Neil's Harbour.
Ile Madame	County of Richmond		May 10, 1880	do	E. E. Binet	Inspector	Arichat
Lunenburg	Lunenburg		Aug. 29, 1892	do	Francis Smith	do	Lunenburg
Inverness	County of Inverness			do			
Richmond	County of Richmond, exclusive of territory set apart as the district of Ile Madame						
Yarmouth	County of Yarmouth			Fish and fish oils			
Windsor	Township of Windsor in County of Hants			do			
Prince Edward Island.							
Charlottetown	Province of Prince Edward Island		June 22, 1896	Leather and raw hides			
Prince	County of Prince		do 19, 1886	Fish and fish oils			
Manitoba.							
Brandon	City of Winnipeg and City of Brandon		Dec. 13, 1895	Wheat and other grain	F. H. Hesson	Inspector	Brandon.
Winnipeg	City of Winnipeg		Sept. 3, 1885	do do	Wm. Clarke	do	Winnipeg.
do	do		Aug. 20, 1884	do do	David Horn	do	do
do	do		do 20, 1884	do do	James Massie	Dep. Inspector	do
do	do		do 20, 1884	Leather and raw hides	W. J. Bird	Inspector	do

DEPARTMENT OF INLAND REVENUE,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX C.

STATEMENT showing Quantity of certain Staple Articles of Canadian Commerce inspected under provisions of 37 Vic., Cap. 45, during the year ended 30th June, 1897, and the Fees accrued thereon as returned to the Department of Inland Revenue by the respective Inspectors.

WHEAT AND OTHER GRAIN.

DISTRICTS.	WHEAT.																		
	Manitoba Hard.				American.	Northern.				Spring.				Goose.		Frosted.			
	Extra.	No. 1.	No. 2.	No. 3.	No. 1.	No. 1.	No. 2.	No. 3.	Rejected	No. 1.	No. 2.	No Grade	Rejected.	No. 1.	No. 2.	No. 1.	No. 2.	No. 3.	Feed.
	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls. *300	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.
Montreal..	.....	13,980	9,120	147,300	63,540	.....	.....	.....	.....	.....	.....	.....	3,300	7,500	14,100	76,140	....	.....	.....
Kingston...	.....	.....	3,000	.....	.....	9,200	.....	.....	..	2,800	400	.....	.....	....	900	.....	.....	.....	.....
Toronto....	.....	6,300	6,700	9,355	.....	900	.....	.....	300	.....	.....	.....	.....	5,700	...	.....	.....	.....	.....
Port Arthur	28,500	3,730,970	1,710,520	905,790	.....	250,040	91,200	9,490	.....	31,540	1,140	5,320	284,810	.....	.....	406,600	249,850	18,620	3,800
Winnipeg..	89,300	2,520,100	892,620	350,900	.....	176,500	33,440	3,420	1,900	16,780	2,640	.....	74,640	.....	.....	129,440	99,320	17,960	.....
Brandon....	1,140	23,480	21,620	14,940	.....	.....	.....	.....	....	.....	....	....	.....	....	.....	1,520	200	...	380
Totals....	118,940	6,294,830	2,643,580	1,428,285	63,540	436,640	124,640	12,910	2,200	51,120	4,180	5,320	362,750	13,200	15,000	613,700	349,370	36,580	4,180

WHEAT AND OTHER GRAIN—*Continued.*

DISTRICTS.	WHEAT—*Concluded.*												OTHER GRAIN.						
	Mixed Winter.		White Winter.		No Grade.	Condemned.	Red Winter.				White Fife.		Wheat Feed.	Indian Corn.				Buckwheat		
	No. 2	Rejected	No. 1.	No. 2.			No. 1.	No. 2.	No. 3	Rejected.	No. 1.	No. 2		No. 2.	No. 3.	Mixed Rejected.	Rejected	No. 1.	No. 2.	No. 3.
	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.
Montreal..	.....	.....	600	6,600	...	.....	6,300	15,300	....	... ..	.. .	.....	.....	†2,180 3,268,126	.....	.....	1,680	3,456	213,714	47,204
Kingston...	.....	.....	5,400	5,700	..	.....	15,400	2,600	.....	.....	....	.....	.....	4,800	....	... .	....	....	23,300	.....
Toronto....	2,400	300	.....	5,600	.....	.....	.....	15,200	3,760	300	...	.....	.....	‡3,640	§7,800 3,900	560	3,640	.....	16,700	.....
Port Arthur	.....	.....	.....	.....	6,270	5,510	.....	.....	.....	.....	4,560	.....	.....	.....	.....	.....	...	.....	.....	.....
Winnipeg..	.....	.....	....	.....	48,880	.....	... .	.....	.....	64,780	10,640	3,420	3,800	.....	.....	.....	.....	.....	.....	.....
Brandon....	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	... ..	....	.....	... .	.....
Totals....	2,400	300	6,000	17,900	55,150	5,510	21,700	33,100	3,760	65,080	15,200	3,420	3,800	3,272,926	3,900	560	5,320	3,456	253,714	47,204

Statement showing the Quantity of certain Staple Articles of Canadian Commerce, &c.—Continued.

WHEAT AND OTHER GRAIN—*Continued.*

Districts.	Other Grain—*Continued*																
	Buckwheat.		Oats.													Rye.	
	Rejected	No Grade.	No. 1.	No. 2.	No. 3.	No. 1, White.	No. 2, White.	No. 3, White.	No. 2. Mixed.	American, No. 2.	Mixed Grain.	Mixed Rejected.	Rejected	No Grade	Feed.	No. 1.	No. 2.
	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.
Montreal	7,588	27,164	101,656	2,045,748	112,868	.....	.....	.....	.....	129,278	8,500	27,540	.....	.....	.....	19,376	175,028
Kingston	400	.....	41,600	7,350	1,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,600	.....
Toronto	1,975	.....	.....	.....	.....	15,338	471,476	44,370	95,848	.....	.....	‖11,700	.....	.....	.....	.....	.....
Port Arthur	.....	.....	.....	160,740	.....	.....	.....	.....	380	.....	.....	8,924	22,852	.....	.....	.....	19,824
Winnipeg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,280	18,810	6,270	.....	.....
Brandon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	9,963	27,164	143,256	2,213,838	114,068	15,338	471,476	44,370	96,228	129,278	8,500	36,464	25,132	18,810	6,270	20,976	194,852

WHEAT AND OTHER GRAIN—*Concluded.*

Districts.	Other Grain—*Concluded.*														Fees.
	Rye.		Barley.							Peas.					
	American, No. 2.	Rejected	No. 1.	No. 2.	No. 3, Extra.	No. 3.	No Grade.	Rejected.	Feed.	No. 1.	No. 2.	No. 3.	Rejected.	B.E., No. 1.	B.E., No. 2.	
	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	Ctls.	$ cts.
Montreal	71,696	280	39,544	38,736	34,064	33,994	.....	.....	3,168	213,300	2,059,200	56,880	23,800	.....	.....	9,937 45
Kingston	.....	.....	34,900	17,400	2,800	800	.....	.....	.....	45 900	7,800	.....	.....	400	8,400	277 70
Toronto	.....	280	60,264	45,672	32,175	.....	.....	9,460	30,240	390,350	390,300	39,200	12,460	.....	.....	3,008 07
Port Arthur	.....	380	.....	3,420	380	4,750	2,280	760	6,080	1,900	.....	.....	.....	.....	.....	16,259 05
Winnipeg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,772 40
Brandon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69 60
Totals	71,696	940	134,608	105,228	69,419	39,544	2,280	10,220	39,488	651,450	2,457,300	96,080	36,200	400	8,400	34,324 27

*Feed. †No Grade. ‡Mixed. §Yellow, 2. ‖Mixed, 3.

STATEMENT showing Quantity of certain Staple Articles of Canadian Commerce inspected, &c.—*Continued.*

PICKLED FISH.

Districts.	Salmon.			Sea Trout.		Mackerel.		Herrings.			Gaspereauxand Alewives.	Shad.	Codfish.	Other Fish.		Fees.
	Tcs.	Brls.	½ Brls.	Brls.	½ Brls.	Brls.	½ Brls.	Brls.	½ Brls.	Boxes.	Brls.	½ Brls.	Brls.	Brls.	½ Brls.	
																$ cts.
Quebec	3	233	4	79	5	....	..	888	124	..	.....	....	3,753	164	2	308 02
Carleton, N.B.	....	....	..	....	....	.....	..	.....	.....	..	493	.....	.. ..	....	..	24 65
St. John	.. .	...	..	....	....	.....	..	3,405	7,049	..	1,497	.....	.....	....	..	466 79
Lunenburg	....	....	..	....	....	78	1	1,017	1	..	.....	.....	.....	....	..	79 12
Arichat	....	....	..	....	....	48	1	109	220	4	5	1	.....	....	..	22 17
Totals	3	233	4	79	5	126	2	5,419	7,394	4	1,995	1	3,753	164	1	900 75

FISH OIL.

Districts.	Seal Oil.			Porpoise Oil.		Cod Oil.						Hake Oil.	Other Fish Oil.	Fees.
	No. 2 Pale.	No. 3 Straw	No. 4 Bro'n.	No. 2 Straw.		A.			B.			A.	A.	
	Tcs.	Tcs.	Tcs.		Brls.	Pun.	Tcs.	Brls	Pun.	Tcs.	Brls.	Brls.	Tcs.	
														$ cts.
Quebec	6	323	26	1	.....	...	549	....	....	4	....	.....	1	178 05
St. John	....	.....	....	.....	11	....	....	303	....	....	21	310	....	106 15
Lunenburg	....	....	....	..	....	20	319	....	4	....	4	....	.....	69 40
Totals	6	323	26	1	11	20	868	303	4	4	25	310	1	353 60

FLOUR.

District.	Straight Roller.		Extra.		Superfine.		Sour.		Rejected.	Fees.
	Brls.	Bags.	Brls.	Bags.	Brls.	Bags.	Brls.	Bags.	Bags.	
										$ cts.
Quebec	4,945	1,412	2,119	6,350	195	1,025	104	50	1,058	228 95

STATEMENT showing Quantity of certain Staple Articles of Canadian Commerce inspected, &c.—*Concluded.*

BEEF AND PORK.

District.	Beef.	Pork.			Fees
	Mess.	Mess.	Thin Mess	Rejected.	
	Brls.	Brls.	Brls.	Brls.	$ cts.
Quebec	112	572	41	16	185 25

LEATHER AND HIDES.

—	Hides.				Calf Skins.		Fees.
	No. 1	No. 2	No. 3	Sq. Ft.	No. 1	No. 2	
							$ cts.
Montreal	69,405	8,211	8,242				4,806 95
Quebec	21,663	8,586	1,089	18,486			1,757 12
Hamilton	18,286	6,067	592		1,233	283	1,323 05
Kingston	5,123	177	449				287 45
Ottawa	8,797	2,030	336				559 15
Toronto	19,029	19,137	4,192				3,137 95
St. John	5,667						281 45
Winnipeg	4,190	1,775	289		547	209	350 40
Lévis	4,154	698	1				242 65
Totals	156,314	46,681	15,190	18,486	1,780	492	12,746 17

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B.

STATEMENT of Seizures on account of Illicit Manufactures for Fiscal Year ended 30th June, 1897.

Divisions.	Number.	Names.	Schedule Value.	Residences.	Dates.	Remarks.
			$ cts.			
Ottawa	134	E. A. Coté	1 50	Papineauville	Sept. 7, '96	
	135	Rev. C. E. Perrin	1 00	Hartwell	do 5, '96	
	136	A. S. Lauzon	0 30	Papineauville	do 7, '96	
	137	P. Reginbald	2 00	do	do 7, '96	
	138	L. Lavigne	0 30		April 9, '97	
Owen Sound	28	Wm. McIlroy	21 00		Feb. 20, '97	Sentenced to fine of $100 and 1 mo.'s jail and in default 5 mos. extra.
Peterborough	3	Wm. Cook	5 00	Ashburnham	Mar. 8, '97	Dept. of Justice for prosecution.
	4	James McLelland	6 00		do 8, '97	
St. Catharines	18	J. Smith	11 80	Niagara Falls	Sept. 7, '96	Dept. of Justice for prosecution.
	19	C. M. Aitnie	0 80		Oct. 30, '96	Penalty of $50.
Toronto	319	E. Sullivan	0 75		do 7, '96	do $10.
	320	Samuel Duckworth	12 00	East Luther	Dec. 29, '96	Sentenced to fine of $100. and costs.
	321	Wm. M. Bridgman	2 00	Tp. North Orillia	Feb. 10, '97	Sentenced to fine of $100.
	322	Wm. Baxter	5 25	do	do 10, '97	do do
	323	J. C. Scarr	8 00	Tp. of Ferguson	March 4, '97	do do and 1 mo. or in default 2 mos. extra.
	324	F. Stotesbury			do 22, '97	Fined $10.
	325	Albert Weiser			May 5, '97	
	326	Joseph Desbois, Jos. Le Fournier, Neil McArthur	5 00	Tp. of Springer	June 2, '97	Desbois and Le Fournier fined $100 each and 1 and 2 mos. imprisonment respectively.
Joliette	135	J. B. H. Gaudet	4 00	L'Epiphanie	do 12, '97	Fined $5.
Montreal	851	A. Archambault	3 00	St. Pierre les Liens	July 25, '96	Fined $10.
	852	Siméon Crevier	5 50	St. Laurent	Aug. 1, '96	do $50.
	853	P. Thomas	0 70	Laprairie	Sept. 1, '96	do $10.
	854	F. X. Bonneau	5 00	St. Philippe	do 2, '96	do $100.
	855	J. G. Gascon	8 00	St. François de Sales	Oct. 5, '96	do
	856	Jos. Gravel	1 70		do 15, '96	do $50.
	857	Jos. O'Connor	0 90		do 15, '96	Case dismissed.
	858	Ovide Leroux	10 00		do 15, '96	Fined $50.
	859	Henri Dubois	4 10		do 15, '96	do
	860	Jno. McLean	10 50		do 15, '96	do
	861	J. E. Pharand	1 50		do 17, '96	Fined $10.
	862	J. E. Poirier	0 60		do 17, '96	
	863	J. Besner	1 50		do 17, '96	
	864	D. Hayes	7 00		do 20, '96	Fined $50.
	865	P. Payette	4 50		Nov. 2, '96	Sentenced to fine of $50, or 5 days in jail.
	866	Jos. Bonnette, Cyrille Blouin, Emile Blouin	9 00		do 6, '96	Sentenced to fine $100 and 2 mos. jail and 1 mo. extra in default. do do Sentenced to fine $100 and 1 mo. or 2 mos. extra in default.
	867	Ovila Venne	5 00		do 14, '96	Fined $10.
	868	Chas. Collin, J. M. Bellisle	4 50		Nov. 22, '96	Sentenced to fine of $100 or 15 days imprisonm't
	Nil	Edmond Jean		Amqui	do 22, '96	Sentenced to fine of $100 or 45 days imprisonment
	869	Jos. Clément	0 65		do 30, '96	Fined $5.
	870	Jno. Charette	6 00	St. Rose	Dec. 1, '96	Case dismissed.

STATEMENT of Seizures on account of Illicit Manufactures for Fiscal Year ended 30th June, 1867—*Continued.*

Divisions.	Number.	Names.	Schedule Value.	Residences.	Dates.	Remarks.
			$ cts.			
Montreal— *Concluded.*	871	Vitalice Bélair	28 00		Dec. 7, '96	
	872	Albert Leithardt. *alias* Leonard	13 25		Jan. 2, '97	Sentenced to fine of $100 and costs and 1 mo. jail.
	873	E. Picard	4 00		do 27, '97	Fined $10.
	874	Onésime Goulet	0 60		do 28, '97	
	875	E. Ladouceur	0 50	St. Polycarpe	Feb. 13, '97	
	876	Fabien Blanchard	0 65		do 23, '97	Dept. of Justice for prosecution.
	877	Vital Dufort	0 40		do 25, '97	Fined $10.
	878	Israel Gauthier	4 50	St. Pierre aux Liens.	March 1, '97	do $10.
	879	Wilfrid Coté	48 00		do 9, '97	
	880	F. R. Bonneau	2 00	St. Philippe	do 15, '97	do $50
	881	Michel Légaré	42 00	Ste. Thérèse	do 16, '97	Fined $50 and costs or 1 mo. jail.
	882	Eusèbe Beaudoin	1 00		April 1, '97	Fined $10.
	883	Albert Fauteux	0 50		do 10, '97	do $10.
	884	P. E. Poirier	1 50	Côteau Station	do 15, '97	do $10.
	885	J. Lalonde *alias* Latreille, Louis Dupuis. W. Blondin	8 85	St. Anicet	May 4, '97	do $100. do $100.
	886	R. Bouthillier	1 00		do 12, '97	
	887	J. R. Beauchamp	2 00		do 25, '97	do $10.
	888	Pierre Rivard	2 75	Ste. Cunégonde	June 2, '97	do $25.
	889	Wm. Cooper	1 00		do 10, '97	do $25.
Quebec	890	Eustache Sarrazin	32 90	Ste. Thérèse	do 11, '97	do $50 and costs.
	392	Joseph Lafrance	6 00	Bic	July 23, '96	Case dismissed.
	393	Louis Cloutier	3 25	St. Fabien	do 23, '96	
	Nil	J. A. Blais		Lévis	do 23, '96	Penalty of $50.
	394	F. X. Pageau	80 00	St. Roch	Aug. 12, '96	Sentenced to fine of $50.
	395	Lazare Houde	30 00	Charlesbourg	do 12, '96	Fined $100 and costs.
	396	M. Fontaine	5 00	St. Valier	do 20, '96	
	397	Pierre Jobidou	10 00	Charlesbourg	Sept. 5, '96	Sentenced to fine of $100 and 1 mo. jail.
	398	Louis Roy			do 16, '96	
	399	E. Fiset	2 64	St. Christine	Oct. 10, '96	Sentenced to fine of $100 and costs or 1 mos. jail.
	400	J. M. B. Dion	6 20		do 26, '96	
	401	Mde. Jos. Sart	6 00	Notre Dame du Lac.	Dec. 7, '96	Fined $10.
	402	Louis Bouffard	3 00	St. Raphael	do 15, '96	Dept. of Justice for prosecution.
	403	Michel Thébarge	4 00	do	do 15, '96	do do
	404	Philias Cadrin	2 00	do	do 15, '96	do do
	405	Jos. Carbonneau	4 00	do	do 16, '96	do do
	406	E. Nadeau	6 00	Notre Dame du Portage.	Jan. 12, '97	Sentenced to fine of $100 and 1 mo. jail.
	407	J. E. Teucarre	50 00	Inverness	do 17, '97	
	408	Jos. B. Jarvis	4 00		Feb. 4, '97	Sentenced to fine of $100 and 1 mo. jail in two cases.
	409	Théophile Lachance	8 00	St. Sauveur		Sentenced to fine of $100 and 1 mo. jail.
	410	Louis Deslaurier	25 00		April 20, '97	Dismissed.
	411	Alphonse Deslaurier	42 50		do 26, '97	Sentenced to fine of $100 and 1 mo. jail.
	412	Jos. Blouin	16 80	River St. Charles	May 15, '97	do do
	413	Louis Brousseau	20 00	St. Sauveur	do 31, '97	Dept. of Justice for prosecution.
Sherbrooke	108	J. Lapalme	10 00	St. Johns	Aug. 25, '96	Fined $5.
	109	A. J. Fréchette	0 85	Iberville	do 24, '96	Dept. of Justice for prosecution.
	110	H. Boucher	1 50	do	do 25, '96	Fined $10.

STATEMENT of Seizures on account of Illicit Manufactures for Fiscal Year ended 30th June, 1897—*Continued.*

Divisions.	Number.	Names.	Schedule Value.	Residences.	Dates.	Remarks.
			$ cts.			
Sherbrooke—*Concluded.*	111	J. E. Pelletier	0 20	do	do 24, '96	Dept. of Justice for prosecution.
	112	J. B. Latour	0 50	Farnham	do 24, '96	Fined $10.
	113	Thos. V. Read	17 00	Tp. of Whitton	Sept. 7, '96	do $50.
	114	Jos. Soucy	33 20	Coaticook	Oct. 9, '96	Sentenced to fine of $100.
	115	Jno. Hanigan		Notre Dame de Stanbridge.	do 21, '96	Fined $10.
	116	Mrs. J. Nugent	2 40		Nov. 4, '96	do $10.
	117	Jedison L. Perkins	2 00	Mansonville	Jan. 8, '97	do $50.
	118	Pierre Cordeau		St. Valérien	do 18, '97	do $50.
	119	Jos. Mead & Co	10 20	North Coaticook	Feb. 6, '97	do $25.
	120	Mrs. Ellen Hurd	3 60	do	do 6, '97	do $50.
	121	Dwight Paul	2 00	Fairfax	do 25, '97	do $50.
	122	Alex. Ouimet	1 00	Farnham	Mar. 4, '97	do $5.
	123	Henri Fortin			do 15, '97	do $50 and costs or 3 mos. jail.
	124	Mrs. Brooks	0 20	Coaticook	Mar. 18, '97	Sentenced to fine of $100.
	125	Adèlard Picard		Ste. Cecile de Milton.	April 15, '97	Sentenced to fine of $50 and costs or 3 mos. jail.
		Joseph Picard		do		Sentenced to fine of $200 and costs and 2 mos., and 2 mos. more in default.
	126	Pierre Langevin	10 00	St. Valérien	April 15, '97	Sentenced to fine of $100 and costs and 1 mo., and 2 mos. more in default.
Sorel	70	Marchessault Bros	0 50	St. Ours	Oct. 24, '96	Fined $10.
	71	Rich. Lamoureaux	0 50	Contrecœur	do 24, '96	do
	72	U. St. Jean & Co	2 00	do	do 24, '96	do
Ste. Hyacinthe	62	P. A. Lahaise	0 25	St. Hilaire	July 30, '96	Fined $10.
	63	L. G. E. Goulet	0 50	do	do 30, '96	do
	64	F. Lalonde	2 00	St. Barnabé	Aug. 10, '96	do
	65	J. B. Richer dit Laflèche	6 20	St. Jude	Mar. 6, '97	Sentenced to fine of $100 and 1 mo. jail, in default 1 month extra.
Terrebonne	56	Z. Desjardins	2 00		do 19, '96	do $50 and costs.
	57	Jos. Gadbois	2 10		do 19, '96	do $50.
	58	Michel Légaré	8 25	Ste. Thérèse	Mar. 17, '97	do $100.
Three Rivers	103	Aimé Ricard	22 00	Grandes Piles	Jan. 27, '97	Case dismissed.
Chatham, N.B.	11	Geo. E. Mercier	2 50	Dalhousie	Dec. 4, '96	
St. John	58	James Doherty	2 00	New Ireland	Aug. 22, '96	Sentenced to fine of $100.
	59	Lawrence Doherty	4 00		do 22, '96	do do $100.
	60	Napoléon St. Pierre	3 00	Winding Ledges	Mar. 31, '97	Fined $25.
	61	Napoléon Bernier	0 60	Conors	do 31, '97	
	62	Demers Landry	5 40	do	do 31, '97	do $25.
	63	Paul Rosignol	6 60	Caron Brook	April 1, '97	
	64	Mrs. C. Morrison	5 40	St. Hilaire	do 1, '97	
	65	Abraham DeVillers	8 00	Green River	do 2, '97	Sentenced to fine of $100 and 1 mo. jail.
	66	F. B. Soucie	0 90	St. Leonards	do 2, '97	
Cape Breton	43	Alex. McDonald. Chas. McDonald. Angus McLeod. Alex. McEachern	41 60	Mabou Harbour	Aug. 27, '96	Sentenced to fine of $100 and 1 month in jail.
	44	Noah Hunt. Chas. A. Hunt. Geo. Hunt Jno. McKinnon. Wm. McNorten. Jno. McDonald. Fred. Jefferson. Gabriel Bilard.	167 50		Sept. 4, '96	Dept. of Justice for prosecution.
	45	Jno. McDonald. Angus McLean.	67 15		do 25, '96	Sentenced to fine $100 and 1 month in jail.

STATEMENT of Seizures on account of Illicit Manufactures for Fiscal Year ended 30th June, 1897—*Concluded.*

Divisions.	Number.	Names.	Schedule Value.	Residences.	Dates.	Remarks.
			$ cts.			
Cape Breton—*Concluded.*	46	Alex. McDonald. / Mich. McDonald	24 60	Lake Ainslie....	Feb. 11, '97	Sentenced to fine $500 and 1 month in jail.
	47	Malc. McDonald. / Jno. B. McDonald	27 00	Little Mabou..	do 12, '97	Dept. of Justice for prosecution.
	48	Donald A. McLeod..	60 00	Brook Village...	Mar. 20, '97	do do
	49	Jno. McDonald.....	28 20	Little Mabou..	do 20, '97	do do
Halifax. . ..	158	John Ross.....	14 50	Kemptown	Feb. 16, '97	do do
	159	John McKay.	20 50	do	Mar. 23, '97	do de
	160	Mrs. David Walker.	0 20	. ...	May 14, '97	do do
	161	Chas. Clarke.....	0 12	....	May 31, '97	Fined $100.
	162	Edward McCallum..	2 00	East New Annan	June 19, '97	do and 1 mos. jail.
Pictou.....	69	John McDonald...	11 90	Kippoch	Nov. 7, '96	
	70	Albert Beckwith	5 15	....	June 7, '97	Sentenced to fine of $100 or 3 mos. imprisonmn't.
	71	Donald McDonald..	2 00	Antigonish	June 17, '97	
Yarmouth....	1	Wm. Lowe ..... / W. McNaughton	103 40	.....	May 7, '97	Sentenced to fine of $100 and 1 mo. jail; in default 3 mos. extra.
Winnipeg.....	46	Jas. Coulter.....	35 00	Wawanesa	Oct. 28, '96	do $100.

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX 16.

STATEMENT showing the Amount of Excise and other Revenues collected at each of the undermentioned Outoffices, during the Fiscal Year ended 30th June, 1897.

Divisions.	Outoffices.	Licenses.	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Petroleum	Manufactures in Bond.	Other Receipts.	Electric Light Inspection Fees.	Totals.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Belleville	Deseronto	20 00	639 68			4,192 00						4,851 68
	Trenton	20 00	3,994 66									4,014 66
Brantford	Norwich	50 00							1,536 87		10 00	1,596 87
	Tilsonburg	195 00	2,913 98		2,635 53	27 80	1,441 80				30 00	7,244 11
	Woodstock	400 00	925 11		870 00	4 00	3,023 70				60 00	5,282 81
Guelph	Berlin	395 00	39,622 00			8,819 58	17,619 63					66,456 21
	Galt	470 00	7,259 78		11,048 85	74 10	1,987 95	0 10				20,840 78
	New Hamburg	50 00			2,540 37							2,590 37
	Preston	300 00			2,734 59	138 50	2,324 40					5,497 49
	Salem	50 00										50 00
	Waterloo	275 00			12,326 28	181 90	5,524 50					18,307 68
	Waterloo Distillery	250 00	352,830 52		1,800 00					2,280 87		357,161 39
Hamilton	Dundas	200 00			37,665 99							37,865 99
	Grenville	150 00			12,942 46							13,092 46
Kingston	Napanee	40 00	7,178 81			3,529 25		61 30			10 00	10,819 36
London	Aylmer										10 00	10 00
	Glencoe										10 00	10 00
	Forest										10 00	10 00
	Parkhill										10 00	10 00
	Petrolea	20 00	12,922 31					8,329 81		4 00	25 00	21,301 12
	Sarnia	130 00	14,385 21		965 10	18,003 75		8 70		59 98	10 00	33,562 74
	Strathroy	120 00	2,581 68		4,219 36						10 00	6,931 04
	St. Thomas	165 00	5,164 73		1,289 85	146 90	6,477 00	310 90			25 00	13,579 38
	Watford										10 00	10 00
Owen Sound	Collingwood	155 00	4,038 37			14,578 75	577 35					19,349 47
	Kincardine	20 00	1,367 86							316 69		1,704 55
	Meaford	20 00	3,571 79			2,446 00						6,037 79
	Neustadt	150 00			2,186 00							2,336 00
	Walkerton	200 00			5,261 46	8 50	507 40					5,977 36
Perth	Arnprior	40 00	7,551 46								25 00	7,616 46
	Almonte										25 00	25 00
	Carleton Place										25 00	25 00

	Eganville	20 00	2,432 43								20 00	2,472 43
	Pakenham										10 00	10 00
	Pembroke	155 00	14,139 20			12,052 68	1,998 99				25 00	28,370 87
	Renfrew	20 00	5,255 94								20 00	5,295 94
	Smith's Falls	75 00				60 10	2,856 00	273 90			50 00	3,315 00
Peterborough	Cobourg	70 00	7,233 50		1,838 64						45 00	9,187 14
	Lindsay	50 00			57 00						35 00	142 00
	Port Hope	270 00	2,928 71		13,796 68			225 60		849 99	50 00	18,120 98
Prescott	Brockville	345 00	4,172 79		8,414 39	147 80	5,637 72	260 46				18,978 16
	Gananoque	20 00	4,827 75									4,847 75
St. Catharines	Niagara Falls	75 00				30 60	769 35					874 95
	Port Colborne	100 00			4,056 12							4,156 12
	Thorold	20 00	1,881 44									1,901 44
	Welland	95 00	1,318 95			1 20	399 60	121 10				1,935 85
Straford	Goderich	207 50	3,807 99		1,620 45	20 00	425 40	0 20				6,081 54
	Listowel	125 00			1,606 35	140 30	3,366 00	205 90				5,443 55
	Palmerston	275 00			52,484 52	80 00	424 80					53,264 32
	St. Mary's	20 00	3,252 17			1,780 75		0 30				5,053 22
Toronto	Barrie	370 00	4,796 01		3,934 62	24 40	1,336 80			307 00	110 00	10,878 83
	Hornby	100 00			3,327 00							3,427 00
	Orillia	100 00			979 20						25 00	1,104 20
	Sault Ste. Marie	20 00	1,465 70			2,790 00					25 00	4,300 70
	Whitby							50 20				50 20
Windsor	Chatham	135 00	8,755 93			3,993 20	4,039 17	4 20			25 00	16,952 50
	Leamington	75 00				13 00	1,011 30				10 00	1,109 30
Montreal	Valleyfield	20 00	24,564 98				708 00					25,292 98
Quebec	Gaspé	20 00				691 50						711 50
	Magdalen Islands	20 00				742 38						762 38
	Paspébiac	20 00				2,273 00						2,293 00
	Rivère du Loup	40 00	7,774 58			171 88	72 00					8,058 46
Sherbrooke	Granby	275 00				60,878 36	36,083 46				10 00	97,246 82
	St. John's	90 00	20,087 98					46 30		179 78	10 00	20,414 06
Terrebone	St. Jerome	95 00	12,289 93			379 33	16,703 70					29,467 96
Three Rivers	Drummondville							13 00				13 00
	Victoriaville	95 00	9,904 35			110 10	2,201 10					12,310 55
St. John, N.B.	Bathurst		403 35			1,214 39						1,617 74
	Campo Bello		139 40									139 40
	Fredericton	40 00	190 90			9,068 12		91 00		9 00		9,399 02
	Moncton	40 00				16,218 35		2,299 50			25 00	18,582 85
	Newcastle	20 00	127 50			9,703 25						9,850 75
	St. Stephen					9,921 35	522 00	182 80				10,626 15
	Sackville	20 00				4,597 63		3 20				4,620 83
	Sussex	20 00				1,635 00						1,655 00
	Woodstock	40 00	802 24					8 10				850 34
Cape Breton	North Sydney	45 00				5,906 50		65 65				6,017 15
Halifax	Amherst	20 00	2,948 04			999 38						3,967 42
	Truro	40 00	1,603 70			9,444 76						11,088 46
Pictou	Antigonish	40 00				5,065 13						5,105 13
	New Glasgow	20 00				3,628 75					25 00	3,673 75
Yarmouth	Weymouth	20 00				1,406 88						1,426 88

STATEMENT showing the Amount of Excise and other Revenues collected at each of the undermentioned Outoffices—*Concluded.*

Divisions.	Outoffices.	Licenses.	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Petroleum	Manufactures in Bond.	Other Receipts.	Electric Light Inspection Fees.	Totals.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Winnipeg	Brandon	215 00	13,190 44			2,560 90	1,518 45					17,484 79
	Gretna	20 00	4,029 69									4,049 69
	Portage la Prairie	60 00	8,810 61			3,539 00						12,409 61
	Prince Albert	220 00	1,598 40		1,055 96	248 14				10 00		3,132 50
	Rat Portage	60 00	18,288 28			1,047 63					25 00	19,420 91
	Virden	20 00	6,229 23									6,249 23
	West Selkirk	20 00	4,065 96									4,085 96
Calgary	Anthracite	20 00	854 75									874 75
	Edmonton	170 00	1,215 47		943 81	676 25						3,005 53
	Lethbridge	20 00	1,447 06					1 23		4,210 95		5,679 24
	MacLeod							29 25				29 25
Vancouver	Golden	20 00	6,180 90			594 50						6,795 40
	Grand Forks	50 00			213 00							263 00
	Kamloops	145 00	7,144 49		723 70	820 90	1,886 10					10,720 19
	Kaslo	145 00	5,010 96		330 75	306 00	1,057 05	19 70				6,869 46
	Nakusp	20 00	4,974 42			2,643 50						7,637 92
	Nelson	130 00	24,976 30		964 50	500 63		54 55				26,625 98
	New Westminster	125 00			1,714 30	210 20	4,292 10			1 00		6,342 60
	Revelstoke	120 00	3,847 43		30 00	515 60						4,512 43
	Rossland	302 50	11,695 55		1,820 53	26 60	846 00	90 10				14,781 28
	Trail	187 50	9,446 94		2,488 05	61 90	301 50	7 50				12,492 99
	Vernon	50 00			90 00							140 00
Victoria	Nanaimo	320 00	1,830 71		5,682 44		1,827 60			17 00		9,677 75
		10,107 50	748,890 60		206,657 85	231,092 25	129,767 92	12,764 55	1,536 87	8,246 26	850 00	1,349,913 80

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

FINANCIAL RETURNS, 1896-97

DR. **No. 1.—GENERAL REVENUE ACCOUNT, 1896-97.** CR.

Memo. of Refunds deducted below.	Amounts deposited to the Credit of the Receiver General.	Authorized Abatements.	Balances due 30th June, 1897.	Totals.	SERVICES.	Revenues of Previous Years not collected 1st July, 1896.	Revenues Accrued, 1896-97.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
95,348 55	9,173,597 74	.... ..	23,790 29	9,197,388 03	Excise and Seizures, per Statement No. 3.....	37,612 95	9,159,775 08	9,197,388 03
.....	4,282 00	10 00	28,426 08	32,718 08	Hydraulic and other Rents, per Statement No. 5....	28,523 08	4,195 00	32,718 08
10 00	12,071 68	400 00	12,678 41	25,150 09	Minor Public Works, per Statement No. 6.	15,713 13	9,436 96	25,150 09
.....	10,428 12	.....	38,457 58	48,885 70	Culling Timber, per Statement No. 7	38,529 73	10,355 97	48,885 70
11 75	36,795 69	..... .	2,348 24	39,143 93	Weights and Measures, per Statements Nos. 19 (A) and 19 (B).....	2,550 40	36,593 53	39,143 93
....	17,271 75	.....	485 75	17,757 50	Gas Inspection, per Statement No. 21.....	425 00	17,332 50	17,757 50
90 00	6,895 25	66 25	.. ....	6,961 50	Electric Light Inspection, per Statement No. 23.....	117 00	6,844 50	6,961 50
.....	4,302 55	....	.....	4,302 55	Law Stamps, per Statement Nos. 10 and 18.....	.. ..	4,302 55	4,302 55
.. . .	.....	.....	45 04	45 04	Bill Stamps, per Statement No. 9.....	45 04	. . ..	45 04
.....	769 25	.....	.. ..	769 25	Sundry Minor Revenues, per Statement No. 11.....	. . ..	769 25	769 25
.....	22,266 91	.....	.....	22,266 91	Methylated Spirits, net receipts.....	....	22,266 91	22,266 91
95,460 30	9,288,680 94	.. ....	.....	9,395,388 58		. ...	9,271,872 25	9,395,388 58
.....	95,460 30	....	.....	95,460 30	.....LESS—Refunds as per Statement No. 16.....	.. ..	95,460 30	95,460 30
....	9,193,220 64	476 25	106,231 39	9,299,928 28	.....Totals...	123,516 33	9,176,411 95	9,299,928 28

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

DR. No. 2.—GENERAL EXPENDITURE

Amounts due to Collectors, &c., 1st July, 1896.	Expenditures Authorized by Department.					Amounts due by Collectors, &c., 30th June, 1897.	Totals.
	Salaries.	Contingencies.	Seizures.	Cullers' Fees.	Cullers' Annuities.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
608 04	304,458 41	88,135 68	1,096 79	.....	....	468 98	394,767 90
.....	5,050 00	1,752 05	....	3,733 36	6,083 34	75 00	16,693 75
....	....	.. . .	4,251 50	....	....	.....	4,251 50
.....	9,013 98	18,576 50	....	. . ..	....	25 91	27,616 39
. .....	42,265 07	6,269 37	....	..... .	....	16 66	48,551 10
269 80	50,166 87	16,659 47	6 28	.....	.....	.....	67,102 42
.....	14,907 85	4,238 20	.....	.....	....	212 88	19,358 93
.....	1,830 06	7,191 65	.....	....	....	.....	9,021 71
877 84	427,692 24	142,822 92	5,354 57	3,733 36	6,083 34	799 43	587,363 70

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

ACCOUNT, 1896–97. CR.

SERVICES.	Amounts due by Collectors, &c., 1st July, 1896.	Amounts disbursed by the Receiver General on requisitions of the Department.	DEDUCTIONS FROM SALARIES FOR		Amounts due to Collectors, &c., 30th June, 1897.	Totals.
			Superannuations.	Insurance.		
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Excise and seizures, per statement No. 4	343 98	386,203 01	6,011 50	71 76	2,137 65	394,767 90
Culling timber, per statement No. 8	75 00	16,517 79	100 96	.....	.....	16,693 75
Excise seizures distributed, per statement No. 4, appendix B	.....	4,251 50	.....	.....	.....	4,251 50
Sundry minor expenditure, per statement No. 12	500 00	26,977 75	138 64	.....	.....	27,616 39
Departmental expenditure, per statement No. 17	16 66	47,800 98	733 46	.....	.....	48,551 10
Weights and measures, per statements Nos. 20A and 20B	.....	65,034 83	828 06	80 04	1,159 49	67,102 42
Gas inspection, per statement No. 22	212 88	18,877 39	261 61	.....	7 05	19,358 93
Electric light inspection, per statement No. 24	.....	8,998 71	.....	.....	23 00	9,021 71
..... Totals	1,148 52	574,661 96	8,074 23	151 80	3,327 19	587,363 70

E. MIALL,
Commissioner.

EXCISE,

No. 3.—Collection Divisions,

Dr. (*For Details, see*

Balances due 1st July, 1896.	Amount Accrued during the Year, including License Fees.							
	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Petroleum Inspection Fees.	Bonded Manufactures.	Seizures.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts	$ cts.	$ cts.
2,983 43	203,161 49	50 00	4,160 27	6,296 60	1,167 60	233 50	.....	.....
234 18	27,122 93	150 00	10,352 90	8,111 70	18,375 81	144 40	1,586 77	.....
.....	11,031 15	.....	.....	3,442 77	.....	2 40	.....	.....
23 10	410,580 20	400 00	82,906 08	11,620 27	29,046 48	176 90	.....	.....
2,015 43	231,863 16	150 00	70,591 49	323,318 02	25,186 35	1,068 10	4,582 80	.....
112 20	47,435 35	100 00	62,757 72	24,395 77	21,132 36	1,681 10	1,547 25	.....
2,589 24	89,930 74	300 00	90,297 11	49,672 83	130,941 81	10,610 24	.....	4 00
138 75	173,726 54	200 00	4,355 79	45,264 25	.....	1,838 70	.....	.....
472 30	18,587 16	175 00	18,999 84	30,433 77	4,120 65	306 70	.....	.....
257 21	65,656 31	50 00	100 00	12,112 78	4,704 99	273 90	.....	.....
345 70	20,148 98	200 00	20,526 90	9,577 94	918 00	338 60	.....	.....
.....	10,754 00	50 00	.....	1,956 49	.....	170 58	.....	.....
.....	114,566 95	150 00	32,252 86	160 80	5,862 72	278 99	300 00	.....
693 15	16,564 58	100 00	14,700 68	3,553 63	10,637 25	123 30	.....	67 60
346 21	36,295 30	250 00	56,956 49	4,256 80	7,895 70	435 90	.....	.....
1,459 17	652,954 80	650 00	244,300 22	190,049 78	34,348 17	6,695 36	14,659 08	334 44
1,368 52	545,214 74	210 70	17,341 94	4,042 60	7,436 67	208 38	100 00	.....
430 23	.....	.....	.....	.....	.....	.....	.....	.....
13,468 82	2,675,594 38	3,185 70	730,600 29	728,265 80	301,774 56	24,587 05	22,775 90	406 04
78 10	30,156 64	50 00	642 20	13,663 57	1,540 31	.....	.....	102 80
10,415 25	905,226 70	600 00	146,529 36	1,070,784 94	252,795 87	6,557 20	10,906 27	1,331 68
1,499 98	276,758 14	200 00	36,421 90	117,583 59	10,755 38	3 40	3,255 14	487 35
70 91	123,371 08	150 00	4,308 00	69,265 35	51,810 96	46 30	300 00	314 34
.....	21,137 53	.....	.....	.....	.....	.....	.....	30 00
.....	55,181 16	.....	.....	.....	.....	.....	.....	30 00
270 00	12,289 93	50 00	389 46	2,345 88	16,778 70	.....	.....	150 00
304 29	53,240 24	.....	.....	1,523 88	6,542 94	285 00	.....	130 60
12,638 53	1,477,361 42	1,050 00	188,290 92	1,275,167 21	340,224 16	6,891 90	14,461 41	2,576 77
.....	127 50	.....	.....	7,812 14	.....	.....	.....	.....
2,202 18	101,351 79	100 00	10,338 57	123,654 46	11,547 30	4,776 75	.....	150 00
2,202 18	101,479 29	100 00	10,338 57	131,466 60	11,547 30	4,776 75	.....	150 00
.....	.....	.....	.....	8,844 25	.....	65 65	.....	.....
740 85	91,992 94	200 00	32,993 82	111,961 80	2,010 90	1,517 82	.....	10 00
.....	.....	.....	.....	22,447 00	.....	.....	.....	.....
17 40	.....	.....	.....	14,277 02	526 50	27 05	.....	10 00
5,860 50	.....	.....	.....	.....	.....	.....	.....	.....
6,618 75	91,992 94	200 00	32,993 82	157,530 07	2,537 40	1,610 52	.....	20 00
157 25	391 75	50 00	1,080 00	44,038 20	.....	280 90	.....	.....

1896-97.

in Account with Revenue.

Appendix A.) CR.

Other Receipts.	Total Duties Accrued.	Total Debits.	DIVISIONS.	Deposited to the Credit of the Receiver General.	Balances due 30th June, 1897.	Total Credits.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
120 00	215,189 46	218,172 89	Belleville	218,151 89	21 00	218,172 89
485 00	66,329 51	66,563 69	Brantford	66,280 96	282 73	66,563 69
185 00	14,661 32	14,661 32	Cornwall	14,661 32		14,661 32
2,360 87	537,090 80	537,113 90	Guelph	536,969 90	144 00	537,113 90
1,292 50	658,052 42	660,067 85	Hamilton	659,673 83	394 02	660,067 85
545 95	159,595 50	159,707 70	Kingston	159,578 83	128 87	159,707 70
310 00	372,066 73	374,655 97	London	373,047 81	1,608 16	374,655 97
215 50	225,600 78	225,739 53	Ottawa	225,739 53		225,739 53
80 00	72,703 12	73,175 42	Owen Sound	73,119 92	55 50	73,175 42
313 00	83,210 98	83,468 19	Perth	83,415 07	53 12	83,468 19
100 00	51,810 42	52,156 12	Peterborough	52,156 12		52,156 12
60 00	12,991 07	12,991 07	Port Arthur	12,991 07		12,991 07
151 25	153,723 57	153,723 57	Prescott	153,179 52	544 05	153,723 57
100 00	45,847 04	46,540 19	St. Catharines	46,409 99	130 20	46,540 19
80 00	106,170 19	106,516 40	Stratford	105,567 50	948 90	106,516 40
4,493 26	1,148,485 11	1,149,944 28	Toronto	1,149,207 53	736 75	1,149,944 28
576 50	575,130 53	576,499 05	Windsor	576,241 38	257 67	576,499 05
		430 23	Suspense Account		430 23	430 23
11,468 83	4,498,658 55	4,512,127 37	*Ontario*	4,506,392 17	5,735 20	4,512,127 37
60 00	46,215 52	46,293 62	Joliette	46,206 30	87 32	46,293 62
3,012 48	2,397,744 50	2,408,159 75	Montreal	2,402,578 94	5,580 81	2,408,159 75
920 00	446,384 90	447,884 88	Quebec	446,828 58	1,056 30	447,884 88
170 62	249,736 65	249,807 56	Sherbrooke	249,435 70	371 86	249,807 56
60 00	21,227 53	21,227 53	Sorel	21,227 53		21,227 53
40 00	55,251 16	55,251 16	St. Hyacinthe	55,251 16		55,251 16
20 00	32,023 97	32,293 97	Terrebonne	32,079 77	214 20	32,293 97
80 00	61,802 66	62,106 95	Three Rivers	61,730 41	376 54	62,106 95
4,363 10	3,310,386 89	3,323,025 42	*Quebec*	3,315,338 39	7,687 03	3,323,025 42
40 00	7,979 64	7,979 64	Chatham	7,979 64		7,979 64
328 00	252,246 87	254,449 05	St. John	253,004 38	1,444 67	254,449 05
368 00	260,226 51	262,428 69	*New Brunswick*	260,984 02	1,444 67	262,428 69
20 00	8,929 90	8,929 90	Cape Breton	8,929 90		8,929 90
400 00	241,087 28	241,828 13	Halifax	241,636 03	192 10	241,828 13
80 00	22,527 00	22,527 00	Pictou	22,527 00		22,527 00
80 00	14,920 57	14,937 97	Yarmouth	14,925 37	12 60	14,937 97
		5,860 50	Suspense Account		5,860 50	5,860 50
580 00	287,464 75	294,083 50	*Nova Scotia*	288,018 30	6,065 20	294,083 50
20 00	45,860 85	46,018 10	Charlottetown, *P.E.I*	45,700 55	317 55	46,018 10

EXCISE,

No. 3.—Collection Divisions,

Dr. (*For Details, see*

Balances due 1st July, 1896.	Amount Accrued during the Year, including License Fees.							
	Spirits.	Malt Liquor.	Malt.	Tobacco.	Cigars.	Petroleum Inspection Fees.	Bonded Manufactures.	Seizures.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
371 62	218,775 43	819 00	27,322 45	150,168 52	12,124 26	1,162 31	.....	110 00
98 98	9,381 02	150 00	7,608 19	676 25	.....	30 48	.....	.....
470 60	228,156 45	969 00	34,930 64	150,844 77	12,124 26	1,192 79	.....	110 00
1,491 65	107,271 94	900 00	14,870 55	34,676 77	12,412 35	2,404 15	.....	.....
565 17	90,121 40	350 00	19,622 34	35,021 93	9,659 64	273 55	.....	100 00
2,056 82	197,393 34	1,250 00	34,492 89	69,698 70	22,071 99	2,677 70	.....	100 00
37,612 95	4,772,369 57	6,804 70	1,032,727 13	2,557,011 35	690,279 67	42,017 61	37,237 31	3,362 81
.....	39,383 30	200 45	48,081 55	7,481 96	181 29	.....	.....	.....
.....	4,732,986 27	6,604 25	984,645 58	2,549,529 39	690,098 38	42,017 61	37,237 31	3,362 81

Inland Revenue Department,
Ottawa, 20th August, 1897.

1896–97.

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 30th June, 1897.	Total Credits.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
555 00	411,036 97	411,408 59	..Winnipeg, Man	411,381 88	26 71	411,408 59
80 00	17,925 94	18,024 92	..Calgary, N.W.T	18,024 92	.....	18,024 92
635 00	428,962 91	429,433 51	.....*Manitoba and N. W. T.*	429,406 80	26 71	429,433 51
410 00	172,945 76	174,437 41	..Vancouver.....	172,055 20	2,382 21	174,437 41
120 00	155,268 86	155,834 03	..Victoria...	155,702 31	131 72	155,834 03
530 00	328,214 62	330,271 44	.....*British Columbia*.....	327,757 51	2,513 93	330,271 44
17,964 93	9,159,775 08	9,197,388 03	..Totals..	9,173,597 74	23,790 29	9,197,388 03
20 00	95,348 55	.....	..LESS—Refunds, as per Statement No. 16.			
17,944 93	9,064,426 53	.....	..Net Revenue.			

E. MIALL,
Commissioner.

EXCISE,

No. 4.—COLLECTION Divisions

DR. (*For Details see*

Balances due by Collectors, 1st July, 1896.	Amounts received from Department to meet Expenditure.	Deductions from Salaries for		Balances due to Collectors, 30th June, 1897	Totals.	Divisions.
		Superannuation.	Insurance.			
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
43 98	6,749 91	138 61	.....	2 31	6,934 81	....Belleville.....
.....	7,478 05	143 66	71 76	26 41	7,719 88	....Brantford.....
.....	1,107 93	20 00	.....	.....	1,127 93	....Cornwall.....
.....	16,509 28	304 30	.....	.....	16,813 58	....Guelph.....
.....	20,338 70	395 83	.....	.....	20,734 53	....Hamilton.....
.....	10,550 68	200 34	.....	33 75	10,784 77	....Kingston.....
.....	16,225 53	311 78	.....	.....	16,537 31	....London.....
.....	6,263 62	63 76	.....	.....	6,327 38	....Ottawa.....
.....	4,802 43	84 28	.....	99 31	4,986 02	....Owen Sound.....
.....	6,010 25	87 21	.....	.....	6,097 46	....Perth.....
.....	4,622 20	87 92	.....	11 79	4,721 91	....Peterborough.....
.....	1,030 58	20 00	.....	.....	1,050 58	....Port Arthur.....
.....	10,833 17	195 79	.....	.....	11,028 96	....Prescott.....
.....	3,779 47	76 49	.....	.....	3,855 96	....St. Catharines.....
.....	6,839 46	121 64	.....	48 87	7,009 97	....Stratford.....
.....	39,623 70	795 13	.....	.....	40,418 83	....Toronto.....
.....	19,145 05	372 58	.....	49 08	19,566 71	....Windsor.....
.....	8,864 38	150 00	.....	84 72	9,099 10	....District Inspectors.....
43 98	190,774 39	3,569 32	71 76	356 94	194,815 69	.....*Ontario*.....
.....	2,344 55	43 96	.....	4 20	2,392 71	....Joliette.....
.....	42,367 88	758 14	.....	25 85	43,151 87	....Montreal.....
.....	11,775 45	184 05	.....	.....	11,959 50	....Quebec.....
.....	7,057 43	110 57	.....	39 26	7,207 26	....Sherbrooke.....
.....	997 00	19 60	.....	.....	1,016 60	....Sorel.....
.....	1,042 55	20 00	.....	.....	1,062 55	....St. Hyacinthe.....
.....	1,065 73	14 56	.....	5 25	1,085 54	....Terrebonne.....
.....	2,553 80	44 96	.....	122 42	2,721 18	....Three Rivers.....
.....	5,460 24	50 00	.....	8 63	5,518 87	....District Inspectors.....
.....	74,664 63	1,245 84	.....	205 61	76,116 08	.....*Quebec*.....
.....	999 00	20 00	.....	.....	1,019 00	....Chatham.....
.....	9,628 45	178 09	.....	38 50	9,845 04	....St. John.....
.....	2,735 96	44 00	.....	.....	2,779 96	....District Inspector.....
.....	13,363 41	242 09	.....	38 50	13,644 00	.....*New Brunswick*.....
.....	1,135 81	15 00	.....	48 55	1,199 36	....Cape Breton.....
.....	9,911 71	189 70	.....	.....	10,101 41	....Halifax.....
.....	1,002 31	18 40	.....	36 91	1,057 62	....Pictou.....
.....	1,960,49	34 96	.....	.....	1,995 45	....Yarmouth.....
.....	14,010 32	258 06	.....	85 46	14,353 84	.....*Nova Scotia*.....
100 00	2,252 38	43 96	.....	.....	2,396 34	.....*Charlottetown, P.E.I.*.....
200 00	14,045 32	225 35	.....	.....	14,470 67	....Winnipeg, Man.....
.....	3,758 37	48 00	.....	.....	3,806 37	....Calgary, N.W.T.....
.....	3,350 35	50 00	.....	.....	3,400 35	....District Inspector.....
200 00	21,154 04	323 35	.....	.....	21,677 39	.....*Manitoba and N.W.T.*.....

1896–97.

in account with Expenditure.

Appendix B.)

CR.

Balances due to Collectors, 1st July, 1896.	Expenditure authorized by the Department.						Balances due by Collectors, 30th June, 1897.	Totals.
	Salaries.	Seizures Expenditure.	Special Assistance	Rent.	Travelling Expenses.	Sundries.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
.....	6,499 72	.. . ..	.....	.....	201 95	189 16	43 98	6,934 81
85 70	6,742 48	.....	.....	50 00	546 86	294 84	... .	7,719 88
20 75	1,000 00	7 78	.....	.....	12 40	87 00	.....	1,127 93
37 49	14,739 79	.....	707 98	92 00	511 65	599 67	125 00	16,813 58
....	19,618 70	.....	751 31	.....	108 65	255 87	.....	20,734 53
.....	10,027 50	.. ..	. ...	270 00	52 70	434 57	.....	10,784 77
.....	15,105 00	.....	672 42	80 00	176 10	503 79	.....	16,537 31
.....	5,944 93	14 50	205 50	.....	58 78	103 67	.... ..	6,327 38
.....	3,803 31	24 50	319 21	175 00	400 98	263 02	.....	4,986 02
.. ....	5,516 69	.....	32 22	98 65	126 84	323 06	.. ..	6,097 46
8 84	4,400 00	25 41	.. ..	..... .	77 40	210 26	.....	4,721 91
.....	1,000 00	.....	.....	.....	8 60	41 98	.....	1,050 58
28 70	10,599 92	... .	100 00	..... .	6 65	293 69	.. ..	11,028 96
19 88	3,097 52	8 40	180 00	20 00	382 95	147 21	.....	3,855 96
.. . .	6,051 08	.....	424 70	.....	322 20	211 99	.....	7,009 97
.....	39,293 88	161 98	.....	.....	601 02	361 95	... .	40,418 83
57 99	18,840 05	.....	100 00	.....	233 80	334 87	... .	19,566 71
.. ....	7,500 00	....	. . ....	100 00	1,314 70	184 40	....	9,099 10
259 35	179,780 57	242 57	3,493 34	885 65	5,144 23	4,841 00	168 98	194,815 69
.....	2,249 16	15 60	....	.....	15 70	112 25	... .	2,392 71
109 24	38,065 84	107 32	3,576 22	.....	633 48	659 77	.....	43,151 87
....	9 752 46	170 19	818 94	.....	767 29	450 62	.. . .	11,959 50
....	6,134 06	98 44	.....	365 00	264 83	344 93	.....	7,207 26
.....	980 00	21 10	....	.....	....	15 50	... .	1,016 60
.....	1,000 00	12 55	....	.....	....	50 00	.....	1,062 55
....	786 07	33 92	.....	60 00	97 10	108 45	.....	1,085 54
....	2,150 00	25 40	229 17	....	141 80	174 81	.. ....	2,721 18
.....	5,000 00	....	.....	.....	449 07	69 80	....	5,518 87
109 24	66,117 59	484 52	4,624 33	425 00	2,369 27	1,986 13	. .. ..	76,116 08
..... .	1,000 00	. .....	.....	.. ....	.....	19 00	.....	1,019 00
75 00	9,021 29	1 60	162 50	.....	234 72	349 93	.....	9,845 04
.....	2,200 00	....	.....	.. ..	548 58	31 38	... .	2,779 96
75 00	12,221 29	1 60	162 50	....	783 30	400 31	....	13,644 00
120 95	750 00	214 45	....	....	61 56	52 40	....	1,199 36
....	9,678 71	.....	....	.....	170 88	251 82	.....	10,101 41
....	920 00	38 03	.. ....	.....	17 60	81 99	..... .	1,057 62
.....	1,750 60	113 62	.....	....	116 93	14 90	.....	1,995 45
120 95	13,098 71	366 10	....	.....	366 97	401 11	.....	14 353 84
....	2,200 00	.. ..	....	30 00	....	66 34	100 00	2,396 34
....	10,675 45	.....	1,954 58	360 00	774 95	505 69	200 00	14,470 67
....	2,999 88	.....	.....	120 00	515 75	170 74	.....	3,806 37
.....	2,500 00	. .....	.....	360 00	469 05	71 30	....	3,400 35
.....	16,175 33	..... .	1,954 58	840 00	1,759 75	747 73	200 00	21,677 39

EXCISE,

No. 4.—COLLECTION Divisions

DR. (*For Details see*

Balances due by Collectors, 1st July, 1896.	Amounts received from Department to meet Expenditure.	DEDUCTIONS FROM SALARIES FOR		Balances due to Collectors, 30th June, 1897.	Totals.	Divisions.
		Superannuation.	Insurance.			
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	
	7,740 70	122 35		175 45	8,038 50	Vancouver
	5,111 73	107 97		0 60	5,220 30	Victoria
	3,109 70	50 00			3,159 70	District Inspector
	15,962 13	280 32		176 05	16,418 50	*British Columbia*
	401 29				401 29	Chief Inspector of Inland Revenue
	200 21			25 24	225 45	Inspector of Bonded Factories
	21,022 65				21,022 65	General Expenditure
	5,833 41				5,833 41	Legal Expenses
	4,030 55				4,030 55	Printing
	954 70				954 70	Stationery
	455 25				455 25	Lithographing, Engraving, &c.
	9,289 16	48 56		1,250 55	10,588 27	Preventive Service
	5,490 23				5,490 23	Commission to Customs Officers
	58 63				58 63	Commission on sale of stamps for Canada Twist
	6,285 63				6,285 63	Duty-pay to officers in charge of most important establishments
343 98	386,203 01	6,611 50	71 76	2,137 65	394,767 90	Grand Totals

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

1896-97.

in account with Expenditure—*Concluded*.

Appendix B.)

Cr.

Balances due to Collectors, 1st July, 1896.	Expenditure authorized by the Department.						Balances due by Collectors, 30th June, 1897.	Totals.
	Salaries.	Seizures Expenditure.	Special Assistance	Rent.	Travelling Expenses.	Sundries.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
40 75	5,210 00	.....	1,171 29	478 00	512 65	625 81	.....	8,038 50
.....	4,255 00	.....	555 00	120 00	171 65	118 65	.....	5,220 30
.....	2,500 00	.....	.....	.....	659 70	.....	.....	3,159 70
40 75	11,965 00	.....	1,726 29	598 00	1,344 00	744 46	.....	16,418 50
.....	.....	.....	.....	.....	365 04	36 25	.....	401 29
.....	.....	.....	.....	.....	225 45	.....	.....	225 45
.....	.....	.....	.....	.....	.....	21,022 65	.....	21,022 65
.....	.....	.....	.....	.....	.....	5,833 41	.....	5,833 41
.....	.....	.....	.....	.....	.....	4,030 55	.....	4,030 55
.....	.....	.....	.....	.....	.....	954 70	.....	954 70
.....	.....	.....	.....	.....	.....	455 25	.....	455 25
2 75	2,899 92	2 00	.....	.....	.....	7,683 60	.....	10,588 27
.....	.....	.....	.....	.....	.....	5,490 23	.....	5,490 23
.....	.....	.....	.....	.....	.....	58 63	.....	58 63
.....	.....	.....	.....	.....	.....	6,285 63	.....	6,285 63
608 04	304,458 41	1,096 79	11,961 04	2,778 65	12,358 01	61,037 98	468 98	394,767 90

E. MIALL,
Commissioner.

HYDRAULIC AND OTHER RENTS.

No. 5.—Summary Statement of Lessees Accounts, 1896-97.

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

Balances due 1st July, 1896.	Accrued during the Year ended 30th June, 1897.	Totals.	——	Authorized Abatements.	Deposited to the Credit of the Receiver General.	Balances due 30th June, 1897.	Totals.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.
2,610 84	3,700 00	6,310 84	Chaudière Falls and Ottawa River		4,068 00	2,242 84	6,310 84
5 00	5 00	10 00	Saguenay River	10 00			10 00
	27 00	27 00	St. Lawrence River		27 00		27 00
60 00	40 00	100 00	St. Maurice River		20 00	80 00	100 00
60 00	10 00	70 00	Rivière du Liévre			70 00	70 00
738 91	413 00	1,151 91	Sundry properties		167 00	984 91	1,151 91
			Land Sales.				
15,573 50		15,573 50	Principal Accounts			15,573 50	15,573 50
9,474 83		9,474 83	Interest do			9,474 83	9,474 83
28,523 08	4,195 00	32,718 08	Totals	10 00	4,282 00	28,426 08	32,718 08

E. MIALL,
Commissioner.

Inland Revenue Department,
Ottawa, 20th August, 1897.

Balances due 1st July, 1896.	Accrued during year ended 30th June, 1897.	Refunds	Totals.	Works.	Authorized Abatements.	Deposited to the credit of Receiver General.	Balances due 30th June, 1897.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	*Bridges.*	$ cts.	$ cts.	$ cts.	$ cts.
2.600 62	.....	.....	2,600 62	.....Dunnville	.....	.....	2,600 62	2,600 62
				Ferries.				
50 00	25 00	.....	75 00	.....Bridgeburgh and Black Rock.....	25 00	25 00	25 00	75 00
.....	10 00	.....	10 00	.....Bristol	.....	10 00	.....	10 00
.....	50 00	.....	50 00	.....Buckingham and Cumberland	.....	50 00	.....	50 00
200 00	.....	.....	200 00	. . . Buffalo and point near Point Albinot.....	200 00	.....	.....	200 00
10 00	10 00	.....	20 00	.....Cardinal and Ogdensburg.....	.....	10 00	10 00	20 00
50 00	50 00	.....	100 00	.....Chippewa and Schlosser's Landing	50 00	50 00	.....	100 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	. . . .Fitzroy and Onslow.....	.....	50 00	.....	50 00
.....	50 00	.....	50 00	.....Fort Erie and Buffalo.....	.....	50 00	.....	50 00
77 22	155 00	.....	232 22	.....Hull (new lease)	.....	77 22	155 00	232 22
1,736 79	.....	.....	1,736 79	.....Hull (old lease)	.....	.....	1,736 79	1,736 79
.....	30 00	.....	30 00	... ..Lapasse and Gower Point	.....	30 00	.....	30 00
.....	6 00	.....	6 00	.....Montebello and Alfred.....	.....	6 00	.....	6 00
.....	100 00	.....	100 00	.....New Edinburgh and Gatineau (new lease).....	.....	50 00	50 00	100 00
75 00	.....	.....	75 00	.... New Edinburgh and Gatineau (old lease).....	75 00	.....	.....	75 00
.....	50 00	.....	50 00	.....Niagara and Youngstown (new lease).....	.....	.....	50 00	50 00
.....	41 67	.....	41 67	.....Niagara and Youngstown (old lease)	.....	41 67	.....	41 67
.....	1 00	.....	1 00	... Ouellette Street, Detroit.....	.....	1 00	.....	1 00
.....	12 00	.....	12 00	.. Papineauville and Brown's Wharf	.....	12 00	.....	12 00
.....	202 00	.....	202 00	.... Pembroke and Allumette Island (new lease).....	.....	202 00	.....	202 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 (new lease).....	.....	10 00	.....	10 00
.....	.....	10 00	10 00	. . . Queenston (old lease).....	.....	10 00	.....	10 00
150 00	50 00	.....	200 00	. . Queenston and Lewiston.....	.....	200 00	.....	200 00
.....	50 00	.....	50 00	.....Rockliffe and Gatineau.....	.....	50 00	.....	50 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
50 00	.....	.....	50 00	...Victoria and Black Rock	50 00	.....	.....	50 00

DR. No. 6.—MINOR PUBLIC WORKS, 1896–97—*Concluded.* CR.

Balances due 1st July, 1896.	Accrued during year ended 30th June, 1897.	Refunds	Totals.	Works.	Authorized Abatements.	Deposited to the credit of Receiver General.	Balances due 30th June, 1897.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	*Sundries.*	$ cts.	$ cts.	$ cts.	$ cts.
8,000 00	.....	.....	8,000 00	Dundas and Waterloo Road	.....	.....	8,000 00	8,000 00
2,520 00	7,963 39	.....	10,483 39	Government Telegraph Lines	.....	10,483 39	.....	10,483 39
.....	175 00	.....	175 00	Part of building, Portland, N.B. (new lease)	.....	175 00	.....	175 00
142 50	0 90	.....	143 40	Part of building, Portland, N.B. (old lease)	.....	143 40	.....	143 40
.....	25 00	.....	25 00	Wiarton Docks	.....	25 00	.....	25 00
15,713 13	9,426 96	10 00	25,150 09	Totals	400 00	12,071 68	12,678 41	25,150 09

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

No. 7.—CULLERS' REVENUE, 1896–97.

(For Details, see Appendix A.)

DR. CR.

Balances due 1st July, 1896.	Amounts accrued for measuring and culling timber during the year ended 30th June, 1897.	Totals.	——	Deposited to the credit of the Receiver General.	Balances due 30th June, 1897.	Totals.
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
38,239 96	19,355 97	48,595 93	....Quebec.....	10,428 12	38,167 81	48,595 93
289 77	....	289 77	....Plamondon, M. A	....	289 77	289 77
38,529 73	10,355 97	48,885 70	..... Totals.....	10,428 12	38,457 58	48,885 70

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

No. 8.—CULLERS' EXPENDITURE, 1896-97.

DR. *(For Details, see Appendix B.)* CR.

Balances due 1st July, 1896.	Received from Department to meet expenditure.	Deductions from Salaries for Superannuation.	Totals.	—	Authorized Expenditures.				Balances due 30th June, 1897.	Totals.
					Salaries.	Contingencies.	Cullers' Fees.	Annuities.		
$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
*75 00	10,373 68	100 96	10,549 64	Quebec	5,050 00	1,691 28	3,733 36		75 00	10,549 64
	6,083 34		6,083 34	Superannuated Cullers				6,083 34		6,083 34
	41 38		41 38	Printing		41 38				41 38
	19 39		19 39	Stationery		19 39				19 39
75 00	16,517 79	100 96	16,693 75	Totals	5,050 00	1,752 05	3,733 36	6,083 34	75 00	16,693 75

* This amount originally belonged to Montreal office, which was abolished and the books transferred to Quebec.

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

BILL STAMPS, 1896-97.

DR. No. 9.—BILL STAMPS Distributors in account with the Inland Revenue Department. CR.

BALANCES, 1ST JULY, 1896.		Totals.	——	BALANCES, 30TH JUNE, 1897.		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

LAW STAMPS, 1896–97.

DR. No. 10.—LAW STAMPS 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.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.	$ cts.
2,180 00	2,180 00	....Cassels, R., Registrar, Supreme Court.....	109 00	2,071 00	2,180 00
2,349 00	2,349 00	....Audette, L. A., Registrar, Exchequer Court.....	117 45	2,231 55	2,349 00
4,529 00	4,529 00	.....Totals.....	226 45	4,302 55	4,529 00

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

DR. SUNDRY MINOR REVENUES, 1896-97. CR.

Accrued during the year ended 30th June, 1897.	Totals.	——	Deposited to the credit of the Receiver General.	Totals.
$ cts.	$ cts.		$ cts.	$ cts.
293 25	293 25	....Fertilizers Inspection Fees.....	293 25	293 25
453 80	453 80	....Adulteration of Food Fees.....	453 80	453 80
22 20	22 20	... Casual Revenue	22 20	22 20
769 25	769 25	.....:.....Totals....	769 25	769 25

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

No. 12.—SUNDRY MINOR EXPENDITURES, 1896-97.

DR. *(For Details see Appendix B.)* CR.

Balance due 1st July, 1896.	Amounts received from Department to meet Expenditure	Deductions from Salaries for Superannuation.	Totals.	—	Salaries.	Contingencies.	Printing.	Stationery.	Balance due 30th June, 1897.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
500 00	23,870 16	138 64	24,508 80	....Adulteration of Food.....	9,013 98	15,019 47	283 12	166 32	25 91	24,508 80
.....	2,921 38	.....	2,921 38	....Inspection of Staples.....	.....	2,902 01	19 37	.....	.....	2,921 38
.....	186 21	.....	186 21	....Minor Public Works.....	.....	160 71	25 50	.....	.....	186 21
500 00	26,977 75	138 64	27,616 39	.....Totals.....	9,013 98	18,082 19	327 99	166 32	25 91	27,616 39

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

No. 13.—STATEMENT showing the quantities of the several articles subject to
1895, 1896 and 1897 and

ARTICLES SUBJECT TO EXCISE DUTY.	1895.			
	QUANTITIES.			Duty.
	Ex-Manufactory.	Ex-Warehouse.	Totals.	
	Gallons.	Gallons.	Gallons.	$ cts.
Spirits	36,035	2,509,019	2,545,054	3,870,752 20
	Imported.	*95,255	95,255	28,576 48
	36,035	2,604,274	2,640,309	3,899,328 68
Malt Liquor, the duty being paid on malt	17,628,815	.....	17,628,815	285 86
	Lbs.	Lbs.	Lbs.	
Malt	15,658	50,643,969	50,659,627	759,929 62
	No.	No.	No.	
Cigars	56,845,489	49,285,805	106,131,294	635,028 35
Cigarettes	54,493,440	12,135,000	66,628,440	99,943 11
	Lbs.	Lbs.	Lbs.	
Tobacco from Foreign Leaf	870,921	7,914,967	8,785,888	2,196,472 25
do Canadian Leaf	227,781	244,862	472,643	23,632 20
Snuff	244,085	.....	244,085	44,314 95
Canadian Twist	.....	65,710	65,710	3,285 53
Raw Leaf Tobacco, Foreign	.....	111	111	33 30
	1,342,787	8,225,650	9,568,437	2,267,738 23
Inspection Fees on Petroleum	.....	.....	.....	41,389 08
Manufactures in Bond	.....	.....	.....	46,405 23
Licenses, Spirits	.....	.....	.....	2,250 00
do Malt Liquor	.....	.....	.....	6,250 00
do Malt	.....	.....	.....	6,150 00
do Cigars	.....	.....	.....	12,212 50
do Tobacco	.....	.....	.....	2,149 50
do Manufactures in Bond	.....	.....	.....	1,375 00
Totals	.....	.....	.....	7,780,435 16

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

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

Excise Duty taken for Consumption, during the years ended 30th June, the Duty accrued thereon.

1896.				1897.			
Quantities.			Duty.	Quantities.			Duty.
Ex-Manufactory.	Ex-Warehouse.	Totals.		Ex-Manufactory.	Ex-Warehouse.	Totals.	
Gallons.	Gallons.	Gallons.	$ cts.	Gallons.	Gallons.	Gallons.	$ cts.
11,908	2,332,859	2,344,767	3,973,300 25	2,568	2,779,946	2,782,514	4,732,506 19
Imported.	* 118,291	118,291	35,487 31	Imported.	*125,378	125,378	37,613 38
11,908	2,451,150	2,463,058	4,008,787 56	2,568	2,905,324	2,907,892	4,770,119 57
18,014,714	.....	18,014,714	147 74	17,888,239	.....	17,888,239	479 70
Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.	
24,701	51,665,577	51,690,278	775,354 05	57,720	68,385,633	68,443,353	1,026,652 13
No.	No.	No.		No.	No.	No.	
64,208,250	44,082,010	108,290,260	648,462 92	67,469,160	45,806,945	113,276,105	678,029 67
77,664,900	2,797,000	80,461,900	120,692 85	92,134,000	1,664,000	93,798,000	156,257 85
Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.	
838,584	7,799,189	8,637,773	2,159,443 97	929,077	8,071,528	9,000,605	2,250,151 57
244,955	218,699	463,654	23,182 63	537,463	188,618	726,081	36,304 25
237,570	1,300	238,870	43,389 30	237,020	.....	237,020	43,041 95
.....	51,903	51,903	2,595 18	.....	78,371	78,371	3,918 53
.....	287	287	86 10	.....	648,688	648,688	65,027 20
1,321,109	8,071,378	9,392,487	2,228,697 18	1,703,560	8,987,205	10,690,765	2,398,443 50
.....	.....	.....	40,322 60	.....	.....	.....	42,017 61
.....	.....	.....	47,669 29	.....	.....	.....	35,787 31
.....	.....	.....	2,500 00	.....	.....	.....	2,250 00
.....	.....	.....	6,600 00	.....	.....	.....	6,325 00
.....	.....	.....	6,200 00	.....	.....	.....	6,075 00
.....	.....	.....	12,475 00	.....	.....	.....	12,250 00
.....	.....	.....	2,509 00	.....	.....	.....	2,310 00
.....	.....	.....	1,600 00	.....	.....	.....	1,450 00
.....	.....	.....	7,902,018 19	.....	.....	.....	9,138,447 34

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

E. MIALL,
Commissioner.

No. 14.—Amounts deposited monthly to the credit of the Receiver General on account of Inland Revenues, during the Fiscal Year ended 30th June, 1897.

—	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Manitoba and North-west Territories.	British Columbia.	Totals.
July:—	$ cts.	$ cts.	$ cts.	$ s.	$ cts.	$ cts.	$ cts.	$ cts.
Excise	280,587 05	247,297 54	22,998 51	22,411 89	3,599 75	30,792 49	22,387 64	630,074 87
do Seizures		500 00						500 00
Culling Timber		1,555 62						1,555 62
Hydraulic Rents	150 00	21 00					50 00	221 00
Minor Public Works						3,750 44		3,750 44
Weights and Measures	1,949 12	671 95		56 90	5 45	25 40		2,708 82
Gas Inspection	244 25			111 50	18 00		51 75	425 50
Electric Light Inspection	38 25			78 75				117 00
Other Revenues	199 90	25 00		50 00	25 00			299 90
	283,168 57	250,071 11	22,998 51	22,709 04	3,648 20	34,568 33	22,489 39	639,653 15
August:—								
Excise	277,409 05	270,603 08	26,361 33	22,262 01	3,871 50	33,264 92	26,755 46	660,527 35
do Seizures		91 85						91 85
Culling Timber		2,387 94						2,387 94
Hydraulic Rents	200 00						6 00	206 00
Minor Public Works	200 00		43 75			2,520 00		2,763 75
Weights and Measures	867 55	569 45	137 86	219 00	12 55	174 05	8 50	1,988 96
Gas Inspection	845 00	381 25	7 50			2 00	1 75	1,237 50
Electric Light Inspection	178 50	105 50	4 00	49 25				337 25
Other Revenues	47 50							47 50
	279,747 60	274,139 07	26,554 44	22,530 26	3,884 05	35,960 97	26,771 71	669,588 10
September:—								
Excise	290,580 73	257,767 82	23,790 94	21,761 34	4,030 10	44,508 32	28,872 60	671,311 85
do Seizures		141 90						141 90
Culling Timber		1,721 92						1,721 92
Hydraulic Rents	50 00	25 00	10 00				12 00	97 00
Weights and Measures	546 82	690 78	192 20	190 06	11 20	103 43	62 60	1,797 09
Gas Inspection	888 25	361 75	11 50	55 25			6 00	1,322 75
Electric Light Inspection	99 50	28 75	21 00	23 75				173 00
Other Revenues	459 80							459 80
	292,625 10	260,737 92	24,025 64	22,030 40	4,041 30	44,611 75	28,953 20	677,025 31

October:—								
Excise	346,103 00	297 156 51	28,712 75	26,835 69	3,735 57	43,185 20	25,862 93	771,591 65
do Seizures	10 00	260 59						270 59
Culling Timber		240 61						240 61
Hydraulic Rents	262 00	1 00					5 00	268 00
Minor Public Works							1 00	1 00
Weights and Measures	2,554 23	1,211 31	204 10	204 16	15 00	76 54	44 95	4,310 29
Gas Inspection	795 25	393 75	112 75	38 60		20 00	49 50	1,409 25
Electric Light Inspection	132 75	48 75	2 75	37 50				221 75
Other Revenues	384 95	1 00	115 00					500 95
	350,242 18	299,313 52	29,147 35	27,115 35	3,750 57	43,281 74	25,963 38	778,814 09
November:—								
Excise	295,930 61	263,596 81	24,016 54	25,749 94	4,920 24	43,020 65	22,477 96	679,712 75
do Seizures	50 00	379 40						429 40
Culling Timber		323 12						323 12
Minor Public Works	91 67		43 75					135 42
Weights and Measures	1,907 95	1,193 63	71 65	146 00	33 95	156 16	50 50	3,559 84
Gas Inspection	1,022 00	553 00	29 75	8 75		14 25	3 50	1.641 25
Electric Light Inspection	187 00	41 75	11 00	26 00				265 75
Other Revenues	725 15	95 00	35 00	65 00				920 15
	299,924 38	266,182 71	24,207 69	25,995 69	4,954 19	43,191 06	22,531 96	686,987 68
December:—								
Excise	312,542 32	333,364 15	26,357 15	28,465 60	4,735 75	41,647 25	30,648 55	777,760 77
do Seizures		154 00				110 00		264 00
Culling Timber		151 31						151 31
Hydraulic Rents	300 00							300 00
Minor Public Works	1 00							1 00
Weights and Measures	1,874 12	658 70	58 80	25 90	33 05	101 45		2,752 02
Gas Inspection	1,041 25	476 75	20 00	34 25		15 75	83 00	1,671 00
Electric Light Inspection	133 25	54 25	24 00	47 75				259 25
Other Revenues	1,288 00	243 60		53 00	10 00	26 00		1,620 60
	317,179 94	335,102 76	26,459 95	28,626 50	4,778 80	41,900 45	30,731 55	784,779 95
January:—								
Excise	248,973 68	210,346 54	19,456 39	20,806 10	2,652 75	29,825 75	22,638 65	554,699 86
do Seizures		146 45						146 45
Hydraulic Rents	51 00						1 00	52 00
Minor Public Works	25 00							25 00
Weights and Measures	2,255 45	358 82	55 45	20 70	8 10	84 90	122 60	2,906 02
Gas Inspection	980 75	505 00	53 75	105 00	18 00	18 00	72 75	1,753 25
Electric Light Inspection	319 25	16 50	1 25	149 75				486 75
Other Revenues	943 00	105 80		64 00	10 00	25 00		1,147 80
	253,548 13	211,479 11	19,566 84	21,145 55	2,688 85	29,953 65	22,835 00	561,217 13

No. 14.—Amounts deposited monthly to the credit of the Receiver General on account of Inland Revenues, &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	259,335 80	221,126 48	18,130 21	17,845 92	3,330 42	28,423 43	29,189 68	577,381 94
do Seizures	21 60	15 32	100 00	.....	.....	.....	.....	136 92
Hydraulic Rents	850 00	.....	.....	.....	.....	.....	.....	850 00
Minor Public Works	252 00	77 22	43 75	.....	.....	.....	.....	372 97
Weights and Measures	1,754 08	634 38	46 80	53 30	7 85	87 50	23 60	2,607 51
do do Seizures	.....	1 00	.....	.....	.....	.....	.....	1 00
Gas Inspection	674 50	318 50	34 50	16 50	1 50	17 00	10 00	1,072 50
Electric Light Inspection	269 75	64 50	.....	32 50	.....	.....	.....	366 75
Other Revenues	452 00	36 00	20 00	25 00	.....	.....	.....	533 00
	263,609 73	222,273 40	18,375 26	17,973 22	3,339 77	28,527 93	29,223 28	583,322 59
MARCH :—								
Excise	821,677 47	387,409 57	30,517 14	35,350 83	5,116 00	54,957 73	43,559 53	1,378,588 27
do Seizures	.....	342 61	.....	10 00	.....	.....	.....	352 61
Hydraulic Rents	1 00	1 00	.....	.....	.....	.....	.....	2 00
Minor Public Works	170 00	.....	.....	.....	.....	.....	.....	170 00
Weights and Measures	1,685 57	779 15	65 40	39 75	6 00	174 85	72 95	2,823 67
Gas Inspection	719 50	324 00	162 50	13 25	21 00	27 00	.....	1,267 25
Electric Light Inspection	144 75	123 25	2 75	61 25	.....	.....	.....	332 00
Other Revenues	497 00	10 00	.....	25 00	.....	1 00	.....	533 00
	824,895 29	388,989 58	30,747 79	35,500 08	5,143 00	55,160 58	43,632 48	1,384,068 80
APRIL :—								
Excise	1,193,803 66	512,892 39	29,102 91	57,985 80	6,945 42	62,240 68	31,881 98	1,894,852 84
do Seizures	317 44	111 20	.....	.....	.....	.....	.....	428 64
Culling Timber	.....	52 16	.....	.....	.....	.....	.....	52 16
Hydraulic Rents	1 00	25 00	.....	.....	.....	.....	.....	26 00
Minor Public Works	126 00	6 00	.....	.....	.....	.....	.....	132 00
Weights and Measures	2,554 06	1,542 93	58 36	71 05	10 05	245 55	7 05	4,489 05
do do Seizures	10 00	.....	.....	.....	.....	.....	.....	10 00
Gas Inspection	795 75	399 00	150 00	38 00	.....	44 75	42 50	1,470 00
do Penalty	10 00	.....	.....	.....	.....	.....	.....	10 00
Electric Light Inspection	51 25	137 00	.....	33 00	.....	.....	.....	221 25
Other Revenues	379 35	57 00	18 00	.....	.....	.....	.....	454 35
	1,198,048 51	515,222 68	29,329 27	58,127 85	6,955 47	62,530 98	31,931 53	1,902,146 29

MAY:—								
Excise								352,547 10
do Seizures	93,504 60	220,099 84	3,876 08	4,583 65	1,643 95	10,307 99	18,530 99	
Culling Timber		120 65	50 00				100 00	270 65
Hydraulic Rents		308 86						308 86
Minor Public Works	1 00							
Weights and Measures	175 00	62 00	197 15					1 00
Gas Inspection	1,719 36	1,274 04	57 30	110 25	12 65	106 60	29 20	434 15
do Penalty	695 25	500 00	105 00	26 75	8 75	15 25		3,309 40
Electric Light Inspection	5 00		2 25					1,351 00
Other Revenues	55 75	114 50	45 00			14 00		5 00
	756 27	12 00						172 50
								827 27
	96,912 23	222,491 89	4,332 78	4,720 65	1,665 35	10,443 84	18,660 19	359,226 93
JUNE:—								
Excise	85,538 16	91,100 89	7,514 07	3,949 53	1,119 10	7,122 39	24,851 54	221,195 68
do Seizures	7 00	312 80						319 80
Culling Timber		3,686 58						3,686 58
Hydraulic Rents	2,241 00			16 00	1 00		1 00	2,259 00
Minor Public Works	75 00		311 75	156 90		4,210 95		4,285 95
Weights and Measures	1,592 55	1,254 37	282 75	22 00	37 05	164 40	15 00	3,532 02
Gas Inspection	1,311 75	964 00	20 75	129 50		13 75	41 25	2,635 50
Electric Light Inspection	287 75	368 50		3 00		230 50		1,027 00
Other Revenues	613 48	26 00						642 48
	91,666 69	97,703 14	8,129 32	4,276 93	1,157 15	11,741 99	24,908 79	239,584 01
Grand Totals	4,551,568 35	3,343,706 89	263,874 84	290,751 52	46,006 70	441,873 27	328,632 46	9,266,414 03
Methylated Spirits								22,266 91
Total, agreeing with Statement No. 1, page 3								9,288,680 94

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

EXCISE

No. 15.—COMPARATIVE Monthly

—		July.	August.	September.	October.	November.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Spirits	1895-96	277,875 87	298,039 77	325,458 48	409,181 04	395,344 55
	1896-97	315,321 78	317,874 44	368,191 61	387,574 40	367,241 97
Increase, 1896-97		37,445 91	19,834 67	42,733 13	.....	.....
Decrease, 1896-97		.....	.....	.....	21,606 64	28,102 58
Malt Liquor	1895-96	5,650 00	262 34	150 00	212 30	68 50
	1896-97	5,350 00	300 00	150 00	100 00	150 00
Increase, 1896-97		.....	37 66	.....	.....	81 50
Decrease, 1896-97		300 00	.....	.....	112 30	.....
Malt	1895-96	54,963 04	45,211 88	55,227 56	79,725 08	75,778 60
	1896-97	54,292 66	68,060 49	51,729 59	66,022 92	63,136 89
Increase, 1896-97		.....	22,848 61	.....	.....	.....
Decrease, 1896-97		670 38	.....	3,497 97	13,702 16	12,641 71
Tobacco	1895-96	188,059 76	228,102 91	200,778 81	238,733 81	206,250 24
	1896-97	206,643 87	197,769 65	207,831 71	235,795 48	190,525 88
Increase, 1896-97		18,584 11	.....	7,052 90	.....	.....
Decrease, 1896-97		.....	30,333 26	.....	2,938 33	15,724 36
Cigars	1895-96	66,200 39	62,422 87	56,787 09	57,598 21	52,916 82
	1896-97	73,126 48	60,599 49	57,769 56	58,978 65	50,839 56
Increase, 1896-97		6,926 09	.....	982 47	1,380 44	.....
Decrease, 1896-97		.....	1,823 38	.....	.....	2,077 26
Petroleum	1895-96	1,740 89	2,917 64	4,824 75	5,971 35	5,356 11
	1896 97	2,034 07	2,635 91	5,193 98	6,106 57	5,360 73
Increase, 1896-97		293 18	.....	369 23	135 22	4 62
Decrease, 1896-97		.....	281 73	.....	.....	.....
Manufactures in bond	1895-96	4,027 88	4,727 54	6,071 90	6,482 82	4,287 27
	1896-97	4,073 14	3,619 16	4,431 76	3,983 97	3,425 54
Increase, 1896-97		45 26	.....	.....	.....	.....
Decrease, 1896-97		.....	1,108 38	1,640 14	2,498 85	861 73
Seizures	1895-96	180 83	385 63	678 76	608 37	396 26
	1896-97	500 00	91 85	187 09	437 40	337 40
Increase, 1896-97		319 17	.....	.....	.....	.....
Decrease, 1896-97		.....	293 78	491 67	170 97	58 86
Other Receipts	1895-96	6,660 95	1,564 50	1,013 70	1,906 74	1,213 47
	1896-97	6,334 25	643 50	1,116 50	883 22	1,228 67
Increase, 1896-97		.....	.....	102 80	.....	15 20
Decrease, 1896-97		326 70	921 00	.....	1,023 52	.....
Total Increase, 1896-97		62,316 64	7,959 41	45,610 75	.....	.....
Total Decrease, 1896-97		.....	.....	.....	40,537 11	59,365 18
Total Revenue, 1895-96		605,359 61	643,635 08	650,991 05	800,419 72	741,611 82
do 1896-97		667,676 25	651,594 49	696,601 80	759,882 61	682,246 64

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

REVENUE.

Statement, 1895–96 and 1896–97.

December.	January.	February.	March.	April.	May.	June.	Totals.
$ cts.	$ cts.	$ cts.	$ cts.	$ cts	$ cts.	$ cts.	$ cts.
459,706 30	331,839 99	266,378 34	296,376 42	310,219 36	315,070 33	325,797 11	4,011,287 56
472,372 79	262,614 59	316,342 05	950,660 72	891,305 85	63,116 77	59,752 60	4,772,369 57
12,666 49	.....	49,963 71	654,284 30	581,086 49	.....	.....	761,082 01
.....	69,225 40	.....	.....	.....	251,953 56	266,044 51	.....
10 70	35 70	.....	10 80	36 20	50 00	261 20	6,747 74
110 70	.....	50 00	50 00	544 00	.....	.....	6,804 70
100 00	.....	50 00	39 20	507 80	.....	.....	56 96
.....	35 70	.....	.....	.....	50 00	261 20	.....
73,125 76	67,153 00	65,689 62	74,360 24	71,379 90	60,325 29	58,614 08	781,554 05
69,832 43	58,829 03	55,607 74	363,599 12	152,106 74	14,637 64	14,871 88	1,032,727 13
.....	.....	.....	289,238 88	80,726 84	.....	.....	251,173 08
3,293 33	8,323 97	10,081 88	.....	.....	45,687 65	43,742 20	.....
172,047 76	165,322 54	155,641 15	192,091 30	197,087 37	207,470 39	200,312 99	2,351,899 03
193,784 50	145,379 25	160,091 66	268,742 22	461,312 60	211,226 54	77,907 99	2,557,011 35
21,736 74	.....	4,450 51	76,650 92	264,225 23	3,756 15	.....	205,112 32
.....	19,943 29	.....	.....	.....	.....	122,405 00	.....
51,722 19	45,498 52	42,653 86	49,810 05	51,500 79	59,965 20	63,861 93	660,937 92
54,520 98	41,817 72	41,654 61	63,125 79	97,232 64	47,112 24	43,501 95	690,279 67
2,798 79	.....	.....	13,315 74	45,731 85	.....	.....	29,341 75
.....	3,680 80	999 25	.....	.....	12,852 96	20,359 98	.....
4,225 88	4,001 65	3,082 62	2,287 64	2,225 86	1,731 23	1,956 98	40,322 60
4,790 18	3,571 74	3,269 13	2,861 81	1,801 23	2,195 64	2,196 62	42,017 61
564 30	.....	186 51	574 17	.....	464 41	239 64	1,695 01
.....	429 91	.....	.....	424 63	.....	.....	.....
2,690 60	2,496 95	2,637 39	3,494 49	4,457 64	4,080 67	3,814 14	49,269 29
1,851 20	1,813 32	3,189 72	3,246 60	2,673 37	2,543 81	2,385 72	37,237 31
.....	.....	552 33	.....	.....	.....	.....	.....
839 40	683 63	.....	247 89	1,784 27	1,536 86	1,428 42	12,031 98
762 80	965 78	1,819 22	488 24	773 01	662 15	278 68	7,999 73
158 55	1 30	184 42	435 71	428 64	281 00	319 45	3,362 81
.....	.....	.....	.....	.....	.....	40 77	.....
604 25	964 48	1,634 80	52 53	344 37	381 15	.....	4,636 92
3,141 70	1,602 50	2,532 87	1,428 60	1,435 25	1,741 95	1,908 25	26,150 48
788 00	918 40	981 75	1,581 00	1,497 64	1,033 45	958 55	17,964 93
.....	.....	.....	152 40	62 39	.....	.....	.....
2,353 70	684 10	1,551 12	.....	.....	708 50	949 70	8,185 55
30,775 64	.....	40,936 01	1,033,955 19	969,787 33	.....	.....	1,223,606 68
.....	103,971 28	.....	.....	.....	308,950 12	454,910 60	.....
767,433 69	618,916 63	540,435 07	620,347 78	639,115 38	651,097 21	656,805 36	7,936,168 40
798,209 33	514,945 35	581,371 08	1,654,302 97	1,608,902 71	342,147 09	201,894 76	9,159,775 08

E. MIALL,
Commissioner.

No. 16.—Refunds of Revenue during the Fiscal Year ended 30th June, 1897.

EXCISE.

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
		1896.			$ cts.	$ cts.
Spirits	Heney, J. J	Oct. 21	Prescott	Refund under Revised Statutes, cap. 34, sec. 238	7,559 88	
	Hamilton, J. S., & Co.	do 24	Brantford	do do 34 do 178	32 55	
	Leonard, A. C	do 27	Windsor	do do 29 do 78	23 43	
	Howard, A. L	Nov. 25	Sherbrooke	do do 34 do 238	5,068 30	
		1897.				
	Wiser & Sons, J. P	March 17	Prescott	do do 29 do 78	1,713 94	
	Heney, J. J	April 28	do	do do 34 do 238	8,956 07	
	do	May 10	do	do do 34 do 238	6,472 56	
	Howard, A. L	June 2	Sherbrooke	do do 34 do 238	9,556 57	
						39,383 30
		1897.				
Malt Liquor	Huether, H., estate of	Jan. 7.	Owen Sound	do do 29 do 78	50 00	
	Wilson, Wm	April 21	Toronto	do do 29 do 78	150 45	
						200 45
		1896.				
Malt	Winslow, Albert	Aug. 24	Peterborough	do do 29 do 78	418 21	
	Reinhardt, C. S	do 24	Montreal	do do 29 do 78	334 86	
	Dawes, A. J	do 24	do	do do 29 do 78	1,683 62	
	Scott, James P	do 24	do	do do 29 do 78	2,119 00	
	Molson, J. H. R	do 24	do	do do 29 do 78	897 47	
	DeRepentigny, A	do 24	do	do do 29 do 78	2 70	
	Strangman, Chas	do 24	do	do do 29 do 78	206 51	
	Langston, J. C	do 24	do	do do 29 do 78	44 19	
	Star Brewing Co., The	do 24	do	do do 29 do 78	114 97	
	Coté & Amyot	do 24	Quebec	do do 29 do 78	293 20	
	Boswell & Bros	do 24	do	do do 29 do 78	938 28	
	Clouthier, D	do 24	Terrebonne	do do 29 do 78	17 37	
	Jones, Simeon	do 24	St. John	do do 29 do 78	329 25	
	Ready, James	do 24	do	do do 29 do 78	324 53	

Oland, J. C.	do	24	Halifax	do	do	29	do	78	419	78
O'Mullin, J. C	do	24	do	do	do	29	do	78	121	50
Hayward, C. H	do	24	do	do	do	29	do	78	207	10
Lindberg, John	do	24	do	do	do	29	do	78	116	32
Wickwire, W. N	do	24	do	do	do	29	do	78	889	50
Blackwood, Wm	do	24	Winnipeg	do	do	29	do	78	111	11
Courtney, Joseph	do	24	do	do	do	29	do	78	10	05
Drewry, E. L.	do	24	do	do	do	29	do	78	580	57
Shea, Patrick	do	24	do	do	do	29	do	78	177	74
Cross, A. E.	do	24	Calgary	do	do	29	do	78	211	08
Cairns, Thos	do	24	do	do	do	29	do	78	15	90
Brunelle, Wm	do	24	do	do	do	29	do	78	6	00
Kappler, J	do	24	Vancouver	do	do	29	do	78	21	37
Leahy, John	do	24	Victoria	do	do	29	do	78	18	00
Eaton, C	do	27	Owen Sound	do	do	29	do	78	387	21
Roy, James A	do	27	Belleville	do	do	29	do	78	212	36
Bernhardt, Louis	do	27	Brantford	do	do	29	do	78	10	50
Luke, C	do	27	do	do	do	29	do	78	99	77
Bixel, Arthur	do	27	do	do	do	29	do	78	228	60
Schwartz, John S	do	27	Owen Sound	do	do	29	do	78	140	42
Schwan, David	do	27	do	do	do	29	do	78	61	36
Farquharson & Grainger	do	27	do	do	do	29	do	78	157	50
Huether, Henry	do	27	do	do	do	29	do	78	126	52
Macpherson, D	do	27	Peterborough	do	do	29	do	78	143	70
Calcutt, Henry	do	27	do	do	do	29	do	78	157	68
Haslam. W. H	do	27	do	do	do	29	do	78	16	35
Steele, James J	do	27	Hamilton	do	do	29	do	78	271	31
Lottridge, J. M	do	27	do	do	do	29	do	78	752	27
Wilson, M. S	do	27	do	do	do	29	do	78	1,154	10
Sleeman, George	do	27	Guelph	do	do	29	do	78	1,691	99
Todd, M. N	do	27	do	do	do	29	do	78	51	00
Bauer, F. K., estate of	do	27	do	do	do	29	do	78	331	42
Cranston, Adam	do	27	do	do	do	29	do	78	161	18
Holliday, Thos	do	27	do	do	do	29	do	78	217	17
Rau, Mary	do	27	do	do	do	29	do	78	177	49
Seagram, Joseph E	do	28	do	do	do	29	do	78	184	50
Huether, C. N., & Co.	do	28	do	do	do	29	do	78	138	23
Bernhardt, P.	do	28	do	do	do	29	do	78	132	69
Clarke, L. H	do	28	Kingston	do	do	29	do	78	1,336	20
Stevenson, Thomas	do	28	do	do	do	29	do	78	135	19
Fisher, John	do	28	do	do	do	29	do	78	107	86
Bixel, A.	do	28	Brantford	do	do	29	do	78	162	00
Labatt, John	do	28	London	do	do	29	do	78	1,177	90
Heuser, Peter	do	28	do	do	do	29	do	78	59	47
Carling, T. H.	do	28	do	do	do	29	do	78	1,487	32
Rudolph, Henry	do	28	do	do	do	29	do	78	87	45
McCarthy, D. J	do	28	Prescott	do	do	29	do	78	571	62
Bowie, Robert	do	28	do	do	do	29	do	78	311	20
Prescott B. & M. Co.	do	28	do	do	do	29	do	78	344	10

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

EXCISE—*Continued.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority Refunded.	Amounts.	Totals.
		1896.			$ cts.	$ cts.
Malt—*Continued.*	Wiser, & Sons, J. P.	Aug. 28.	Toronto	Refund under Revised Statutes, cap. 29 sec. 78	167 54	
	Taylor, H. J.	do 28.	St. Catharines	do do 29 do 78	265 66	
	Cronmiller & White	do 28.	do	do do 29 do 78	177 97	
	Hergott Bros.	do 28.	Stratford	do do 29 do 78	48 04	
	Martini, Joseph	do 28.	do	do do 29 do 78	36 15	
	Watson, John	do 28.	do	do do 29 do 78	99 40	
	Devlin, Felix	do 28.	do	do do 29 do 78	57 95	
	Clarke, L. H	do 28.	Kingston	do do 29 do 78	1,350 04	
	Kuntz, Jacob	do 28.	Stratford	do do 29 do 78	52 76	
	Ottawa B. & M. Co.	do 28.	Ottawa	do do 29 do 78	99 27	
	O'Keefe, Eugene	do 28.	Toronto	do do 29 do 78	1,530 74	
	Davies, Robert	do 28.	do	do do 29 do 78	2,075 28	
	Thomas, W. J	do 28.	do	do do 29 do 78	1,385 87	
	Toronto Brewing & M. Co.	do 28.	do	do do 29 do 78	1,110 67	
	Brain, Edwin	do 28.	do	do do 29 do 78	128 11	
	Anderton, W. A.	do 28.	do	do do 29 do 78	143 54	
	Simpson, T. W	do 28.	do	do do 29 do 78	109 50	
	Gooderham, W. G	do 28.	do	do do 29 do 78	847 36	
	Clarke, J. A. P.	do 28.	do	do do 29 do 78	26 33	
	Cosgrove, L. J.	do 28.	do	do do 29 do 78	1,042 88	
	Beneteau, P	do 28.	Windsor	do do 29 do 78	7 50	
	Griesinger, Louis, jr.	do 28.	do	do do 29 do 78	466 50	
	Walker, F. H.	do 28.	do	do do 29 do 78	1,738 56	
	Roy, Joseph	do 28.	Joliette	do do 29 do 78	23 35	
	Proteau & Carignan	Sept. 30.	Quebec	do do 29 do 78	212 93	
	Schumacher, A.	do 30.	Owen Sound	do do 29 do 78	16 23	
	Grant, Maggie	do 30.	Perth	do do 29 do 78	18 24	
	Leahy, John	Oct. 8.	Victoria	do do 34 do 178	154 56	
	The Walkerville B. Co.	do 8.	Windsor	do do 34 do 178	43 16	
	Wickwire, W. N.	do 8.	Halifax	do do 34 do 178	1,243 29	
	O'Brien, S.	do 8.	Victoria	do do 34 do 178	127 17	
	Oland, J. C.	do 8.	Halifax	do do 34 do 178	42 93	
	Reuter, Geo	do 24.	Guelph	do do 29 do 78	72 56	

Brading, H. F.	do	24	Ottawa	do	29	do	78	128	72
Huetteman, Jos.	do	24	Windsor	do	29	do	78	15	76
The Prescott B. & M. Co.	do	24	Prescott	do	29	do	78	148	13
Carling, T. H.	do	24	London	do	29	de	78	277	08
Ludwig, L.	do	24	Stratford	do	29	do	78	23	70
Wilson, Wm.	do	27	Toronto	do	29	do	78	108	10
The Prescott B. & M. Co.	Nov.	3	Prescott	do	29	do	78	263	16
Cosgrove, L. J.	do	23	Toronto	do	29	do	78	1,573	01
Huetteman, Jos.	do	23	Windsor	do	29	do	78	27	89
do	do	23	do	do	29	do	78	37	50
The Prescott B. & M. Co.	Dec.	18	Prescott	do	34	do	178	28	55
1897.									
Roy, Jos	Jan.	7	Joliette	do	29	do	78	35	60
Leahy, John	do	9	Victoria	do	34	do	178	123	12
The Victoria Phoenix B.Co.	do	9	do	do	34	do	178	56	57
O'Brien, Stephen	do	9	do	do	34	do	178	58	22
Carling, T. H.	do	9	London	do	34	do	178	22	44
The Walkerville B. Co	do	9	Windsor	do	34	do	178	44	63
Oland, J. C.	do	9	Halifax	do	34	do	178	309	25
Wickwire, W. N	do	9	do	do	34	do	178	1,182	03
The Prescott B. & M. Co.	do	19	Prescott	do	34	do	178	71	90
Lottridge, J. M.	do	19	Hamilton	do	29	do	78	423	77
Wilson, Wm.	do	23	Toronto	do	29	do	78	132	25
Carling, T. H.	Feb.	19	London	do	29	do	78	24	65
Davies, Robert	do	19	Toronto	do	34	do	178	111	62
Labatt, John	April	9	London	do	34	do	178	28	80
Carling, T. H.	do	9	do	do	34	do	178	8	46
The Walkerville B. Co	do	9	Windsor	do	34	do	178	28	85
Wickwire, W. N	do	9	Halifax	do	34	do	178	999	09
Oland, J. C.	do	9	do	do	34	do	178	249	47
The Victoria Phoenix B.Co.	do	9	Victoria	do	34	do	178	147	02
Leahy, John	do	9	do	do	34	do	178	74	22
Fairall, H. S.	do	9	do	do	34	do	178	15	53
Sleeman, George	do	14	Guelph	do	29	do	78	67	77
Hummel, D.	do	14	do	do	29	do	78	15	00
The Prescott B. & M. Co.	May	7	Prescott	do	29	do	78	414	15
Drewry, E. L.	June	10	Winnipeg	do	29	do	78	142	50
Holliday, Thos	do	25	Guelph	do	29	do	78	24	94
Dawes, A. J.	do	25	Montreal	do	29	do	78	193	74
Winslow, A	do	25	Peterborough	do	29	do	78	953	40
Wilson, Wm.	do	25	Toronto	do	29	do	78	123	84
Wickwire, W. N	do	25	Halifax	do	34	do	178	1,029	27
1896.								48,081	55
Tobacco									
Tuckett, Geo. T.	July	24	Hamilton	do	34	do	270	71	90
The Empire Tobacco Co.	Aug.	29	Montreal	do	34	do	259	0	84

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

EXCISE—*Continued.*

Articles.	To whom paid.	Dates.	Divisions.	Under what Authority refunded.	Amounts.	Totals.
		1896.			$ cts.	$ cts.
Tobacco—*Continued.*	The American Tobacco Co..	Aug. 29..	Toronto.....	Refund under Revised Statutes, cap. 34, sec. 270 . .	35 90	
	do do ..	do 29..	do	do do . 34 do 259.....	338 23	
	Houde, B., & Co.....	do 29..	Quebec.....	do do 34 do 259.....	90 34	
	Lemesurier, John.....	do 29..	do	do do 34 do 259 ...	14 16	
	Tuckett, Geo. T	do 29..	Hamilton.....	do do 34 do 259 ...	34 66	
	Henry, James	do 29..	Montreal.....	do do 34 do 259.....	10 65	
	do	do 29..	do	do do 34 do 270	5 00	
	Isaacs, A.	do 29..	St. John, N.B....	do do 34 do 259	19 85	
	McKenna, A.	do 29..	Pictou.....	do do 34 do 259....	0 12	
	McDonald & Co.....	do 2)..	do	do do 34 do 259....	0 30	
	Isaacs, A.....	Sept. 30..	St. John, N.B....	do do 34 do 259 . .	19 63	
	McDonald & Co	do 30..	Pictou..	do do 34 do 259.....	0 60	
	Fortier, J. M.....	do 30..	do	do do 34 do 259	263 99	
	Henry, James	do 30..	do	do do 34 do 259	12 33	
	Lemesurier, John	do 30..	Quebec.....	do do 34 do 259.. ...	6 89	
	Houde, B., & Co.....	do 30..	do	do do 34 do 259 ...	74 90	
	The American Tobacco Co.	do 30..	Montreal.....	do do 34 do 259....	375 91	
	Tuckett, Geo. T..... ...	do 30 ..	Hamilton	do do 34 do 259.	40 68	
	do	do 30..	do	do do 34 do 270....	114 93	
	McKenna, A.....	do 30..	Pictou.....	do do 34 do 259 . ..	0 05	
	Fortier, J. M.....	do 30..	Montreal.	do do 34 do 270	8 00	
	The Empire Tobacco Co...	do 30..	do	do do 34 do 259	0 53	
	American do ..	do 30..	do	do do 34 do 270.....	18 80	
	McAlpin, E. A.....	Oct. 12 .	Toronto	do do 29 do 78.....	33 53	
	do	do 12..	do	do do 34 do 259	45 12	
	The American Tobacco Co..	do 12..	Montreal.....	do do 29 do 78	50 46	
	do do ..	do 12.	do	do do 34 do 259.....	341 01	
	Tuckett, Geo. T	do 12..	Hamilton	do do 29 do 259.....	49 90	
	do	do 12..	do	do do 29 do 78	108 96	
	McDonald, W. C.....	do 12..	Montreal.....	do do 31 do 78....	5 40	
	Henry, James	do 12..	do	do do 34 do 259	12 21	
	McDonald & Co.....	do 12..	Pictou..	do do 34 do 259.....	0 50	
	Isaacs, A.	do 12..	St. John, N.B....	do do 34 do 259	18 81	

Fortier, J. M.	do	12..	Montreal	do	do	34	do 259	16 76
Lemesurier, John	do	19..	Quebec	do	do	34	do 259	7 58
Houde, B., & Co	do	22..	do	do	do	34	do 259	84 65
The Empire Tobacco Co.	do	26	Montreal	do	do	29	do 78	33 65
Henry, James	Nov.	3..	do	do	do	34	do 270	5 00
The American Tobacco Co.	do	3..	do	do	do	34	do 270	30 71
Tuckett, Geo. T	do	7..	Hamilton	do	do	34	do 259	46 30
Houde, B., & Co	do	7..	Quebec	do	do	34	do 259	87 19
Isaacs, A.	do	7..	St. John, N.B.	do	do	34	do 259	23 57
Fortier, J. M.	do	14..	Montreal	do	do	34	do 259	5 40
The American Tobacco Co.	do	14..	do	do	do	34	do 259	378 88
Henry, James	do	14.	do	do	do	34	do 259	11 36
Tuckett, Geo. T.	do	23..	Hamilton	do	do	29	do 78	111 90
Henry, James	do	24..	Montreal	do	do	34	do 270	5 00
Tuckett, Geo. T	Dec.	5..	Hamilton	do	do	34	do 259	54 45
Houde, B., & Co	do	5..	Quebec	do	do	34	do 259	69 42
Lemesurier, John	do	5..	do	do	do	34	do 259	14 19
Isaacs, A.	do	7..	St. John, N.B.	do	do	34	do 259	13 41
Tuckett, Geo. T.	do	7..	Hamilton	do	do	34	do 270	163 70
Fortier, J. M.	do	14..	Montreal	do	do	34	do 259	12 32
The American Tobacco Co.	do	14.	do	do	do	34	do 259	251 25
Henry, James	do	14..	do	do	do	34	do 259	13 61
			1897.					
Tuckett, Geo. T	Jan.	7..	Hamilton	do	do	29	do 78	17 50
McAlpine, E. A.	do	11..	Toronto	do	do	34	do 259	39 73
do	do	11.	do	do	do	29	do 78	36 52
The Empire Tobacco Co.	do	11..	Montreal	do	do	29	do 78	31 00
do	do	11..	do	do	do	34	do 259	1 63
Houde, B., & Co	do	11..	Quebec	do	do	34	do 259	67 67
Lemesurier, John	do	11	do	do	do	34	do 259	4 32
Isaacs, A	do	11	St. John, N.B.	do	do	34	do 259	16 50
Tuckett, Geo. T	do	11..	Hamilton	do	do	34	do 259	65 92
do	do	11..	do	do	do	29	do 78	100 92
Fortier, J. M.	do	19..	Montreal	do	do	34	do 259	12 60
McDonald, W. C	do	19..	do	do	do	29	do 78	3 15
The American Tobacco Co.	do	19.	do	do	do	29	do 78	28 47
do	do	19..	do	do	do	34	do 259	272 98
Henry, James	do	19..	do	do	do	34	do 259	11 35
do	do	28..	do	do	do	34	do 270	5 00
McDonald & Co	do	28..	Pictou	do	do	34	do 259	1 03
The American Tobacco Co.	do	29..	Montreal	do	do	34	do 270	39 11
Tuckett, Geo. T	Feb.	8..	Hamilton	do	do	34	do 259	21 40
Henry, James	do	18..	Montreal	do	do	34	do 259	4 33
Houde, B., & Co	do	18..	Quebec	do	do	34	do 259	54 12
The American Tobacco Co.	do	18	Montreal	do	do	34	do 259	236 11
Lemesurier, John	do	18	Quebec	do	do	34	do 259	3 96
Fortier, J. M.	do	18..	Montreal	do	do	34	do 259	0 40

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

EXCISE—*Concluded.*

Articles.	To whom paid.	Date.	Divisions.	Under what Authority refunded.	Amounts.	Totals.
		1897.			$ cts.	
Tobacco-*Concluded.*	The American Tobacco Co.	Feb. 19..	Montreal	Refund under Revised Statutes, cap. 34 sec. 270	25 43	
	Frechette, E., & Frére	do 19..	Quebec	do do 34 do 259	9 87	
	The American Tobacco Co.	do 26..	Montreal	do do 34 do 270	39 61	
	Isaacs, A	Mar. 5..	St. John, N.B.	do do 34 do 259	9 68	
	Houde, B., & Co	do 8..	Quebec	do do 34 do 270	41 78	
	do	do 8..	do	do do 34 do 259	65 74	
	Lemesurier, John	do 8..	do	do do 34 do 259	5 62	
	Tuckett, Geo. T	do 8..	Hamilton	do do 34 do 259	38 40	
	The American Tobacco Co.	do 13..	Montreal	do do 34 do 259	188 26	
	Fortier, J. M	do 13..	do	do do 34 do 259	7 67	
	Henry, James	do 13..	do	do do 34 do 258	5 34	
	The American Tobacco Co.	do 15..	do	do do 34 do 270	18 18	
	McDonald & Co	do 17..	Pictou	do do 29 do 78	31 25	
	The American Tobacco Co.	do 23..	Montreal	do do 34 do 270	93 00	
	McAlpin, E. A	April 5..	Toronto	do do 29 do 78	32 70	
	do	do 5..	do	do do 34 do 259	26 00	
	Tuckett, Geo. T	do 12..	Hamilton	do do 34 do 259	46 65	
	do	do 12..	do	do do 29 do 78	71 81	
	Houde, B., & Co	do 15..	Quebec	do do 34 do 259	57 59	
	Lemesurier, John	do 15..	do	do do 34 do 259	4 24	
	Isaacs, A	do 17..	St. John, N.B.	do do 34 do 259	18 30	
	The Empire Tobacco Co.	do 17..	Montreal	do do 29 do 78	29 05	
	McKenna, A	do 22..	Pictou	do do 34 do 259	0 12	
	Henry, James	do 22..	Montreal	do do 34 do 259	11 68	
	Fortier, J. M	do 22..	do	do do 34 do 259	6 86	
	McDonald, W. C	do 22..	do	do do 29 do 78	4 05	
	The American Tobacco Co.	do 22..	do	do do 29 do 78	57 70	
	do	do 22..	do	do do 34 do 259	331 47	
	do	do 22..	do	do do 34 do 270	59 38	
	Lemesurier, John	May 8..	Quebec	do do 34 do 259	11 91	
	Tuckett, Geo. T	do 10..	Hamilton	do do 34 do 259	46 63	
	Isaacs, A	do 11..	St. John, N.B.	do do 34 do 259	23 47	
	Houde, B., & Co	do 13..	Quebec	do do 34 do 259	98 75	

	Henry, James	do	19..	Montreal	do	do	34 do 259	6 51	
	Fortier, J. M.	do	19..	do	do	do	34 do 259	18 09	
	The American Tobacco Co.	do	19..	do	do	do	34 do 259	266 87	
	Tuckett, Geo. T	do	20..	Hamilton	do	do	34 do 270	30 10	
	Henry, James	do	25.	Montreal	do	do	34 do 270	2 40	
	Fortier, J. M.	do	28..	do	do	do	34 do 270	4 55	
	The American Tobacco Co.	do	28..	do	do	do	34 do 270	34 83	
	Tuckett, Geo. T	do	28..	Hamilton	do	do	34 do 270	9 75	
	do	June	7..	do	do	do	34 do 259	39 89	
	do	do	7..	do	do	do	34 do 270	280 80	
	Isaacs, A.	do	8..	St. John, N.B.	do	do	34 do 259	14 50	
	Houde, B., & Co.	do	8..	Quebec	do	do	34 do 259	45 92	
	Lemesurier, John	do	8..	do	do	do	34 do 259	4 87	
	Henry, James	do	12..	Montreal	do	do	34 do 259	4 33	
	The American Tobacco Co.	do	12..	do	do	do	34 do 259	213 10	
	Fortier, J. M.	do	12..	do	do	do	34 do 259	8 19	
	Houde, B., & Co.			Quebec	do	do	34 do 259	34 20	
	Lemesurier, J.			do	do	do	34 do 259	4 30	
	McAlpin, E. A.			Toronto	do	do	34 do 259	42 14	
	Tuckett, Geo. T			Hamilton	do	do	34 do 259	31 68	
	do			do	do	do	29 do 78	125 64	
		1896.							7,481 96
Cigars	Cohen, M.	Oct.	24..	Victoria	do	do	29 do 78	56 25	
	Kurtz & Co.	Dec.	2 .	do	do	do	34 do 270	37 54	
	Maddock, Wm.	do	24..	Stratford	do	do	29 do 78	50 00	
		1897.							
	Muencke, Wm.	May	7 .	Guelph	do	do	29 do 78	37 50	
									181 29
		1896.							
Bonded Warehouse	Otterbein, C.	Sept.	30..	Brantford	do	do	29 do 78		20 00
		1897.							
Minor Revenues	Walker Joseph	June	24..	Queenston, Ont	O. C., 19, 6, 97. Ref. 73,277				10 00
Weights & Measures	Quebec Central Railway	do	25..	Sherbrooke	do	do 73,628			11 75
		1897.							
Electric Light Registration Fees	Keyes, Geo.	Feb.	19..	Colborne	Refund under O.C., 25 Sept., 1895			15 00	
	Dunnville Electric Light Co	do	19..	Dunnville	do	do		15 00	
	Donald, Alex	do	19..	Campbellford	do	do		15 00	
	Wilkinson, R.	do	19..	Niagara	do	do		15 00	
	The Bowmanville Electric Light Co.	March	10..	Bowmanville	do	do		30 00	
									90 00
							Grand total		95,460 30

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

No. 17.—DEPARTMENTAL EXPENDITURE, 1896-97.

DR. *(For Details, see Appendix B.)* CR.

Due by sundry persons, 1st July, 1896.	Disbursed by the Receiver General.	Deductions for Superannuation.	Totals.		Salaries.	Contingencies.	Due by sundry persons, 30th June, 1897.	Totals.
$ cts.	$ cts.	$ cts	$ cts.		$ cts.	$ cts	$ cts.	$ cts.
.....	4,986 56	.....	4,986 56	....Controllers of Inland Revenue	4,986 56	.....	.....	4,986 56
.....	36,545 05	733 46	37,278 51	....Departmental Officers	37,278 51	.....	.....	37,278 51
.....	379 09	.....	379 09	....Subscription to Newspapers.....	.....	379 09	.....	379 09
.....	1,812 32	.....	1,812 32	.. Extra Clerks.....	.....	1,812 32	.....	1,812 32
.....	721 35	.....	721 35	....Telegraph Companies	.....	721 35	.....	721 35
.....	1,560 71	.....	1,560 71	Stationery.....	.....	1,560 71	.....	1,560 71
.....	123 30	.....	123 30	....Books and Maps.....	.....	123 30	.....	123 30
.....	913 92	.....	913 92	...Printing	.....	913 92	.....	913 92
.....	26 41	.....	26 41	Postage	.....	26 41	.....	26 41
16 66	732 27	.....	748 93	....Sundry persons.....	.....	732 27	16 66	748 93
16 66	47,800 98	733 46	48,551 10	.....Totals	42,265 07	6,269 37	16 66	48,551 10

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

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

DR. **No. 18.—STATEMENT showing amount of Revenue accrued during Year ended 30th June, 1897.** CR.

—	Weights and Measures Stamps.	Gas Stamps.	Electric Light Stamps.	Law Stamps.		Totals.	—	Weights and Measures Stamps.	Gas Stamps.	Electric Light Stamps.	Law Stamps.		Totals.
				Supreme Court.	Exchequer Court.						Supreme Court.	Exchequer Court.	
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
To amount of stamps destroyed or returned by distributors..	1,643 38	645 50	.....	.....	.....	2,288 88	By amount of stamps in the hands of distributors on 1st July, 1896.	40,967 36	30,020 80	31,005 50	.....	.....	101,993 66
To commission allowed	.....	.....	.....	109 00	117 45	226 45	By stamps issued by Inland Revenue Department during the year	32,824 00	15,612 50	7,150 00	2,180 00	2,349 00	60,115 50
To amount of stamps remaining in hands of distributors, 30th June, 1897	35,694 90	27,670 30	34,226 00	.....	.....	97,591 20							
To balance, being the revenue accrued during 1896-97. ...	36,453 08	17,317 50	3,929 50	2,071 00	2,231 55	62,002 63							
Total.	73,791 36	45,633 30	38,155 50	2,180 00	2,349 00	162,109 16	Totals.....	73,791 36	45,633 30	38,155 50	2,180 00	2,349 00	162,109 16

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

WEIGHTS AND MEASURES, 1896-97.

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

Balances due by Inspectors, 1st July, 1896.		Stamps issued to Inspect'rs.	Seizures and Penalties.	Other Receipts.	Transfers. *	Totals.	Divisions.	Transfers. *	Stamps returned or destroyed.	Deposited to the credit of the Receiver General.	Balances due by Inspectors, 30th June, 1897.		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.	$ cts.
1,872 22	4 00	1,410 00			1,365 83	4,652 05	Belleville		3 10	2,034 80	2,606 70	7 45	4,652 05
2,350 65	1,336 17	7,639 00		28 45		11,354 27	Hamilton			7,393 99	2,736 85	1,223 43	11,354 27
1,749 54		856 00				2,605 54	Kingston	1,365 83		1,239 71			2,605 54
988 71		2,197 50				3,186 21	London	941 21		2,245 00			3,186 21
2,914 94	44 94	1,970 00				4,929 88	Orillia	3,487 02		1,442 86			4,929 88
576 15		2,559 00		96 00	157 76	3,388 91	Ottawa		618 75	1,492 51	1,220 82	56 83	3,388 91
3,024 90	451 62	2,000 00			3,487 02	8,963 54	Toronto	157 76		3,992 01	4,404 47	409 30	8,963 54
1,846 16		2,356 00	10 00		941 21	5,153 37	Windsor		22 10	1,429 98	3,701 29		5,153 37
15,323 27	1,836 73	20,987 50	10 00	124 45	5,951 82	44,233 77	*Ontario*	5,951 82	643 95	21,270 86	14,670 13	1,697 01	44,233 77
9,059 73	367 75	7,600 00	1 00			17,028 48	Montreal		1 50	7,960 28	8,751 95	314 75	17,028 48
3,387 85	184 20	2,230 00		5 00		5,807 05	Quebec		218 90	2,105 05	3,339 04	144 06	5,807 05
2,453 91						2,453 91	Three Rivers			775 18	1,678 73		2,453 91
14,901 49	551 95	9,830 00	1 00	5 00		25,289 44	*Quebec*		220 40	10,840 51	13,769 72	458 81	25,289 44
911 23		200 00				1,111 23	King's	796 48		314 75			1,111 23
2,252 93		365 00			796 48	3,414 41	St. John		640 48	944 92	1,829 01		3,414 41
3,164 16		565 00			796 48	4,525 64	*New Brunswick*	796 48	640 48	1,259 67	1,829 01		4,525 64
783 53	13 75					797 28	Cape Breton			102 30	694 98		797 28
540 92	29 85	311 50				882 27	Halifax			544 75	262 37	75 15	882 27
543 81		625 00				1,168 81	Pictou		6 55	352 80	787 71	21 75	1,168 81
537 17						537 17	Yarmouth			294 12	243 05		537 17
2,405 43	43 60	936 50				3,385 53	*Nova Scotia*		6 55	1,293 97	1,988 11	96 90	3,385 53

528 91	.....	225 00	.....	....	.....	753 91	*Charlottet'n, P.E.I.*	.....	1 50	192 90	559 51	....	753 91
4,054 06	25 40	.....	.....	.....	.....	4,079 46	*Winnipeg, Man...*	.....	130 50	1,500 83	2,448 13	.....	4,079 46
590 04	.....	280 00	.....	....	.....	870 04	*Victoria, B.C.*.....	....	....	436 95	430 29	2 80	870 04
40,967 36	2,457 68	32,824 00	11 00	129 45	6,748 30	83,137 79	Grand total...	6,748 30	1,643 38	36,795 69	35,694 90	2,255 52	... 73

* The amounts in the columns of "Transfers" represent the value of stamps belonging to certain divisions abolished during the year.

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

WEIGHTS AND MEASURES, 1896-97.

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

DR. CR.

Balances due 1st July, 1896. — Cash on hand.	Totals.	Divisions.	Balances due 30th June, 1897. — 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	Total	92 72	92 72

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

WEIGHTS AND MEASURES, 1896-97.

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

(*For Details, see Appendix B.*)

Dr. Cr.

Amounts received from Department to meet Expenditure.	Deductions from Salaries for		Balances due to Inspectors, 30th June, 1897.	Totals.	Districts.	Balance due to Inspectors, 1st July, 1896.	Expenditures authorized by the Department.						Totals.
	Superannuation.	Insurance.					Salaries.	Seizures Expenses.	Special Assistance	Rent.	Travelling Expenses.	Sundries.	
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
3,580 73	53 92		278 80	3,913 45	Belleville		2,899 92		124 98	140 00	503 63	244 92	3,913 45
6,377 82	60 00		13 00	6,450 82	Hamilton		5,099 80		458 36		769 70	122 96	6,450 82
2,408 77	26 00			2,434 77	Kingston		1,500 00		416 60	90 00	243 93	184 24	2,434 77
2,865 67	41 28			2,906 95	London		2,333 20	6 28		60 00	415 13	92 34	2,906 95
2,051 12	26 60	34 80		2,112 52	Orillia		1,249 90		350 00		477 75	34 87	2,112 52
3,390 82	40 58	6 96		3,438 36	Ottawa		2,655 05			208 34	439 69	135 28	3,438 36
4,084 24	58 96		144 94	4,288 14	Toronto		3,490 26				702 59	95 29	4,288 14
2,596 16	32 64			2,628 80	Windsor		2,116 56			15 00	398 79	98 45	2,628 80
27,355 33	339 98	41 76	436 74	28,173 81	*Ontario*		21,344 69	6 28	1,349 94	513 34	3,951 21	1,008 35	28,173 81
8,039 80	124 52		130 20	8,294 52	Montreal		7,133 05				871 99	289 48	8,294 52
5,179 00	75 92	38 28	240 68	5,533 88	Quebec		4,466 64		16 25	100 00	818 98	132 01	5,533 88
1,855 12	19 69			1,874 81	Three Rivers		1,386 81				455 41	32 59	1,874 81
15,073 92	220 13	38 28	370 88	15,703 21	*Quebec*		12,986 50		16 25	100 00	2,146 33	454 08	15,703 21
1,327 71	23 30			1,351 01	King's		1,166 60				175 26	9 15	1,351 01
2,425 60	39 96		31 94	2,497 50	St. John's		2,300 00				177 40	20 10	2,497 50
3,753 31	63 26		31 94	3,848 51	*New Brunswick*		3,466 60				352 66	29 25	3,848 51
628 91	5 32			634 23	Cape Breton		266 64				326 29	41 30	634 23
2,059 31	14 29		6 00	2,079 60	Halifax		1,514 64			375 00	39 80	150 16	2,079 60

WEIGHTS AND MEASURES, 1896-97—*Concluded.*

No. 20 (A) Inspection Divisions in Account with Expenditure.

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

Amount received from Department to meet Expenditure.	Deductions from Salaries for		Balances due to Inspectors, 30th June, 1897.	Totals.	Districts.	Balance due to Inspectors, 1st July, 1896.	Expenditures authorized by the Department.						Totals.
	Superannuation.	Insurance.					Salaries.	Seizures Expenses.	Special Assistance	Rent.	Travelling Expenses.	Sundries.	
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1,636 33	26 00	.....	.....	1,662 33	....Pictou	.....	1,500 00	.....	.....	.....	125 18	37 15	1,662 33
1,115 95	20 00	.....	.....	1,135 95	....Yarmouth.....	.....	1,000 00	.....	.....	.....	116 64	19 31	1,135 95
5,440 50	65 61	.....	6 00	5,512 11	.....*Nova Scotia*.....	.....	4,281 28	.....	.....	375 00	607 91	247 92	5,512 11
2,003 17	29 90	.....	.....	2,033 07	.....*Charlottetown, P.E.I.*	.....	1,908 86	.....	.....	.....	49 61	74 60	2,033 07
5,509 19	64 16	.....	313 93	5,887 28	....*Winnipeg, Man.*	269 80	3,508 26	.....	1,078 39	108 00	400 14	522 69	5,887 28
93 25	.....	.....	.....	93 25	.....District Inspector...	.....	.....	.....	.....	.....	93 25	.....	93 25
5,602 44	64 16	.....	313 93	5,980 53		269 80	3,508 26	.....	1,078 39	108 00	493 39	522 69	5,980 53
1,807 81	17 02	.....	.....	1,824 83	..... *Victoria, B.C.*.	.....	1,120 68	.....	.....	300 00	334 85	69 30	1,824 83
879 44	12 00	.....	.....	891 44	....Inspector of Scale Factories	.....	750 00	.....	.....	.....	140 98	0 46	891 44
784 00	16 00	.....	.....	800 00	....Commissioner of Standards	.....	800 00	.....	.....	.....	.....	.....	800 00
1,592 17	.....	.....	.....	1,592 17	....General Contingencies.	.....	.....	.....	.....	.....	.....	1,592 17	1,592 17
289 70	.....	.....	.....	289 70	....Printing	.....	.....	.....	.....	.....	.....	289 70	289 70
453 04	.....	.....	.....	453 04	....Stationery	.....	.....	.....	.....	.....	.....	453 04	453 04
65,034 83	828 06	80 04	1,159 49	67,102 42	.....Grand Totals.....	269 80	50,166 87	6 28	2,444 58	1,396 34	8,076 99	4,741 56	67,102 42

Inland Revenue Department,
Ottawa, 20th August, 1897.

E. MIALL,
Commissioner.

WEIGHTS AND MEASURES, 1896-97.

No. 20 (B).—Inspection Divisions in Account with Expenditure.

DR. (Old Divisions.) CR.

Balances due by sundry persons, 1st July, 1896.	Totals.	Divisions.	Balances due by sundry persons, 30th June, 1897.	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

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

GAS INSPECTION AND LAW STAMPS, 1896-97.

DR. No. 21.—STAMP DISTRIBUTORS in Account with Inland Revenue Department. CR.

BALANCES DUE BY INSPECTORS, 1ST JULY, 1896.		Stamps issued to Inspectors and others.	Penalties.	Transferred Accounts to.	Totals.	DISTRICTS.	Transferred Accounts from.	Damaged Stamps.	Commission allowed to Distributors of Stamps.	Deposited to the credit of the Receiver General.	BALANCES DUE BY INSPECTORS, 30TH JUNE, 1897.		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.	$ cts.
903 75		200 00			1,103 75	Barrie				145 25	958 50		1,103 75
209 50		375 00			584 50	Belleville				161 25	423 25		584 50
307 50		175 00			482 50	Berlin				202 50	280 00		482 50
341 25		12 50			353 75	Brockville				93 00	260 75		353 75
265 50		350 00			615 50	Cobourg				237 50	376 00	2 00	615 50
219 75					219 75	Cornwall				37 00	182 75		219 75
395 25		237 50			632 75	Guelph				107 00	525 75		632 75
1,283 50	123 50	1,225 00			2,632 00	Hamilton				988 50	1,492 25	151 25	2,632 00
1,159 25		375 00			1,534 25	Kingston				424 25	1,110 00		1,534 25
320 50					320 50	Listowel				58 50	262 00		320 50
812 25	116 25	2,150 00	15 00		3,093 50	London				2,122 00	793 50	178 00	3,093 50
314 25		87 50			401 75	Napanee				111 00	290 75		401 75
1,048 00		400 00			1,448 00	Ottawa				524 75	923 25		1,448 00
610 25					610 25	Owen Sound				60 25	550 00		610 25
862 75					862 75	Peterborough				159 25	703 50		862 75
351 50		75 00			426 50	Sarnia				135 75	290 75		426 50
1,006 00					1,006 00	Stratford				155 50	850 50		1,006 00
6,164 80		3,250 00			9,414 80	Toronto				4,315 25	5,099 55		9,414 80
16,575 55	239 75	8,912 50	15 00		25,742 80	*Ontario*				10,038 50	15,373 05	331 25	25,742 80
2,311 00		3,650 00			5,961 00	Montreal				4,776 75	1,184 25		5,961 00
860 25		600 00			1,460 25	Quebec				360 75	1,099 50		1,460 25
642 75					642 75	Sherbrooke				39 50	603 25		642 75
3,814 00		4,250 00			8,064 00	*Quebec*				5,177 00	2,887 00		8,064 00
738 25		475 00			1,213 25	Fredericton				83 75	1,129 50		1,213 25
1,376 75					1,376 75	Moncton	795 50	531 25		50 00			1,376 75
605 00		750 00		795 50	2,150 50	St. John				836 25	1,314 25		2,150 50

2,720 00	.....	1,225 00	.....	795 50	4,740 50	.....*New Brunswick*.....	795 50	531 25	.....	970 00	2,443 75	.....	4,740 50
1,049 75	111 50	775 00	.....	.....	1,936 25	Halifax	.....	.....	.....	469 25	1,354 00	113 00	1,936 25
110 25	.....	.....	.....	.....	110 25	Pictou.....	.....	110 25	.....	.....	.....	.....	110 25
1,160 00	111 50	775 00	.....	.....	2,046 50	.....*Nova Scotia*.....	.....	110 25	.....	469 25	1,354 00	113 00	2,046 50
1,164 25	18 00	.....	.....	.....	1,182 25	..*Charlottetown, P. E. I.*.....	.....	.....	.....	67 25	1,115 00	.....	1,182 25
599 00	.....	450 00	.....	.....	1,049 00	.....*Winnipeg, Man.*.....	.....	.....	.....	187 75	861 25	.....	1,049 00
976 75	.....	.....	.....	.....	976 75	..Nanaimo.....	.....	.....	.....	42 00	934 75	.....	976 75
1,169 00	31 25	.....	.....	.....	1,200 25	..New Westminster.....	.....	.....	.....	49 25	1,133 00	18 00	1,200 25
974 75	20 50	.....	.....	.....	995 25	..Vancouver.....	.....	.....	.....	123 00	848 75	23 50	995 25
867 50	.....	.....	.....	.....	867 50	..Victoria	.....	.....	.....	147 75	719 75	.....	867 50
3,988 00	51 75	.....	.....	.....	4,039 75	.....*British Columbia* ...	.....	.....	.....	362 00	3,636 25	41 50	4,039 75
30,020 80	421 00	15,612 50	15 00	795 50	46,864 80	.....Grand Totals.....	795 50	641 50	.....	17,271 75	27,670 30	485 75	46,864 80
.....	.....	4,529 00	.....	.....	4,529 00	.....Law Stamps.....	.....	.....	226 45	4,302 55	.....	.....	4,529 00

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

GAS INSPECTION.

No. 22.—Inspection Districts in Account with Expenditure, 1896–97.

(*For Details see Appendix B.*)

Dr. Cr.

Amounts due by sundry persons, 1st July, 1896.	Amounts received from Department to meet expenditure.	Deductions from salaries for superannuation.	Amounts due to sundry persons, 30th June, 1897.	Totals.	Districts.	Expenditures Authorized by the Department.					Amounts due by sundry persons, 30th June, 1897.	Totals.
						Salaries.	Special assistance.	Rent.	Travelling Expenses.	Sundries.		
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
.....	100 60	2 00	.....	102 60	....Barrie.....	100 00	.....	.....	.....	2 60	.....	102 60
.....	328 80	5 00	.....	333 80	....Belleville.....	250 00	.....	50 00	4 20	29 60	.....	333 80
.....	110 00	2 00	.....	112 00	....Berlin.....	100 00	.....	.....	.....	12 00	.....	112 00
.....	108 29	.....	.....	108 29	....Brockville.....	.....	99 96	.....	.....	8 33	.....	108 29
.....	169 75	2 00	.....	171 75	....Cobourg.....	100 00	.....	.....	39 30	32 45	.....	171 75
.....	148 40	2 00	.....	150 40	....Cornwall.....	100 00	.....	.....	.....	50 40	.....	150 40
.....	110 30	2 00	.....	112 30	....Guelph.....	100 00	.....	.....	.....	12 30	.....	112 30
.....	1,787 42	33 24	.....	1,820 66	....Hamilton.....	1,699 96	.....	18 00	61 65	41 05	.....	1,820 66
.....	492 61	8 00	.....	500 61	....Kingston.....	400 00	.....	45 00	.....	55 61	.....	500 61
.....	143 75	1 25	.....	145 00	....Listowel.....	100 00	.....	45 00	.....	.....	.....	145 00
.....	1,450 50	20 00	.....	1,470 50	....London.....	1,000 00	.....	110 00	267 10	93 40	.....	1,470 50
.....	85 77	0 80	.....	86 57	....Napanee.....	41 65	.....	.....	6 50	38 42	.....	86 57
.....	1,281 70	12 00	.....	1,293 70	....Ottawa.....	900 00	.....	300 00	.....	93 70	.....	1,293 70
.....	321 00	4 00	.....	325 00	....Owen Sound.....	200 00	.....	125 00	.....	.....	.....	325 00
.....	201 50	4 00	.....	205 50	....Peterborough.....	200 00	.....	.....	.....	5 50	.....	205 50
.....	22 00	.....	.....	22 00	....Sarnia.....	.....	.....	20 00	.....	2 00	.....	22 00
.....	208 50	4 00	.....	212 50	....Stratford.....	200 00	.....	.....	.....	12 50	.....	212 50
.....	2,243 79	28 04	.....	2,271 83	....Toronto.....	2,199 92	.....	.....	27 00	44 91	.....	2,271 83
.....	9,314 68	130 33	.....	9,445 01	.....*Ontario*.....	7,691 53	99 96	713 00	405 75	534 77	.....	9,445 01
.....	2,572 80	37 28	.....	2,610 08	....Montreal.....	2,199 84	.....	240 00	19 75	150 49	.....	2,610 08
.....	1,426 79	25 96	.....	1,452 75	....Quebec.....	1,300 00	.....	100 00	.....	52 75	.....	1,452 75
.....	98 00	2 00	.....	100 00	....Sherbrooke.....	100 00	.....	.....	.....	.....	.....	100 00
.....	4,097 59	65 24	.....	4,162 83	.....*Quebec*.....	3,599 84	.....	340 00	19 75	203 24	.....	4,162 83

.....	199 00	2 50	...	201 50	....Fredericton	200 00	.....	.....	.....	1 50	.....	201 50
.....	293 29	5 00	.....	298 29	....Moncton	250 00	.....	.....	47 14	1 15	.....	298 29
.....	1,028 11	20 00	.....	1,048 11	....St. John	1,000 00	.....	.....	18 16	29 95	.....	1,048 11
.....	1,520 40	27 50	.....	1,547 90	..... *New Brunswick*.....	1,450 00	.....	.....	65 30	32 60	.....	1,547 90
.....	1,915 39	25 96	.....	1,941 35	....Halifax	1,300 00	.....	159 35	369 40	112 60	.....	1,941 35
12 88	.....	.....	.....	12 88	....Pictou	.....	.....	.....	.....	.....	12 88	12 88
12 88	1,915 39	25 96	...	1,954 23	..... *Nova Scotia*.....	1,300 00	.....	159 35	369 40	112 60	12 88	1,954 23
.....	244 47	.....	.....	244 47	.....*Charlottetown, P.E.I*.....	199 92	.....	.....	15 25	29 30	.....	244 47
.....	293 55	3 30	.....	296 85	.....*Winnipeg, Man*.....	166 00	.....	108 00	.....	22 25	.....	296 85
.....	98 68	1 28	.....	99 96	....Nanaimo	99 96	.....	.....	.....	.....	.....	99 96
.....	98 00	2 00	.....	100 00	....New Westminster	100 00	.....	.....	.....	.....	.....	100 00
.....	182 15	2 00	7 05	191 20	...Vancouver	100 00	.....	.....	.....	91 20	.....	191 20
.....	496 00	4 00	.....	500 00	... Victoria	200 00	.....	300 00	.....	.....	.....	500 00
.....	874 83	9 28	7 05	891 16	..... *British Columbia*.....	499 96	.....	300 00	.....	91 20	.....	891 16
200 00	228 93	.....	...	428 93	....General	.....	.....	.....	212 58	16 35	200 00	428 93
.....	129 65	.....	.....	129 65	.. General expenses	.....	.....	.....	.....	129 65	.....	129 65
.....	158 14	.....	.....	158 14	....Printing.....	.....	.....	.....	.....	158 14	.....	158 14
.....	79 76	.....	.....	79 76	....Stationery.....	.....	.....	.....	.....	79 76	.....	79 76
.....	20 00	.....	.....	20 00	... Lithographing.....	.....	.....	.....	.....	20 00	.....	20 00
212 88	18,877 39	261 61	7 05	19,358 93	....Grand Totals.....	14,907 85	99 96	1,620 35	1,088 03	1,429 86	212 88	19,358 93

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

ELECTRIC LIGHT STAMPS, 1896-97.

DR. No. 23.—STAMP DISTRIBUTORS in account with Inland Revenue Department. CR.

BALANCES, 1ST JULY, 1896.		Stamps issued to Inspectors.	Registration Fees Accrued.*	Totals.	DISTRICTS.	DEPOSITED TO THE CREDIT OF THE RECEIVER GENERAL.		BALANCES, 30TH JUNE, 1897.		Totals.
Stamps on hand.	Cash on hand.					Registration Fees Collected.*	Inspection Fees.	Stamps on hand.	Cash on hand.	
$ cts.	$ cts.	$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
754 00	.....	.....	300 00	1,054 00	....Belleville.....	300 00	131 25	622 75	.....	1,054 00
2,120 00	38 25	100 00	335 00	2,593 25	....Hamilton.....	335 00	235 25	2,023 00	.....	2,593 25
2,148 75	.....	150 00	480 00	2,778 75	....London.....	480 00	196 25	2,063 50	39 00	2,778 75
6,398 00	.....	875 00	280 00	7,553 00	....Ottawa	280 00	944 50	6,328 50	.....	7,553 00
6,421 25	.....	1,250 00	645 00	8,316 25	...Toronto	645 00	390 50	7,280 75	.....	8,316 25
17,842 00	38 25	2,375 00	2,040 00	22,295 25	.....*Ontario*	2,040 00	1,897 75	18,318 50	39 00	22,295 25
5,989 75	.....	725 00	220 00	6,934 75	....Montreal.....	220 00	871 75	5,843 00	.....	6,934 75
2,709 50	.....	.....	25 00	2,734 50	...Quebec.....	25 00	201 00	2,507 50	1 00	2,734 50
369 50	.....	.....	155 00	524 50	....Sherbrooke.....	155 00	20 50	349 00	.....	524 50
9,068 75	.....	725 00	400 00	10,193 75	..... *Quebec*.....	400 00	1,093 25	8,699 50	1 00	10,193 75
2,030 00	.....	25 00	125 00	2,180 00	..*St. John, N.B.*.....	125 00	89 75	1,965 25	.....	2,180 00
2,064 75	78 75	425 00	325 00	2,893 50	.....*Halifax, N.S.*.....	325 00	669 00	1,899 50	.....	2,893 50
.....	.....	1,250 00	25 00	1,275 00	.....*Winnipeg, Man*.....	25 00	230 50	1,019 50	.....	1,275 00
.....	.....	1,175 00	.....	1,175 00	....Vancouver.....	.....	.....	1,148 75	26 25	1,175 00
.....	.....	1,175 00	.....	1,175 00	....Victoria	.....	.....	1,175 00	.....	1,175 00
.....	.....	2,350 00	.....	2,350 00	.....*British Columbia*.....	.....	.....	2,323 75	26 25	2,350 00
.....	.....	.....	2,915 00	39,187 50	..... Grand Totals.....	2,915 00	.....	.....	.....	39,187 50
.....	.....	.....	90 00	90 00	Less Refunds as per Statem'nt No. 16.	90 00	.....	.....	.....	90 00
31,005 50	117 00	7,150 00	2,825 00	39,097 50	..... Net Revenue.....	2,825 00	3,980 25	34,226 00	66 25	39,097 50

*The Registration Fees were collected by Collectors of Inland Revenue.

INLAND REVENUE DEPARTMENT, OTTAWA, 20th August, 1897. E. MIALL, *Commissioner.*

ELECTRIC LIGHT INSPECTION.

No. 24.—Inspection Districts in Account with Expenditure, 1896–97.

DR. (*For Details, see Appendix B.*) CR.

Amounts due to sundry persons, 30th June, 1897.	Amounts received from Department to meet Expenditure.	Totals.	Districts.	Expenditure Authorized by the Department.			Totals.
				Salaries.	Travelling Expenses.	Sundries.	
$ cts.	$ cts.	$ cts.		$ cts.	$ cts.	$ cts.	$ cts.
23 00	2,471 33	2,494 33	Chief electrical engineer	1,830 06	575 65	88 62	2,494 33
.....	110 58	110 58	Belleville	.....	98 66	11 92	110 58
.....	50 15	50 15	Hamilton	.....	46 25	3 90	50 15
.....	35 28	35 28	London	.....	13 00	22 28	35 28
.....	19 47	19 47	Ottawa	.....	7 50	11 97	19 47
.....	103 00	103 00	Toronto	.....	97 50	5 50	103 00
.....	1 10	1 10	Montreal	.....	.....	1 10	1 10
.....	4 01	4 01	Quebec	.....	.....	4 01	4 01
.....	13 09	13 09	St. John, N.B	.....	12 34	0 75	13 09
.....	82 20	82 20	Halifax	.....	81 45	0 75	82 20
.....	81 00	81 00	Victoria, B.C	.....	18 00	63 00	81 00
.....	5,963 22	5,963 22	General	.....	.....	5,963 22	5,963 22
.....	22 66	22 66	Printing	.....	.....	22 66	22 66
.....	41 62	41 62	Stationery	.....	.....	41 62	41 62
23 00	8,998 71	9,021 71		1,830 06	950 35	6,241 30	9,021 71

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

DR. No. 25—STATEMENT showing the Transactions in connection with the Manufacture of Methylated Spirits, 1896-97. CR.

—	Amount.	Total.	—	Amount.	Total.
	$ cts.	$ cts.		$ cts.	$ cts.
To Stock on hand 1st July, 1896		11,190 26	By goods sold during the year		95,444 84
Wood naphtha	5,850 66		Methylated spirits	86,236 38	
Methylated spirits	2,377 49		Drums and barrels	9,091 00	
Alcohol	1,544 89		Wood naphtha	61 04	
Drums and barrels	1,417 22		Alcohol	55 92	
Articles purchased during the year		65,733 08	Stock on hand 30th June, 1897		12,028 06
Alcohol	33,517 74		Wood naphtha	6,788 76	
Wood naptha	23,355 74		Methylated spirits	4,032 88	
Drums and barrels	8,859 60		Alcohol	483 92	
			Drums and barrels	722 50	
Other expenses, as follows		7,444 85			
Freight	2,172 99				
Rent of warehouse	800 00				
do motor power	125 00				
Heating	143 00				
Lighting	28 35				
Salaries	3,784 96				
Stationery	8 55				
Sundries	382 00				
Balance, being net profit over expenditure		23,104 71			
Totals		107,472 90	Totals		107,472 90

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

No. 26—STATEMENT showing the amounts voted and the Expenditure authorized for each service for the year ended 30th June, 1897.

Services.	Grants.	Expenditures.	Over Expenditures.	Under Expenditures.
	$ cts.	$ cts.	$ cts.	$ cts.
Controller's salary	5,000 00	4,986 56		13 44
Departmental salaries	38,250 00	37,278 51		971 49
do contingencies	7,250 00	6,269 37		980 63
Excise salaries	311,081 75	301,553 18		9,528 57
do contingencies	49,700 00	49,469 41		230 59
do do on account of stamps	19,000 00	19,000 00		
Commission to Customs officers	5,500 00	5,490 23		9 77
Duty pay	6,000 00	5,490 20		509 80
do other than special surveys	1,000 00	795 43		204 57
Cullers' salaries	5,050 00	5,050 00		
do contingencies	2,250 00	1,752 05		497 95
do fees	3,800 00	3,733 36		66 64
do annuities	7,200 00	6,083 34		1,116 66
Preventive service	10,700 00	9,340 13		1,359 87
Minor revenues	400 00	186 21		213 79
Tobacco stamp commission	100 00	58 63		41 37
Weights and measures salaries	56,850 00	50,166 87		6,683 13
do contingencies	15,950 00	15,776 06		173 94
Gas inspection salaries	15,150 00	14,907 85		242 15
do contingencies	8,000 00	4,231 15		3,768 85
Electric light inspection	9,000 00	8,998 71		1 29
Inspection of staples	3,000 00	2,921 38		78 62
Adulteration of food	25,066 66	24,008 80		1,057 86
Methylated spirits	70,000 00	73,215 63	3,215 63	
	675,298 41	650,763 06	3,215 63	27,750 98

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX A

STATISTICS

APPENDIX A.—SPIRITS.

No. 1.—RETURN of Manufactures for

DIVISIONS.	GRAIN, &c., USED FOR DISTILLATION.				
	Malt.	Indian Corn.	Rye.	Oats and other Grain.	Barley.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Belleville, Ont	172,140	3,160,520	1,083,310	32,760	
Guelph do	156,860	2,733,600	495,940	40,800	
Hamilton do	113,120	2,259,998	419,176	35,350	
Perth do	194,960				
Prescott do					
Toronto do	1,136,191	20,467,530	4,414,924	241,925	26,210
Windsor do	63,240	216,000	888,060	2,700	
Halifax, N.S					
Totals	1,836,511	28,837,648	7,301,410	353,535	26,210

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

the Year ended 30th June, 1897.

Total Grain used for Distillation.	Licenses.		Proof Spirits Manufactured at $1.70, $1.72, $1.90 and $1.92 per gall.		Duty Collected ex-Manufactory, on Deficiencies and Assessments.		Total Duty Collected ex-Manufactory, including License Fees.
	No.	Fees.					
Lbs.		$	Gallons.	$ cts.	Gallons.	$ cts.	$ cts.
4,448,730	1	250	261,320·73	460,164 13	.....	.....	250 00
3,427,200	1	250	206,966·06	362,850 81	24·54	41 72	291 72
2,827,644	1	250	162,919·89	281,851 81	1,069·20	1,817 64	2,067 64
194,960	2	500	9,801·95	17,544 24	316·06	553 22	1,053 22
....	1	250	33·44	63 53	1,008·20	1,713 94	1,963 94
26,286,780	1	250	1,569,486·68	2,727,412 31	4·05	6 88	256 88
1,170,000	1	250	69,429·42	118,030 01	129·97	220 95	470 95
....	1	250	.....	.....	15·78	27 14	277 14
38,355,314	9	2,250	*2,279,958·17	3,967,916 84	2,567·80	4,381 49	6,631 49

* This includes surplus of 145·14 galls.

E. MIALL,
Commissioner.

APPENDIX A.—*Continued*—SPIRITS.

No. 2.—COMPARATIVE STATEMENT of manufactures

PROVINCES.	GRAIN, &C., USED FOR DISTILLATION.					
	Malt.	Indian Corn.	Rye.	Oats and other Grain.	Wheat.	Barley.
1896.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Ontario	3,376,898	57,932,131	12,010,149	754,620	30,150	*4,399 25,820
Nova Scotia	.....	.....	.....	.....	.....	.....
Totals	3,376,898	57,932,131	12,010,149	754,620	30,150	*4,399 25,820
1897.						
Ontario	1,836,511	28,837,648	7,301,410	353,535	.....	26,210
Nova Scotia	.....	.....	.....	.....	.....	.....
Totals	1,836,511	28,837,648	7,301,410	353,535	.....	26,210

*Cherry Pomace ..... 925 lbs.
Wine Lees ..... 3,473 "
4,399 "

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

for the Years ended 30th June, 1896 and 1897.

Total Grain used for Distillation.	Licenses. No.	Licenses. Fees.	Proof Spirits Manufactured at $1.70, $1.72, $1.90 and $1.92 per gall.		Duty collected ex-manufactory, on Deficiencies and Assessments.		Total duty collected ex-Manufactory, including License Fees.
Lbs.		$	Galls.	$ cts.	Galls.	$ cts.	$ cts.
*4,399 74,129,768	9	2,250	4,382,209·85	7,450,032 89	11,776·28	18,188 54	20,438 54
....	1	250	.....	.....	131·38	199 70	449 70
*4,399 74,129,768	10	2,500	†4,382,209·85	7,450,032 89	11,907·66	18,388 24	20,888 24
38,355,314	8	2,000	2,279,958·17	3,967,916 84	2,552·02	4,354 35	6,354 35
.....	1	250	.....	.....	15·78	27 14	277 1
38,355,314	9	2,250	‡2,279,958·17	3,967,916 84	2,567·80	4,381 49	6,631 49

†This includes surplus of 8,911·44 galls.
‡ do do 145·14 do

E. MIALL,
Commissioner.

APPENDIX A.—*Continued*—SPIRITS.

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

DIVISIONS.	Spirits in Process, including deficiencies brought forward.	Spirits manufactured during the year.	Spirits returned to distillery for redistillation.	Spirits received from other sources.
				Duty paid.
	Galls.	Galls.	Galls.	Galls.
Belleville, Ont.	23,887·51	261,320·73	.....	1,316·23
Guelph "	28,542·25	206,966·06	2,436·83	442·79
Hamilton "	4,656·90	162,919·89	†531·80 76,934·07	.....
Perth "	314·78	9,801·95	.....	.....
Prescott "	20,340·94	33·44	7,985·23	73·31
Toronto "	8,226·47	1,569,486·68	†1,695·17 112,498·20	867·46
Windsor "	96,344 32	69,429·42	14,357·92	52·88
Halifax, N.S.	15·78	.....	.....	.....
Totals	182,328·95	* 2,279,958·17	†2,226·97 214,212·25	2,752·67

*This includes surplus of 145·14 galls. †Duty paid, spirits.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

in the Dominion of Canada during the Year ended 30th June, 1897.

Totals.	Spirits warehoused during the year.	Fusel oil written off.	Spirits written off.	Deficiencies on which duty was collected.	Spirits in process, including deficiencies carried forward.	Totals.
Galls.	Galls.	Galls.	Galls.	Galls.	Galls.	Galls.
286,524·47	271,916·25	1,571 52	....	.....	13,036·70	286,524·47
238,387·93	205,004·01	940·28	... .	24·54	32,419·10	238,387·93
245,042·66	241,532·98	436·20	.. ..	1,069·20	2,004 28	245,042·66
10,116·73	7,043·52	.....	.....	233·64	2,839·57	10,116·73
28,432·92	26,135·78	1,934·48	.....	.....	362 66	28,432·92
1,692,773·98	1,678,526·45	6,263·16	.....	4·05	7,980·32	1,692,773·98
180,184·54	166,325·85	4,256·67	‡59·12	129·97	9,412·93	180,184 54
15 78	.....	.....	.....	15·78	....	15 78
2,681,479·01	2,596,484·84	15,402·31	59·12	1,477·18	68,055 56	2,681,479·01

‡Destroyed.

E. MIALL,
Commissioner.

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 at $1.70, $1.72, $1.90 and $1.92 per Gallon.	
Galls.	Galls.	Galls.	Galls.	Galls.		Galls.	Galls.
594,597·47	271,916·25	.....	12,704·93	879,218·65	Belleville, Ont.	119,292·71	202,911·49
2,796·60	.....	.....	22,655·21	25,451·81	Brantford "	15,865·01	27,122·93
665·03	.....	.....	6,792·80	7,457·83	Cornwall "	6,431·12	11,031·15
944,101·16	205,004·01	.....	54,088·20	1,203,193·37	Guelph "	241,309·78	410,288·48
561,697·83	241,532·98	.....	63,276·71	866,507·52	Hamilton "	135,134·16	229,795·52
5,299·37	.....	.....	30,635·54	35,934·91	Kingston "	27,807·91	47,435·35
6,200·26	.....	.....	47,953·68	54,153·94	London "	52,761·85	89,930·74
11,262·85	.....	.....	91,119·29	102,382·14	Ottawa "	102,187·14	173,726·54
6,069.23	.....	.....	84,004·28	90,073·51	do G'vt. W'se	.....	.....
.....	.....	.....	133·58	133·58	do Dept. Lab	.....	.....
2,258·27	.....	.....	8,785 18	11,043·45	Owen S'nd, Ont	10,925·88	18,587·16
57,992·09	7,043·52	.....	22,031·42	87,067·03	Perth "	37,720·85	64,603·09
1,311·48	.....	.....	10,810·06	12,121·54	Peterboro' "	11,764·00	20,148·98
726·94	.....	.....	6,359·57	7,086·51	Port Arthur"	6,212·68	10,754·00
1,052,770·46	26,135·78	76,628·37	39,820·06	1,195,354·67	Prescott "	52,400·12	112,603·01
1,469·22	.....	.....	8,894·58	10,363·80	St. Cath'ns "	9,721·15	16,564·58
1,332·10	.....	.....	20,367·69	21,699·79	Stratford "	21,321·57	36,295·30
4,376,615·98	1,678,526·45	213·51	86,786·91	6,142,142·85	Toronto "	384,352·30	652,697·92
4,924,782·01	166,325·85	.....	17,022·27	5,108,130·13	Windsor "	319,547·06	544,743·79
12,551,948·35	2,596,484·84	76,841·88	634,241·96	15,859,517·03	Totals.....	1,554,755·29	2,669,240·03
3,376·72	.....	.....	15,785·23	19,161·95	Joliette, Que.	17,716·25	30,156·64
69,512·01	.....	*72·06	597,493·49	667,077·56	Montreal "	536,135·68	905,226·70
21,546·34	.....	.....	164,224·85	185,771·19	Quebec "	162,667·12	276,758·14
4,116·72	.....	.....	31,373·52	35,490·24	St. Hya'the "	32,437 16	55,181·16
5,709·47	.....	48,749·54	60,874·17	115,333·18	Sherbrooke "	63,842·83	123,371·08
1,565·33	.....	.....	11,576·31	13,141·64	Sorel "	12,400·11	21,137·53
1,327·86	.....	.....	5,901·51	7,229·37	Terrebonne "	7,229·37	12,289·93
3,294·99	.....	.....	31,184·38	34,479·37	Three Riv's "	31,266·52	53,240·24
110,449·44	.....	*72·06 48,749·54	918,413 46	1,077,684·50	Totals.....	863,695·04	1,477,361·42
75·00	.....	.....	160·05	235·05	Chatham, N.B.	75·00	127·50
9,237·50	.....	.....	53,805·20	63,042·70	St. John "	59,056·51	101,351·79
9,312·50	.....	.....	53,965·25	63,277·75	Totals.....	59,131·51	101,479·29
122,242·19	.....	.....	22,001·69	144,243·88	Halifax, N.S...	53,521·78	91,715·80
227·76	.....	.....	....	227·76	Chr'to'n, P.E.I	227·76	391·75
30,562·82	.....	.....	119,148·01	149,710·83	Winnipeg, Man	128,340·83	218,775·43
1,542·54	.....	.....	5,308·74	6,851·28	Calg'ry, N.W.T	5,455·86	9,381·02
19,905·41	.....	28·92	63,434·80	83,369·13	Vanco'ver, B. C	61,956·92	107,271·94
14,911·08	.....	.....	51,291·56	66,202·64	Victoria "	52,861·11	90,121·40
34,816 49	.....	28·92	114,726·36	149,571·77	Totals.....	114,818·03	197,393·34
8,612·54	.....	.....	.....	8,612·54	Sundries.....	.....	.....
12,869,714·63	2,596,484.84	*72·06 125,620·34	1,867,805·47	17,459,697·34	Grand Totals..	2,779,946·10	†4,765,738·08

*Seized. †This amount includes $37,613.38, collected on imported spirits, used in bonded factories, at 30c. per gallon.

INLAND REVENUE DEPARTMENT, OTTAWA, 20th August, 1897.

for the Year ended 30th June, 1897. CR.

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.
177,296·04	.....	5,895·76	2,775·06	428·14	.....	573,530·94	879,218·65
1,242·50	.....	.....	.....	.....	5,745·00	2,599·30	25,451·81
.....	.....	.....	.....	.....	.....	1,026·71	7,457·83
53,688·63	2,436·83	16,696·65	582·67	5,846·82	.....	882,631·99	1,203,193·37
118,896·97	76,934·07	11,315·01	873·01	941·85	18,341·91	504,070·54	866,507·52
....	....	.....	.....	92·51	5,529·45	2,505·04	35,934·91
.....	.....	....	.....	721·27	.....	670·82	54,153·94
75·42	.....	.....	62·58	.....	.....	57·00	102,382·14
.....	....	....	133·15	.....	†88,730·56	1,209·80	90,073·51
.....	.....	....	133·58	....	.....	.....	133·58
.....	.....	.....	.....	.....	....	117·57	11,043·45
130·63	....	1,147·96	.....	58·42	.....	48,009·17	87,067·03
.....	.....	.....	.....	.....	.....	357·54	12,121·54
.....	.....	.....	.....	.....	.....	873·83	7,086·51
226,930·46	7,985·23	4,452·91	230·71	1,989·09	76,628·37	824,737·78	1,195,354·67
.....	....	.....	.....	.....	.....	642·65	10,363·80
.....	.....	.....	.....	.....	.....	378·22	21,699·79
633,908·46	112,498·20	98,284·80	2,740·87	16,207·00	47,852·20	4,846,299·02	6,142,142·85
529,372·77	14,357·92	54,543·81	160·26	123,771·01	.....	4,066,377·30	5,108,130·13
1,741,541·88	214,212·25	192,336·90	7,691·89	150,056·11 {	†88,730·56 } 154,096·93 }	11,756,095·22	15,859,517·03
.....	.....	....	.....	.....	.....	1,445·70	19,161·95
43,661·88	.....	.....	.....	4,382·67	36,316·75	46,580·58	667,077·56
.....	.....	.....	.....	.....	12,282·54	10,821·53	185,771·19
322·31	....	.....	.....	.....	.....	2,730·77	35,490·24
63·82	.....	.....	.....	.....	48,749·54	2,676·99	115,333·18
.....	.....	.....	.....	.....	.....	741·53	13,141·64
.. ..	.....	.....	.....	.....	.....	.....	7,229·37
.....	.....	.....	.....	.....	.....	3,212·85	34,479·37
44,048·01	....	.....	.....	4,382·67	97,348·83	68,209·95	1,077,684·50
160·05	....	.....	.....	.....	.....	.....	235·05
160·05	.....	.....	.....	52·82	.....	3,773·32	63,042·70
320·10	.....	.....	.....	52·82	.....	3,773·32	63,277·75
73,316·45	.....	12,403·62	.....	679·44	.....	4,322·59	144,243·88
.....	.....	.....	.....	.....	.....	.....	227·76
3,787·47	.....	.....	.....	76·50	.....	17,506·03	149,710·83
.....	.....	.....	.....	.....	.....	1,395·42	6,851·28
1,648·61	.....	.....	.....	647·54	.....	19,116·06	83,369·13
3,142·95	.....	.....	67·32	3,048·09	.....	7,083·17	66,202·64
4,791·56	.....	.....	67·32	3,695·63	.....	26,199·23	149,571·77
.....	.....	.....	.....	.....	.....	8,612·54	8,612·54
1,867,805·47	214,212·25	204,740·52	*7,759·21	158,943·17 {	†88,730·56 } 251,445·76 }	11,886,114·30	17,459,697·34

*Of this quantity, 7,255·20 gallons is spirits allowed distillers, free of duty, as compensation for duty paid spirits brought into the distilleries.

334·05 do written of by authority.
107·38 do destroyed by authority.
62·58 do. for use of His Excellency the Governor General.

Totals... 7,759·21

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

E. MIALL, *Commissioner.*

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 at $1.70, $1.72, $1.90 and $1.92 per Gallon.	
Galls.	Galls.	Galls.	Galls.	Galls.	1896.	Galls.	$ cts.
10,992,816·99	4,467,816·09	85,559·78	756,079·63	16,302,272·49	Ontario	1,069,044·74	1,838,974 46
123,630·37		*219·78 / 32,731·25	1,003,989·78	1,160,571·18	Quebec	907,276·78	1,544,132 23
8,765·28			71,582·59	80,347·87	New Brunswick	70,948·68	121,109 72
249,356·07	11,393·26		15,796·32	276,545·65	Nova Scotia	50,065·99	85,764 84
94·82			1,387·58	1,482·40	P. E. Island	1,254·64	2,157 97
25,373·79			138,184·69	163,558·48	Manitoba	128,718·46	218,822 94
1,303·76			5,810·55	7,114·31	N.W. Territories	5,571·77	9,471 96
24,903·52			113,443 63	138,347·15	British Columbia	99,977·63	169,965 20
8,612·54				8,612·54	Sundries		
11,434,857·14	4,479,209·35	*219·78 / 118,291·03	2,106,274·77	18,138,852·07	Totals	2,332,858·69	3,990,399 32
					1897.		
12,551,948·35	2,596,484·84	76,841·88	634,241·96	15,859,517·03	Ontario	1,554,755·29	2,669,240 03
110,449·44		*72·06 / 48,749·54	918,413·46	1,077,684·50	Quebec	863,695·04	1,477,361 42
9,312·50			53,965·25	63,277·75	New Brunswick	59,131·51	101,479 29
122,242·19			22,001·69	144,243·88	Nova Scotia	53,521·78	91,715 80
227·76				227·76	P. E. Island	227·76	391 75
30,562·82			119,148·01	149,710·83	Manitoba	128,340·83	218,775 43
1,542·54			5,308·74	6,851·28	N.W. Territories	5,455·86	9,381 02
34,816·49		28·92	114,726·36	149,571·77	British Columbia	114,818·03	197,393 34
8,612·54				8,612·54	Sundries		
12,869,714·63	2,596,484·84	*72·06 / 125,620·34	1,867,805·47	17,459,697·34	Totals	2,779,946·10	4,765,738 08

* Seized.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

Returns for the Years ended 30th June, 1896 and 1897. Cr.

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.
1,972,293·87	154,689·13	145,133·44	6,023·37	135,629·31	*88,533·17 178,977·11	12,551,948·35	16,302,272·49
47,691·83	... .	.....	.....	210·20	94,942·93	110,449·44	1,160,571·18
.....	.....	.....	.....	86·69	.....	9,312·50	80,347·87
80,994·31	11,409·04	9,436·22	555·84	1,842·06	....	122,242·19	276,545·65
.....	.....	.....	.....	.....	... .	227·76	1,482·40
4,140·79	....	.....	....	136·41	.....	30,562·82	163,558·48
.. ..	.....	....	.....	.....	....	1,542·54	7,114·31
1,153·97	.....	.....	.....	2,399·06	.....	34,816·49	138,347·15
.....	....	.....	.....	.....	.....	8,612·54	8,612·54
2,106,274·77	166,098·17	154,569·66	6,579·21	140,303·73	*88,533·17 273,920·04	12,869,714·63	18,138,852·07
1,741,541·88	214,212·25	192,336·90	7,691·89	150,056·11	*88,730·56 154,096·93	11,756,095·22	5,859,517·03
44,048·01	....	.....	....	4,382·67	97,348·83	68,209·95	1,077,684·50
320·10	.....	.....	.....	52·82	.....	3,773·32	63,277·75
73,316·45	....	12,403·62	..... .	679·44	.....	4,322·59	144,243·88
.....	.....	.....	.....	.... .	.....	.....	227·76
3,787·47	.....	.....	....	76·50	.....	17,506·03	149,710·83
.....	.....	.....	.....	.....	....	1,395·42	6,871·28
4,791·56	.....	... .	67·32	3,695·63	.....	26,199·23	149,571·77
....	.....	.....	.....	.....	.....	8,612·54	8,612·54
1,867,805·47	214,212·25	204,740·52	7,759·21	158,943·17	*88,730·56 251,445·76	11,886,114·30	17,459,697·34

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

	1896.	1897.
Total duty collected ex-manufactory and ex-warehouse.....	$4,008,787 56	$4,770,119 57
do do on Licenses.....	2,500 00	2,250 00
Totals.....	$4,011,287 56	$4,772,369 57

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—MALT.

No. 6.—RETURN of Manufactures for the year ended 30th June, 1897.

PROVINCES.	LICENSES.		Grain placed in Steep.	Malt manufactured at 1½c. per lb.	Paid Duty Ex-manufactory.	Warehoused.	Total duty collected Ex-manufactory, including License Fees.
	Number.	Fees.					
		$	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
Belleville, Ont. ...	1	50	358,526	277,258	.....	277,258	50 00
Brantford do	2	100	536,992	427,356	.....	427,356	100 00
Guelph do	8	725	6,814,223	5,408,157	.....	5,408,157	725 00
Hamilton do	3	500	6,020,254	4,889,167	30,130	4,859,037	951 95
Kingston do	2	250	4,288,898	3,486,411	.....	3,486,411	250 00
London do	3	450	5,490,147	4,412,394	.....	4,412,394	450 00
Owen Sound, Ont...	1	100	1,000,776	786,371	.....	786,371	100 00
Perth do ...	2	100	240,874	200,027	.....	200,027	100 00
Peterborough do ...	2	250	1,365,600	1,080,856	.....	1.080,856	250 00
Prescott do ..	3	300	1,953,284	1,552,667	15,160	1.537,507	527 40
St. Catharines do ...	2	100	1,021,515	827,644	.....	827,644	100 00
Stratford do ...	1	200	3,004,000	2,450,770	.....	2,450,770	200 00
Toronto do ...	10	1,400	15,738,515	12,490,574	.....	12,490,574	1,400 00
Windsor do ...	1	200	.....	.....	.....	.....	200 00
Totals.....	41	4,725	47,833,604	38,289,652	45,290	38,244,962	5,404 35
Montreal, Que.... ..	3	600	6,949,738	5,674,094	.....	5,674,094	600 00
Quebec do	1	150	1,313,584	1,039,452	.....	1,039,452	150 00
Totals.....	4	750	8,263,322	6,713,546	.....	6,713,546	750 00
Halifax, N.S.....	2	150	1,122,577	915,341	.....	915,341	150 00
Winnipeg, Man.. ...	4	300	1,573,828	1,257,846	9,685	1,248,161	445 25
Calgary, N.W.T.. ..	2	150	467,520	368,321	2,745	365,576	191 18
Grand Totals...	53	6,675	59,260,851	47,544,706	59,720	47,486,986	6,940 78

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX A—*Continued*—MALT.

No. 7.—Comparative Statement of Manufactures for the Years ended 30th June, 1896 and 1897.

Provinces.	Licenses. Number.	Licenses. Fees.	Grain placed in Steep.	Malt manufactured at 1½c. per lb.	Paid Duty Ex-manufactory.	Warehoused-	Total Duty collected Ex-manufactory, including License Fees.
1896.		$	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
Ontario	45	4,875	53,741,829	42,988,486	8,379	42,980,107	5,000 69
Quebec	5	800	10,040,318	8,091,535	.....	8,091,535	800 00
Nova Scotia	1	50	387,478	310,436	.....	310,436	50 00
Manitoba	3	250	1,430,975	1,167,596	3,324	1,164,272	299 86
N. W. Territories	3	175	405,632	326,335	12,998	313,337	369 99
British Columbia	1	50	42,959	34,853	.....	34,853	50 00
Totals	58	6,200	66,050,191	52,919,241	24,701	52,894,540	6,570 54
1897.							
Ontario	41	4,725	47,833,604	38,289,652	45,290	38,244,362	5,404 35
Quebec	4	750	8,263,322	6,713,546	.....	6,713,546	750 00
Nova Scotia	2	150	1,122,577	915,341	.....	915,341	150 00
Manitoba	4	300	1,573,828	1,257,846	9,685	1,248,161	445 25
N. W. Territories	2	150	467,520	368,321	2,745	365,576	191 18
Totals	53	6,075	59,260,851	47,544,706	57,720	47,486,986	6,940 78

E. MIALL,
Commissioner.

Inland Revenue Department,
Ottawa, 20th August, 1897.

APPENDIX A—*Continued*—MALT.

DR. No. 8.—WAREHOUSE RETURN for

Remaining in Warehouse from last year.	Placed in Warehouse.	Increases.	Received from other Divisions.	Imported.	Totals.	DIVISIONS.
Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
51,326	277,258	686	.....	.....	329,270	....Belleville, Ont .....
256,672	427,356	7,041	52,000	.....	743,069	...Brantford do .....
2,137,947	5,408,157	113,828	484,239	.....	8,144,171	....Guelph do .....
1,721,096	4,859,037	53,262	361,409	.....	6,994,804	...Hamilton do .....
2,053,515	3,486,411	5,296	8,400	.....	5,553,622	....Kingston do .....
1,917,756	4,412,394	74,626	118,240	13,767	6,536,783	....London do .....
54,136	.....	1,006	254,840	.....	309,982	....Ottawa do .....
284,919	786,371	.....	463,592	.....	1,534,882	....Owen Sound, Ont.....
5,701	200,027	113	.....	.....	205,841	....Perth do .....
223,912	1,080,856	29,898	396,300	.....	1,730,966	....Peterborough do .....
1,149,684	1,537,507	22,803	.....	.....	2,709,994	....Prescott do .....
246,342	827,644	12,463	15,274	.....	1,101,723	....St. Catharines do .....
2,303,648	2,450,770	31,798	322,302	.....	5,108,518	....Stratford do .....
5,625,384	12,490,574	98,863	452,063	23,700	18,690,584	....Toronto do .....
3,138,619	.....	8,866	430,000	58,862	3,636,347	....Windsor do .....
21,170,657	38,244,362	460,549	3,358,659	96,329	63,330,556	.....Totals .....
12,262	.....	.....	31,680	.....	43,942	....Joliette, Que.....
3,977,634	5,674,094	87,354	788,012	7,466	10,534,560	...Montreal do .....
201,432	1,039,452	5,915	1,171,330	.....	2,418,129	....Quebec do .....
.....	.....	650	308,232	.....	308,882	....Sherbrooke, Que .....
7,899	.....	.....	18,000	.....	25,899	....Terrebonne do .....
4,199,227	6,713,546	93,919	2,317,254	7,466	13,331,412	.....Totals .....
73,364	.....	3,944	611,930	.....	689,238	....St. John, N.B.....
122,616	915,341	102	1,301,845	3,600	2,343,504	....Halifax, N.S.....
.....	.....	.....	72,000	.....	72,000	....Charlottetown, P.E.I.
591,383	1,248,161	10,845	179,720	.....	2,030,109	....Winnipeg, Man. .....
156,456	365,576	3,406	.....	.....	525,438	....Calgary, N.W.T.....
27,527	.....	.....	170,000	953,205	1,150,732	....Vancouver, B.C.....
.....	.....	.....	.....	1,308,163	1,308,163	....Victoria, B.C.....
27,527	.....	.....	170,000	2,261,368	2,458,895	..... Totals .....
26,341,230	47,486,986	572,765	8,011,408	2,368,763	84,781,152	.....Grand totals.....

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

the Year ended 30th June, 1897. CR.

Entered for Consumption at 1½ cents per lb.		Removed to other Divisions.	Exported.	Free, and Written off by Authority.	Remaining in Warehouse.	Totals.
Lbs.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
274,018	4,110 27	.....	.....	.....	55,252	329,270
683,527	10,252 90	.....	.....	.....	59,542	743,069
5,478,740	82,181 08	1,664,795	144,000	4,994	851,642	8,144,171
4,642,636	69,639 54	1,653,686	104,272	.....	594,210	6,994,804
4,167,181	62,507 72	946,480	.....	446	439,515	5,553,622
5,989,771	89,847 11	510,000	.....	13,767	23,245	6,536,783
290,386	4,355 79	.....	.....	.....	19,596	309,982
1,259,989	18,899 84	140,000	.....	.....	134,893	1,534,882
.....	.....	.....	.....	200,661	5,180	205,841
1,351,792	20,276 90	280,000	.....	.....	99,174	1,730,966
2,115,024	31,725 46	127,444	.....	1,500	466,026	2,709,994
973,379	14,600 68	.....	.....	.....	128,344	1,101,723
3,783,766	56,756 49	1,254,840	.....	.....	69,912	5,108,518
16,193,345	242,900 22	1,229,863	120,256	.....	1,147,120	18,690.584
1,142,796	17,141 94	74,300	.....	8,760	2,410,491	3,636,347
48,346,350	725,195 94	7,881,408	368,528	230,128	6.504.142	63,330,556
42,813	642 20	.....	.....	.....	1,129	43,942
9,728,624	145,929 36	.....	.....	15,514	790,422	10,534,560
2,418,129	36,271 90	.....	.....	.....	.....	2,418,129
287,200	4,308 00	.....	.....	.....	21,682	308,882
25,899	389 46	.....	.....	.....	.....	25,899
12,502,665	187,540 92	.....	.....	15,514	813,233	13,331,412
689,238	10,338 57	.....	.....	.....	.....	689,238
2,189,583	32,843 82	.....	9,243	94,056	50,622	2,343,504
72,000	1,080 00	.....	.....	.....	.....	72,000
1,791,815	26,877 20	120,000	.....	.....	118,294	2,030,109
494,467	7,417 01	10,000	.....	.....	20,971	525,438
991,352	14,870 55	.....	.....	.....	159,380	1,150,732
1,308,163	19,622 34	.....	.....	.....	.....	1,308,163
2,299,515	34,492 89	.....	.....	.....	159,380	2,458,895
68,385,633	1,025,786 35	8,011,408	377,771	339,698	7,666,642	94,781,152

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—MALT.

DR. 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.	1896.
18,602,997	42,980,107	650,105	3,237,184	6,481	65,476,874	Ontario
3,578,287	8,091,535	95,425	2,118,812	5,520	13,889,579	Quebec
39,845	.....	7,652	900,590	.....	948,087	New Brunswick
179,200	310,436	.....	1,968,000	.....	2,457,636	Nova Scotia
12,000	.....	620	36,000	.....	48,620	Prince Edward Island.
483,923	1,164,272	10,364	178,864	.....	1,837,423	Manitoba
144,189	313,337	5,590	8,000	.....	471,116	N. W. Territories
29,831	34,853	.....	88,000	1,964,660	2,117,344	British Columbia
23,070,272	52,894,540	769,756	8,535,450	1,976,661	87,246,679	.....Totals.....
						1897.
21,170,657	38,244,362	460,549	3,358,659	96,329	63,330,556	Ontario
4,199,227	6,713,546	93,919	2,317,254	7,466	13,331,412	Quebec
73,364	.....	3,944	611,930	.....	689,238	New Brunswick
122,616	915,341	102	1,301,845	3,600	2,343,504	Nova Scotia
.....	.....	.....	72,000	.....	72,000	Prince Edward Island.
591,383	1,248,161	10,845	179,720	.....	2,030,109	Manitoba
156,456	365,576	3,406	.....	.....	525,438	N. W. Territories
27,527	.....	.....	170,000	2,261,368	2,458,895	British Columbia
26,341,230	47,486,936	572,765	8,011,408	2,368,763	84,781,152	.....Totals.....

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

for the Years ended 30th June, 1896 and 1897. CR.

Entered for Consumption at 1½ cents per lb.		Removed to other Divisions.	Exported.	Free, and Written off by Authority.	Remaining in Warehouse.	Totals.
Lbs.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
35,153,166	527,298 19	8,463,450	372,142	317,459	21,170,657	65.476,874
9,683.871	145,257 10	.....	1,572	4,909	4,199,227	13,889,579
874,163	13,112 45	.....	.....	560	73,364	948,087
2,329,620	34,944 30	.....	5,400	.....	122,616	2.457,636
48,620	729 30	.....	.....	.....	.....	48,620
1,178,040	17,670 59	68,000	.....	.....	591,383	1,837,423
310,660	4,659 90	4,000	.....	.....	156,456	471,116
2,087,437	31,311 68	.....	.....	2,380	27,527	2,117,344
51,665,577	774,983 51	8,535,450	379,114	325,308	26,341,230	87,246,679
48,346,350	725,195 94	7,881,408	368,528	230,128	6,504,142	63,330,556
12,502,665	187,540 92	.....	.....	15,514	813,233	13,331,412
689,238	10,338 57	.....	.....	.....	.....	689,238
2,189,583	32,843 82	.....	9,243	94,056	50,622	2,343,504
72,000	1,080 00	.....	.....	.....	.....	72,000
1,791,815	26,877 20	120,000	.....	.....	118,294	2,030,109
494,467	7,417 01	10,000	.....	.....	20,971	525,438
2,299,515	34,492 89	.....	.....	.....	159,380	2,458,895
68,385,633	1,025,786 35	8,011,408	377,771	339,698	7,666,642	84,781,152

	1896.	1897
Total Duty Collected Ex-Mannfactory and Ex-Warehouse.....	$775,354 05	$1,026,652 13
do do on Licenses.....	6,200 00	6,075 00
Totals	$781,554 05	$1,032,727 13

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—MALT LIQUOR.

No. 10.—RETURN of Manufactures for the Year ended 30th June, 1897.

DIVISIONS.	LICENSES.		Total Quantity of Malt used for Brewing.	Other commodities used.	Malt Liquor Manufactured.	Malt Liquor exported and used by H.M. Army and Navy.	Total Duty Collected, including License Fees
	Number.	Fees.					
		$	Lbs.	Lbs.	Galls.	Galls.	$ cts.
Belleville, Ont.	1	50	112,968		32,965		50 00
Brantford do	3	150	514,033		193,155		150 00
Guelph do	8	400	3,681,993		1,376,773		400 00
Hamilton do	3	150	2,259,010		898,666		150 00
Kingston do	2	100	374,930		119,675		100 00
London do	6	300	3,661,172		1,402,791	3,401	300 00
Ottawa do	4	200	671,920		208,921		200 00
Owen Sound, Ont.	*9	175	955,760		403,425		175 00
Perth do	1	50	2,000		550		50 00
Peterborough do	4	200	844,237		290,899		200 00
Port Arthur do	1	50	22,500		8,320		50 00
Prescott do	3	150	1,489,299		495,254		150 00
St. Catharines do	2	100	845,560		317,925		100 00
Stratford do	5	250	339,229		154,550		250 00
Toronto do	13	650	10,058,712		4,144,570	2,940	650 00
Windsor do	4	200	1,241,440	943	615,776	3,309	210 70
Totals	69	3,175	27,074,763	943	10,664,215	9,650	3,185 70
Joliette, Que.	1	50	41,937		12,595		50 00
Montreal do	12	600	10,156,176		3,549,803		600 00
Quebec do	4	200	2,619,603		907,780		200 00
Sherbrooke, Que.	3	150	445,224		152,097		150 00
Terrebonne do	1	50	25,153		8,370		50 00
Totals	21	1,050	13,288,093		4,630,645		1,050 00
St. John, N.B.	2	100	913,564		326,385		100 00
Halifax, N.S.	4	200	2,297,806		806,367	165,862	200 00
Charlottetown, P.E.I.	1	50	71,964		21,600		50 00
Winnipeg, Man.	7	350	1,364,129	3,000	445,925		819 00
Calgary, N.W.T.	3	150	358,544		129,350		150 00
Vancouver B.C.	20	900	1,054,713		394,284	420	900 00
Victoria, B.C.	7	350	1,353,141		469,468	26,976	350 00
Totals	27	1,250	2,407,854		863,752	27,396	1,250 00
Grand Totals.	*134	6,325	47,776,717	3,943	17,888,239	202,908	6,804 70

* 5 licenses $250 paid in June 1896 for year 1896-97.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—MALT LIQUOR.

No. 11.—COMPARATIVE STATEMENT of Manufactures for the Years ended 30th June, 1896 and 1897.

PROVINCES.	LICENSES. Number.	LICENSES. Fees.	Total quantity of Malt used for Brewing.	Other commodities used.	Malt Liquor manufactured.	Malt Liquor exported and used by H. M. Army and Navy.	Total Duty Collected, including License Fees.
1896.		$	Lbs.	Lbs.	Galls.	Galls.	$ cts.
Ontario	72	3,600	28,889,230	7,148	11,375,629	32,356	3,679 24
Quebec	19	925	12,619,195½	.....	4,253,282	.....	925 00
New Brunswick	3	150	895,913	.....	290,608	.....	150 00
Nova Scotia	5	250	2,327,257	.....	822,567	137,022	250 00
Prince Edward Island	1	50	48,871	.....	14,500	.....	50 00
Manitoba	8	375	1,157,768	.....	378,626	.....	375 00
N. W. Territories	5	225	300,527	.....	104,161	.....	225 00
British Columbia	21	1,025	2,135,372	2,000	775,341	24,319	1,093 50
Totals	134	6,600	48,374,133½	9,184	18,014,714	193,697	6,747 74
1897.							
Ontario	*69	3,175	27,074,763	943	10,664,215	9,650	3,185 70
Quebec	21	1,050	13,288,093	.....	4,630,645	.....	1,050 00
New Brunswick	2	100	913,564	.....	326,385	.....	100 00
Nova Scotia	4	200	2,297,806	.....	806,367	165,862	200 00
Prince Edward Island	1	50	71,964	.....	21,600	.....	50 00
Manitoba	7	350	1,364,129	3,000	445,925	.....	819 00
N. W. Territories	3	150	358,544	.....	129,350	.....	150 00
British Columbia	27	1,250	2,407,854	.....	863,752	27,396	1,250 00
Totals	*134	6,325	47,776,717	3,943	17,888,239	202,908	6,804 70

* 5 licenses paid in June, 1896, for year 1896-97.

1896	Exported	32,628	gallons.
	Used by H. M. Army and Navy	161,069	do
	Total	193,697	do
1897	Exported	14,863	do
	Used by H. M. Army and Navy	188,045	do
	Total	202,908	do

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX A—*Continued*—TOBACCO.

No. 12.—RETURN of Manufactures

DIVISIONS.	Total weight of Raw Leaf Tobacco and all other materials actually used.	LICENSES.		TOBACCO MANUFACTURED.			CIGARETTES MANU	
		Number.	Amount.	At 25 cents per lb.	Paid Duty.	Warehoused	At $1.50 & $3.00 per M.	Paid Duty
	Lbs.		$ cts.	Lbs.	Lbs.	Lbs.	No.	No.
Hamilton	820,123	1	75 00	819,418	149,284½	670,133½	1,404,000	1,339,000
London	5	1	75 00	5	5			
Toronto	131,057	1	75 00	128,898	49,450½	79,447½		
Totals	951,185	3	225 00	948,321	198,740	749,581	1,404,000	1,339,000
Joliette	226,830½	2	75 00					
Montreal	6,255,661 31/40	12	775 00	5,706,463½	287,404½	5,419,059	91,808,000	85,933,000
Quebec	383,910¼	5	300 00	246,871½	200,019½	46,852		
Sherbrooke	461,607	3	150 00	224,043½	72,224½	151,819		
Three Rivers	9,006	1	50 00					
Totals	7,337,015⅜	23	1,350 00	6,177,378½	559,648½	5,617,730	91,808,000	85,933,000
St. John, N.B.	46,057	1	75 00	7,656	7,096	560	13,230,500	4,862,000
Cape Breton, N.S	10,131	1	75 00	11,131	11,131			
Halifax, N.S	79,418	2	150 00	80,224	22,739½	57,484½		
Pictou, N.S.	63,255	2	150 00	73,341	14,734	58,607		
Totals	152,804	5	375 00	164 696	48,604½	116,091½		
Charlottetown, P.E.I	170,781	2	150 00	174,617	114,936	59,681		
Victoria, B.C.	185			60⅛	51⅜	9⅛	59,680	
Grand Totals.	8,658,627⅞	34	2,175 00	7,472,729 3/16	929,076⅜	6,543,652 7/16	106,493,180	92,134,000

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

for the Year ended 30th June, 1897.

FACTURED.	CANADIAN TOBACCO MANUFACTURED.			SNUFF MANUFACTURED.					Total Duty Collected, ex-Manufactory, including License Fees.
Warehoused.	At 5 cents per lb.	Paid Duty	Warehoused.	At 25 cents per lb.	Paid Dnty.	At 18 cents per lb.	Paid Duty	Warehoused.	
No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
65,000									39,404 65
									76 25
									12,437 63
65,000									51,918 53
	227,403½	135,714½	91,689						6,860 73
5,875,000	134,371	121,589	12,782	5,180	5,180	103,460	103,460		241,733 74
	71,658	63,136	8,522	225	225	128,155	128,155		76,585 77
	247,388	207,702½	39,685½						28,591 36
	9,321	9,321							516 05
5,875,000	690,141½	537,463	152,678½	5,405	5,405	231,615	231,615		354,287 65
8,368,500									9,944 50
									2,857 75
									5,834 88
									3,833 50
									12,526 13
									28,884 00
50,680									12 90
14,359,180	690,141½	537,463	152,678½	5,405	5,405	231,615	231,615		457,573 71

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—TOBACCO.

No. 13.—COMPARATIVE STATEMENT of Manufactures

PROVINCES.	LICENSES.		Total weight of raw leaf tobacco and all other materials actually used.	TOBACCO MANUFACTURED.			CIGARETTES MANU	
	No.	Fees.		At 25 cents per lb.	Paid Duty.	Warehoused.	At $1.50 & $3.00 per M.	Paid Duty.
1896.		$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	No.	No.
Ontario	4	262 50	1,314,826½	1,307,022 77/100	220,027½	1,086,995 27/100	2,135,500	2,135,500
Quebec	25	1,562 50	8,944,934 1/2	7,943,257¼	509,749¾	7,433,507½	82,772,400	74,471,400
N. Brunswick	1	37 50	6,173	3,317	3,317	.....	1,008,000	1,008,000
Nova Scotia	4	262 50	184,240	191,712	25,376½	166,335½	.....	.....
P. E. Island	2	150 00	160,783	163,795	80,023	83,772	.....	.....
B. Columbia	1	75 00	311	90	90	.....	78,500	50,000
Totals	37	2,350 00	10,611,268 5/12	9,609,194 1/100	838,583¾	8,770,610 27/100	85,994,400	77,664,900
1897.								
Ontario	3	225 00	951,185	948,321	198,740	749,581	1,404.000	1,339,000
Quebec	23	1,350 00	7,337,015⅔	6,177,378½	559,648½	5,617,730	91,808,000	85,933,000
N. Brunswick	1	75 00	46,657	7,656	7,096	560	13,230,500	4,862,000
Nova Scotia	5	375 00	152,804	164,696	48,604½	116,091½	.....	.....
P. E. Island	2	150 00	170,781	174,617	114,936	59,681	.....	.....
B. Columbia	....	.....	185	60¼	51 3/5	9⅕	50,680	.....
Totals	34	2,175 00	8,658,627⅔	7,472,729 3/100	929,076⅜	6,543,652 7/10	106,493,180	92,134,000

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

for the Years ended 30th June, 1896 and 1897.

FACTURED.	CANADIAN TOBACCO MANUFACTURED.			SNUFF MANUFACTURED.						Total Duty Collected, ex-Manufactory, including License Fees.
Warehoused.	At 5 cents per lb.	Paid Duty.	Warehoused.	At 25 cents per lb	Paid Duty.	Warehoused.	At 18 cents per lb.	Duty Paid.	Warehoused.	
No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	$ cts.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58,472 64
8,301,000	474,205	244,955½	229,249½	5,610	5,610	.....	233,260	231,960	1,300	296,110 12
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,378 75
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,606 63
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,155 75
28,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	172 50
8,329,500	474,205	244,955½	229,249½	5,610	5,610	.....	233,260	231,960	1,300	383,896 39
65,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	51,918 53
5,875,000	690,141½	537,463	152,678½	5,405	5,405	.....	231,615	231,615	.....	354,287 65
8,368,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,944 50
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,526 13
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28,884 00
50,680	.....	.....	.....	.....	.....	.....	.....	.....	.....	12 90
14,359,180	690,141½	537,463	152,678½	5,405	5,405	.....	231,615	231,615	.....	457,573 71

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—TOBACCO.

DR. No. 14.—WAREHOUSE RETURN for the Year ended 30th June, 1897. CR.

Remaining in Warehouse from last Year.			Placed in Warehouse.				Placed in Warehouse from other Divisions.		Total to be Accounted for.			Divisions.	Ex-Warehoused for Excise Duty.				Ex-Warehoused for Removal to other Divisions.		Ex-Warehoused for Exportation.			Ships' Stores.		Written off by Authority.			Taken for Re-Working.			Remaining in Warehouse.			Total Accounted for.		
Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Tobacco Re-Warehoused.	Cigarettes.	Canadian Tobacco.	Tobacco.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.		Tobacco at 25c. per lb.	Cigarettes at $1.50 and $3 per M.	Canadian Tobacco at 35c. p. lb.	Duty.	Tobacco.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.
Lbs.	No.	Lbs.	Lbs.	lbs.	No.	Lbs.	Lbs.	Lbs.	Lbs.	No.	Lbs.		Lbs.	Lbs.	Lbs.	$ cts.	Lbs.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.
3,462							21,498		24,960			Belleville, Ont.	24,960			6,240 00																24,960		
1,997							29,203		31,200			Brantford do	31,200			7,800 00																31,200		
1,593							13,788		15,381			Cornwall do	13,691			3,422 77													1,690			15,381		
4,054½							36,664		40,718½			Guelph do	40,718½			10,179 59																40,718½		
406,789			670,133½		65,000		536,598		1,613,520½	65,000		Hamilton do	1,062,332			265,582 97	400,816		25,546	65,000				155			23,683½			100,988			1,613,520½	65,000	
6,661							88,291½		94,952½			Kingston do	94,423½			23,605 87														529			94,952½		
29,511½							155,338½		184,850			London do	171,570½			42,892 60													144			13,135½			184,850		
13,883							166,868		180,751			Ottawa do	180,751			45,187 75																180,751		
10,287½							112,259		122,546½			Owen Sound do	121,393½			30,348 37	309													844			122,546½		
2,865							45,061		47,926			Perth do	47,809½			11,952 38													116½			47,926		
1,941½							36,284		38,225½			Peterborough do	38,225½			9,556 34																38,225½		
2,629							7,484½		10,113½			Port Arthur do	7,826			1,956 49	339													1,948½			10,113½		
												Prescott do																							
1,929½							11,105		13,034½			St. Catharines do	13,034½			3,258 63																13,034½		
1,146							14,484		15,630			Stratford do	15,630			3,907 50																15,630		
80,358			79,447½				617,369½		777,175			Toronto do	702,345			175,586 25	40,347											6,785			27,698			777,175		
1,180							14,128		15,308			Windsor do	15,308			3,827 00																15,308		
570,287½			749,581		65,000		1,906,424½		3,226,292½	65,000		Totals	2,581,218½			645,304 51	441,811		25,546	65,000				155			30,612½			146,949½			3,226,292½	65,000	
		35,780½				91,689					127,469½	Joliette, Que.			111,375½	5,568 84		1,127½												8,673½		6,293			127,469½
981,628½	256,000	4,945	5,419,059	385	5,875,000	12,782	5,847½		6,406,920	6,131,000	17,727	Montreal do	3,190,918½	1,606,000	17,481	803,810 27	3,177,179		22,604	4,002,500							793½		246	6,425	522,500		6,406,920	6,131,000	17,727
41,236½		9,899½	46,852			8,522	75,720½	1,127½	163,809½		19,549	Quebec do	153,429½		15,315½	39,122 62						350½					129		688½	9,903		3,545	163,809½		19,549
38,975		12,257½	151,819			39,685½	28,230		219,024		51,943	Sherbrooke do	141,080		44,446	37,492 49	11,458½		56,628½		1,837						3,271		5,660	6,586			219,024		51,943
210					3,026½				3,236½			Three Rivers do	3,236½			809 13																3,236½		
1,062,050	256,000	62,882½	5,617,730	385	5,875,000	152,678½	112,824½	1,127½	6,792,989½	6,131,000	216,688½	Totals	3,497,661½	1,606,000	188,618	886,803 35	3,188,637½	1,127½	79,232½	4,002,500	1,837	350½					4,193½		15,268	22,914	522,500	9,838	6,792,989½	6,131,000	216,688½
1,750							30,804½		32,554½			Chatham, N.B	31,248½			7,812 14	1,306																32,554½		
43,547½			560		8,368,500		413,874½		457,986	8,368,500		St. John do	448,136	44,000		112,099 96			2,960	7,654,500		708								6,182	670,000		457,986	8,368,500	
45,297½			560		8,368,500		444,683		490,540½	8,368,500		Totals	479,384½	44,000		119,912 10	1,306		2,960	7,654,500		708								6,182	670,000		490,540½	8,368,500	
4,538							19,671		24,209			Cape Breton, N.S.	23,626			5,906 50														583			24,209		
98,850			57,484½				316,512		472,846½			Halifax do	422,624			105,656 02			19,800½			372								30,050			472,846½		
28,257			58,607				32,840		119,704			Pictou do	74,454			18,613 50	10,350½		23,187			69					327			11,316½			119,704		
10,029½							47,403½		57,433			Yarmouth do	56,984			14,246 02						97								352			57,433		
141,674½			116,091½				416,426½		674,192½			Totals	577,688			144,422 04	10,350½		42,987½			538					327			42,301½			674,192½		
8,145			59,681						67,826			Charlottetown, P.E.I.	60,176			15,044 00	1,975											332			5,343			67,826		
91,451½							511,604½		603,056			Winnipeg, Man.	597,486			149,371 52	1,837														3,733			603,056		
							2,705		2,705			Calgary, N.W.T	2,705			676 25																2,705		
34,639½							122,954		157,593½			Vancouver, B.C.	136,480			34,120 01	1,047		262			2,458								17,346½			157,593½		
19,606½	19,000		9½		50,680		129,678		149,293 7/10	69,680		Victoria do	138,728 7/10	14,000		34,703 13	336		227½			4,886	49,830		5,850					5,115½			149,293 7/10	69,680	
54,246	19,000		9½		50,680		252,632		306,887½	69,680		Totals	275,208 7/10	14,000		68,823 14	1,383		489½			7,344	49,830		5,850					22,462			306,887½	69,680	
19,719½									19,719½			Sundries																		19,719½			19,719½		
1,992,871½	275,000	62,882½	6,543,652 7/10	385	14,359,180	152,678½	3,647,300	1,127½	12,184,208½ 7/10	14,634,180	216,688½	Grand Totals	8,071,528½	1,664,000	188,618	2,030,356 91	3,647,300	1,127½	151,215½	11,722,000	1,837	8,940½	49,830	155	5,850	35,465	15,268	269,604½	1,192,500	9,838	12,184,208½ 7/10	14,634,180	216,688½

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—TOBACCO.

DR. No. 15.—COMPARATIVE STATEMENT of Warehouse Returns for the Years ended 30th June, 1896 and 1897. CR.

Provinces.	Remaining in Warehouse from last Year.			Placed in Warehouse.						Placed in Warehouse from other Divisions.			Total to be Accounted for.			
					Re-Warehoused.											
	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Tobacco.	Cigarettes.	Cigarettes.	Canadian Tobacco.	Snuff.	Tobacco.	Canadian Tobacco.	Snuff.	Tobacco.	Cigarettes.	Canadian Tobacco.	Snuff.
	Lbs.	No.	Lbs.	Lbs.	Lbs.	No.	No.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	No.	Lbs.	Lbs.
1896.																
Ontario	602,183 3/5			1,086,995 27/35						2,370,440	41,149 1/2	1,300	4,059,619 1/35			1,300
Quebec	348,860	3,296,500	60,708	7,433,507 1/2	4,524 7/35	595,320	8,301,000	229,249 1/2	1,300	247,886			8,034,777 17/35	12,192,820	331,107	1,300
New Brunswick	29,633									552,616 1/2			582,249 1/2			
Nova Scotia	130,602 1/2			166,335 1/2						553,351			850,289			
P. E. Island	16,246			83,772						510			100,528			
Manitoba	48,898 1/2									747,349 1/2			796,248			
N.W. Territories										2,840			2,840			
British Columbia	69,826 1/2						28,500			289,204 1/2			359,031	28,500		
Sundries	19,719 1/2												19,719 1/2			
Totals	1,265,969 1/2	3,296,500	60,708	8,770,610 27/35	4,524 7/35	595,320	8,329,500	229,249 1/2	1,300	4,764,197 1/2	41,149 1/2	1,300	14,865,301 27/35	12,221,320	331,107	2,600
1897.																
Ontario	570,287 1/4			749,581			65,000			1,906,424 1/2			3,226,292 1/2	65,000		
Quebec	1,062,050	256,000	62,882 1/2	5,617,730		385	5,875,000	152,678 1/2		112,824 1/2	1,127 1/2		6,792,989 3/5	6,131,000	216,688 1/2	
New Brunswick	45,297 1/2			560			8,368,500			444,683			490,540 1/2	8,368,500		
Nova Scotia	141,674 1/2			116,091 1/2						416,429 1/2			674,192 1/2			
P. E. Island	8,145			59,681									67,826			
Manitoba	91,451 1/2									511,604 1/2			603,056			
N.W. Territories										2,705			2,705			
British Columbia	54,246	19,000		9 1/2			50,680			252,632			306,887 1/2	69,680		
Sundries	19,719 1/2												19,719 1/2			
Totals	1,992,871 1/4	275,000	62,882 1/2	6,543,652 7/10	385		14,359,180	152,678 1/2		3,647,300	1,127 1/2		12,184,208 1/2 0	14,634,180	216,688 1/2	

Provinces.	Ex-Warehoused for Excise Duty.					Ex-Warehoused for Removal to other Divisions.			Ex-Warehoused for Exportation.			Ships' Stores.		Written off by Authority.		Army Stores.	Taken for Re-Working.			Remaining in Warehouse.			Total Accounted for.			
	Tobacco at 25c. per lb.	Cigarettes at $1.50 and $3 per M.	Canadian Tobacco at 5c. per lb.	Snuff at 18c. per lb.	Duty.	Tobacco.	Canadian Tobacco.	Snuff.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Tobacco.	Cigarettes.	Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Tobacco.	Cigarettes.	Canadian Tobacco.	Snuff.
1896.	Lbs.	No.	Lbs.	Lbs.	$ cts.	Lbs.	Lbs.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.	No.	Lbs.	Lbs.
Ontario	2,771,874			1,300	693,202 67	662,310 1/2			33,039 7/35			287 1/2					21,820 1/2			570,287 1/4			4,059,619 7/35			1,300
Quebec	2,767,783	2,797,000	218,698 1/2		707,076 55	4,078,062	41,149 1/2	1,300	113,613 1/2	8,567,000	1,312	512		4,524 7/35	405,320		8,233	167,500	7,064 1/2	1,062,050	256,000	62,882 1/2	8,034,777 17/35	12,192,820	331,107	1,300
New Brunswick	535,605				133,901 29				387			960								45,297 1/2			582,249 1/2			
Nova Scotia	651,441 1/2				162,860 45	4,754 1/2			42,975			1,132 1/2		3,762		1,716	2,833			141,674 1/2			850,289			
P. E. Island	84,500				21,125 00	4,934						1,223					1,726			8,145			100,528			
Manitoba	698,755				174,688 77	6,041 1/2														91,451 1/2			796,248			
N.W. Territories	2,840				710 00																		2,840			
British Columbia	286,390 1/2				71,597 63	8,095			292			10,107 1/2	9,500							54,246	19,000		359,031	28,509		
Sundries																				19,719 1/2			19,719 1/2			
Totals	7,799,189	2,797,000	218,698 1/2	1,300	1,965,162 36	4,764,197 1/2	41,149 1/2	1,300	190,306 7/35	8,567,000	1,312	14,122 1/2	9,500	8,286 7/10	405,320	1,716	34,612 1/2	167,500	7,064 1/2	1,992,871 1/4	275,000	62,882 1/2	14,805,301 27/35	12,221,320	331,107	2,600
1897.																										
Ontario	2,581,218 1/2				645,304 51	441,811			25,546	65,000							30,612 1/2			146,949 1/2			3,226,292 1/2	65,000		
Quebec	3,497,661 1/2	1,606,000	188,618		886,803 35	3,188,637 1/2	1,127 1/2		79,232 1/2	4,002,500	1,837	350 1/2		155			4,193 1/2		15,268	22,914	522,500	9,838	6,792,989 3/5	6,131,000	216,688 1/2	
New Brunswick	479,384 1/2	4,000			119,912 10	1,306			2,960	7,654,500		708								6,182	670,000		490,540 1/2	8,368,500		
Nova Scotia	577,688				144,422 04	10,350 1/2			42,987 1/2			538					327			42,301 1/2			674,192 1/2			
P. E. Island	60,176				15,044 00	1,975											332			5,343			67,826			
Manitoba	597,486				149,371 52	1,837														3,733			603,056			
N.W. Territories	2,705				676 25																		2,705			
British Columbia	275,208 7/10	14,000			68,823 14	1,383			489 1/2			7,344	49,830		5,850					22,462			306,887 1/4	69,680		
Sundries																				19,719 1/2			19,719 1/2			
Totals	8,071,528 1/2	1,664,000	188,618		2,030,356 91	3,647,300	1,127 1/2		151,215 1/2	11,722,000	1,837	8,940 3/4	49,830	155	5,850		35,465		15,268	269,604 1/2	1,192,500	9,838	12,184,208 1/2 8	14,634,180	216,688 1/2	

	1896.	1897.
Total duty collected ex-manufactory and ex-warehouse on tobacco, including Canada Twist and Raw Leaf	$2,349,390.03	$2,554,701.35
do do on Licenses	2,509.00	2,310.00
Totals	$2,351,899.03	$2,557,011.35

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

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

No. 16.—WAREHOUSE Return for the Year ended 30th June, 1897.

Remaining in Warehouse from last Year.	Placed in Warehouse.	Placed in Warehouse from other Divisions.	Total Weights to be accounted for.	DIVISIONS.	Ex-Warehoused for Duty, being Deficiencies on Samples, &c.		Ex-Warehoused for Removal to other Divisions.	Ex-Warehoused for Exportation.	Free and written off by authority.	Taken for Horticultural purposes.	Destroyed.	Ex-Warehoused for Manufacture.	Remaining in Warehouse.	Total Weights accounted for.
					Quantity.	Duty.								
Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.		Std. lbs.	$ cts.	Std. lbs.	Std. lbs.	S. lbs.	S. lbs.	S. lbs.	Std. lbs.	Std. lbs.	Std. lbs.
.....	4,602	2,067	6,669	..Belleville, Ont	.....	.....	270	1,262	...	.....	.....	3,788	1,349	6,669
.....	102,473	1,861	104,334	..Brantford do	.....	.....	.....	7,227	12	..	10	67,194	29,891	104,334
.....	150,552	3,624¼	154,176¼	..Guelph do	.....	.....	3.441	19,048	23	...	.....	87,771¼	43,893	154,176¼
1,364	2,317,369	2,341	2,321,074	..Hamilton do	.....	.....	364	122,941	.....	.....	...	1,008,178	1,189,591	2,321,074
242	176,599	10,965	187,806	..Kingston do	.....	.....	10,584	3,216	10	....	...	70,376	103,620	187,806
.....	911 622	4,077	915,699	..London do	.....	.....	3,465	129,610	...	14	2,671	425,714	354,225	915,699
.....	.....	2,391	2,391	..Ottawa do	.....	.....	.....	.....	.....	2,391	.....	.....	.....	2,391
.....	8,083	201	8,284	..Owen Sound do	.....	.....	.....	.....	18	....	... ..	7,618	648	8,284
641	6,873	9,045	16,559	..Perth do	.....	.....	147	.....	...	....	... .	14,358	2,054	16,559
... .	2,026	1,870	3,896	.. Peterborough, Ont ...	.....	.....	.....	.....	...	....	.....	2,479	1,417	3,896
.....	28,491	1,434½	29,925½	..Prescott, Ont.....	.....	.....	.....	.....	...	....	.....	23,734½	6,191	29,925½
.....	85,550	1,255	86,805	..St. Catharines, Ont..	.....	.....	5,461	14,311	503	....	.....	37,320	29,210	86,805
.....	42,731	431	43,162	..Stratford, Ont.....	.....	.....	.....	2,236	...	....	...	26,957	13,969	43,162
753	386,977	4,813	392,543	..Toronto do	.....	.....	3,723	27,015	175	.....	408	242,756	118,466	392,543
.....	39,486	1,101	40,587	..Windsor do ...	.....	.....	160	2,918	.....	.....	.....	25,820	11,689	40,587
3,000	4,263,434	47,476¾	4,313,910¾	.....Totals	... ...	.....	27,615	329,784	741	2,405	3,089	2,044,063¾	1,906,213	4,313,910¾
240	1,525	8¾	1,773¾	..Joliette, Que.....	.....	.....	1,525	.....	.....	.....	.. ..	8¾	240	1,773¾
510,994½	16,404,865½	18,563	16,934,423	..Montreal do	105	31 51	166,714¼	588,191	2,888½	.....	844	7,153,157	9,022,523¼	16,934,423
.....	408,990¾	39,819¼	448,810	..Quebec do	.....	.....	3,641	.....	.....	.	...	321,333	123,836	448,810
.....	.....	506	506	..St. Hyacinthe, Que...	.....	.....	.....	.....	.....	506	.....	.....	.....	506
.....	659,073	77,058	736,131	..Sherbrooke, Que ...	.....	.....	700	31,273	...	..	.....	420,495½	283,662½	736,131
7,718	54,271	8,581	70,570	..Terrebonne do	.....	.....	4,155	.....	.....	.....	....	60,316	6,099	70,570
4,026	13,874	7,380½	25,280½	..Three Rivers do	.. ....	.....	150	.....	.....	.....	.....	13,910½	11,220	25,280½
522,978½	17,542,599¼	151,916½	18,217,494¼	.....Totals	105	31 51	176,885¼	619,464	2,888½	506	844	7,969,220¾	9,447,580¾	18,217,494¼
.....	137,886	2,612	140,498	..St. John, N.B.....	.....	.....	487	1,766	33	....	.....	105,731	32,481	140,498

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

No. 16.—WAREHOUSE Return for the Year ended 30th June, 1897.—*Concluded.*

Remaining in Warehouse from last Year.	Placed in Warehouse.	Placed in Warehouse from other Divisions.	Total Weights to be accounted for.	DIVISIONS.	Ex-Warehoused for Duty, being Deficiencies on Samples, &c.		Ex-Warehoused for Removal to other Divisions.	Ex-Warehoused for Exportation.	Free and written off by authority.	Taken for Horticultural purposes.	Destroyed.	Ex-Warehoused for Manufacture.	Remaining in Warehouse.	Total Weights accounted for.
					Quantity.	Duty.								
Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.		Std. lbs.	$ cts.	Std. lbs.	Std. lbs.	S. lbs.	S. lbs.	S. lbs.	Std. lbe.	Std. lbs.	Std. lbs.
.....	19,115	.....	19,115	..Cape Breton, N.S	.....	.....	.....	.... ..	.....	.....	. ..	12,617	6,498	19,115
1,307	126,905	629	128,841	..Halifax, N.S.....	... ...	.....	1,307	.....	.....	....	. ..	86,706	40,828	128,841
.....	96,330	... .	96,330	..Pictou do	.....	.....	.....	... .	.....	... ..	..	58,377	37,953	96,330
.....	1,869	... .	1,869	..Yarmouth, N.S ...	.....	.....	.....	.....	9	... .	.....	1,609	251	1,869
1,307	244,219	629	246,155	.....Totals	.....	.....	1,307	.....	9	....	.....	159,309	85,530	246,155
.....	271,634	.....	271,634	..Charlottetown, P.E.I.	.....	.. ....	.....	.....	.....	....	.....	174,638	96,996	271,634
.. ..	65,418	3,429	68,847	..Winnipeg, Man	.....	.....	.....	3,680	20	.....	...	39,343	25,804	68,847
435	55,494½	19,726¼	75,655¾	..Vancouver, B.C.....	....	..... .	89	.....	... ..	.....	2,133	50,521¾	22,912	75,655¾
300	73,999	252¾	74,551¾	..Victoria do	.....	.....	19,659	953	.....	....	3,971	48,847¾	1,121	74,551¾
735	129,493¼	19,979	150,207½	.....Totals	.....	.....	19,748	953	. . .	..	6,104	99,369½	24,033	150,207½
528,020½	22,654,683¾	226,042¼	23,408,746½	.....Grand Totals...	*105	31 51	226,042¼	955,617	3,691½	2,911	10,037	10,591,675	11,618,637¾	23,408,746½

* In addition to the above, 648,583 actual pounds paid duty, when ex-warehoused for manufacture, at 10c. and 14c. per lb. actual weight. The standard weight being included in the quantity ex-warehoused for manufacture, as shown above.

Actual weight paying duty at 10c. and 14c. per lb., 648,583.....	$64,995.69
Standard do 30c. per lb., 105..	31.51
	$65,027.20

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX A.—*Continued*—RAW LEAF TOBACCO, &c.

No. 17.—Comparative Warehouse Statement for the Years ended 30th June, 1896 and 1897.

Remaining in Warehouse from last Year.	Placed in Warehouse.	Placed in Warehouse from other Divisions.	Total Weights to be Accounted for.	Provinces.	Ex-Warehoused for duty being Deficiencies on Samples, &c.		Ex-Warehoused for Removal to other Divisions.	Ex-Warehoused for Exportation.	Free and Written off by authority.	Used for Horticultural purposes.	Destroyed.	Ex-Warehoused for Manufacture.	Remaining in Warehouse.	Total Weights accounted for.
					Quantity.	Duty.								
Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	1896.	Std. lbs.	$ cts.	Std. lbs.	Std. lbs.	Std. lbs.	S. lbs.	Std. lbs.	Std. lbs.	Std. lbs.	Std. lbs.
538,012	1,563,473	57,857	2,159,342	Ontario	.....	...	31,621	208,882	.....	1,860	.....	1,913,979	3,000	2,159,342
407,593	1,250,722	218,400	1,876,715	Quebec	287	86 10	246,885	257,997	43	640	.....	847,884½	522,978½	1,876,715
.....	6,143	1,196	7,339	New Brunswick	.....	.....	2,906	3,237	.....	.....	.....	1,196	.....	7,339
.....	2,729	4,260	6,989	Nova Scotia	.....	.....	299	2,430	10	.....	.....	2,943	1,307	6,989
.....	6,813	2,313	9,126	Manitoba	.....	.....	3,901	2,654	.....	.....	.....	2,571	.....	9,126
118	10,074	7,412	17,604	British Columbia	.....	.....	5,826	5,875	.....	.....	.....	5,168	735	17,604
945,723	2,839,954	291,438	4,077,115	Totals	287	86 10	291,438	481,075	53	2,500	.....	2,773,741½	528,020½	4,077,115
				1897.										
3,000	4,263,434	47,476¾	4,313,910¾	Ontario	.....	.....	27,615	329,784	741	2,405	3,089	2,044,063¾	1,906,213	4,313,910¾
522,978½	17,542,590¼	151,916¼	18,217,494¼	Quebec	105	31 51	176,885¼	619,464	2,888½	506	844	7,969,220¾	9,447,580¾	18,217,494¼
.....	137,886	2,612	140,498	New Brunswick	.....	.....	487	1,766	33	.....	.....	105,731	32,481	140,498
1,307	244,219	629	246,155	Nova Scotia	.....	..	1,307	.....	9	.....	.....	159,309	85,530	246,155
.....	271,634	.....	271,634	P. E. Island	.....	...	.....	.....	.....	.....	.....	174,638	96,996	271,634
.....	65,418	3,429	68,847	Manitoba	.....	.....	.....	3,680	20	.....	.....	39,343	25,804	68,847
735	129,493½	19,979	150,207½	British Columbia	.....	.....	19,748	953	.....	.....	6,104	99,369½	24,033	150,207½
528,020½	22,654,683¾	226,042¼	23,408,746½	Totals	105	31 51	226,042¼	955,647	3,691½	2,911	10,037	10,591,675	11,618,637¾	23,408,746½

	1896.	1897.
Total duty collected ex-warehouse	$ 86 10	$ 65,027 20

Inland Revenue Department,
Ottawa, 20th August, 1897.

E. MIALL,
Commissioner.

APEENDIX A—*Continued*—CANADA TWIST TOBACCO.

No. 18.—STATEMENT of Revenue collected for the Year ended 30th June, 1897.

DIVISIONS.	LICENSES.		Canada Twist at 5 cts. per lb.	Duty collected, including License Fees.
	No.	Fees.		
		$	Lbs.	$ cts.
Cornwall	1	2	360	20 00
Ottawa	4	8	1,370	76 50
Prescott	1	2	220	13 00
Totals	6	12	1,950	109 50
Joliette	21	35	23,980	1,234 00
Montreal	21	42	14,029	743 45
Terrebonne	23	46	38,411½	1,966 58
Totals	65	123	76,420½	3,944 03
Grand Totals	71	135	78,370½	4,053 53

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX A—*Continued*—CANADA TWIST TOBACCO.

No. 19.—COMPARATIVE STATEMENT of Revenue collected for the Years ended 30th June, 1896 and 1897.

YEARS.	PROVINCES.	LICENSES.		Canada Twist at 5 cts. per lb.	Duty collected, including License Fees.
		No.	Fees.		
			$	Lbs.	$ cts.
1896	Ontario	8	16	1,777½	104 88
	Quebec	76	143	50,126	2,649 30
	Totals	84	159	51,903½	2,754 18
1897	Ontario	6	12	1,950	109 50
	Quebec	65	123	76,420½	3,944 03
	Totals	71	135	78,370½	4,053 53

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX A—*Continued*—CIGARS.

No. 20.—RETURN of Manufactures

DIVISIONS.	LICENSES.		Total weight of Raw Leaf Tobacco, and all other materials actually used in production.	De-ficiencies paying duty.
	No.	Fees.		
		$ cts.	Lbs.	No.
Belleville, Ont	1	75 00	3,869	
Brantford "	9	675 00	47,680	
Guelph "	12	900 00	78,159	150
Hamilton "	16	1,162 50	67,516	1,760
Kingston "	2	150 00	62,894	
London "	15	1,125 00	370,400	
Owen Sound "	*3	75 00	7,940	
Perth "	2	150 00	13,006	
Peterborough "	1	75 00	2,347	
Prescott "	3	225 00	18,611	
St. Catharines "	8	562 50	29,112	
Stratford "	4	262 50	23,814	400
Toronto "	17	1,275 00	93,195	55
Windsor "	4	300 00	23,771	
Totals	*97	7,012 50	842,314	2,365
Joliette, Que	1	50 00	9,365	
Montreal "	29	2,100 00	798,269⅜	3,210
Quebec "	5	350 00	31,369⅝	
Sherbrooke "	4	300 00	155,157½	
Terrebonne "	1	75 00	51,777	
Three Rivers "	3	225 00	15,063½	
Totals	43	3,100 00	1,061,002⅛	3,210
St. John, N.B.	3	187 50	28,008	
Halifax, N.S.	2	150 00	6,089	
Yarmouth "	1	75 00	1,705	
Totals	3	225 00	7,794	
Winnipeg, Man	3	225 00	34,895	
Vancouver, B.C.	9	600 00	38,193¾	
Victoria "	12	900 00	28,532	
Totals	21	1,500 00	66,725¾	
Grand Totals	*170	12,250 00	2,040,738⅞	5,575

* Two of these License Fees paid in June, 1896, for year 1896-97.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

for the Year ended 30th June, 1897.

Cigars at $7 per Thousand.		Cigars at $6 per Thousand.			Canadian Cigars at $3 per Thousand.			Total Duty Collected Ex-Manufactory, including License Fees.
Produced.	Paid Duty.	Produced.	Paid Duty.	Warehoused	Produced.	Duty Paid	Warehoused.	
No.	No.	No.	No.	No.	No.	No.	No.	$ cts.
.....	.....	190,100	141,100	49,000	.....	.....	.....	921 60
1,200	1,200	2,849,885	1,813,385	1,036,500	.....	.....	.....	11,563 71
.....	.....	4,454,460	2,547,120	1,907,340	.....	.....	.....	16,183 62
.....	.....	3,716,525	2,447,455	1,269,070	.....	.....	.....	15,857 79
.....	.....	3,321,760	1,658,660	1,663,100	.....	.....	.....	10,101 96
.....	.....	21,246,245	13,700,305	7,545,940	.....	.....	.....	83,326 83
.....	.....	429,375	280,125	149,250	.....	.....	.....	1,755 75
.....	.....	757,255	251,880	505,375	.....	.....	.....	1,661 28
.....	.....	140,500	140,500	.....	.....	.....	.....	918 00
.....	.....	963,120	654,320	308,800	.....	.....	.....	4,150 92
.....	.....	1,605,775	1,138,775	467,000	.....	.....	.....	7,395 15
.....	.....	1,171,200	1,047,300	123,900	.....	.....	.....	6,548 70
.....	.....	5,078,865	2,995,590	2,083,275	.....	.....	.....	19,248 87
.....	.....	1,185,595	895,445	290,150	.....	.....	.....	5,672 67
1,200	1,200	47,110,660	29,711,960	17,398,700	.....	.....	.....	185,306 85
.....	.....	.....	.....	.....	524,850	286,400	238,450	909 20
150	150	41,123,230	25,185,145	15,938,085	.....	.....	.....	153,231 18
.....	.....	1,638,480	767,465	871,015	46,000	46,000	.....	5,092 79
.....	.....	7,921,565	5,770,205	2,151,360	.....	.....	.....	34,921 23
.....	.....	2,914,050	851,750	2,062,300	.....	.....	.....	5,185 50
.....	.....	902,640	473,620	429,020	.....	.....	.....	3,066 72
150	150	54,499,965	33,048,185	21,451,780	570,850	332,400	238,450	202,406 62
.....	.....	1,476,500	381,050	1,095,450	.....	.....	.....	2,473 80
.....	.....	352,525	220,150	132,375	.....	.....	.....	1,470 90
.....	.....	75,250	75,250	.....	.....	.....	.....	526 50
.....	.....	427,775	295,400	132,375	.....	.....	.....	1,997 40
.....	.....	1,804,735	702,850	1,101,885	.....	.....	.....	4,442 10
.....	.....	1,907,725	1,848,300	59,425	.....	.....	.....	11,689 80
.....	.....	1,435,340	1,142,090	293,250	.....	.....	.....	7,752 54
.....	.....	3,343,065	2,990,390	352,675	.....	.....	.....	19,442 34
1,350	1,350	108,662,700	67,129,835	41,532,865	570,850	332,400	238,450	416,069 11

E. MIALL,
Commissioner.

APPENDIX A.—*Continued*—CIGARS.

No. 21.—COMPARATIVE STATEMENT of Manufactures

PROVINCES.	LICENSES.		Total weight of Raw Leaf Tobacco, and all other materials actually used in production.	Deficiencies paying duty.	CIGARS AT $7 per THOUSAND.	
	No.	Fees.			Produced.	Paid Duty.
1896.		$ cts.	Lbs.	No.	No.	No.
Ontario	96	7,125 00	792,750	3,026	2,280	2,280
Quebec	48	3,287 50	986,027¾	16,323	102,981	102,981
New Brunswick	2	150 00	35,144	.....	.....	.....
Nova Scotia	4	262 50	9,367½	.....	.....	.....
Manitoba	3	225 00	35,897	.....	.....	.....
British Columbia	21	1,425 00	51,057	1,600	.....	.....
Totals	174	12,475 00	1,910,243¼	20,949	105,261	105,261
1897.						
Ontario	*97	7,012 50	842,314	2,365	1,200	1,200
Quebec	43	3,100 00	1,061,002⅛	3,210	150	150
New Brunswick	3	187 50	28,008	.....	.....	.....
Nova Scotia	3	225 00	7,794	.....	.....	.....
Manitoba	3	225 00	34,895	.....	.....	.....
British Columbia	21	1,500 00	66,725¾	.....	.....	.....
Totals	*170	12,250 00	2,040,738⅞	5,575	1,350	1,350

*Two license fees paid in June, 1896 for the year 1896-97.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

for the Years ended 30th June, 1896 and 1897.

Cigars at $6 per Thousand.			Cigars at $3 per Thousand.			Total Duty Collected Ex-Manufactory, including License Fees.
Produced.	Paid duty.	Warehoused.	Produced.	Paid duty.	Warehoused.	
No.	No.	No.	No.	No.	No.	$ cts.
46,148,285	27,214,075	18,934,210	.....	.....	.....	170,443 57
52,536,245	32,976,760	19,559,485	515,870	244,500	271,370	202,700 36
1,916,390	757,990	1,158,400	.....	.....	.....	4,697 94
516,965	335,815	181,150	.....	.....	.....	2,277 39
1,803,550	234,475	1,569,075	.....	.....	.....	1,631 85
2,629,125	2,318,425	310,700	.....	.....	.....	15,345 15
165,550,560	63,837,540	41,713,020	515,870	244,500	271,370	397,096 26
47,110,660	29,711,960	17,398,700	.....	.....	.....	185,306 85
54,499,965	33,048,185	21,451,780	570,850	332,400	238,450	202,406 62
1,476,500	381,050	1,095,450	.....	.....	.....	2,473 80
427,775	295,400	132,375	.....	.....	.....	1,997 40
1,804,735	702,850	1,101,885	.....	.....	.....	4,442 10
3,343,065	2,990,390	352,675	.....	.....	.....	19,442 34
108,662,700	67,129,835	41,532,865	570,850	332,400	238,450	416,069 11

E. MIALL,
Commissioner

APPENDIX A—*Continued*—CIGARS.

DR. No. 22.—WAREHOUSE RETURN for the

REMAINING IN WAREHOUSE FROM LAST YEAR.		PLACED IN WAREHOUSE.		PLACED IN WAREHOUSE FROM OTHER DIVISIONS.	RE-IMPORTED.	TOTAL NUMBER TO BE ACCOUNTED FOR.		DIVISIONS.
Foreign.	Canadian.	Foreign.	Canadian.	Foreign.	Foreign.	Foreign.	Canadian.	
No.	No.	No.	No.	No.	No.	No.	No.	
.....	.....	49,000	.....	.....	.....	49,000	.....	Belleville, Ont.....
397,175	.....	1,036,500	.....	.....	.....	33,675	.....	Brantford " ....
465,600	.....	1,907,340	.....	.....	.....	2,372,940	.....	Guelph " ....
612,575	.....	1,269,070	.....	.....	.....	1,881,645	.....	Hamilton " ....
472,675	.....	1,663,100	.....	.....	.....	2,135,175	.....	Kingston " ....
2,302,640	.....	7,545,940	.....	.....	.....	9,848,580	.....	London " ....
137,400	.....	149,250	.....	131,000	.....	417,650	.....	Owen Sound, Ont..
295,845	.....	505,375	.....	.....	.....	801,220	.....	Perth " .
78,550	.....	308,800	.....	.....	.....	387,350	.....	Prescott " .
183,800	.....	467,000	.....	.....	.....	650,800	.....	St. Catharines " .
106,600	.....	123,900	.....	.....	.....	230,500	.....	Stratford " .
761,675	.....	2,083,275	.....	10,125	.....	2,855,075	.....	Toronto " .
127,200	.....	290,150	.....	.....	.....	417,350	.....	Windsor " .
5,941,735	.....	17,398,700	.....	141,125	.....	23,481,560	.....	.....Totals.....
.....	54,570	.....	238,450	.....	.....	.....	293,020	Joliette, Que.....
3,426,350	.....	15,938,085	.....	.....	5,000	19,369,435	.....	Montreal " .....
198,600	.....	871,015	.....	.....	.....	1,069,615	.....	Quebec " .....
1,004,560	.....	2,151,360	.....	.....	500	3,156,420	.....	Sherbrooke, Que..
196,825	.....	2,062,300	.....	.....	.....	2,259,125	.....	Terrebonne " ..
205,250	.....	429,020	.....	.....	.....	635,270	.....	Three Rivers " ..
5,032,585	54,570	21,451,780	238,450	.....	5,500	26,489,865	293,020	.....Totals.....
985,050	.....	1,095,450	.....	.....	.....	2,080,500	.....	St. John, N.B.....
29,400	.....	132,375	.....	.....	.....	161,775	.....	Halifax, N.S.....
384,700	.....	1,101,885	.....	.....	.....	1,486,585	.....	Winnipeg, Man....
80,000	.....	59,425	.....	70,000	.....	209,425	.....	Vancouver, B.C...
176,150	.....	293,250	.....	.....	.....	469,400	.....	Victoria, B.C.....
12,629,620	54,570	41,532,865	238,450	211,125	5,500	54,379,110	293,020	..Grand Totals....

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

Year ended 30th June, 1897. Cr.

Ex-Warehoused for Excise Duty.			Ex-Warehoused for Removal to other Divisions.	Ex-Warehoused for Exportation.	Remaining in Warehouse.		Total Number Accounted for.	
Foreign.	Canadian.	Duty.	Foreign.	Foreign.	Foreign.	Canadian.	Foreign.	Canadian.
No.	No.	$ cts.	No.	No.	No.	No.	No.	No.
41,000		246 00			8,000		49,000	
1,135,350		6,812 10			298,325		1,433,675	
2,143,810		12,862 86	10,125		219,005		2,372,940	
1,554,760		9,328 56		4,000	322,885		1,881,645	
1,838,400		11,030 40			297,375		2,135,775	
7,935,830		47,614 98	68,000		1,844,750		9,848,580	
394,150		2,364 90			23,500		417,650	
507,285		3,043 71			293,935		801,220	
285,300		1,711 80			102,050		387,350	
540,350		3,242 10			110,450		650,800	
224,500		1,347 00			6,000		230,500	
2,516,550		15,099 30	10,000		328,525		2,855,075	
294,000		1,764 00			123,350		417,350	
19,411,285		116,467 71	88,125	4,000	3,978,150		23,481,560	
	210,370	631 11				82,650		293,020
16,594,115		99,564 69	88,000	62,625	2,624,695		19,369,435	
943,765		5,662 59			125,850		1,069,615	
2,814,955		16,889 73	25,000	12,000	304,465		3,156,420	
1,932,200		11,593 20	10,000		316,925		2,259,125	
579,370		3,476 22			55,900		635,270	
22,864,405	210,370	137,817 54	123,000	74,625	3,427,835	82,650	26,489,865	293,020
1,512,250		9,073 50		72,100	496,150		2,080,500	
90,000		540 00			71,775		161,775	
1,280,360		7,682 16			206,225		1,486,585	
120,425		722 55			89,000		209,425	
317,850		1,907 10		200	151,350		469,400	
45,596,575	210,370	274,210 56	211,125	150,925	8,420,485	82,650	54,379,110	293,020

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—CIGARS.

DR. No. 23.—COMPARATIVE STATEMENT of Warehouse Returns

REMAINING IN WAREHOUSE FROM LAST YEAR.		PLACED IN WAREHOUSE.		PLACED IN WAREHOUSE FROM OTHER DIVISIONS.	RE-IMPORTED.	TOTAL NUMBER TO BE ACCOUNTED FOR.		PROVINCES.
Foreign.	Canadian.	Foreign.	Canadian.	Foreign.	Foreign.	Foreign.	Canadian.	
No.	No.	No.	No.	No.	No.	No.	No.	1896.
6,220,600	.....	18,934,210	.....	460,350	.....	25,615,160	.....	..Ontario.....
7,254,610	.....	19,559,485	271,370	887,950	.....	27,702,045	271,370	..Quebec.....
927,400	.....	1,158,400	.....	.....	.....	2,085,800	.....	..NewBrunswick..
178,925	.....	181,150	.....	.....	.....	360,075	.....	..Nova Scotia.....
208,775	.....	1,569,075	.....	.....	.....	1,777,850	.....	..Manitoba.....
165,475	.....	310,700	.....	180,000	.....	656,175	.....	.B. Columbia ....
14,955,785	.....	41,713,020	271,370	1,528,300	.....	58,197,105	271,370	....Totals.....
								1897.
5,941,735	.....	17,398,700	.....	141,125	.....	23,481,560	.....	..Ontario.....
5,032,585	54,570	21,451,780	238,450	.....	5,500	26,489,865	293,020	.Quebec.....
985,050	.....	1,095,450	.....	.....	.....	2,080,500	.....	..NewBrunswick..
29,400	.....	132,375	.....	.....	.....	161,775	.....	..Nova Scotia.....
384,700	.....	1,101,885	.....	.....	.....	1,486,585	.....	..Manitoba.....
256,150	.....	352,675	.....	70,000	.....	678,825	.....	..B. Columbia ....
12,629,620	54,570	41,532,865	238,450	211,125	5,500	54,379,110	293,020	....Totals.....

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897

for the Years ended 30th June, 1896 and 1897. CR.

Ex-Warehoused for Excise Duty.			Ex-Warehoused for Removal to other Divisions	Ex-Warehoused for Exportation.	Written off.	Remaining in Warehouse.		Total Number Accounted for.	
Foreign.	Canadian.	Duty.	Foreign.	Foreign.	Foreign	Foreign.	Canadian.	Foreign.	Canadian.
No.	No.	$ cts.	No.	No.	No.	No.	No.	No.	No.
19,416,275	.....	116,497 65	238,350	18,800	.....	5,941,735	.....	25,615,160	.....
21,257,935	216,800	128,198 01	1,289,950	108,625	12,950	5,032,585	54,570	27,702,045	271,370
1,068,600	.....	6,411 60	.....	32,150	.....	985,050	.....	2,085,800	.....
330,675	.....	1,984 05	.....	.....	.....	29,400	.....	360,075	.....
1,393,150	.....	8,358 90	.....	.....	.....	384,700	.....	1,777,850	.....
398,575	.....	2,391 45	.....	1,450	.....	256,150	.....	656,175	.....
43,865,210	216,800	263,841 66	1,528,300	161,025	12,950	12,629,620	54,570	58,197,105	271,370
19,411,285	.....	116,467 71	88,125	4,000	.....	3,978,150	.....	23,481,560	.....
22,864,405	210,370	137,817 54	123,000	74,625	.....	3,427,835	82,650	26,489,865	293,020
1,512,250	.....	9,073 50	.....	72,100	.....	496,150	.....	2,080,500	.....
90,000	.....	540 00	.....	.....	.....	71,775	.....	161,775	.....
1,280,360	.....	7,682 16	.....	.....	.....	206,225	.....	1,486,585	.....
438,275	.....	2,629 65	.....	200	.....	240,350	.....	678,825	.....
45,596,575	210,370	274,210 56	211,125	150,925	.....	8,420,485	82,650	54,379,110	293,020

	1896.	1897.
Total duty collected ex-factory and ex-warehouse	$ 648,462 92	$ 678,029 67
do on licenses	12,475 00	12,250 00
Totals	$ 660,937 92	$ 690,279 67

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—INSPECTION OF PETROLEUM.

No. 24.—Return of Fees for Year ended 30th June, 1897.

Revenue Divisions.	Packages.							Fees Collected.
	At 10 cts.		At 5 cts.			At 2½ cts.		
	Canadian.	Imported.	Mixed.	Canadian.	Imported.	Canadian.	Imported.	
	No.	No.	No.	No.	No.	No.	No.	$ cts.
Belleville, Ont.	1,233	1,102						233 50
Brantford do	1,071	373						144 40
Cornwall do		24						2 40
Guelph do	1,306	463						176 90
Hamilton do	7,089	3,592						1,068 10
Kingston do	14,822	1,989						1,681 10
London do	90,170	4,548	164			44,872	9	10,610 24
Ottawa do	13,327	5,069						1,838 70
Owen Sound do	2,416	651						306 70
Perth do	2,739							273 90
Peterborough do	1,461	1,925						338 60
Port Arthur do		1,643					251	170 58
Prescott do	1,764	1,023			1		8	278 99
St. Catharines do		1,233						123 30
Stratford do	3,726	623	10					435 90
Toronto do	44,948	22,005					2	6,695 36
Windsor do		1,909			70		534	208 38
Totals	186,072	48,163	174		71	44,872	804	24,587 05
Montreal, Que.	39,707	25,715					600	6,557 20
Quebec do		34						3 40
Sherbrooke do		463						46 30
Three Rivers do	2,850							285 00
Totals	42,557	26,212					600	6,891 90
St. John, N.B.	14,036	33,434			14	582	578	4,776 75
Cape Breton, N.S.		644			25			65 65
Halifax do	1,052	12,192					7,737	1,517 82
Yarmouth do		205			50		162	27 05
Totals	1,052	13,041			75		7,899	1,610 52
Charlottetown, P.E.I.	10	2,799						280 90
Winnipeg, Man.	889	9,554				346	4,374	1,162 31
Calgary, N.W.T.		34					1,083	30 48
Vancouver, B.C.		1,605			24		89,697	2,404 15
Victoria do							10,942	273 55
Totals		1,605			24		100,639	2,677 70
Grand totals.	244,616	134,842	174		184	45,800	115,977	42,017 61

E. MIALL,
Commissioner.

Inland Revenue Department,
Ottawa, 20th August, 1897.

APPENDIX A—*Continued*—INSPECTION OF PETROLEUM.

No. 25.—Comparative Statement for Years ended 30th June, 1896 and 1897.

Years.	Provinces.	Packages.				Fees Collected.
		At 25 cts.	At 10 cts.	At 5 cts.	At 2½ cts.	
		No.	No.	No.	No.	$ cts.
1896	Ontario	6	230,911	35	35,392	23,979 47
	Quebec		70,882		978	7,112 65
	New Brunswick		43,068	81	618	4,326 33
	Nova Scotia		14,480		8,251	1,654 28
	Prince Edward Island		3,175			317 50
	Manitoba		8,451	2	5,051	971 49
	N. W. Territories		22		1,000	27 20
	British Columbia		5,261	231	55,838	1,933 68
	Totals.	6	376,250	349	107,128	40,322 60
1897	Ontario		234,409	71	45,676	24,587 05
	Quebec		68,769		600	6,891 90
	New Brunswick		47,470	14	1,160	4,776 75
	Nova Scotia		14,093	75	7,899	1,610 52
	Prince Edward Island		2,809			280 90
	Manitoba		10,443		4,720	1,162 31
	N. W. Territories		34		1,083	30 48
	British Columbia		1,605	24	100,639	2,677 70
	Totals.		379,632	184	161,777	42,017 61

E. MIALL,
Commissioner.

Inland Revenue Department,
Ottawa, 20th August, 1897.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

No. 26.—RETURN of Manufactures for the Year ended 30th June, 1897.

Divisions.	Number of Licenses.	License fees.	Materials Used.			Products of Manufactures.		Vinegar entered for Duty Ex-Manufactory.		Entered for Warehouse.		Total Duty collected Ex-Manufactory, including License Fees.
			Proof Spirits.	Beer, Wine, &c.	Other Materials.	Vinegar at 4 and 6 cts. per Gallon.	Crude Fulminate.			Vinegar.	Crude Fulminate	
		$	Galls.	Galls.	Lbs.	Galls.	Lbs.	Galls.	$ cts.	Galls.	Lbs.	$ cts.
Brantford, Ont.	1	50	5,745·00	191·25		27,891·66		27,891·66	1,536 77			1,586 77
Hamilton do	2	100	18,341·91	226·10		105,249·42		14,811·78	813 94	90,437·64		913 94
Kingston do	1	50	5,529·45	142·67		39,286·80		3,330·17	161 33	35,956·63		211 33
Prescott do	1	300	76,628·37		*376,064 †37,418		46,683				46,683	300 00
Toronto do	6	300	47,852·20	1,176·40		259,090·37		257,147·86	14,359 08	1,942·51		14,659 08
Windsor do	2	100			‡8,760							100 00
Totals	13	900	154,096·93	1,736·42	*376,064 †37,418 ‡8,760	431,518·25	46,683	303,181·47	16,871 12	128,336·78	46,683	17,771 12
Montreal, Que	4	200	36,316·75	401·70		189,858·71		101,911·76	5,780 14	87,946·95		5,980 14
Quebec do	1	50	12,282·54	484·00		64,435·71		55,768·21	3,059 86	8,667·50		3,109 86
Sherbrooke do	1	300	48,749·54		*228,637 †28,124		33,397				33,397	300 00
Totals	6	550	97,348·83	885·70	*228,637 †28,124	254,294·42	33,397	157,679·97	8,840 00	96,614·45	33,397	9,390 00
Grand totals	19	1450	251,445·76	2,622·12	*604,701 †65,542 ‡8,760	685,812·67	80,080	460,861·44	25,711 12	224,951·23	80,080	27,161 12

* Nitric acid. † Mercury. ‡ Malt.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL.
Commissioner.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

No. 27.—COMPARATIVE STATEMENT of Manufactures for the Years ended 30th June, 1896 and 1897.

PROVINCES.	LICENSE.		MATERIALS USED.			PRODUCTS OF MANUFACTURES.		Vinegar entered for duty Ex-Manufactory.		ENTERED FOR WAREHOUSE.		Total Duty collected Ex-Manufactory, including License Fees.
	Number.	Fees.	Proof Spirits.	Beer, Wine, Vinegar, &c.	Other Materials.	Vinegar at 4 and 6 cts. per Gall.	Crude Fulminate			Vinegar.	Crude Fulminate.	
1896.		$	Galls.	Galls.	Lbs.	Gall.	Lbs.	Galls.	$ cts.	Galls.	Lbs.	$ cts.
Ontario	15	1000	178,977·11	2,396·02	*420,896 †41,048	514,100·58	51,080	391,272·60	23,476 35	122,827·98	51,080	24,476 35
Quebec	7	600	94,942·93	1,700·00	*168,090 †20,748	265,103 50	21,418	245,970·17	14,758 20	19,133·33	21,418	15,358 20
Totals	22	1600	273,920·04	4,096·02	*588,986 †61,796	779,204 08	72,498	637,242·77	38,234 55	141,961·31	72,498	39,834 55
1897.												
Ontario	13	900	154,096 93	1,736·42	*376,064 †37,418 ‡8,760	431,518·25	46,683	303,181·47	16,871 12	128,336·78	46,683	17,771 12
Quebec	6	550	97,348·83	885·70	*228,637 †28,124	254,294·42	33,397	157,679·97	8,840 00	96,614·45	33,397	9,390 00
Totals	19	1450	251,445·76	2,622·12	*604,701 †65,542 ‡8,760	685,812·67	80,080	460,861·44	25,711 12	224,951·23	80,080	27,161 12

*Nitric acid. †Mercury. ‡Malt.

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

No. 28.—STATEMENT showing the transactions in Vinegar in the Bonded Manufactories in the Dominion of Canada, during the Year ended 30th June, 1897.

On hand 1st July, 1896.	Manufactured during the Year.	Brought in.	Totals.	DIVISIONS.	Removed from Factory.	On hand 30th June, 1897.	Totals.
Galls.	Galls.	Galls.	Galls.		Galls.	Galls.	Galls.
.....	27,891·66	.....	27,891·66	....Brantford, Ont.	27,891·66	....	27,891·66
50,355·16	105,249·42	....	155,604·58	....Hamilton, Ont.....	80,531·21	75,073·37	155,604·58
9,644·18	39,286·80	....	48,930·98	....Kingston, Ont.	33,719·78	15 211·20	48,930·98
....	259,090 37	....	259,090·37	....Toronto, Ont	257,147·86	1,942·51	259,090·37
59,999·34	431,518·25	.....	491,517·59	.....Totals.....	399,290·51	92,227·08	491,517·59
24,566 68	189,858·71	25,676·59	240,101·98	....Montreal, Que.....	229,363·73	10,738·25	240,101·98
....	64,435·71	..... .	64,435·71	....Quebec, Que.	55,768·21	8,667·50	64,435·71
24,566·68	254,294·42	25,676·59	304,537·69	... ... Totals.....	285,131·94	19,405·75	304,537·69
84,566·02	685,812·67	25,676·59	796,055·28	.....Grand Totals.....	684,422·45	111,632·83	796,055·28

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

No. 29.—Warehouse Return for the Year ended 30th June, 1897.

Vinegar remaining in Warehouse from last Year.	Placed in Warehouse.		Vinegar received in Bond from other Divisions.	Totals.		Divisions.	Entered for Consumption.		Vinegar removed in Bond to other Divisions.	Crude Fulminate export'd	Vinegar remaining in Warehouse.	Totals.	
	Vinegar.	Crude Fulminate.		Vinegar.	Crude Fulminate.		Vinegar.	Duty.				Vinegar.	Crude Fulminate.
Galls.	Galls.	Lbs.	Galls.	Galls.	Lbs.		Galls.	$ cts.	Galls.	Lbs.	Galls.	Galls.	Lbs.
44,086·25	90,437·64	.....	.....	134,523 89	.....	Hamilton, Ont.	65,245·75	3,668 86	.....	.....	69,278·14	134,523·89	.....
8,224·21	35,956·63	.....	.....	44,180 84	.....	Kingston do	24,435·30	1,335 92	6,458·65	.....	13,286·89	44,180·84	.....
.....	.....	46,683	.....	.....	46,683	Prescott do	.....	.....	.....	46,683	.....	.....	46,683
.....	1,942·51	.....	.....	1,942·51	.....	Toronto do	.....	.....	.....	.....	1,942·51	1,942·51	.....
52,310·46	128,336·78	46,683	.....	180,647·24	46,683	..... Totals.....	89,681·05	5,004 78	6,458·65	46,683	84,507·54	180,647·24	46,683
8,740·60	87,946·95	.....	3,252·76	99,940·31	.....	Montreal, Que.	95,611·59	4,926 13	.....	.....	4,328·72	99,940·31	.....
.....	8,667·50	.....	3,205·89	11,873·39	.....	Quebec do	2,943·37	145 28	.....	.....	8,930·02	11,873·39	.....
.....	.....	33,397	.....	.....	33,397	Sherbrooke do	.....	.....	.....	33,397	.....	.....	33,397
8,740·60	96,614·45	33,397	6,458·65	111,813·70	33,397	.....Totals.....	98,554·96	5,071 41	.....	33,397	13,258·74	111,813·70	33,397
61,051·06	224,951·23	80,080	6,458·65	292,460·94	80,080	...Grand Totals..	188,236·01	10,076 19	6,458·65	80,080	97,766·28	292,460·94	80,080

Inland Revenue Department,
Ottawa, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

No. 30.—Comparative Statement of Warehouse Returns for the Years ended 30th June, 1896 and 1897.

Vinegar remaining in Warehouse from last Year.	Placed in Warehouse.		Vinegar received in Bond from other Divisions.	Totals.		Provinces.	Entered for Consumption.		Vinegar removed in Bond to other Divisions.	Crude Fulminate, Exported.	Vinegar Remaining in Warehouse.	Totals.	
	Vinegar.	Crude Fulminate.		Vinegar.	Crude Fulminate.		Vinegar.	Duty.				Vinegar.	Crude Fulminate.
Galls.	Galls.	Lbs.	Galls.	Galls.	Lbs.	1896.	Galls.	$ cts.	Galls.	Lbs.	Galls.	Galls.	Lbs.
47,316·66	122,827·98	51,080	.....	170,144·64	51,080	..Ontario.....	111,567·35	6,694·03	6,266·83	51,080	52,310·46	170,144·64	51,080
29,019·09	19,133·33	21,418	6,266·83	54,419·25	21,418	. Quebec.....	45,678·65	2,740·71	.....	21,418	8,740·60	54,419·25	21,418
76,335·75	141,961·31	72,498	6,266·83	224,563·89	72,498	....Totals ...	157,246·00	9,434·74	6,266·83	72,498	61,051·06	224,563·89	72,498
						1897.							
52,310·46	128,336·78	46,683	.....	180,647·24	46,683	..Ontario.....	89,681·05	5,004·78	6,458·65	46,683	84,507·54	180,647·24	46,683
8,740·60	96,614·45	33,397	6,458·65	111,813·70	33,397	..Quebec. ...	98,554·96	5,071·41	.....	33,397	13,258·74	111,813·70	33,397
61,051·06	224,951·23	80,080	6,458·65	292,460·94	80,080	....Totals.....	188,236·01	10,076·19	6,458·65	80,080	97,766·28	292,460·94	80,080

	1896.	1897.
Total duty collected, ex-manufactory and ex-warehouse.....	$ 47,669 29	$ 35,787 31
do on licenses.....	1,600 00	1,450 00
	$ 49,269 29	$ 37,237 31

Inland Revenue Department,
Ottawa, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX A—*Continued*—METHYLATED SPIRITS.

No. 31.—STATEMENT showing quantity of Raw Materials on hand at beginning and end of year and brought in and used during the Year 1896–97.

(A)

Names of Articles.	Stock on hand 1st July, 1896.	Brought in during the year.	Total to be accounted for.	Used in manufacture of Methylated Spirits.	Sold or lost by Leakage.	Stock on hand 30th June, 1897.	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	6,069·23	84,004·28	90,073·51	88,730·56	133·15	1,209·80	90,073·51
Wood naphtha	7,004·61	37,439·90	44,444·51	31,522·04	63·56	12,858·91	44,444·51

(B)

STATEMENT showing quantity of Raw Materials 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.
88,730·56	31,522·04	.....	120,252·60	119,541·77	710·83	$\frac{3}{5}$	120,252·60

(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 1st July, 1896.	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 30th June, 1897.	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.
3,254·51	119,541·77	.....	122,796·28	117,236·33	.....	.....	5,559·95	122,796·28

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

E. MIALL,
Commissioner.

APPENDIX A—*Continued.*

No. 32.—STATEMENT of Lumber measured, culled and counted, through the Office of the Supervisor of Cullers, at the Port of Quebec, during the fiscal Year ended 30th June, 1897.

Pieces.	Description.	Measured Culled and counted.	Tons standard.	Rate.	Cullers' fees.	Total accrued.
			Tons. Pts.	Cts.	$ cts.	$ cts.
37,214	Waney white pine	Stringed	52,892·15			
400	" ash	"	323·03			
2,199	" birch	"	1,239·23			
447	" cherry	"	219·29			
5	" butternut	"	3·21			
19	" maple	"	15·25			
321	" walnut	"	151·13			
6	" whitewood	"	8·11			
3	" oak	"	9·32			
114	" elm	"	67·21			
37	" hickory	"	20·19			
			54,951·12	7½	4,121 35	
13,712	Waney white pine	"	20,449·31			
2,557	" ash	"	1,862·31			
4,780	" birch	"	2,674·16			
631	" cherry	"	204·29			
15	" butternut	"	7·13			
204	" maple	"	176·37			
460	" walnut	"	209·35			
28	" whitewood	"	31·35			
38	" elm	"	46 16			
35	" hickory	"	13·24			
1	" red pine	"	1·08			
1	" basswood	"	25			
			25,679·20	9⅜	2,407 45	
7,647	Square white pine	Measured	7,682·36	5	384 14	
2,368	Square white pine	"	2,053 28	6¼	128 36	
1,162	" red pine	"	1,124·33			
7,666	" oak	"	12,413·37			
2,950	" elm	"	3,811·36			
3	" tamarac	"	2·28			
1	" hickory	"	1·07			
			17,354·21	6⅔	1,145 40	
1,486	Square red pine	"	1,414·22			
10,854	" oak	"	16,928·19			
6,187	" elm	"	6,886·32			
153	" hickory	"	169·05			
1,949	" birch	"	896·23			
1	" ash	"	1·00			
			26 296·21	8½	2,169 46	
						10,356 16
	Deduct for fractions					19
	Total					10,355 97

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

HYDRAULIC AND OTHER RENTS, &c.

LESSEES' ACCOUNTS, 1896-97

APPENDIX

DR. No. 33.—HYDRAULIC and other Rents, &c.,

Balances due on 1st July, 1896.	Rents and Interests accrued up to 30th June, 1897.	Totals.	Number.	Location.	Original Lessees.	Present Occupants.
$ cts.	$ cts.	$ cts.				
100 00	300 00	400 00	1	Ottawa River	Perley & Pattee	J. R. Booth
50 00	150 00	200 00	2	do	Thompson & Perkins	do
150 00	450 00	600 00	3	do	Lyman Perkins	do
	450 00	450 00	4	do	R. Blackburn *et al*	McKay Milling Co. (Limited)
	100 00	100 00	5	do	J. & J. Petrie	Mrs. M. Petrie
	100 00	100 00	6	do	A. H. Baldwin	Ottawa Electric Co
	300 00	300 00	7	do		Ottawa Electric Ry Co.
	400 00	400 00	8	do	Perley & Pattee	Ottawa Electric Co
	50 00	50 00	9	do	J. M. Currier	N. S. Blaisdell
	600 00	600 00	10	do	Harris, Bronson & Co.	The Bronson & Weston Lumber Co
	200 00	200 00	11	do	Levi Young	Ottawa Electric Ry Co.
	104 00	104 00	12	do		J. R. Booth
	20 00	20 00	13	do		Bronson & Weston
	100 00	100 00	14	do		do
96 00	96 00	192 00	15	do	Perley & Pattee	J. R. Booth
8 00	8 00	16 00	16	do	L. M. Coutlee	Mary Conroy
570 84		570 84	17	do		John Rochester
	25 00	25 00	18	do		Nérée Têtreau
200 00		200 00	19	do	Hon. J. Skead	
96 00		96 00	20	do	do	
	1 00	1 00	21	do	G. A. Grier & Co.	Ottawa Investment Co
860 00	40 00	900 00	22	do		D. Carmichael
380 00		380 00	23	do		John Rankin
75 00	150 00	225 00	24	do	J. R. Booth	
25 00	5 00	30 00	25	do	Colin Dewar	
	50 00	50 00	26	do	Bronson & Weston	
	1 00	1 00	27	do		Alfred Desjardins
	1 00	1 00	1	St. Lawrence R.	Que. Har. Commissioners	
	25 00	25 00	2	do	Rich. & Ont. Nav. Co.	
	1 00	1 00	3	do		Narcisse Blais
1 00	1 00	2 00	4	Quebec	Corp. of Quebec	
5 00	5 00	10 00	5	Richibucto Har.	Wm. Hudson	
	1 00	1 00	6	Rondeau Har.	School Trustees	
	1 00	1 00	7	Collingwood Har	Great North. Transit Co.	
	1 00	1 00	8	Ottawa	E. G. Laverdure	
	1 00	1 00	9	Walkerton, Ont.	D. Robertson & John Rowland	
165 00		165 00	10	British Columbia	A. Peel	
90 00		90 00	11	do	Jonathan Maury	
25 00	25 00	50 00	12	do	Roderick Finlayson	
25 00	25 00	50 00	13	do	Joseph Spratt	
	1 00	1 00	14	do	Bank of British Columbia	
	1 00	1 00	15	do	W. Dodd	
	12 00	12 00	16	do	D. W. Gordon	

A—*Continued.*

Lessees' Accounts, 1896–97. CR.

Description of Property.	Number.	Date to which the Account is made up.	Rebate.	Paid during the Fiscal Year.	Balances due on 30th June, 1897.	Totals.
			$ cts.	$ cts.	$ cts.	
Lots B and C, Chaudiere St., service ground	1	June 30, '97	.....	400 00	.....	400 00
Lot D do do	2	do ..	.....	200 00	.....	200 00
Lots E, F. and G. South Head St	3	do ..	.....	600 00	.....	600 00
Lots H. I. J. Grist Mill, South Head St....	4	do ..	.....	450 00	.....	450 00
Lot K, fanning mill do	5	Dec. 31, '96	.....	50 00	50 00	100 00
Lot L, service ground do ..	6	do ..	.....	100 00	.....	100 00
Lots Q, R and T, service ground, North Middle St	7	do ..	.....	300 00	.....	300 00
Lots M, N, O and P, service ground (no water used)	8	do ..	.....	400 00	.....	400 00
Lot S, service ground	9	do ..	.....	50 00	.....	50 00
Lots U, V, W, X, Y and Z, service ground.	10	June 30, '97	.....	600 00	.....	600 00
Two strips of land.....	11	Jan. 1, '98	.....	200 00	.....	200 00
Lumber yard at head of slides	12	Sept. 20, '97	.....	104 00	....	104 00
Bridge over slides...	13	June 30, '98	.....	20 00	.....	20 00
Strip of land, Amelia Island.....	14	Jan. 1, '98	.....	100 00	.....	100 00
Reserve, head of Chaudière Island...	15	do		192 00	.....	192 00
Small island, Deschênes Rapids.....	16	Jan. 1, '97	.....	.....	16 00	16 00
Portion of lot 39, Concession A, Nepean...	17	Feb. 1, '85	.....	....	570 84	570 84
Excavated channel, slide and two dams, Little Chaudière	18	Mar. 1, '97	.....	25 00	.....	25 00
Water lots opposite lot 30, Concession A, Nepean	19	Dec. 1, '91	....	.....	200 00	200 00
Three small Islands, Ottawa River.	20	May 1, '82	.....	....	96 00	96 00
Covering over portion of Ottawa slides	21	Nov. 10, '97	... .	1 00	....	1 00
Water lot, Calumet.....	22	June 30, '97	.....	.. ..	900 00	900 00
East portion of Hawley's Island	23	do '81	.....	... ...	380 00	380 00
Piece of land south-west end of Union bridge	24	Nov. 12, '97	.....	225 00	....	225 00
Piece of land on Victoria Island.....	25	June 15, '98	.....	.....	30 00	30 00
Piece of land south side Middle St., Victoria Island	26	Aug. 31, '97	... .	50 00	... .	50 00
Piece of land, Long Point Rouge, Templeton, Ottawa County.....	27	Oct. 24, '97	.....	1 00	.....	1 00
Small lot of land near Custom House, Quebec	1	Sept. 1, '97	.....	1 00	....	1 00
Roadway from pier, at Coteau Landing.....	2	July 1, '97	... .	25 00	.....	25 00
Privilege to erect bridge on St. Charles River	3	Feb. 6, '98	.....	1 00	....	1 00
Old Provincial Government Building lot on Mountain Hill.....	4	June 25, '98	.. .. ..	1 00	1 00	2 00
Piece of land at North Beach.....	5	June 30, '97	.....	10 00	. .....	10 00
Use of old log house formerly used as Custom House, Shrewsbury, Ont	6	Sept. 11, '96	..... .	1 00	....	1 00
Use of old breakwater for storing coal ...	7	Feb. 5, '98	.....	1 00	.....	1 00
South-east half of lot No. 8, Ottawa.....	8	Dec. 18, '97	.....	.....	1 00	1 00
Right of way over strip of land	9	April 27, '98	.....	1 00	....	1 00
Portion of Assay Office, New Westminster.	10	June 11, '81	.....	.....	165 00	165 00
do do ..	11	do ..	.....	.....	90 00	90 00
Privilege to erect two bulkheads, Rock Bay, Victoria Harbour.....	12	June 1, '98	.....	25 00	25 00	50 00
Privilege to build a wharf opposite his own property, Victoria Harbour.....	13	do ..	.....	25 00	25 00	50 00
Right of drainage through Government property, Nanaimo..... ...	14	Dec. 1, '97	.....	1 00	... .	1 00
Old Government House, Yale.....	15	July 24, '96	.....	1 00	.....	1 00
Beach lots A. C, E and F, front of Government reserve, and lots A, B, C and D, front of lots 7, 8 and 9, Nanaimo Harbour.....	16	Aug. 27, '97	.....	12 00	.....	12 00

APPENDIX

DR. No. 33.—HYDRAULIC and other Rents, &c.,

Balances due on 1st July, 1896.	Rents and Interests accrued up to 30th June, 1897.	Totals.	Number.	Location.	Original Lessees.	Present Occupants.
$ cts.	$ cts.	$ cts.				
.....	5 00	5 00	17	do ..	S. Williams.....	.....
.....	5 00	5 00	18	do ..	George A. Huff.....	.....
.....	1 00	1 00	19	do ..	Can. Pac. Railway Co...	.....
427 91	.....	427 91	20	do ..	John Wilson.....	.....
.....	250 00	250 00	21	do ..	do	David Diamond .....
60 00	10 00	70 00	22	Rivière du Lièvre	Dominion Phosphate Co.	.....
.....	1 00	1 00	23	Charlotte town, P.E.I.....	Rt. Rev. Bishop McIntyre	Rt. Rev. Bishop McDonald.....
20 00	20 00	40 00	24	Rivière St. Maurice, Que.	Laurentides Pulp Co. (Limited).....	.....
40 00	20 00	60 00	25	do ..	Jos. Ant. Gagnon.....	.....
5 00	5 00	10 00	26	Saguenay River.	.....	A. E. Gagné.....
.....	16 00	16 00	27	Antigonish, N.S.	.....	L. C. Archibald .....
.....	1 00	1 00	28	Owen Sound. ..	Grand Trunk Railway...	.....
.....	60 00	60 00	29	Windsor..	Archie McNee.....	.....
3,474 75	4,195 00	7,669 75				

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

A—*Continued.*

Lessees' Accounts, 1896–97. CR.

Description of Property.	Number.	Date to which the Account is made up.	Rebate.	Paid during the Fiscal Year.	Balances due on 30th June, 1897.	Totals.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Frontage on lot No. 7, block M, Victoria	17	July 16, '97	.....	5 00	.....	5 00
Permission to build a wharf on lot A, block 2, on Somas River, Alberni	18	Aug. 12, '97	.....	5 00	.....	5 00
Portion of Custom house lot, New Westminster	19	April 14, '98	.....	1 00	.....	1 00
Lot 1, block 13, cor. Begbie and Columbia Sts., New Westminster	20	May 12, '97	.....	.....	427 91	427 91
do do	21	Jan. 29, '97	.....	.....	250 00	250 00
Permission to erect a landing at Little Rapids, Rivière du Lièvre	22	April 30, '98	.....	.....	70 00	70 00
Leave to connect drain to main service of public buildings	23	May 6, '98	.....	1 00	.....	1 00
Tract of land, Chûte de la Grand'Mère, St. Maurice River	24	June 17, '98	.....	20 00	20 00	40 00
Water lot on St. Maurice River	25	Mar. 8, '98	.....	.....	60 00	60 00
Water power, St. Joseph d'Alma, Saguenay River	26	Oct. 31, '97	10 00	.....	.....	10 00
Tract of land and water lot, McNair's Cove	27	Dec. 30, '97	.....	16 00	.....	16 00
Lot of land west of Sydenham River	28	Dec. 31, '97	.....	1 00	.....	1 00
Lot on Ouellette St., Windsor, Ont	29	Oct. 31, '97	.....	60 00	.....	60 00
			10 00	4,282 00	3,377 75	7,669 75

E. MIALL,
Commissioner.

APPENDIX

No. 33 (A) HYDRAULIC and other Rents, &c.—

Balances due on 1st July, 1896.	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 Creeley
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, 20th August, 1897.

A—*Concluded.*

Lessees' Accounts, 1896-97—*Concluded.*

Description of Property.	Number.	Date to which the account is made up.	Balances due on 30th June, 1897.	Totals.
			$ cts.	$ cts.
Hamilton and Port Dover Road & Caledonia Bridge....	1	.....	12,092 83	12,092 83
Lot No. 1, Wolfe street.....	2	.....	433 34	433 34
do 9 do	3	.....	333 34	333 34
do 49 do	4	.....	300 00	300 00
do 73 and 74, Tower street	5	.....	147 80	147 80
do 64, Wolfe street and 211 and 252 Ware street....	6	.....	248 40	248 40
do 67 and 68, Monument street	7	.....	154 80	154 80
do 22 and 23, Wolfe street.....	8	.....	600 00	600 00
do 32, Wolfe street	9	.....	333 33	333 33
do 65 and 66, Wolfe street	10	.....	533 33	533 33
do 31, Wolfe street.....	11	.....	333 33	333 33
do 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
do 9 do	3	do ..	120 00	120 00
do 49 do	4	do ..	306 00	306 00
do 73 and 74, Tower street	5	do ..	155 22	155 22
do 64, Wolfe street and 211 and 252 Ware street....	6	do ..	275 82	275 82
do 67 and 68, Monument street.....	7	do ..	208 95	208 95
do 22 and 23, Wolfe street	8	do ..	828 00	828 00
do 32, Wolfe street	9	Nov. 1, 1863..	190 00	190 00
do 65 and 66, Wolfe street	10	do ..	298 68	298 68
do 31, Wolfe street	11	do ..	35 91	35 91
do 135, Church street.....	12	do ..	100 00	100 00
Monument Hotel.....	13	do ..	100 00	100 00
			9,474 83	9,474 83

E. MIALL,
Commissioner.

APPENDIX B.

No. 1.—Details of Excise Expenditure for the Year ended 30th June, 1897.

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Belleville.	$ cts.	$ cts.	$ cts.
McAllister, A.....	Salary as Collector for year	31 96	1,506 68	
Standish, J. G.....	do Special Class Exciseman for year ...	28 04	1,371 96	
Pole, C. W...	do Deputy Collector do ..	24 00	1,176 00	
McCoy, W	do 1st Class Exciseman do ...	19 96	980 04	
McCuaig, A. F.....	do Deputy Collector do ...	16 04	783 96	
McFee, A. C	do Probationary Exciseman, from 1st July to 17th Jan. ; 3rd Class Exciseman, from 18th Jan. to 30th June.....	18 61	542 47	
	Salaries.....	138 61	6,361 11	
	Contingencies.....	.....	391 11	
				6,752 22
	Brantford.			
Spence, J.....	Salary as Collector for year.....	31 96	1,568 04	
Sinon, E. H.....	do Deputy Collector for year	24 00	1,176 00	
Walsh, D. J.....	do Special Class Exciseman for year ...	24 00	1,176 00	
Fraser, G. J.....	do Deputy Collector do	19 96	980 04	
Hart, P. D.....	do 2nd Class Exciseman do	16 96	833 04	
Boyle, P.....	do 1st do do (insurance $71.76)	26 78	793 94	
	Insurance $71 76	.....	.....	
	Salaries.....	143 66	6,527 06	
	Contingencies.....	... .	891 70	
				7,418 76
	Cornwall.			
Mulhern, M. M....	Salary as Collector for year.....	20 00	980 00	
	Contingencies..... .. .	.....	107 18	
				1,087 18
	Guelph.			
Powell, J. B. ...	Salary as Collector for year.....	36 00	1,764 00	
Bouteiller, G. A....	do Special Class Exciseman, from 1st July to 31st Jan	17 50	857 50	
Dawson, W... ...	do Special Class Exciseman, 1st Feb. to 30th June	11 66	571 66	
Till, T. M.....	do Deputy Collector for year	25 96	1,274 04	
Woodward, G. W..	do Special Class Exciseman do	24 00	1,176 00	
Lynes, K	do do do	24 00	1,176 00	
Broadfoot, S.....	do Accountant do	19 96	980 04	
Bish, P.....	do 1st Class Exciseman do	19 96	980 04	
Yates, J. M.....	do 2nd do do	16 96	833 04	
Bowman, A.....	do 1st do do .. .	18 68	916 32	
O'Brien, E. C.....	do 2nd do do	16 95	833 05	
O'Donohoe, M. J...	do 2nd do from 1st July to 13th Jan. ; 1st Class Exciseman, from 14th Jan. to 30th June... .	15 89	780 59	
Spence, F. H.....	do 1st Class Exciseman, from 1st Aug. to 30th June.....	18 30	898 37	
Howie, A..	do 3rd Class Exciseman for year.....	15 00	735 00	
Brain, A. F	do 2nd do do	21 00	579 00	
Alteman, P. J	do Probationary Exciseman, from 26th April to 30th June..... .	2 48	80 84	
	Salaries.	304 30	14,435 49	
	Contingencies...	.....	1,911 30	
				16,346 79

Appendix B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Hamilton.	$ cts.	$ cts.	$ cts.
Miller, W. F	Salary as Collector for year	43 20	2,116 80	
Cameron, D. M	do Special Class Exciseman for year	30 00	1,470 00	
Conway, B. J	do do do	30 00	1,470 00	
Ross, S. F	do Deputy Collector do	30 01	1,469 99	
McPherson, A. F	do Accountant, 1st July to 31st Jan.	16 31	800 31	
Donaghy, W	do Special Class Exciseman for year	28 04	1,371 96	
Baby, W. A. D	do do do	28 04	1,371 96	
O'Brien, J. F	do 1st Class Exciseman do	19 96	980 04	
Irwin, R	do do do	19 54	957 96	
Crawford, W. F	do do 1st July to 31st Jan.; Accountant, 1st Feb. to 30th June	18 66	918 58	
Hobbs, G. N	do 2nd Class Exciseman for year	16 96	833 04	
Logan, J	do 2nd do do	16 96	833 04	
Amor, W	do 2nd do do	16 96	833 04	
Dumbrille, R. W	do 1st do do	17 82	874 68	
Weir, J	do 1st do do	17 82	874 68	
Mackay, G. W	do 3rd do do	15 00	735 00	
Wardell, R. S. R	do 3rd do do	26 87	741 88	
Hayhurst, T. H	Salary as Prob. Exciseman from 2nd April to 30th June	3 68	119 91	
Blackman, C	do Messenger for the year	.....	450 00	
	Salaries	395 83	19,222 87	
	Contingencies	.....	1,115 83	
				20,338 70
	Kingston.			
Rowland, F	Salary as Collector for the year	31 96	1,568 04	
Earle, R. H	do Special Class Exciseman for the year	24 00	1,176 00	
Dickson, C. T	do Accountant do	24 00	1,176 00	
Grimason, T	do Deputy Collector do	24 00	1,176 00	
Hanley, A	do Asst. Accountant do	19 96	980 04	
McFarland, C. D	do 1st Class Exciseman do	18 68	916 32	
Browne, G. W	do 2nd do do	16 96	833 04	
Lyons, E	do 1st do do	17 82	874 68	
O'Donnell, J	do 3rd do do	15 00	735 00	
Fahey, E	do 3rd do do	7 96	392 04	
	Salaries	200 34	9,827 16	
	Contingencies	.....	757 27	
				10,584 43
	London.			
Alexander, T	Salary as Collector for the year	36 00	1,764 00	
Davis, T. G	do Deputy Collector for the year	30 00	1,470 00	
McSween, J	do 1st Class Exciseman do	19 96	980 04	
Hicks, W. H	do Deputy Collector do	19 96	980 04	
Coles, F. H	do Accountant do	19 96	980 04	
Girard, I	do 1st Class Exciseman do	19 96	980 04	
Stewart, J	do 1st do do	19 96	980 04	
Lee, E	do 1st do do	19 96	980 04	
Taylor, J. F	do 2nd do do	16 96	833 04	
Rowland, E	do 2nd do do	16 96	833 04	
Marcon, F. E	do 1st do do	17 82	874 68	
Webbe, C. E. A	do 2nd do do	16 95	833 05	
Wilson, D	do Asst. Accountant do	18 01	881 99	
Tracy, J. P	do 2nd Class Exciseman do	15 77	771 73	
Foster, H	do 3rd do do	23 55	651 45	
	Salaries	311 78	14,793 22	
	Contingencies	.....	1,432 31	
				16,225 53

Appendix B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Ottawa.	$ cts.	$	$ cts.
Battle, M.	Salary as Collector for the year	.....	1,599 96	
Esmonde, J. R.	do Deputy Collector for the year	.....	1,154 97	
Slattery, R.	do 1st Class Exciseman do	19 96	980 04	
Lett, F. P. A.	do 3rd do do	15 00	735 00	
Waller, J.	do 3rd do do	15 00	735 00	
Doyle, J. E. H.	do 3rd do do	13 80	676 20	
	Salaries	63 76	5,881 17	
	Contingencies	.....	382 45	
				6,263 62
	Owen Sound.			
Graham, W. J.	Salary as Collector for the year	22 99	1,127 01	
Nichols, J. T.	do Deputy Collector for the year	19 96	980 04	
Chisholm, W. N.	do do do	15 77	771 73	
Blyth, A	do 3rd Class Exciseman do	19 92	562 57	
Johnson, J. J.	do 2nd Class Exciseman from 1st March to 30th June	5 64	277 68	
	Salaries	84 28	3,719 03	
	Contingencies	.....	1,182 71	
				4,901 74
	Perth.			
McLenaghan, N.	Salary as Collector for the year	.....	1,200 00	
Mason, F.	do Special Class Exciseman for the year	30 00	1,470 00	
Goodman, A. W.	do 1st Class do	19 96	980 04	
McKimm, U. H.	do Deputy Collector, from 1st July to 31st May	14 63	718 63	
Devine, P.	do do do	10 89	355 74	
Harty, M. J.	do Deputy Collector, from 1st July to 27th March	3 62	290 97	
George, J.	do Deputy Collector for the year	5 96	194 04	
Mills, A. E.	do do do	.....	150 00	
Rowan, W. E.	do do from 26th April to 30th June	2 15	70 06	
	Salaries	87 21	5,429 48	
	Contingencies	.....	580 77	
				6,010 25
	Peterborough.			
Hall, J. J.	Salary as Collector for the year	24 00	1,176 00	
Cahill, Thos.	do Deputy Collector for the year	19 96	980 04	
Howden, R.	do do do	16 04	783 96	
Bickle, J. W.	do do do	13 96	686 04	
Knowlson, J. B.	do do do	13 96	686 04	
	Salaries	87 92	4,312 08	
	Contingencies	.....	313 07	
				4,625 15
	Port Arthur.			
Ironside, G. A.	Salary as Collector for the year	20 00	980 00	
	Contingencies	.....	50 58	
				1,030 58
	Prescott.			
Dumbrille, J.	Salary as Collector for the year	36 00	1,764 00	
Gerald, W. H.	do Special Class Exciseman for the year	30 00	1,470 00	
Keilty, T	do Deputy Collector do	25 96	1,274 04	
Macdonald, A. B.	do 1st Class Exciseman do	19 96	980 04	
Gow, J. E.	do do do	19 96	980 04	

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Prescott—Concluded.	$ cts.	$ cts.	$ cts.
Marshall, F.	Salary as Exciseman for the year	16 96	833 04	
Keeler, G. S.	do 2nd Class Exciseman do	16 95	833 05	
Wood, J. A.	do Deputy Collector do	.....	799 92	
Ferguson, J.	do 3rd Class Exciseman do	15 00	735 00	
Johnston, G. E.	do do do	15 00	735 00	
	Salaries	195 79	10,404 13	
	Contingencies	.....	400 34	
				10,804 47
	St. Catharines.			
Hesson, C. A.	Salary as Collector for the year	24 00	1,176 00	
Harris, J. G.	do Deputy Collector, from 23rd December to 30th June	17 08	472 14	
Milliken, E.	do 2nd Class Exciseman for the year	16 96	833 04	
Schram, R. L. H.	do 3rd do do	18 45	539 85	
	Salaries	76 49	3,021 03	
	Contingencies	.....	738 56	
				3,759 59
	Stratford.			
Caven, A.	Salary as Collector for the year	31 96	1,568 04	
Rennie, G.	do Deputy Collector for the year	24 00	1,176 00	
Dingman, N. J.	do Exciseman do	24 00	1,176 00	
Spence, F. H.	do 1st Class Exciseman, from 1st to 31st July	1 66	81 67	
Clark, A. F.	do Accountant for the year	19 96	980 04	
Egener, A.	do 1st Class Exciseman for the year	17 82	874 68	
Orr, H. N.	do Probationary Exciseman, from 7th May to 30th June	2 24	73 01	
	Salaries	121 64	5,929 44	
	Contingencies	.....	958 89	
				6,888 33
	Toronto.			
Stratton, W. C.	Salary as Collector for year	43 96	2,156 04	
Gerald, C.	do Special Class Exciseman for year	31 96	1,568 04	
Dudley, W. H.	do do do	31 96	1,568 04	
Bennett, J.	do Deputy Collector do	30 00	1,470 00	
Blair, J. B.	do Accountant do	28 04	1,371 96	
Iler, B.	do Special Class Exciseman do	25 96	1,274 04	
Henderson, W.	do Deputy Collector do	26 94	1,321 81	
Rogerson, J. M.	do Special Class Exciseman do	24 00	1,176 00	
Dawson, W.	do do 1st July to 31st Jan.	14 00	686 00	
Metcalf, W. F.	do do for year	24 00	1,176 00	
Westman, T.	do do do	24 00	1,176 00	
Taylor, G. W.	do do 1st to 31 July	2 00	98 00	
Boomer, J. B.	do Assistant Accountant for year	24 00	1,176 00	
Boyd, S. I.	do Deputy Collector do	24 00	1,176 00	
Dick, J. W.	do Special Class Exciseman do	24 00	1,176 00	
Shanacy, M.	do Deputy Collector do	22 04	1,077 96	
Coleman, C.	do do do	19 96	980 04	
Evans, G. T.	do 1st Class Exciseman do	19 96	980 04	
Weyms, C.	do do do	19 96	980 04	
Helliwell, H. N.	do do do	19 96	980 04	
McDonald, J. A.	do do do	19 96	980 04	
O'Leary, T. J.	do do do	19 96	980 04	
Flynn, D. J.	do do do	19 96	980 04	
Jamieson, R. C.	do do do	19 96	980 04	
Bell, J. E.	do do do	18 68	916 32	
Graham, W. T.	do do do	17 82	874 68	

APPENDIX B.—No. 1,—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Toronto—Concluded.	$ cts.	$ cts.	$ cts.
Doyle, B. J.	Salary as 1st Class Exciseman for year	17 82	874 68	
Brennan, D. J.	do do do	17 82	874 68	
Barber, J. S.	do 2nd do do	16 96	833 04	
Murry, A. E.	do 2nd do do	16 96	833 04	
Howard, W. W. S.	do 2nd do 1st July to 13th Jan.; 1st Class Exciseman, 14th Jan. to 30th June	15 89	780 59	
Cook, W. R.	do 2nd Class Exciseman, 1st July to 13th Jan.; 1st Class Exciseman, 14th Jan. to 30th June	15 89	780 59	
Adams, J. S.	do 3rd Class Exciseman for year	15 00	735 00	
Dodds, E. W	do Deputy Collector do	18 00	882 00	
Coulter, A	do 3rd Class Exciseman do	21 00	579 00	
Jones, A	do do do	14 40	705 60	
Hurst, L. B.	do do 1st July to 13th Jan.; 2nd Class Exciseman, 14th Jan. to 30th June	13 39	656 36	
Pringle, J.	do Deputy Collector for year		199 92	
Boyd, J. F. S.	do Messenger	14 96	485 04	
	Salaries	795 13	38,498 75	
	Contingencies		1,124 95	
				39,623 70
	Windsor			
Kenning, J. H.	Salary as Collector for year	43 96	2,156 04	
Ramon, P.	do Deputy Collector for year	30 00	1,470 00	
Spereman, G. J.	do Special Class Exciseman do	31 96	1,568 04	
Bouteiller, G. A.	do do 1st Feb. to 30th June	13 32	653 34	
Taylor, G. W.	do do 1st Aug. to 30th June	22 00	1,078 00	
Crowe, W.	do Accountant for year	28 04	1,371 96	
Dunlop, C.	do Deputy Collector for year	24 00	1,176 00	
Brennan, J.	do Accountant do	22 04	1,077 96	
Allan, G. A.	do 1st Class Exciseman do	19 96	980 04	
Jubenville, J. P.	do 2nd do do	16 96	833 04	
Thomas, R.	do 2nd do do	16 95	833 05	
Johnson, J. J.	do 2nd do do	11 28	555 37	
Bayard, G. A.	do 2nd do do	15 77	771 73	
Kilroy, E. T.	do 2nd do 1st July to 13th Jan.; 1st Class Exciseman, 14th Jan. to 30th June	15 89	780 59	
Falconer, J.	do 3rd Class Exciseman for year	15 00	735 00	
Keogh, P. M.	do 3rd do do	15 00	735 00	
Crotty, J.	do 3rd do do	15 00	735 00	
Cahill, J. W.	do 3rd do do	15 00	735 00	
Bradley, Carrie	do 1st do 1st to 11th July.	0 45	22 39	
Scott, M. W.	do Deputy Collector for year		199 92	
	Salaries	372 58	18,467 47	
	Contingencies		668 67	
				19,136 14
	Joliette.			
Leprohon, R. M.	Salary as Collector for year	19 96	980 04	
Marion, J. E. E.	do 3rd Class Exciseman for year	15 00	735 00	
Richard, J. B. T.	do Deputy Collector do	9 00	291 00	
Basinet, L	do do 2nd Nov. to 30th June		199 16	
	Salaries	43 96	2,205 20	
	Contingencies		143 55	
				2,348 75

Appendix B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Montreal.	$ cts.	$ cts.	$ cts.
Lawlor, H.	Salary as Collector for year	41 40	2,028 60	
Macdonald, D.	do Deputy Collector for year	30 00	1,470 00	
Toupin, F. X. J. A.	do do do	29 93	1,465 07	
Lecours, H. T.	do Accountant do	28 04	1,371 96	
Caven, W.	do Special Exciseman do	25 96	1,274 04	
Fox, J. D.	do Asst. Accountant do	24 00	1,176 00	
Forest, E. R.	do Cashier do	23 99	1,176 01	
Hudon, A.	do Exciseman, 1st July to 30th April	16 60	816 70	
Beauchamp, J. P.	do 1st Class Exciseman for year	19 96	980 04	
Fox, T.	do do do	19 96	980 04	
Villeneuve, J.	do do do	19 96	980 04	
Scullion, W. J.	do do do	19 54	957 96	
Macintyre, D.	do do do	19 54	957 96	
Murray, D.	do do do	18 68	916 32	
Hawkins, A. C.	do do do	17 82	858 68	
Bulmer, W.	do 2nd Class do	16 96	833 04	
Malo, T.	do do do	16 96	833 04	
Dumouchel, L.	do do do	16 96	833 04	
McClanaghan, M.	do do do	16 96	833 04	
Courtney, J. J.	do do do	16 96	833 04	
Verner, F.	do do do	16 96	833 04	
Dixon, H. G. S.	do do do	16 95	833 05	
Reilly, J. S.	do do do	15 77	771 73	
Lane, T. M.	do do Exciseman, 1st July to 13th Jan.; 1st Class Exciseman, 14th Jan. to 30th June	15 89	780 59	
Manning, J.	do Exciseman for year	16 96	833 04	
Millier, E.	do 3rd Class Exciseman for year	15 00	735 00	
Baby, J.	do do do	15 00	735 00	
Panneton, G. E.	do do do	15 00	735 00	
Pinsonnault, A.	do do do	15 00	735 00	
Laporte, G.	do do do	15 00	735 00	
Watkins, J. A.	do do do	15 00	735 00	
Costigan, J. J.	do do do	15 00	735 00	
Codd, H. J. S.	do do do	15 00	735 00	
Daveluy, J. P.	do do do	14 98	735 02	
O'Flaherty, E. J.	do do do	15 00	735 00	
Brabant, J. B. G. N.	do do do	15 00	735 00	
Belair, A.	do do do	14 40	705 60	
Ryan, W.	do do do	.....	720 00	
Mainville, C. P.	do do do	13 80	676 20	
Scullion, P. J.	do do do	13 44	661 56	
Renaud, A. H.	do do do	21 00	579 00	
Desaulniers, J. E. A.	do Probationary Exciseman, 23rd Dec. to 30th June	7 81	254 25	
	Salaries	758 14	37,307 70	
	Contingencies	.....	4,976 79	
				42,284 49
	Quebec.			
LaRue, G.	Salary as Collector for year	36 00	1,764 00	
Cahill, J. H.	do Deputy Collector for year	.....	1,299 96	
Coleman, J. J.	do 1st Class Exciseman do	19 54	957 96	
Rouleau, J.	do 3rd do do	15 00	735 00	
LeMoine, J.	do do do do	15 00	735 00	
Bourget, O.	do do do do	15 00	735 00	
Lépine, L.	do do do do	15 00	735 00	
Fahey, O.	do do do do	15 00	735 00	
Sexton, J.	do do do do	15 00	735 00	

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Quebec—Concluded.	$ cts.	$ cts.	$ cts.
Bourassa, J.	Salary as 3rd Class Exciseman for year	23 55	651 45	
Timmons, P.	do Messenger for year	14 96	485 04	
	Salaries	184 05	9,568 41	
	Contingencies	.....	2,207 04	
				11,775 45
	Sherbrooke.			
Simpson, A. F.	Salary as Collector for year	28 03	1,371 97	
Quinn, J. D.	do Special Exciseman for year	24 00	1,176 00	
Gatien, F.	do Deputy Collector do	19 96	980 04	
Chartier, E.	do do do	.....	879 97	
Boucher, O. N. E.	do do do	16 72	818 28	
Bowen, F.	do 3rd Class Exciseman do	18 71	543 76	
Perkins, L. A.	do Deputy Collector, 1st July to 31st Jan.	3 15	253 47	
	Salaries	110 57	6,023 49	
	Contingencies	.....	1,073 20	
				7,096 69
	Sorel.			
Fortier, J. J. O.	Salary as Collector for year	19 60	960 40	
	Contingencies	.....	36 60	
				997 00
	St. Hyacinthe.			
Boivin, C. A.	Salary as Collector for year	20 00	980 00	
	Contingencies	.....	62 55	
				1,042 55
	Terrebonne.			
Desroches, D.	Salary as Collector for year	13 96	686 04	
Fiset, A.	do Deputy Collector, 1st July to 30th Sept.	0 60	49 38	
St. Michel, F. X.	do do 26th April to 30th June	.....	36 09	
	Salaries	14 56	771 51	
	Contingencies	.....	299 47	
				1,070 98
	Three Rivers.			
Hébert, C. D.	Salary as Collector for year	24 00	1,176 00	
Duplessis, C. Z.	do 3rd Class Exciseman for year	15 00	735 00	
Bernier, C. E.	do Deputy Collector do	5 96	194 04	
	Salaries	44 96	2,105 04	
	Contingencies	.....	571 18	
				2,676 22
	Chatham.			
Lawlor, R. A	Salary as Collector, from 1st July to 30th April.	20 00	980 00	
	Contingencies	.....	19 00	
				999 00

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	St. John.	$ cts.	$ cts.	$ cts.
Atherton, R..	Salary as Collector for year	31 96	1,568 04	
Clark, J. A	do Deputy Collector for year	24 00	1,176 00	
Belyea, T. H	do Accountant do	19 96	980 04	
McCloskey, J. R	do 1st Class Exciseman do	19 54	957 96	
Fitzpatrick, J. W.	do do do do	18 68	916 32	
Geldart, O. A	do do do do	17 43	853 82	
Ferguson, J. C	do 2nd Class do do	16 95	833 05	
Smyth, B. B	do do do do	15 77	771 73	
Hill, A. M	do Deputy Collector do	10 04	489 96	
Dibblee, W	do do do	3 76	296 28	
	Salaries	178 09	8,843 20	
	Contingencies		748 75	
				9,591 95
	Cape Breton.			
McDonald, M. A	Salary as Collector for year	15 00	735 00	
	Contingencies		328 41	
				1,063 41
	Halifax.			
Grant, H. H.	Salary as Collector for year	36 00	1,764 00	
King, R. M	do Deputy Collector for year	25 96	1,274 04	
James, T. C.	do Accountant	19 96	980 04	
Carroll, D	do 1st Class Exciseman	19 96	980 04	
Blethen, C. W	do 1st do	18 81	922 44	
Wainwright, F. G	do 2nd do	16 96	833 04	
Hubley, H. H	do 2nd do	15 00	735 00	
Tompkins, P	do 3rd do	15 73	771 73	
Hagarty, P	do 3rd do	15 00	735 00	
Gorman, A	do Messenger	6 32	493 68	
	Salaries	189 70	9,489 01	
	Contingencies		422 70	
				9,911 71
	Pictou.			
Fraser, P	Salary as Collector for year	18 40	901 60	
	Contingencies		137 62	
				1,039 22
	Yarmouth.			
Dustan, W. M	Salary as Collector for year	19 96	980 04	
Munro, H. D	do 3rd Class Exciseman	15 00	735 00	
	Salaries	34 96	1,715 04	
	Contingencies		245 45	
				1,960 49
	Charlottetown.			
Nash, S. C	Salary as Collector for year	24 00	1,176 00	
Moore, T	do Deputy Collector for year	19 96	980 04	
	Salaries	43 96	2,156 04	
	Contingencies		96 34	
				2,252 38

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Winnipeg.	$ cts.	$ cts.	$ cts.
Costigan, H. A....	Salary as Collector for year.....	43 96	2,156 04	
Christie, W. J.....	do Deputy Collector for year.....	30 00	1,470 00	
Hawkins, W. L....	do Accountant do	24 00	1,176 00	
Code, A.....	do do do	23 99	1,176 01	
Girdlestone, R. J. M.	do Deputy Collector do	19 96	980 04	
Thomas, P.....	do do do	18 00	882 00	
Saucier, X.	do 2nd Class Exciseman for year.....	16 96	833 04	
LaRivière, A. C....	do 3rd do do	23 55	651 45	
Colclough, J. W...	do Deputy Collector do	6 32	493 68	
Jameson, S. B.....	do do do	9 00	291 00	
Ross, H. E.....	do do do	5 13	194 82	
Verner, T. H	do Probationary Exciseman, 7th May to 30th June.	2 24	73 01	
O'Meara, F. M	do do do ..	2 24	73 01	
	Salaries	225 35	10,450 10	
	Contingencies.....	.....	3,595 22	
				14,045 32
	Calgary.			
Gosnell, T. S ..	Salary as Collector for year.....	28 04	1,371 96	
Dowling, T.....	do Deputy Collector for year.....	19 96	980 04	
Ives, G. C.....	do do do	.....	399 96	
Osborne, A. D.....	do do do	.....	199 92	
	Salaries	48 00	2,951 88	
	Contingencies.....	.....	806 49	
				3,758 37
	Vancouver.			
Miller, J. E	Salary as Collector for year.....	30 00	1,470 00	
Harvey, E. A.....	do Deputy Collector for year.....	18 00	882 00	
Wolfenden, W.....	do do do	13 96	686 04	
Parkinson, E. B ...	do 3rd Class Exciseman for year.....	23 03	636 97	
Blundell, R.....	do Deputy Collector do	12 00	588 00	
Jones, E. H.....	do do do	11 92	388 08	
Bishop, A.....	do do do	7 48	242 52	
Parsons, C. H	do do do	5 96	194 04	
	Salaries	122 35	5,087 65	
	Contingencies.....	.....	2,787 75	
				7,875 40
	Victoria.			
Jones, R	Salary as Collector for year.....	30 00	1,470 00	
Henwood, G.....	do Exciseman do	19 04	930 96	
O'Sullivan, D.....	do Deputy Collector for year.....	31 44	868 56	
Ridgeman, A. H...	do 3rd Class Exciseman for year.....	21 99	608 01	
Leighton, W. K ...	do Deputy Collector, 1st July to 31st May.....	5 50	269 50	
	Salaries	107 97	4,147 03	
	Contingencies.....	.....	965 30	
				5,112 33

Appendix B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	District Inspectors.	$ cts.	$ cts.	$ cts.
	Ontario.			
Hamilton, W. L.	Salary for year	50 00	2,450 00	
	Contingencies		815 60	
				3,265 60
Morrow, J	Salary for year	50 00	2,450 00	
	Contingencies		270 07	
				2,720 07
Gow, J	Salary for year	50 00	2,450 00	
	Contingencies		513 43	
				2,963 43
	Quebec.			
Vincent, J. L.	Salary for year	50 00	2,450 00	
	Contingencies		162 98	
				2,612 98
Le Moine, J. M.	Salary for year		2,500 00	
	Contingencies		355 89	
				2,855 89
	New Brunswick.			
Burke, T	Salary for year	44 00	2,156 00	
	Contingencies		579 96	
				2,735 96
	Manitoba.			
Barrett, J. K.	Salary for year	50 00	2,450 00	
	Contingencies		900 35	
				3,350 35
	British Columbia.			
Gill, W.	Salary for year	50 00	2,450 00	
	Contingencies		659 70	
				3,109 70
	Chief Inspector.			
Gerald, W. J.	Contingencies			401 29
	Inspector of Bonded Factories.			
Morrow, John	Contingencies			225 45

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Amounts Paid.	Total Amounts Paid.
	General Excise Contingencies.	$ cts.	$ cts.
Westman, Thomas.	Travelling expenses from Toronto to Ottawa and return, including board allowance at Ottawa from 2nd July, 1896, to 10th September, 1896, and 7th to 30th June, 1897..	140 34	
Fréchette, Achille..	Technical translation	100 00	
B. A. B. Note Co..	To pay for stamps and labels supplied	19,000 00	
Pritchard&Andrews	Rubber stamps, stencils, daters, rollers, punches, &c.	168 40	
Esmonde,J.P.&FW	Goods supplied	15 95	
Wiser, J. P. & Sons	To pay for 16 barrels used for fusel oil	32 00	
Gooderham & Worts	To pay for 16·64 galls. spirits	22 69	
Birkett, Thomas...	Hardware..	12 06	
Graves Bros	do	7 20	
Bailey, George....	Work and materials supplied to department	29 90	
Eimer & Amend...	Burettes, pipettes, &c., stands	57 25	
Thackray, Robert..	Lumber	14 25	
Parr, J. A.....	do	37 66	
Oertling, L.....	Hydrometers, petroleometers, and thermometers, and regilding and readjusting hydrometers, petroleometers, &c.	970 48	
Dring & Fage.....	12 sets apparatuses for checking hydrometers	56 10	
Burrow, Stewart & Milne.	Scales	135 00	
Payment, T.	Bottles and stoppers	6 00	
RegistrarExchequer Court.	Two writs of assistance	5 80	
Linton, J. R.....	To pay for loss sustained by license granted and which could not be approved of by the department	100 00	
Canada Express Co	Express charges	59 91	
Dominion do	do	37 10	
Canadian Pacific Ry Co	Freight charges	9 15	
Canada Atlantic Ry Co	do	1 13	
Potvin, Napoleon..	Petty expenses	4 28	
	Total, General Contingencies	.....	21,022 65
	Law Costs.		
Hodgins, F. E.....	Professional service in *re* Regina prosecutions	.....	12 00
Cowper, T. D.....	do Regina *vs.* J. Smith	.....	6 62
O'Connor & Hogg..	do John McKenzie *vs.* Regina	70 00	
do ..	do Gooderham & Worts *vs.* Regina.	5 00	
			75 00
McKay, A. G.....	do Regina *vs.* McIlroy	.....	22 00
Lount, G. W	do Regina *vs.* Duck & Adams	45 00	
do	do Regina *vs.* Baxter	20 12	
do	do Regina *vs.* Bridgman	20 12	
do .. .	do in prosecution of Davenport (J. Livingstone)	20 58	
			105 82
Stone, H. E.....	do in *re* Regina *vs.* J. G. Scarr	.....	20 00
Roger, G. M	do Regina *vs.* Book	.....	20 00
Edwards, E. B.....	do Regina *vs.* Faint	10 00	
do	do Regina *vs.* McClelland	15 00	
do	do Regina *vs.* Tripp	10 00	
			35 00
Robitaille & Roy...	do Regina *vs.* Jobidou	12 92	
do ..	do Regina *vs.* F. X. Pageau	26 70	
do ..	do Regina *vs.* Houde	31 55	
do ..	Laws costs in *re* Regina *vs.* Piset	23 20	
do ..	Professional service in *re* Regina *vs.* Dechenes	215 70	
do ..	do Regina *vs.* J. B. Jarvis	28 20	
			338 27

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Amounts paid.	Total Amounts paid.
	Law Costs—Continued.	$ cts.	$ cts.
Gouin, Lomer	Professional services in *re* Regina *vs.* Gervais	10 00	
do	do Regina *vs.* Gascon	10 00	
do	do Regina *vs.* Crevier	34 00	
do	do Regina *vs.* A. Demers	26 90	
do	do Regina *vs.* Jno. McLean	11 20	
do	do Regina *vs.* A. Seguin	31 20	
do	do Regina *vs.* T. Michaud	91 55	
do	do Regina *vs.* Payette	23 20	
do	do Regina *vs.* Légaré	10 00	
do	Law Costs in *re* Regina *vs.* Collins & Bélisle	44 80	
			292 85
Tessier, A	Professional service in *re* Regina *vs.* A. Lavoie	21 50	
do	do Regina *vs.* Lafrance	32 33	
do	do Regina *vs.* Levesque	27 90	
do	do Regina *vs.* Thibault	61 05	
do	do Regina *vs.* Lafrance	10 00	
do	do Regina *vs.* Jean	61 50	
do	do Regina *vs.* Lafrance	1 00	
do	do Regina *vs.* Lavoie	0 50	
do	do Regina *vs.* Jean	1 00	
			216 78
Bender, A. J	do Regina *vs.* Gagné	32 35	
do	do Regina *vs.* C. Coulombe	141 73	
do	do Regina *vs.* Bernier	113 03	
do	do Regina *vs.* Dussault	32 30	
do	do Regina *vs.* G. Thibault	16 70	
do	do Regina *vs.* F. X. Lavallée	44 05	
do	Law costs in *re* Bernier *vs.* Regina	73 20	
			423 36
Lavery, J. I	Professional services in *re* Regina *vs.* Lavallée	170 54	
do	do Regina *vs.* Roy	61 63	
do	do Regina *vs.* Turgeon	61 63	
do	do Regina *vs.* Journeau	55 34	
do	do Regina *vs.* L. Danjou	91 23	
do	Law costs in *re* Regina *vs.* Readman	54 97	
			495 34
Hall, Hon. J. S	Professional services in *re* Regina *vs.* Poupart	603 45	
do	do Regina *vs.* Lachapelle	23 00	
do	do Regina *vs.* Malhiot	10 00	
do	do Regina *vs.* Courtemanche	10 00	
do	do Regina *vs.* Thouin	88 65	
			735 10
Broderick, J. S	Professional services in *re* Regina *vs.* Soucy	33 00	
do	do Regina *vs,* H. Fortin	19 55	
do	do Regina *vs.* P. Barrett	12 95	
do	Law costs in *re* Regina *vs.* Brooks	36 05	
			101 55
Leduc, J. D	Law costs in *re* Regina *vs.* Gadbois	33 05	
do	do Regina *vs.* Desjardins	33 05	
do	do Regina *vs.* Légaré	26 29	
			92 30
Sicotte, Judge L. W.	Expenses in *re* Regina *vs.* J. Leblanc	44 55	
do	do Regina *vs.* T. Michaud	65 15	
do	do Regina vs. Z. Desjardins	42 50	
			152 20
Desnoyers, Judge M. C	Expenses in *re* Regina *vs.* J. Gadbois	30 80	
do	do Regina *vs.* Dupuis	20 50	
			51 30

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Amounts paid.	Total Amounts paid.
	Law Costs—Continued.	$ cts.	$ cts.
Olivier, A.	Professional services in *re* Regina *vs.* Godin	48 50	
do	do Regina *vs.* Daneau	40 85	
			89 35
Duffy, H. T.	Professional services in *re* Regina *vs.* P. Cordeau	10 00	
do	do Regina *vs.* J. L. Perkins	10 00	
			20 00
Méthot, J. E.	do Simpson *vs.* A. Mercier	46 82	
	do Regina *vs.* McGrath	135 40	
			182 22
Pouliot, J. N.	do Regina *vs.* Poirier	22 00	
	do Regina *vs.* Amyot		
	do Regina *vs.* C. Thibault	48 95	
			70 95
Dionne, L. B.	Law costs in *re* Dickey *vs.* Gauvin and La Banque Jacques Cartier	78 50	
	Professional service in *re* Regina *vs.* A. Dugal	221 11	
			299 61
Faribault, J. E.	do Regina *vs.* Gervais	59 72	
	do Regina *vs.* Daviau	26 85	
			86 57
Lussier & Gendron.	Professional service in *re* Regina *vs.* C. Vadnais	10 00	
	do Regina *vs.* L. Riel	25 70	
			35 70
Taschereau, L.	do Regina *vs.* Corriveau		231 13
Martel, J.	do Regina *vs.* J. LeBlanc		10 00
Carreau, J. P.	do Regina *vs.* O. Saltry		15 00
Fitzpatrick, Taschereau & Taschereau	do Regina *vs.* Corriveau		300 00
Fortin, Alfred	Law costs in *re* Regina *re* X. Lavallée		13 60
Plamondon, J. B.	Professional service in *re* Regina *vs.* Latraverse		22 60
Dugas, F. O.	do Regina *vs.* Lapierre		31 60
Ferguson, J. M.	Advance to meet expenses in *re* Regina *vs.* Finlayson & Grant		100 00
Grenier & Tessier.	Professional service in *re* Regina *vs.* A. Ricard		39 00
DeGuise, Chas.	do Readman & Ekers		117 61
Wurtele, C.	do Regina *vs.* Latraverse		13 30
Letellier, Blaise.	do Regina *vs.* Corriveau		182 96
LeBel, G.	To pay witnesses in *re* Regina *vs.* Dugal		20 00
Bellefeuille, Joseph.	Fees in connection with seizure No. 83		9 30
McKeown, H. A.	Professional service in *re* Regina *vs.* Doherty *et al*	87 91	
do	do Regina *vs.* Doherty *et al*	100 00	
			187 91
Jonah, W. B.	do Regina *vs.* Doherty *et al*		54 00
Ritchie, W. B. A.	do Regina *vs.* John Darbyson	86 80	
do	do Regina *vs.* D. Walker	3 06	
do	do Regina *vs.* John Darbyson	2 03	
do	do Regina *vs.* Bryden	1 03	
do	do Regina *vs.* Farrell	1 50	
do	do Regina *vs.* McIsaacs	0 50	
do	do Regina *vs.* Darbyson	1 50	
	Law costs in *re* Regina *vs.* Bryden	86 90	
			183 32
Borden, R. L.	Professional service in *re* Regina *vs.* A. B. Beaton		34 82
McDonnell, S.	do Regina *vs.* J. McDonald *et al*		151 50
Aikins, Culver & McLenaghan	do consultation with Collector of Inland Revenue		5 00
Beck, N. D.	do Regina *vs.* Cairns		85 75
Mathers, T. G.	do Regina *vs.* St. Boniface		14 87
	Total Law Costs		5,833 41

Appendix B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Place of Residence.	Service.	Amounts paid.	Totals.
		Commission to Customs Officers.	$ cts.	$ cts.
Ormiston, John....	Gananoque, Ont..	From 1st July, 1895, to 30th June, 1896	200 00	
Robinson, Joseph..	Wiarton, Ont. ..	do do ..	5 10	
Cameron, A. McK.	Meaford, Ont. ...	do do ..	200 00	
Hogg, W. A.....	Collingwood, Ont..	do do ..	250 00	
Williamson, A. M.	Kincardine, Ont..	do do ..	100 57	
Plummer, H.	Sault Ste. Marie, O.	do do ..	142 58	
Elliott, George M..	Napanee, Ont.....	do to 28th Nov., 1896	325 00	
Stanley, T. D.....	St. Marys, Ont....	do to 30th June, 1896	200 00	
Rayburn, R	Deseronto, Ont ...	do do ..	150 00	
McGuire, F. J.....	Trenton, Ont	do do ..	150 00	
Leavitt, T. M. H .	Napanee, Ont.....	1st Dec., 1896, to 14th Jan., 1897	31 25	
Kavanagh, A. J ...	Gaspé, Que.....	1st July, 1895, to 30th June, 1896	22 79	
Beauchesne, P. C..	Paspebiac, Que....	do do ..	150 00	
Joncas, P. L.	Magdalen Islands.	do do ..	35 89	
Danis, A. D.....	Valleyfield, Que ..	do do ..	250 00	
Park, W. A	Newcastle, N.B...	do do ..	200 00	
Baldwin, John E ..	Bathurst, N.B....	do do .	20 42	
Wallace, G. H.....	Sussex, N.B	do do ..	88 95	
Milner, W. C.....	Sackville, N.B....	do do ..	200 00	
Street, A. F... .	Fredericton, N.B..	do do ..	250 00	
Clark, A. J.....	Campobello, N.B .	do do ..	54 69	
Binney, J. W.....	Moncton, N.B....	do do ..	250 00	
Jones, N. B	Weymouth, N.S..	do do ..	141 60	
Ratchford, C. E ...	Amherst, N.S.....	do do ..	150 00	
Blair, H. C.. ...	Truro, N.S	do to 30th June, 1897	500 00	
Hamilton, A. G....	North Syney, N.S.	do to 30th June, 1896	200 00	
Boyd, A.....	Antigonish, N.S ..	do do ..	200 00	
McDonald, J. F...	New Glasgow, N.S.	do do ..	200 00	
Ross, H. E... ...	Prince Albert, Man	do do ..	77 32	
Gilhuly, R. H	W. Selkirk, Man..	do do ..	130 99	
Scarth, M. F ...	Virden, Man	do do ..	200 00	
Tennant, F.....	Gretna, Man.....	do do ..	200 00	
Jameson, S. B. ...	Regina, Man	do do ..	52 64	
Little, W. F. ..	Anthracite, Man..	do do ..	29 33	
Champness, Fred ..	Lethbridge, Man..	do do ..	104 75	
Steadman, F. H ...	Macleod, Man....	do do .	1 36	
Hesson, F. H . ..	Brandon, Man....	19th Oct. to 9th Nov., 1896....	25 00	
		Total commission to Customs Officers.	.....	5,490 23
		Commission on Tobacco Stamps.		
Archambault, Delle G.....	St. Alexis, Que...	Allowance of 5 p.c. on sale of stamps.	58 13	
Ferland, Ed..... ..	do ...	do do ..	0 50	
		Total commission on sale of Canada Twist Stamps...	.....	58 64

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
	Duty-Pay.	$ cts.	$ cts.
Beauchamp, J. P	From 1st Jan., 1896, to 14th Jan., 1896	3 76	
Gerald, Charles	1st July, 1896, to 30th June, 1897	200 00	
Dawson, W	do 22nd Jan., 1897	83 86	
O'Leary, T. J	do 30th June, 1897	100 00	
Flynn, D	do do	100 00	
Howard, W. W. S.	do do	100 00	
Jamieson, R. C	do do	122 05	
Brennan, D. J	do do	100 00	
Bell, J. E	do do	100 00	
Hurst, L. B	do do	100 00	
Doyle, B. J	25th Jan., 1897 do	43 54	
Spereman, Jas	1st July, 1896, to 31st Dec., 1896	76 10	
Crowe, W	do 31st Jan., 1897	40 56	
Taylor, G. W	do 30th June, 1897	150 00	
Allen, G. A	do do	100 00	
Brennan, John	do do	100 00	
Falconer, J. E	do do	100 00	
Thomas, Robert	do do	100 00	
Kilroy, E. T	do do	100 00	
Bayard, G. A	do do	100 00	
Johnson, J. J	do 25th Feb., 1897	65 76	
Cahill, J. W	do 30th June, 1897	100 00	
Keogh, P. M	do do	100 00	
Crotty, John	do do	100 00	
Gerald, W. H	do do	150 00	
Gow, J. E	do do	150 00	
Johnston, G. E	do do	100 00	
Keeler, G. S	do do	100 00	
Bouteiller, G. A	do do	139 24	
Howie, A	do do	150 00	
Bish, P	do do	100 00	
Woodward, G. W	do do	100 00	
Standish, J. G	do do	100 00	
McCoy, W	do do	150 00	
Conway, B. J	do do	100 00	
Baby, W. A. D	do do	150 00	
Weir, James	do do	100 00	
Tompkins, P	do do	150 00	
Hagarty, P	do do	100 00	
Masson, F	do do	100 00	
Goodman, A. W	do do	100 00	
Caven, W	do do	200 00	
Miller, E	do do	150 00	
Scullion, W. J	do do	100 00	
Coleman, J. J	do do	150 00	
Lepine, L	do do	75 00	
Cameron, D. M	do to 31st December, 1896	100 00	
Iler, B	do to 30th June, 1897	200 00	
Quinn, J. D	do do	150 00	
Sexton, J	do do	100 00	
Walsh, D. J	do do	100 00	
Foster, H	do do	100 00	
Marcon, F. E	do do	100 00	
Murray, A. E. S	do do	100 00	
Malo, T	do do	100 00	
Daveluy, J. P	do do	91 67	
Dawson, H	From 23rd January, 1897, to do	44 09	
Irwin, R	From 1st do to do	100 00	
	Total duty-pay		6,285 63
	Grand total		371,630 16
	ADD—Printing	4,030 55	
	Stationery	954 70	
	Lithographing	455 25	
			5,440 50

APPENDIX B.—No. 1.—Details of Excise Expenditure, 1896-97—*Concluded.*

Service.	Superannuation Fees.	Amounts paid.	Totals.
	$ cts.	$ cts.	$ cts.
Preventive Service—			
Salaries	48 56	2,851 36	
Contingencies		7,685 60	
			10,536 96
Authorized disbursements (less superannuation)			387,607 62
ADD—Balances due to Collectors, 1st July, 1896		608 04	
do by do 30th June, 1897		468 98	
			1,077 02
			388,684 64
LESS—Balances due by Collectors, 1st July, 1896		343 98	
do to do 30th June, 1897		2,137 65	
			2,481 63
Actual disbursements agreeing with Statement No. 4, page 10			386,203 01

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 2—DETAILS of Fees paid to Cullers for the Fiscal Year ended 30th June, 1897.

Office.	Articles.	Names of Cullers.	Amounts Paid.	Totals.
			$ cts.	$ cts.
Quebec	Square timber	Frederick, Antoine	700 00	
	do	McKendry, Daniel	700 00	
	do	Bergeron, Joseph	700 00	
	do	Kelly, M	700 00	
	do	McPeak, William	700 00	
	do	O'Brien, Martin	116 68	
	do	Kelly, Edward	116 68	
		Total Fees paid to Cullers		3,733 36

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 3.—DETAILS of Cullers' Expenditure for the Fiscal Year ended 30th June, 1897.

Office.	Names.	Nature of Service.	Deductions for Superannuation.	Amounts paid.	Totals.	Grand Totals.
			$ cts.	$ cts.	$ cts.	$ cts.
QUEBEC	Patton James	Supervisor of Cullers for the year	42 00	2,058 60		
	Whelan, W. F	Specification Clerk do	15 00	735 00		
	Gallagher, F	do do	15 00	735 00		
	Bellerive, Geo	do do	15 00	735 00		
	Harney, Thomas	Book-keeper, &c. do	13 96	686 04		
		Total salaries	100 96		4,949 04	
		Contingencies.				
	Foley, Mary	Charwoman		96 00		
	Duggan, James & Co	Night-watchmen		35 00		
	Harney, Thomas	Petty expenses		38 29		
	Quebec Post Office	Rent of drawer		6 00		
	Bell Telephone Co	Rent of telephone		40 00		
	Hearn, Jno., estate of	Rent of offices		450 00		
	Mulroney, W. J. & G	Ink, &c		3 70		
	Rancour, Noël	Ice for season		15 00		
	Holmes, Margaret	Extra house cleaning		41 50		
	Turgeon, P. L	Soap, &c		8 99		
	Fitzgerald, J. & Co	Removing, snow, &c		14 00		
	Kelly, John	Joiners work		13 86		
	Kane, J. R	Tinsmith		4 50		
	McCallum A	Repairing clock		1 75		
	Guérard, Louis	Repairing office furniture		53 30		
	Arnold, Thomas	Cartage of snow		25 00		
		Total Contingencies			846 89	

APPENDIX B.—No. 3.—DETAILS of Cullers' Expenditure, for the Fiscal Year ended 30th June, 1897.—*Concluded.*

Office.	Names.	Nature of Service.	Amounts paid.	Totals.	Grand Totals.
			$ cts.	$ cts.	$ cts.
		Cullers' Expenses.			
	Frederick, Antoine	Expenses	148 03		
	McKendry, D	do	172 42		
	Bergeron, J	do	119 83		
	Kelly, M	do	29 00		
	McPeak, Wm	do	268 33		
	O'Brien, M	do	47 76		
	Kelly, Edward	do	59 02		
		Total Cullers' expenses		844 39	
		Total Expenditure			6,640 32
		Paid to retired Cullers.			
	Jobin, J	Superannuation	200 00		
	Morrissette, J	do	200 00		
	Demers, L	do	200 00		
	Dorval, P	do	200 00		
	Walsh, W	do	200 00		
	Villeneuve, J	do	200 00		
	Bédard, J	do	200 00		
	McNaughton, J	do	200 00		
	Beaupré, Noël	do	200 00		
	Frenette, J	do	200 00		
	Malone, J. C	do	200 00		
	Duggan, Ed	do	200 00		
	Noël, Elie	do	83 34		
	Gilchen, T	do	200 00		
	McInenly, T	do	200 00		
	Laflamme, J	do	200 00		
	Patry, T	do	200 00		
	Cauchy, C	do	200 00		
	Lynch, J	do	200 00		
	Vachon, J. B	do	200 00		
	Murphy, T	do	200 00		
	Demers, F. X	do	200 00		

Munro, Wm	*do*	200 00		
Malone, T	*do*	200 00		
Dorval, George	*do*	200 00		
Kelly, Edward	*do*	200 00		
O'Brien, M	*do*	200 00		
Ferland, P	*do*	200 00		
Barsalo, Ed	*do*	200 00		
McCormick, J	*do*	200 00		
Morency, D	*do*	200 00		
	Total paid to retired Cullers			6,083 34
	Grand total			16,457 02
	ADD—Printing		41 38	
	Stationery		19 39	
				60 77
	Authorized disbursements (less—superannuation)			16,517 79
	ADD—Balance due by Supervisor 30th June, 1897			75 00
				16,592 79
	LESS— do do 1st July, 1897			75 00
	Actual disbursements agreeing with Statement No. 8, page 15			16,517 79

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 4.—DISTRIBUTION of Seizures for the Year ended 30th June, 1897.

Divisions.	To whom paid.	Service.	Amounts Paid.	Totals.
		Ontario.	$ cts.	$ cts.
London	Alexander, Thos	For his portion of seizure No. 51		50 40
	Coles, F. H.	do do 51		50 40
	Tracey, J. P.	do do 51		50 40
	Wilson, David	do do 51		50 40
Ottawa	Slattery, R.	do do 132		5 00
Owen Sound	Graham, W. J	do do 27		4 20
	Briggs, Constable	do do 27		4 20
	Hewitt do	do do 27		4 20
St. Catharines	Hesson, C. A.	To pay informer penalty in seizure No. 19		25 00
Toronto	Bell, J. E.	For his portion of seizure No. 316		2 50
	Taylor, G. W.	do do 316		2 50
	Stratton, W. C.	To pay informer penalty in seizure No. 319	5 00	
		do do 324	5 00	
				10 00
		Quebec.		
Joliette	Leprohon, R. M.	To pay informer penalty in seizure No. 131		50 50
	Curless, C	For his portion of seizure No. 117		1 75
	Watkins, J. A.	do do 117		1 75
	Brabant, J. B. G. N.	do do 121	7 62	
		do do 126	12 30	
		do do 130	38 30	
				58 22
Montreal	Lawlor, H.	To pay informer penalty in seizure No. 846	50 00	
		do do 847	50 00	
		do do 848	5 00	
		do do 849	25 00	
		do do 850	100 00	
		do do 851	5 00	
		do do 852	25 00	
		do do 853	5 00	
		do do 854	5 00	
		do do 855	50 00	
		do do 860	25 00	
		do do 861	5 00	
		do do 867	5 00	
		do do 869	2 00	
		do do 873	5 00	
		do do 875	5 00	
		do do 878	5 00	
		do do 881	25 00	
		do do 882	5 00	
		do do 883	5 00	
		do do 884	5 00	
		do do 885	50 00	
				462 50
		For his portion of seizure No. 784	49 00	
		do do 784	49 00	
		do do 790	0 26	
		do do 902	0 38	
		do do 822	53 14	
		do do 837	3 25	
				106 03
	Courtney, J. J.	do do 790	0 27	
		do do 832	2 64	
		do do 833	2 67	
		do do 834	2 88	
				8 46

APPENDIX B—*Continued.*

No. 4.—DISTRIBUTION of Seizures, 1896-97—*Continued.*

Divisions.	To whom paid.	Service.	Amounts Paid.	Totals.
		Quebec—Continued.	$ cts.	$ cts.
Montreal—*Con.*	Toupin, F. X. J. A. . .	For his portion of seizure No. 802 . . .	0 37	
		do do 822. . . .	53 15	
		do do 837. . . .	3 26	
				56 78
	Warren, Geo.	do do 806. . . .	10 21	
		do do 817 . .	12 45	
		do do 819. . . .	24 97	
		do do 821. . . .	1 03	
				48 66
	Watkins, J. A.	do do 806. . . .	10 21	
		do do 807. . . .	12 79	
		do do 817. . . .	12 45	
		do do 821. . . .	1 02	
		do do 827. . . .	6 60	
		do do 832. . . .	2 63	
		do do 833. . . .	2 68	
		do do 834. . . .	2 87	
				51 25
	Mainville, C. P.	do do 807. .	. . . . .	12 79
	Brabant, J. B. G. N. . . .	do do 808. . . .	0 25	
		do do 823. . . .	51 95	
		do do 824. . . .	47 70	
		do do 826 . . .	7 80	
		do do 830. . . .	1 51	
		do do 836. . . .	6 05	
		do do 843 . . .	3 34	
		do do 844. . . .	26 62	
		do do 845. . . .	0 15	
		do do 846. . . .	69 35	
				214 72
	Kearney, D. J.	do do 822. . . .	. . . . .	53 15
	Forest, E.	do do 828. . . .	. . . . .	5 17
	Dumouchel, L.	do do 828. . . .	. . . . .	5 16
	Danis, A. D.	do do 838. . . .	. . . . .	2 63
	Bailey, John.	do do 838. . . .	. . . . .	2 62
	Kingsbury, W. C. . . .	do do 838. . . .	. . . . .	2 62
	O'Brien, E. C.	do do 843. . . .	. . . . .	3 35
Quebec.	La Rue, Geo	To pay informer penalty collected from J. A. Blais	25 00	
		To pay informer penalty in seizure No. 349	25 00	
		do do 350	25 00	
		do do 376	75 00	
				150 00
		For his portion of seizure No. 355. . . .	. . . . .	14 72
	Lépine, L.	do do 355. . . .	. . . . .	14 73
	Rouleau, Jos.	do do 355 . . .	. . . . .	14 72
	Bourassa, J.	do do 364. . . .	. . . . .	20 48
	Dubé, M.	do do 365 . . .	59 97	
		do do 370. . . .	113 70	
				173 67
	Simpson, A. F.	do do 361. . . .	17 11	
		do do 379. . . .	42 75	
		do do 380. . . .	22 00	
		do do 383. . . .	20 35	
		do do 384. . . .	20 35	
		do do 385. . . .	16 50	
		do do 386. . . .	116 50	
				255 56
	Bourget, O.	do do 361 . .	17 10	
		do do 364. . . .	20 47	

APPENDIX B—*Continued.*

No. 4.—DISTRIBUTION of Seizures, 1896-97—*Continued.*

Divisions.	To whom paid.	Service.	Amounts paid.	Totals.
		Quebec—Continued.	$ cts.	$ cts.
Quebec.—*Con.*	Bourget, O.—*Con.*	For his portion of seizure No. 366	56 98	
		do do 367	16 30	
		do do 375	3 96	
		do do 382	48 14	
				162 95
	Trudel, E	do do 366	56 97	
		do do 367	16 30	
		do do 375	3 96	
		do do 382	48 14	
				125 37
St. Hyacinthe	Boivin, C. A	do do 51	45 50	
		do do 52	47 50	
		do do 59	136 50	
		do do 60	27 87	
				257 37
		To pay informer penalty in seizure No. 62	5 00	
		do do 63	5 00	
		do do 64	5 00	
				15 00
	Simpson, O. F	For his portion of seizure No. 48	0 57	
		do do 53	50 50	
		do do 54	50 50	
		do do 55	50 50	
		do do 61	50 50	
				202 57
	Brabant, J. B. G. N	do do 58		7 45
Sherbrooke	Simpson, A. F	To pay informer penalty in seizure No. 108	2 50	
		do do 110	5 00	
		do do 112	5 00	
		do do 113	25 00	
		do do 115	5 00	
		do do 116	5 00	
		do do 117	25 00	
		do do 118	25 00	
		do do 119	12 50	
		do do 120	25 00	
		do do 122	2 50	
				137 50
		For his portion of seizure No. 79	0 78	
		do do 102	114 45	
		do do 104	131 71	
		do do 106	116 50	
		do do 107	16 50	
				379 94
	McGowan, W. W	do do 37	0 79	
		do do 38	4 70	
		do do 39	0 50	
		do do 40	0 96	
		do do 41	2 43	
		do do 42	7 97	
		do do 47	0 92	
		do do 62	0 26	
		do do 69	1 05	
				19 58
	Barry, A	do do 54	3 76	
		do do 55	2 45	
		do do 56	2 23	
		do do 57	2 01	
		do do 59	0 26	
		do do 65	0 53	
				11 24

APPENDIX B—*Continued.*

No. 4.—DISTRIBUTION of Seizures, 1896-97—*Continued.*

Divisions.	To whom paid.	Service.	Amounts paid.	Totals.
		Quebec—Concluded.	$ cts.	$ cts.
Sherbrooke-*Con.*	Brabant, J. B. G. N....	For his portion of seizure No. 80....	.....	4 45
	Chartier, E.....	do do 105....	.....	56 52
Sorel.....	Fortier, J. J. O.....	To pay informer penalty in seizure No. 70	5 00	
		do do 71	5 00	
		do do 72	5 00	
				15 00
Terrebonne.....	Desroches, D..	do do 57	25 00	
		do do 58	50 00	
				75 00
	Brabant, J. B. G. N	For his portion of seizure No. 45	2 30	
		do do 49....	2 73	
		do do 50.....	99 68	
		do do 51.....	2 64	
		do do 52	2 63	
		do do 53.....	1 32	
		do do 54.. ..	1 32	
				112 62
	Watkins, J. A....	do do 49.....	2 72	
		do do 50.....	99 69	
		do do 53.....	1 32	
		do do 54.....	1 32	
				105 05
	Warren, Geo..... .. .	do do 50	.....	99 68
Three Rivers...	Hébert, C. D.....	To pay informer penalty in seizure No. 90	.....	25 00
		For his portion of seizure No. 101....	.....	5 00
	Watkins, J. A.....	do do 89 .. .	.....	34 40
	Brabant, J. B. G. N ...	do do 92.....	19 23	
		do do 95.....	19 73	
		do do 99	5 00	
		do do 100	5 00	
				48 96
		New Brunswick.		
St. John.	Gibberson, F. D..... .	For his portion of seizure No. 56	1 25	
		do do 57.....	1 00	
				2 25
	Atherton, R	To pay informer penalty in seizure No. 59	50 00	
		do do 60	12 50	
		do do 62	12 50	
				75 00
		Nova Scotia.		
Halifax.....	Blethen, C. W	For his portion of seizure No. 156.....	.....	12 50
	Hagarty, P.....	do do 156.....	.....	12 50
		Manitoba and N. W. Territories.		
Winnipeg.. ...	Costigan, H. A.....	To pay informer penalty in seizure No. 46	.....	50 00
	Wardell, R. S. R.....	For his portion of seizure No. 45.....	.....	4 31
		British Columbia.		
Vancouver	Miller, J. E	For his portion of seizure No. 7.....	.....	143 10
		Grand Total.....	.....	4,251 50

APPENDIX B.—*Concluded.*

No. 4.—DISTRIBUTION of Seizures, 1896–97—*Continued.*

RECAPITULATION.

Ontario	$ 259 20
Quebec	3,692 64
New Brunswick	77 25
Nova Scotia	25 00
Manitoba and North-west Territories	54 31
British Columbia	143 10
Total	$4,251 50

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 5.—DETAILS of Sundry Minor Expenditures, for the Fiscal Year ended 30th June, 1897.

To whom paid.	Service.		Amounts paid.	Totals.
	Minor Revenues.		$ cts.	$ cts.
The Free Press, Ottawa.	Advertising for tenders for Rockliffe Ferry..	$ 9 80		
do ..	do Ottawa and Gatineau Point Ferry.....	13 26		
do ..	do do ..	9 60		
			32 66	
Pontiac Advance.....	Advertising for tenders for Gower Point and Lapasse Ferry		7 20	
The Journal, Ottawa...	Advertising for tenders		32 66	
United Canada, Ottawa.	do		17 40	
The Aylmer Gazette ...	do		7 65	
The Herald, Montreal..	do		9 60	
				107 17
	Law Costs.			
O'Connor & Hogg.....	Costs *re* collection of rent due by Corporation of Galt.		13 36	
do	Professional services in *re* Regina *vs.* North-west Coal and Navigation Co.....		7 56	
do	Professional services in *re* Regina *vs.* Mansfield.....		6 02	
do	do Regina *vs.* Murdy, Dunville Bridge.....		6 00	
				32 94
Belyea, J. A	do Quebec *vs.* Dunham.....		....	20 60
	Total		.....	160 71
	Inspection of Staples.			
Wills, E. A., Secretary Board of Trade, Toronto.....	Expenses of Board meetings to determine the standards of grain		846 43	
Hadrill, G., Sec'y. Board of Trade, Montreal...	do do		578 93	
Bell, C.N., Sec'y. Board of Trade, Winnipeg..	do do	$1,626 81		
	LESS—Proceeds from sale of grain and sacks	269 12		
			1,357 69	
Gibbs, F. E., Inspector of Grain, Port Arthur.	Travelling expenses to Ottawa and return..... .. .		57 50	
Vincent, J. L..	Freight charges on grain samples, &c.....		31 46	
Kerr, J. K.....	Professional service in *re* Regina *vs.* Hallam.		30 00	
	Total..		.....	2,902 01
	Adulteration of Food.	Deductions for Superannuation.		
Macfarlane, Thomas ...	Salary as Chief Analyst for the year.....	43 96	2,156 04	
McGill, A.	do Assistant Analyst for the year.....	23 97	1,776 01	
Babington, F. W.....	do 2nd do do	18 65	1,381 29	
Tourchot, A. L.....	do 3rd do do	15 29	1,134 65	
Watson, James	do Clerk in laboratory for the year...	12 00	888 00	
do	do Food Inspector do ...	2 64	197 28	
Kidd, Thomas.....	do do do ...	6 64	493 28	
Costigan, J. J	do do do ...	5 00	245 00	
Ferguson, J. C.....	do do do ...	3 00	147 00	
Saucier, X.....	do do do ...	4 00	196 00	
Kelly, Ed.	do do from 1st July to 31st Dec., 1896..	3 00	147 00	
Waugh, Richard J.	do do from 13th Feb. to 30th June, 1897..	0 49	113 79	
	Total salaries	138 64	.....	8,875 34

APPENDIX B—*Continued.*

No. 5.—Details of Sundry Minor Expenditures, 1896-97—*Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
	Adulteration of Food—*Continued.*	$ cts.	$ cts.
	Contingencies.		
Macfarlane, Thos	Travelling and other expenses	674 40	
Watson, James	do do	814 67	
Kidd, Thomas	do do	423 60	
Costigan, J. J	do do	377 50	
Ferguson, J. C	do do	282 53	
Waugh, R. J	do do	105 65	
Saucier, X	do do	121 55	
			2,799 90
Best, W. F	Allowance under the Act for retaining fees	200 00	
do	do do rent	100 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	705 00	
			1,105 00
Bowman, M	Allowance under the Act for retaining fees	200 00	
do	do do rent	100 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	570 97	
			970 97
Ellis, W. H	Allowance under the Act for retaining fees	200 00	
do	do do rent	100 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	1,030 25	
			1,430 25
Valade, F. X	Allowance under the Act for retaining fees	200 00	
do	do do rent	100 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	888 00	
			1,288 00
Kenrick, E. B	Allowance under the Act for retaining fees	200 00	
do	do do rent	100 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	766 00	
			1,166 00
Harrison, F. T	Allowance under the Act for retaining fees	200 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	957 00	
			1,257 00
Fiset, M	Allowance under the Act for retaining fees	200 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	956 51	
			1,256 51
Edwards, J. B	Allowance under the Act for retaining fees	200 00	
do	do do materials used in analysis	100 00	
do	Fees for analysis	1,123 00	
	Less—Paid Miss Tyrrell's salary for the year $ 499 92	1,423 00	
	Paid H. Dart & Co. for goods supplied 34 97		
	Paid Montreal Gas Co. for gas supplied in laboratory 43 09		
		577 98	
			845 02
Tyrell, Miss M. J	Services, assisting J. B. Edwards for the year	499 92	
Wright, Miss S. E	do in laboratory, Ottawa, for the year	499 92	
Macfarlane, A. C	do do do from 7th July to 7th Oct., 1896	99 99	
Lehmann, Dr. A	do do do from 15th to 30th June, 1897	35 00	

APPENDIX B—*Continued.*

No. 5.—DETAILS of Sundry Minor Expenditures, 1896-97.—*Continued.*

To whom paid.	Service.	Amounts paid.	Totals.
	ADTLTERATION OF FOOD—*Continued.*	$ cts.	$ cts.
	Contingencies.—Continued.		
Whitehead, Mrs. J.	Services, cleaning iustruments, sample bottles, &c., for the year	162 75	
Davidson, Miss Edith	do in laboratory, Ottawa, from 25th Jan. to 31st Mar., 1897	100 00	
Dart, H., & Co	Goods supplied to laboratory in Montreal	34 97	
Lyman Sons & Co	do do	9 23	
Blyth, G. R.	Toweling do	12 76	
Graham, K. D.	Chemicals, &c. do	183 14	
J. Skinner & Co.	do do	92 70	
Eimer & Amend	do apparatus and materials for laboratory	97 20	
Toronto Electric Light Co	1-volt motor for laboratory	60 00	
Gooderham & Worts	Spirits for laboratory	48 54	
Bausch & Lomb	Chemical apparatus and materials for laboratory	197 19	
Johnston's Fluid Beef Co	Water bath for laboratory	45 00	
Montreal Gas Co.	Gas supplied to Montreal laboratory	43 09	
Graves Bros.	Hardware	14 10	
Butterworth & Co.	Materials supplied and work done	14 23	
Laverdure, E. G.	Glass box capped	15 00	
Peters & Rosh, Drs.	Chemical apparatus	59 25	
Colt, J. B., & Co.	do	73 98	
Pritchard & Andrews	Steel punches	2 50	
Gauvreau, G.	Attending meeting of Board of Examination of Candidates for Public Analysts	20 50	
Girdwood, Dr. G. P	do do do	31 30	
Canadian Pacific Ry.	Freight	7 99	
United States Consul General	Official fee for certificate	1 00	
Mitchell, A. E.	Professional service in *re* Regina *vs.* R. E. Kelly	19 90	
Ritchie, W. B. A	do do Courtney	1 00	
Ross, W. B.	do do Ross	35 00	
Gouin, Lomer	do do F. Lafortune	10 00	
Walker, J. A.	do do Taylor & Williamson	10 00	
Robitaille & Roy	do do Lafontaine	29 05	
Broderick, J. S	Professional service in *re* Regina *vs.* Lanctot $25 00		
do	do Regina *vs.* Champigny 28 85		
do	do Regina *vs.* Robitaille 28 20		
do	do Regina *vs.* Lanctot 3 05	85 10	
Mathers, T. G.	do Regina *vs.* McMillan 10 02		
do	do Regina *vs.* Hodges & Co. 20 25		
do	do Regina *vs.* Sutherland & Campbell 10 00	40 27	
Ferguson, J. M.	do Regina *vs.* Gougeon. } 40 00		
do	do Regina *vs.* Gratton. }		
do	do Regina *vs.* Lafortune 10 00		
do	do Regina *vs.* Gougeon 20 00		
do	do Regina *vs.* Lamoureux & Co. 20 00		
do	do Regina *vs.* L. P. Forest 23 80		
do	do Regina *vs.* J. J. Hayes & J. D. Lambe 39 50	153 30	

APPENDIX B—*Continued.*

No. 5.—DETAILS of Sundry Minor Expenditures, 1896-97—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
	ADULTERATION OF FOOD—*Concluded.*	$ cts.	$ cts.
	Contingencies—Concluded.		
Maveity, Mrs. S..	Washing towels	60 00	
Hagan, Mrs. C.	Trimming, stamping and washing towels	5 00	
Dominion Express Co	Express charges	43 30	
Canadian Express Co.	do	36 95	
Dupont, J. C	Goods supplied	2 95	
Storr, A. M.	Cartage	2 50	
Payment, T.	Soap	2 00	
Woodburn, W. M.	do	1 75	
Potvin, Napoleon	Sundry petty expenses	0 54	
			2,999 86
			15,118 51
	LESS—Sale of apparatus, $97.24; soda solutions, $1.80		99 04
	Total contingencies		15,019 47
	Grand total		26,957 53
	ADD—Printing	327 99	
	Stationery	166 32	
			494 31
	Authorised disbursements, less superannuation		27,451 84
	ADD—Balance due by Food Inspector, Halifax, N.S., 30th June, 1897		25 91
			27,477 75
	DEDUCT—Balance due by Chief Analyst 1st July, 1896		500 00
	Actual disbursements agreeing with Statement No. 12, page 21		26,977 75

RECAPITULATION.

Minor Expenditures	$ 186 21
Inspection of Staples	2,921 38
Adulteration of Food	23,870 16
Total	26,977 75

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 6.—DETAILS of Departmental Expenditure for the Year ended 30th June, 1897.

Names.	Ranks.	Period.	Deductions for Superannuation.	Amounts Paid.	Totals.
			cts.	$ cts.	$ cts.
Prior, Hon. E. G.	Controller, from 1st July to 12th July, 1896.			161 29	
Sir H. G. Joly de Lotbinière	Controller, from 14th July, 1896, to 30th June, 1897.			4,825 27	
Miall, E.	Commissioner	For the year	64 00	3,136 00	
Gerald, W. J.	Assistant Commissioner	do	60 00	2,940 00	
Himsworth, Wm.	Chief Clerk and Secretary	do	48 00	2,352 00	
Campeau, F. R. E.	Chief Clerk and Chief Accountant	do	40 00	1,960 00	
Hall, C. R.	Assistant Accountant.	do	36 00	1,764 00	
Heron, W. L.	Statistical Clerk, Accts. Br.	do	36 00	1,764 00	
Valin, J. E.	Accountant's Branch Clerk.	do	36 00	1,764 00	
Carter, Wm	Assistant Secretary.	do	36 00	1,764 00	
Nettle, R.	Statistical Clerk, Accts. Br.	1st July, '96, to 31st Jan., '97		991 62	
Shaw, J. F.	Chief Statistical Clerk, Accts. Br	For the year	28 75	1,408 75	
Blatch, F. K.	Clerk of Supplies	do	28 00	1,372 00	
Doyon, J. A.	W. & M. Clerk, Accts. Br.	do	28 00	1,372 00	
Newby, F.	Correspondence Branch Clerk.	do	28 00	1,372 00	
Byrnes, J.	Accountant's Branch Clerk.	do	28 00	1,372 00	
Quain, R.	do do	do	28 00	1,372 00	
McCarthy, J. P.	Correspondence Branch Clerk.	1st July, '96 to 28th Feb., '97	18 64	914 64	
Fowler, George	Stamp Branch Clerk..	For the year	27 50	1,347 50	
Burns, John	W. & M. Clerk, Accts. Br.	do	26 75	1,310 75	
Dunne, J. P.	do do	do	26 50	1,298 50	
Winter, C. F	Clerk.	do	22 75	1,114 75	
do	Private Secretary.	1st to 12th July, 1896		19 35	
LeBel, J. A. W.	Correspondence Branch Clerk.	26th Mar. to 30th June, '97	10 25	282 49	
Clément, A.	Clerk.	26th April to 30th June, '97	6 96	191 64	
do	Private Secretary	14th July, '96 to 30th June, '97		542 92	
Brunel, George	Statistical Clerk, Accts. Br.	For the year	20 00	980 00	
McCullough, A.	Correspondence Branch Clerk.	do	11 26	606 24	
Halliday, W. A.	Accountant's Branch Clerk.	do	15 75	509 25	
Potvin, Napoléon	Messenger.	do	12 45	402 55	
Yetts, Robert.	do	do	9 90	320 10	
	Total Salaries		733 46		41,531 61
	Contingencies.				
Hagerty, Miss Bertha	Extra clerk for the year			400 00	
Hughes, P. A.	do do			400 00	
Lawless, Miss E. M.	do do			400 00	
Sullivan, Miss M.	Extra services from 1st Nov., 1896, to 28th Feb., 1897, at $400			133 32	
Clément, Alex.	Private Secretary, services from 14th July, 1896, to 30th Sept., 1896			479 00	
Hon. Sir Henri Joly de Lotbinière	Travelling expenses			30 35	
Miall, Edward	do			101 65	
Clément, Alex	do			277 27	
Postmaster, Ottawa.	Postage for the year			26 41	
G. N. W. Tel. Co.	Telegraph account for the year			284 53	

APPENDIX B—*Continued.*

No. 6.—DETAILS of Departmental Expenditure, 1896-97—*Continued.*

Names.	Service..	Amounts Paid.	Totals.
	Contingencies—Continued.	$ cts.	$ cts.
C. P. Ry. Co.'s Telegraph	Telegraph account for the year	436 82	
Bell Telephone Co	Telephone account for the year	92 50	
The Queen's Printer	Books	18 50	
do	Parliamentary publications	104 80	
do	Printing	913 92	
do	Stationery	1,560 71	
Le Monde, Montreal	Subscription, 2 copies	6 00	
The Planet, Chatham, Ont	do	1 00	
Electrical World, New York	do	3 00	
Dominion Oddfellow, Toronto	do	1 50	
North Sydney Herald, C.B	do 2 years	4 00	
Review, Windsor	do 3 years	4 50	
Sentinel, Toronto	do 1½ years	1 85	
Times, Moncton, N.B	do	4 00	
Gazette, Montreal	do 3 copies	36 00	
Scientific American and Supplement, New York	do from 1st Dec., '96, to 31st Dec., '97	7 60	
The Western World, Toronto	do	1 67	
Evangelical Churchman, Toronto	do	1 00	
The Courier, Brantford	do	3 50	
The Post, Orangeville	do	1 50	
Le Cultivateur, Montreal	do	1 00	
L'Electeur, Quebec	do	3 00	
L'Union Liberale, Quebec	do	1 37	
Acton Free Press, Acton	do	1 00	
Welland Telegraph, Welland	do 3 years	3 00	
Daily Review, Peterborough	do	2 00	
The Journal, St. Thomas	do	2 00	
Oxford Tribune, Ingersoll	do	4 50	
The Thorold Post, Thorold	do	1 00	
The Brockville Times, Brockville	do	4 00	
The Star, Montreal	do	6 00	
The Week, Toronto	do	3 00	
Le Semaine Commerciale, Quebec	do	2 67	
The Daily Sun, St. John, N.B	do	5 00	
The Daily Examiner, Charlottetown, P.E.I	do	4 00	
Le Moniteur Acadien, Shediac, N.B	do 2 years	3 00	
The Inland Printer, Chicago, Ill	do	2 20	
Liverpool Times, Liverpool, N.S	do	1 50	
The Advocate, Exeter, Ont	do	1 50	
The Courier, Bathurst	do	1 00	
The Pembroke Standard, Pembroke	do 9 years	9 00	
Le Spectateur, Hull	do 3 do	6 00	
The Daily Citizen, Ottawa	do 4 copies	30 00	
The Tribune, Winnipeg	do	8 00	
Daily Mail and Empire, Toronto	do	11 60	
The Commercial and Financial Chronicle, New York	do	10 00	
The Glengarian, Alexandria	do 5 years	5 00	
The Fredericton Farmer, N.B	do	1 40	
The Free Press, Ottawa	do 4 copies	20 00	
The Evening Journal, Ottawa	do 4 do	20 00	
The Canadian Gazette, London, Eng	do	4 38	
The Shareholder, Montreal	do	2 00	
The Times, Victoria	do	9 16	

APPENDIX B—*Continued.*

No. 6.—DETAILS of Departmental Expenditure, 1896-97—*Continued.*

Names.	Service.	Amounts paid.	Totals.
	Contingencies— Continued-	$ cts.	$ cts.
The Times, Hamilton	Subscription	3 88	
The Times, Almonte	do	1 50	
The Argus, Lunenburg	do	1 00	
Le Quotidien, Lévis	do	2 00	
The Gazette, Sherbrooke	do	1 00	
The Canadian, Sarnia	do	1 00	
Le Prix Courant, Montreal	do	1 50	
La Gazette de Nicolet, Sorel	do	1 00	
Le Progres, Windsor	do from 1st January, 1888 to 31st December, 1896	15 00	
Courrier du Canada, Quebec	Subscription	3 00	
The Globe, Toronto	do	6 00	
L'Echo de Montmagny, Montmagny	do	1 35	
The World, Vancouver	do	4 00	
The Casket, Antigonish	do	1 90	
The Digby Courier, Digby, N.S.	do 5 years	5 00	
Le Ralliement, Clarence Creek	do	1 12	
Aylmer Gazette, Aylmer	do	1 50	
The Leader, Regina, N.W.T	do	2 00	
The News, St. Johns, Que	do from 1st January, 1888 to 31st December, 1896	18 00	
Courrier de St. Hyacinthe, Que.	Subscription	3 00	
Business, New York	do	2 00	
The World, Toronto	do	3 00	
Canada Swedish Weekly, Winnipeg	do	1 00	
Bulletin des Recherches Historiques, Lévis, Qué	do	2 00	
The Herald, Montreal	do 4 copies, 2 from 1st January, 1897 and 2 from 22nd February, 1897	11 10	
The Standard, Cornwall	Subscription 5 years	5 00	
La Minerve, Montreal	do	5 00	
Le Clairon, Quebec	do	3 00	
Jones, Yarrell & Poulter, London, Eng	do to Chemical News to 31st December, 1896	5 84	
Whitehead, Mrs. J., Ottawa	Cleaning vault and store rooms	6 50	
Maveity, Mrs. S	Washing towels	60 00	
Graham, K. D	Sundries for department	8 40	
Sproule, W. H	do	8 10	
Payment, T	do	8 00	
Dupont, J. C	do	6 15	
Bryson, Graham & Co	do	4 00	
Montminy & Cie	do	3 00	
McMorran, R. M	do	2 40	
Graves Bros	do	1 25	
Butterworth & Co	do	1 00	
Rogers, E. E	4 copies of Globe Annual	1 00	
Ottawa Electric Railway	Street car tickets	5 00	
Canada Express Co	Express charges	3 40	
Dominion do	do	0 85	
Donovan, John	Cartage	78 25	
Storr, A. M	do	6 70	
Beaupré, H	Cab-hire	2 25	
Landreville, M	do	2 00	
Tassé, W	do	2 00	
Ricard, Wm	do	2 00	
Kelly, Charles	do	1 00	
Reeves, A. D	do	1 00	

APPENDIX B.—*Continued.*

No. 6.—DETAILS of Departmental Expenditure, 1896-97—*Concluded.*

Names.	Service.	Amounts paid.	Totals.
	Contingencies—Concluded.	$ cts.	$ cts.
Turcot, B...	Cab-hire	1 00	
Nichol, D.....	do	2 00	
Potvin, Napoléon.....	Sundry petty expenses.....	13 25	
	Total, Departmental Contingencies.	.....	6,269 37
	Authorized disbursements (less superannuation).....	.....	47,800 98
	ADD—Balance due 30th June, 1897.	.....	16 66
			47,817 64
	LESS—Balance due 1st July, 1894...	.....	16 66
	Actual disbursements agreeing with Statement No. 17, page 34.....	....	47,800 98

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B.— *Continued.*

No. 7.—DETAILS of Weights and Measures Expenditure for the Year ended 30th June, 1897.

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Belleville.	$ cts.	$ cts.	$ cts.
Johnson, W.	Salary as Inspector for the year	24 00	1,176 00	
Slattery, T.	do Mechanical Inspector for the year	13 96	686 04	
Irwin, S.	do Assistant do do	13 96	686 04	
Errett, R. W.	do do do do	.....	199 92	
Whittaker, W.	do do do from 1st to 30th June	2 00	98 00	
	Salaries	53 92	2,846 00	
	Contingencies	.....	1,013 53	
				3,859 53
	Hamilton.			
Freed, A. T.	Salary as Inspector for the year	.....	1,399 92	
McDonald, J.	do Assistant Inspector for the year	16 04	783 96	
Marantette, A.	do do do	16 04	783 96	
Fitzgerald, E. W.	do do do	10 00	740 00	
Laidman, R. H	do do do	9 28	690 68	
Wheatly, A. E.	do do do	8 64	641 28	
	Salaries	60 00	5,039 80	
	Contingencies	.....	1,351 02	
				6,390 82
	Kingston.			
Macdonald, J. A.	Salary as Inspector from 1st July to 30th April	16 00	984 00	
Whittaker, W.	do Assistant Inspector from 1st July to 30th April	10 00	490 00	
	Salaries	26 00	1,474 00	
	Contingencies	.....	934 77	
				2,408 77
	London.			
Egan, J.	Salary as Inspector from 1st July to 30th April	20 00	980 00	
Coughlin, D.	do Mechanical Inspector from 1st July to 30th June	10 64	655 96	
Thomas, J. S	do Assistant Inspector from 1st July to 30th April	10 64	655 96	
	Salaries	41 28	2,291 92	
	Contingencies	.....	573 75	
				2,865 67
	Orillia.			
Bolster, G. I.	Salary as Inspector from 1st July to 30th April	16 60	816 70	
Elliott, T. H.	do Mechanical Inspector from 1st July to 30th April (Insurance, $34.80)	10 00	371 80	
	Salaries	26 60	1,188 50	
	Contingencies	.....	862 62	
				2,051 12
	Ottawa.			
Code, A.	Salary as Inspector from 1st July to 30th April	21 60	1,061 70	
McDonald, J. A.	do do 1st May to 30th June	.....	200 00	
Cosgrove, J.	do Assistant Inspector from 1st July to 10th November	4 98	245 83	

APPENDIX B.—No. 7.—Details of Weights and Measures Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Ottawa—Concluded.	$ cts.	$ cts.	$ cts.
Gorman, N.	Salary as Assistant Inspector from 1st July to 31st December	6 96	343 02	
Elliott, T. H.	do Mechanical Inspector from 1st May to 30th June (Insurance, $6.96)	.....	76 36	
Winsor, J.	do Assistant Inspector from 30th March to 30th June	.....	127 64	
MacFarlane, J., sr.	d. Assistant Inspector for the year	7 04	552 96	
	Salaries.....(Insurance, $6.96)	40 58	2,607 51	
	Contingencies	.....	783 31	
				3,390 82
	Toronto.			
Piper, H.	Salary as Inspector for the year	25 96	1,274 04	
Milligan, R. J.	do Assistant Inspector for the year	10 00	740 00	
Wright, R. J.	do do do	15 00	735 00	
Todd, T.	do do do	8 00	592 00	
Murdoch, J.	do do 26th April to 30th June	.....	90 26	
	Salaries	58 96	3,431 30	
	Contingencies	.....	797 88	
				4,229 18
	Windsor.			
Hayward, W. J.	Salary as Inspector for the year	24 00	1,176 00	
Hughes, R. A.	do Assistant Inspector for the year	8 64	641 28	
Coughlin, D.	do Mechanical Inspector, 1st May to 30th June	.....	133 32	
Thomas, J. S.	do Assistant Inspector, 1st May to 30th June	.....	133 32	
	Salaries	32 64	2,083 92	
	Contingencies	.....	512 24	
				2,596 16
	Montreal.			
Chalus, J. O.	Salary as Inspector for the year	31 96	1,568 04	
Daoust, J. A.	do Assistant Inspector for the year	16 04	783 96	
Dorion, G. T.	do do 1st July to 30th April	13 30	653 30	
Gervais, S.	do do for the year	16 04	783 96	
Richard, J. U.	do do 1st July to 28th Feb.	9 28	457 36	
Baker, J. S.	do do for the year	9 28	690 68	
Hébert, J. A. P.	do do do	10 62	789 31	
Tomlinson, W. M.	do do do	8 00	592 00	
Fournier, L. A.	do do do	10 00	489 92	
Dessert, V.	do do 1st Mar. to 30th June	.....	200 00	
	Salaries	124 52	7,008 53	
	Contingencies	.....	1,161 47	
				8,170 00
	Quebec.			
Bourassa, P. E.	Salary as Inspector from 1st July to 31st Oct.	8 00	392 00	
Guay, G. N.	do do from 1st Nov. to 30th June	11 64	655 00	
Kelly, M. J.	do Assistant Inspector for the year. Insurance.....$ 38 28	23 96	737 76	
Pinhey, H.	do Mechanical Inspector for the year	.....	600 00	
Chabot, F. X.	do Assistant Inspector do	12 00	588 00	
Guay, A.	do do do	8 00	592 00	

APPENDIX B.—No. 7.—Details of Weights and Measures Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Total Amounts paid.
	Quebec—Concluded.	$ cts.	$ cts.	$ cts.
Petit, J. B.	Salary as Assistant Inspector for the year	6 32	493 68	
Moreau, A.	do do do	6 00	294 00	
	Salaries	75 92	4,352 44	
	Insurance ...$ 38 28			
	Contingencies		1,067 24	
				5,419 68
	Three Rivers.			
Gravel, A. I.	Salary as Inspector from 10th Feb. to 30th June	1 57	310 50	
Provost, J. J.	do Assistant Inspector for the year	13 96	686 04	
Mongeon, C.	do do from 1st July to 31st Mar.	4 16	370 78	
	Salaries	19 69	1,367 12	
	Contingencies		488 00	
				1,855 12
	Kings.			
Scoville, W. B.	Salary as Inspector from 1st July to 30th April.	13 30	653 30	
Richard, D.	do Assistant Inspector from 1st July to 30th April	10 00	490 00	
	Salaries	23 30	1,143 30	
	Contingencies		184 41	
				1,327 71
	St. John.			
Wilmot, J. B	Salary as Inspector for the year	24 00	1,176 00	
Cowan, E.	do Assistant Inspector for the year	13 96	686 04	
Thériault, L.	do do 1st July to 31st December		300 00	
Richard, D.	do Assistant Inspector, 1st May to 30th June	2 00	98 00	
	Salaries	39 96	2,260 04	
	Contingencies		197 50	
				2,457 54
	Cape Breton.			
Tremaine, L. E	Salary as Inspector, from 1st July to 31st Oct.	5 32	261 32	
	Contingencies		367 59	
				628 91
	Halifax.			
Ryan, J. B.	Salary as Inspector, 1st July to 30th Nov.	8 30	408 35	
Kelly, E.	do Assistant Inspector from 1st July to 30th November	5 00	245 00	
Frame, A.	do Inspector, 18th Nov. to 30th June		619 42	
Waugh, R. J	do Assistant Inspector from 13th Feb. to 30th June	0 99	227 58	
	Salaries	14 29	1,500 35	
	Contingencies		564 96	
				2,065 31
	Pictou.			
McKay, J	Salary as Inspector for the year	18 00	882 00	
Chisholm, J. J.	do Assistant Inspector	8 00	592 00	
	Salaries	26 00	1,474 00	
	Contingencies		162 33	
				1,636 33

APPENDIX B.—No. 7.—Details of Weights and Measures Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deduction for Superannuation.	Amounts paid.	Total Amounts paid.
	Yarmouth.	$ cts.	$ cts.	$ cts.
Allison, C	Salary as Inspector for year	20 00	980 00	
	Contingencies	.....	135 95	
				1,115 95
	Charlottetown.			
Reddin, J	Salary as Inspector, 1st July to 15th May	20 90	1,024 26	
Davy, E	do Acting Inspector from 15th March to 30th June	.....	263 70	
Hughes, H	do Assistant Inspector for the year	9 00	591 00	
	Salaries	29 90	1,878 96	
	Contingencies	.....	124 21	
				2,003 17
	Winnipeg.			
Huggard, R. T	Salary as Inspector from 1st July to 30th April	20 00	980 00	
Magness, R	do do 1st May to 30th June	.....	183 32	
Costello, J. W	do Assistant Inspector for the year	13 96	686 04	
Ross, H. E	do do 1st July to 31st March	8 00	442 00	
McDonald, A. W	do do for the year	14 00	586 00	
Looby, J	do do 1st July to 31st March	4 16	370 78	
Girdlestone, R.J.M	do do for the year	4 04	195 96	
	Salaries	64 16	3,444 10	
	Contingencies	.....	2,109 22	
				5,553 32
	Victoria.			
Findley, H	Salary as Inspector for the year	10 64	789 28	
Leighton, W. K	do Assistant Inspector for the year	6 38	314 38	
	Salaries	17 02	1,103 66	
	Contingencies	.....	704 15	
				1,807 81
	Inspectors.			
Barrett, J. K	Contingencies	.....	.....	93 25
	General.			
Magness, R	Salary as Inspector of Scale Factories from 1st July to 30th April	12 00	738 00	
	Contingencies	.....	141 44	
				879 44
Miall, E	Salary as Commissioner of Standards for the year	16 00	.....	784 00

APPENDIX B—*Continued.*

No. 7.—Details of Weights and Measures Expenditure, 1897—*Concluded.*

To whom paid.	Services.	Amounts paid.	Total Amounts paid.
	General Contingencies.	$ cts.	$ cts.
Burgess, Thomas H	Services as mechanical assistant for year ended 30th June, 1897	800 00	
Smith, George	Services cleaning weights from 24th to 31st July, 7 days at $1.25	8 75	
Doyon, J. A	Travelling expenses	330 64	
Birkett, Thomas	Hardware	26 52	
Burrow, Stewart & Milne	Two imperial testing scales and steel punch	100 75	
The Robert Mitchell Co	Twelve setts sheet brass angle pieces	15 00	
Pritchard & Andrews	Steel punches, rollers and refacing daters	2 42	
Oertling, L	Knife edges to portable kit bearers, grain weights, box end beam scales, brass forceps	104 27	
Harris & Campbell	Lumber supplied	68 00	
Ottawa *Times*	Nickelplating 5 setts scales	12 50	
Parr, J. A	Lumber supplied	6 10	
Bailey, George	Repairing locks, &c	9 80	
Graves Bros	Hardware	2 30	
Canada Atlantic Ry. Co	Freight	29 71	
Canadian Pacific Ry Co	do	0 53	
Canadian Express Co	Express charges	18 70	
Dominion Express Co	do	1 60	
Potvin, Nap	Petty expenses	1 25	
	Law Costs.	1,538 84	
Mathers, T. G	Law costs in *re* Regina *vs* Baron	53 33	
	Total, general contingencies		1,592 17
	Grand total		65,181 78
	ADD—Printing	289 70	
	Stationery	453 04	
			742 74
	Authorized disbursements (less superannuation)		65,924 52
	ADD—Balances due to inspector, 1st July, 1896		269 80
			66,194 32
	LESS—Balances due by inspector, 1st July, 1896		1,159 49
	Actual disbursements agreeing with Statement No. 20 (A) page 44		65,034 83

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 8.—DETAILS of Gas Inspection Expenditure for the Year ended 30th June, 1897.

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Totals.
	Barrie.	$ cts.	$ cts.	$ cts.
Shanacy, M.	Salary as Inspector for year	2 00	98 00	
	Contingencies		2 60	
				100 60
	Belleville.			
Johnson, W.	Salary as Inspector for year	5 00	245 00	
	Contingencies		83 80	
				328 80
	Berlin.			
Lynes, K.	Salary as Inspector for year	2 00	98 00	
	Contingencies		12 00	
				110 00
	Brockville.			
Johnston, C. W.	Contingencies			108 29
	Cobourg.			
Bickle, J. W	Salary as Inspector for year	2 00	98 00	
	Contingencies		71 75	
				169 75
	Cornwall.			
Mulhern, M. M.	Salary as Inspector for year	2 00	98 00	
	Contingencies		50 40	
				148 40
	Guelph.			
Broadfoot, S.	Salary as Inspector for year	2 00	98 00	
	Contingencies		12 30	
				110 30
	Hamilton.			
McPhie, D.	Salary as Inspector for year	31 96	1,568 04	
Dennis, W. A.	do Assistant Inspector for year	1 28	98 68	
	Salaries	33 24	1,666 72	
	Contingencies		120 70	
				1,787 42
	Kingston.			
Burrows, W.	Salary as Inspector for year	8 00	392 00	
	Contingencies		100 61	
				492 61
	Listowel.			
Hawkins, A. St. Geo	Salary as Inspector for year	1 25	98 75	
	Contingencies		45 00	
				140 75
	London.			
Williams, J.	Salary as Inspector for year	20 00	980 00	
	Contingencies		470 50	
				1,450 50

APPENDIX B—*Continued.*

No. 8.—DETAILS of Gas Expenditure, 1897—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	otals.
	Napanee.	$ cts.	$ cts.	$ cts.
Elliott, G. M	Salary as Inspector from 1st July to 30th Nov.	0 80	40 85	
	Contingencies.....	.....	44 92	
				85 77
	Ottawa.			
Roche, H. G.	Salary as Inspector for year.....	12 00	888 00	
	Contingencies.....	.....	393 70	
				1,281 70
	Owen Sound.			
Graham, W. J.....	Salary as Inspector for year.....	4 00	196 00	
	Contingencies.....	.....	125 00	
				321 00
	Peterborough.			
Cahill, T	Salary as Inspector for year.....	4 00	196 00	
	Contingencies.....	.....	5 50	
				201 50
	Sarnia.			
Hicks, W. H	Contingencies.....	.....	.....	22 00
	Stratford.			
Rennie, G.	Salary as Inspector for year.....	4 00	196 00	
	Contingencies.....	.....	12 50	
				208 50
	Toronto.			
Johnstone, J. K...	Salary as Inspector for year.....	28 04	1,371 96	
Pape, Jas	do Assistant Inspector for year.....	.....	799 92	
	Salaries	28 04	2,171 88	
	Contingencies.....	.....	71 91	
				2,243 79
	Montreal.			
Aubin, A.....	Salary as Inspector for year.....	18 64	1,381 28	
O'Flaherty, M. J...	do Assistant Inspector for year	18 64	781 28	
	Salaries	37 28	2,162 56	
	Contingencies.....	.....	410 24	
				2,572 80
	Quebec.			
LeVasseur, N.....	Salary as Inspector for year	19 96	980 04	
Moreau, J. A.....	do Assistant Inspector for year.....	6 00	294 00	
	Salaries	25 96	1,274 04	
	Contingencies.....	.....	152 75	
				1,426 79
	Sherbrooke.			
Simpson, A. F.....	Salary as Inspector for year.	2 00	.....	98 00
	Fredericton.			
Purdie, S. A.....	Salary as Inspector for year.	2 50	197 50	
	Contingencies.....	.....	1 50	
				199 00

APPENDIX B—*Continued.*

No. 8.—Details of Gas Inspection Expenditure, 1896-97—*Continued.*

To whom paid.	Service.	Deductions for Superannuation.	Amounts paid.	Totals.
	Moncton.	$ cts.	$ cts.	$ cts.
Lawlor, R. A.	Salary as Inspector from 1st July to	4 00	245 00	
	Contingencies		48 29	
				293 29
	St. John.			
Rowan, A.	Salary as Inspector for year	20 00	980 00	
	Contingencies		48 11	
				1,028 11
	Halifax.			
Miller, A.	Salary as Inspector for year	24 00	1,176 00	
Munro, H. D.	do Assistant Inspector for year	1 96	98 04	
	Salaries	25 96	1,274 04	
	Contingencies		641 35	
				1,915 39
	Charlottetown.			
Brace, R. K.	Salary as Inspector for year		199 92	
	Contingencies		44 55	
				244 47
	Winnipeg.			
Huggard, R. T.	Salary as Inspector from 1st July to 30th April.	3 30	163 30	
	Contingencies		130 25	
				293 55
	Nanaimo.			
Good, H. L.	Salary as Inspector for year	1 28		98 68
	New Westminster.			
Wolfenden, W.	Salary as Inspector for year	2 00		98 00
	Vancouver.			
Miller, J. E.	Salary as Inspector for year	2 00	98 00	
	Contingencies		91 20	
				189 20
	Victoria.			
Jones, Richard.	Salary as Inspector for year	4 00	196 00	
	Contingencies		300 00	
				496 00
	General.			
McPhee, D.	Travelling and other expenses in connection with equipment of various offices			51 50
Higman, O.	Travelling expenses as electrical engineer			177 43

APPENDIX B.—*Continued.*

No. 8.—DETAILS of Gas Inspection Expenditure, 1897—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
	General Contingencies.—Concluded.	$ cts.	$ cts.
The Canadian Rubber Co.	Rubber tubing and wire	48 50	
Harris & Campbell	Work done and materials supplied	66 25	
Butterworth & Co.	Hardware supplied	11 75	
Pritchard & Andrews	Repairing daters and meter seal	2 65	
Graves Bros.	Hardware	0 50	
	Total general contingencies		129 65
	Grand total		18,626 54
	ADD—Printing	158 14	
	Stationery	79 76	
	Lithographing	20 00	
			257 90
	Authorized disbursements (less superannuation):		18,884 44
	ADD—Balances due by inspectors, 30th June, '97		212 88
			19,097 32
	LESS—Balances due by inspectors, 1st July, '96	212 88	
	do do 30th June, '97	7 05	
			219 93
	Actual disbursements agreeing with Statement No. 22, page 49		18,877 39

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B.—*Continued.*

No. 9.—Details of Electric Light Inspection, Expenditure, for the year ended 30th June, 1897.

To whom paid.	Service.	Amounts paid.	Totals.
	Belleville.	$ cts.	$ cts.
Johnson, Wm.	Contingencies		110 58
	Hamilton.		
McPhie, D.	Contingencies		50 15
	London.		
Williams, J.	Contingencies		35 28
	Ottawa.		
Roche, H. G.	Contingencies		19 47
	Toronto.		
Johnstone, J. K.	Contingencies		103 00
	Montreal.		
Aubin, A.	Contingencies		1 10
	Quebec.		
LeVasseur, N.	Contingencies		4 01
	St. John, N.B.		
Rowan, A.	Contingencies		13 09
	Halifax.		
Miller, A.	Contingencies		82 20
	Victoria.		
Jones, R.	Contingencies		81 00
	Chief Electrical Engineer.		
Higman, O.	Salary for the year	1,830 06	
	Contingencies	664 27	
			2,494 33
	General Contingencies.		
Higman, O., jr.	Services from May 1st to May 25th, 1897, and June 1st to June 22nd, 1897,—39 days at $2.50 per diem	97 50	
Aitkins, C.	24 days' work wiring and attaching electrical standards	60 00	

APPENDIX B.—*Continued.*

No. 9.—Details of Electric Light Inspection Expenditure.—*Concluded.*

To whom paid.	Service.	Amounts paid.	Totals.
	General Contingencies.	$ cts.	$ cts.
Ahearn & Soper	Instruments and fittings supplied	4,934 21	
Harris & Campbell	Work done and materials supplied	90 55	
Queen & Co.	Repairing electrical apparatus, &c	24 65	
Birkett, Thos	Hardware	0 15	
Eimer & Amend	1 spark induction coil and 2 Crooks' tubes, &c	124 75	
Weston Electrical Instrument Co.	Electrical apparatus supplied, &c	93 90	
Whitney Electrical Instrument Co	4 ammeters, electric apparatus, and repairs	192 65	
The Packard Electric Co	2 Crooks' tubes	14 50	
The Canadian General Electric Co	1 watt meter, 500 feet wire, &c	48 80	
Ottawa Electric Co.	22 months testing current for laboratory	27 94	
Borbridge, S. & H.	1 leather case	15 00	
Shutt, F. T.	1 Crooks' tube	6 50	
White, James	1 Kelvin Deka balance and 1 resistance for balance	179 46	
Bailey, Geo.	Repairing locks, keys, &c	9 70	
Topley, Wm. J	Plates and plate holders, &c	15 35	
Graves Bros.	Hardware	7 00	
Lyman, Sons & Co.	Goods supplied	20 61	
	Total general contingencies		5,963 22
	Grand total		8,957 43
	Add—Printing	22 66	
	Stationery	41 62	
			64 28
			9,021 71
	Less—Balance due to Chief Electrical Engineer, 30th June, 1897		23 00
	Actual disbursements agreeing with Statement No. 24, page 51		8,998 71

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX B—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department on Salary, during the Year ended 30th June, 1897.

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Adams, J. S.		1						
Alexander, Thos.		1						
Allan, G. A.		1						
Allison, Chas.				1				
Amor, Wm.		1						
Armstrong, Walter		1						
Atherton, R.		1						
Aubin, A.					1	1		
Babington, F. W.								1
Baby, Jos.		1						
Baby, W. A. D.		1						
Baker, J. S.				1				
Barber, J. S.		1						
Barrett, J. K.		1						
Battle, M.		1						
Bayard, Gilbert A.		1						
Beauchamp, J. P.		1						
Belair, A.		1						
Bell, James E.		1						
Bellerive, Geo.			1					
Belyea, T. H.		1						
Bennett, Jas.		1						
Bernier, C. E.		1						
Bickle, J. W.		1			1			
Bish, Philip.		1						
Bishop, A.		1						
Blackman, C.		1						
Blair, J. B.		1						
Blatch, F. K.	1							
Blethen, C. W.		1						
Blundell, Richard		1						
Blyth, Alex.				1				
Boivin, C. A.		1						
Boomer, J. B.		1						
Boucher, O. N. E.		1						
Bourassa, Joseph		1						
Bourget, 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						
Brace, R. K.					1			
Brain, A. F.		1						
Brennan, D. J.		1						
Brennan, John		1						
Broadfoot, S.		1			1			
Browne, G. W.		1						
Brunel, G.	1							
Bulmer, Wm.		1						
Burgess, Thos. H.				1				
Burke, T.		1						
Burns, John.	1							
Burrows, Wm.					1			
Byrnes, John.	1							

APPENDIX B—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department, 1896-97—*Continued.*

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Cahill, J. H		1						
Cahill, J. W.		1						
Cahill, T.		1			1			
Cameron, D. M.		1						
Campeau, F. R. E.	1							
Carroll, D.		1						
Carter, William	1							
Caven, A.		1						
Caven, W.		1						
Chabot, F. X.				1				
Chalus, J. O.				1				
Chartier, Etienne		1						
Chisholm, J. J.				1				
Chisholm, W. Noble		1						
Christie, W. J.		1						
Clark, A. F.		1						
Clark, James Alfred		1						
Codd, Herbert J. S.		1						
Code, Abraham, jr.		1						1
Colclough, J. W.		1						
Coleman, Charles		1						
Coleman, J. J.		1						
Coles, F. H.		1						
Conway, B. J.		1						
Cook, W. R.		1						
Costello, J. W.				1				
Costigan, H. A.		1						
Costigan, J. J.		1						1
Coughlin, D.				1				
Coulter, Alex.		1						
Courtney, J. J.		1						
Cowan, Edgar				1				
Crawford, W. P.		1						
Crotty, John		1						
Crowe, W.		1						
Curless, C.							1	
Daoust, J. A.				1				
Daveluy, J. P.		1						
Davis, T. G.		1						
Dawson, W.		1						
Dennis, W. A.					1			
Desroches, David		1						
Dibblee, William		1						
Dick, J. W.		1						
Dickson, C. T.		1						
Dixon, H. G. S.		1						
Dingman, N. J.		1						
Dodds, E. W.		1						
Donaghy, William		1						
Doyle, B. J.		1						
Doyle, J. E. H.		1						
Doyon, J. A.	1							
Dowling, Thomas		1						
Dudley, W. H.		1						
Dunne, J. P.	1							
Dumbrille, J.		1						
Dumbrille, R. W.		1						

APPENDIX B—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department, 1896-97—*Continued.*

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Dumouchel, Léandre		1						
Dunlop, C.		1						
Duplessis, C. Z.		1						
Dustan, W. M		1						
Earle, R. H		1						
Egener, A.		1						
Elliott, T. H				1				
Errett, R. W				1				
Esmonde, J. R.		1						
Evans, G. T.		1						
Fahey, Ed		1						
Fahey, Owen		1						
Falconer, James E.		1						
Ferguson, J.		1						
Ferguson, John C		1						1
Findley, Hugh				1				
Fitzgerald, E. W				1				
Fitzpatrick, W. J		1						
Flynn, D. J		1						
Forest, E. R.		1						
Fortier, J. J. O.		1						
Foster, Henry		1						
Fournier, L. A				1				
Fowler, George	1							
Fox, J. D.		1						
Fox, Thomas		1						
Fraser, G. J.		1						
Fraser, P.		1						
Freed, A. T.				1				
Gallagher, F			1					
Gatien, F.		1						
Geldart, O. A.		1						
George, John		1						
Gerald, C.		1						
Gerald, W. H.		1						
Geraid, W. J	1	1						
Gervais, Samuel				1				
Gill, Wm		1						
Girard, Iréné		1						
Girdlestone, R. J. M.		1		1				
Good, H. L.					1			
Goodman, A. W.		1						
Gorman, Arthur M		1						
Gosnell, T. S		1						
Gow, James		1						
Gow, J. E.		1						
Graham, W. J		1			1			
Graham, W. T.		1						
Grant, H. H		1						
Grimason, Thomas.		1						
Guay, Alphonse				1				
Hagan, James		1						
Hagarty, P.		1						
Hall, C. R.	1							
Hall, J. J		1						
Halliday, W. A.	1							
Hamilton, W, L.		1						

APENDIX B.—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department, 1896–97.—*Continued.*

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Hanley, A		1						
Harney, Thomas			1					
Hart, P. D		1						
Harvey, E. A		1						
Hawkins, A. C		1						
Hawkins, A. St. George					1			
Hawkins, W. L		1						
Hayward, W. J				1				
Hébert, C. D		1						
Hébert, J. A. P				1				
Helliwell, H. N		1						
Henderson, W		1						
Henwood, Geo		1						
Heron, W. L	1							
Hesson, C. A		1						
Hicks, W. H		1						
Higman, O						1		
Hill, A. M		1						
Himsworth, Wm	1							
Hobbs, G. N		1						
Howard, W. W. S		1						
Howden, R		1						
Howie, A		1						
Hubley, H. H		1						
Hughes, Henry				1				
Hughes, R. A				1				
Hurst, Levi B		1						
Iler, B		1						
Ironside, G. A		1						
Irwin, Robert		1						
Irwin, Samuel				1				
Ives, G. C		1						
James, T. C		1						
Jamieson, R. C		1						
Jamieson, S. B		1						
Johnson, J. J		1						
Johnson, Wm				1	1	1		
Johnston, G. E		1						
Johnstone, J. K					1	1		
Jones, Andrew		1						
Jones, E. H		1						
Jones, Richard		1			1			
Jubenville, J. P		1						
Keeler, G. S		1						
Keilty, Thos		1						
Kelly James							1	
Kelly, John T							1	
Kelly, M. J				1				
Kenning, J. H		1						
Keogh, P. M		1						
Kidd, Thomas								1
Kilroy, E. T		1						
King, R. M		1						
Knowlson, J. B		1						
Laidman, Richard H				1				
Lane, T. M		1						
Laporte, Geo		1						

APPENDIX B—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department, 1896-97—*Continued.*

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
LaRivière, A. C		1						
LaRue, George		1						
Lawlor, H		1						
Lecours, H. T		1						
Lee, Edward		1						
LeMoine, Jules		1						
LeMoine, J. M		1						
Lépine, Louis		1						
Leprohon, R. M		1						
Lett, F. P. A		1						
LeVasseur, N					1	1		
Logan, John		1						
Lynes, K		1			1	1		
Lyons, E		1						
Macdonald, A. B		1						
Macdonald, D		1						
Macdonald, J. A				1				
Macfarlane, Thos								1
Macintyre, D		1						
Mackay, G. W		1						
Magness, Robt				1	1	1		
Mainville, C. P		1						
Malo, T		1						
Manning, J		1						
Marcon, F. E		1						
Marentette, Alex				1				
Marion, J. E. E		1						
Marshall, F		1						
Mason, F		1						
Metcalf, W. F		1						
Miall, E	1			1				
Miller, A					1	1		
Miller, J. E		1			1			
Miller, W. F		1						
Millier, Elie		1						
Milligan, R. J				1				
Milliken, E		1						
Mills, A. E		1						
Moore, T		1						
Moreau, J. Alf				1	1			
Morrow, John		1						
Mulhern, M. M		1			1			
Munro, H. D		1			1			
Murray, A. S. E		1						
Murray, David		1						
McAllister, A		1						
McClanaghan, M		1						
McCloskey, J. R		1						
McCoy, Wm		1						
McCuaig, Aug. F		1						
McCullough, A	1							
McDonald, A. W				1				
McDonald, J				1				
McDonald, J. A		1						
McDonald, M. A		1						
McFarlane, C. D		1						
McFarlane, J. sen				1				

APPENDIX B.—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department, 1896-97—*Continued.*

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
McFee, A. C.		1						
McGill, A.								1
McKay, John.				1				
McLenaghan, N.		1						
McPhie, Donald					1	1		
McSween, James		1						
Nash, S. C.		1						
Newby, F.	1							
Nichols, J. T.		1						
Osborne, A. D.		1						
O'Brien, E. C.		1						
O'Brien, J. F.		1						
O'Donnell, J.		1						
O'Donohue, M. J.		1						
O'Flaherty, E. J.		1						
O'Flaherty, M. J.					1			
O'Leary, T. J.		1						
O'Sullivan, D.		1						
Panneton, G. E.		1						
Pape, James.					1	1		
Parent, F.		1						
Parkinson, Edward B.		1						
Parsons, C. H.		1						
Patton, James.			1					
Petit, J. B.				1				
Pinhey, Henry				1				
Pinsonnault, Alfred.		1						
Piper, H.				1				
Plessis (*dit* Bélair), A.		1						
Pole, C. W.		1						
Potvin, Napoléon	1							
Powell, J. B.		1						
Pringle, James.		1						
Provost, J. J.				1				
Purdie, S. A.					1			
Quain, Redmond	1							
Quinn, J. D.		1						
Ramon, Pierre.		1						
Reilly, John S.		1						
Renaud, A. H.		1						
Rennie, George		1			1			
Richard, D.				1				
Richard, J. B. T.		1						
Ridgman, A. H.		1						
Roche, H. G.					1	1		
Rogerson, J. M.		1						
Ross, H. E.		1						
Ross, S. F.		1						
Rouleau, J.		1						
Rowan, A.					1	1		
Rowland, E.		1						
Rowland, F.		1						
Ryan, Wm.		1						
Saucier, X.		1						1
Schram, R. L. H.		1						
Scott, M. W.		1						
Scullion, P. J.		1						

APPENDIX B—*Continued.*

No. 10.—List of Persons employed by the Inland Revenue Department, 1896–97—*Concluded.*

Names.	Services.							
	Inside.	Excise.	Cullers' Office.	Weights and Measures.	Gas.	Electric Light Inspection.	Preventive.	Food Inspection.
Scullion W. J.		1						
Sexton, J.		1			1			
Shanacy, M.		1			1			
Shaw, J. F.	1							
Simpson, A. F.		1			1	1		
Sinon, E. H.		1						
Slattery, R.		1						
Slattery, Thomas				1				
Smyth, B. B.		1						
Spereman, J. J.		1						
Spence, F. H.		1						
Spence, John		1						
Standish, J. G.		1						
Stewart, James		1						
Stratton, W. C.		1						
Taylor, G. W.		1						
Taylor, J. F.		1						
Till, T. M.		1						
Thomas, J. S.				1				
Thomas, Philip		1					1	
Thomas, Robert		1						
Timmons, P.		1						
Todd, Thomas			1					
Toulinson, W. M.				1				
Tompkins, P.		1						
Toupin, F. X. J. A.		1						
Tourchot, A. L. J.								1
Tracey, J. P.		1						
Valin, J. E.	1							
Verner, Francis		1						
Villeneuve, J.		1						
Vincent, J. L.		1						
Wainright, F. G.		1						
Waller, J.		1						
Walsh, Daniel J.		1						
Wardell, R. S. R.		1						
Watkins, J. A.		1						
Watson, James								1
Webbe, C. E. A.		1						
Weir, James		1						
Westman, T.		1						
Weyms, C.		1						
Wheatley, Alfred E.				1				
Whelan, W. F.			1					
Whitteker, William				1				
Williams, J.					1	1		
Wilmot, J. B.				1				
Wilson, David		1						
Winters, C. F.	1							
Wolfenden, William		1			1			
Wood, James A.		1						
Woodward, G. W.		1						
Wright, Robert J.				1				
Yates, J. M.		1						
Yetts, R. P.	1							
Total	23	295	6	50	33	14	4	10

APPENDIX B—*Continued.*

No. 11.—List of Persons employed by the Inland Revenue Department on Salary, during a portion of the Year ended 30th June, 1897.

Name.	Period.	Services.				
		Inside.	Excise.	Weights and Measures.	Gas.	Food Inspection.
Alteman, Peter J	From 26th April, 1897, to 30th June, 1897	....	1	....	....	....
Basinet, Louis	do 2nd Nov., 1896, to 30th June, 1897	....	1	....	....	....
Bolster, G. I	do 1st July, 1896, to 30th April, 1897	....	....	1	....	....
Bourassa, P. E	do 1st July, 1896, to 31st Oct., 1896	....	....	1	....	....
Bradley, Carrie	do 1st July, 1896, to 11th July, 1896	....	1	....	....	....
Clément, Alex	do 14th July, 1896, to 30th June, 1897	1	....	....	....	....
Code, Abraham, sen	do 1st July, 1896, to 30th April, 1897	....	....	1	....	....
Cosgrove, John	do 1st July, 1896, to 10th Nov., 1896	....	....	1	....	....
Davy, Edward	do 15th Mar., 1897, to 30th June, 1897	....	....	1	....	....
Desaulniers, J. E. A	do 23rd Dec., 1896, to 30th June, 1897	....	1	....	....	....
Dessert, Victor	do 1st Mar., 1897, to 30th June, 1897	....	....	1	....	....
Devine, P	do 1st July, 1896, to 31st May, 1897	....	1	....	....	....
Dorion, G. F	do 1st July, 1896, to 30th April, 1897	....	....	1	....	....
Egan, James	do 1st July, 1896, to 30th April, 1897	....	....	1	....	....
Elliott, G. M	do 1st July, 1896, to 30th Nov., 1896	....	....	....	1	....
Fiset, Arthur	do 1st July, 1896, to 30th Sept., 1896	....	1	....	....	....
Frame, Archibald	do 18th Nov., 1896, to 30th June, 1897	....	....	1	....	....
Gorman, M	do 1st July, 1896, to 31st Dec., 1896	....	....	1	....	....
Gravel, A. T	do 10th Feb., 1897, to 30th June, 1897	....	....	1	....	....
Guay, G. N	do 1st Nov., 1896, to 30th June, 1897	....	....	1	....	....
Harris, J. G	do 5th Jan., 1897, to 30th June, 1897	....	1	....	....	....
Harty, M. J	do 1st July, 1896, to 27th Mar., 1897	....	1	....	....	....
Hayhurst, T. H	do 2nd April, 1897, to 30th June, 1897	....	1	....	....	....
Hudon, A	do 1st July, 1896, to 30th April, 1897	....	1	....	....	....
Huggard, R. T	do 1st July, 1896, to 30th April, 1897	....	....	1	1	....
Kelly, E	do 1st July, 1896, to 30th Nov., 1896	....	....	1	....	....
Kelly, Edward	do 1st July, 1896, to 31st Dec., 1896	....	....	....	....	1
Lawlor, R. A	do 1st July, 1896, to 30th April, 1897	....	1	....	1	....
LeBel, J. A. W	do 26th Mar., 1897, to 30th June, 1897	1	....	....	....	....
Leighton, W. K	do 1st July, 1896, to 31st May, 1897	....	1	1	....	....
Looby, John	do 1st July, 1896, to 31st Mar., 1897	....	....	1	....	....
Mongeon, Cyrille	do 1st July, 1896, to 31st Mar., 1897	....	....	1	....	....
Murdoch, James	do 26th April, 1897, to 30th June, 1897	....	....	1	....	....
McCarthy, J. P	do 1st July, 1896, to 28th Feb., 1897	1	....	....	....	....
McKimm, U. H	do 1st July, 1896, to 31st May, 1897	....	1	....	....	....
McPherson, A. F	do 1st July, 1896. to 31st Jan., 1897	....	1	....	....	....
Nettle, Richard	do 1st July, 1896, to 31st Jan., 1897	1	....	....	....	....
O'Meara, F. M	do 7th May, 1897, to 30th June, 1897	....	1	....	....	....
Orr, Henry N	do 7th May, 1897, to 30th June, 1897	....	1	....	....	....
Perkins, L. A	do 1st July, 1896, to 31st Jan., 1897	....	1	....	....	....
Reddin, James	do 1st July, 1896, to 15th May, 1897	....	....	1	....	....
Richard, J. U	do 1st July, 1896, to 28th Feb., 1897	....	....	1	....	....
Ross, H. E	do 1st July, 1896, to 31st Mar., 1897	....	....	1	....	....
Rowan, W. E	do 26th April, 1897, to 30th June, 1897	....	1	....	....	....
Ryan, J. B	do 1st July, 1896, to 30th Nov., 1896	....	....	1	....	....
Scovil, W. B	do 1st July, 1896, to 30th April, 1897	....	....	1	....	....
St. Michel, F. X	do 26th April, 1897, to 30th June, 1897	....	1	....	....	....
Thériault, L	do 1st July, 1896 to 31st Dec., 1896	....	....	1	....	....
Tremaine, L. E	dé 1st July, 1896, to 31st Oct., 1896	....	....	1	....	....
Verner, Thomas H	do 7th May, 1897, to 30th June, 1897	....	1	1	....	1
Waugh, R. J	do 13th Feb., 1897, to 30th June, 1897	....	....	....	....	....
Winsor, John	do 30th Mar., 1897, to 30th June, 1897	....	....	1	....	....
	Totals.	4	20	27	3	2

APPENDIX B—*Concluded.*

No. 11.—List of persons employed by the Inland Revenue Department on salary, during a portion of the year ended 30th June, 1897—*Concluded.*

RECAPITULATION.

Employed during the year, as per Statement No. 10.					435
do	a portion of the year, as per Statement No. 11				56
Total					491
Deduct employed in the Inside and Excise Service				1	
do	do		Weights and Measures Office	1	
do	do	Excise and	Weights and Measures Service	2	
do	do	do	Gas Service	15	
do	do	do	Preventive Service	1	
do	do	do	Food Inspection Service	4	
do	do	do	Electric Light Inspection Service	2	
do	do	Weights and Measures and	Gas Service	4	
do	do	do	Electric Light Inspection Service	2	
do	do	do	Food Inspection Service	1	
do	do	Gas Service and	Electric Light Inspection Service	9	
					42
Net Total					449

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

INDEX.

REPORT, RETURNS AND STATISTICS

OF THE

INLAND REVENUES

OF THE

DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED 30TH JUNE

1897

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 QUEEN'S MOST EXCELLENT MAJESTY
1897

[No. 7a—1898.]

REPORT

OF THE

COMMISSIONER 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 30th June, 1897.

1. The total revenue collected during the year for the inspection of weights and measures was $36,795.69 as against $37,132.64 collected during the year ended 30th June, 1896.

2. The total expenditure was $65,942.93, as against $69,896.63 expended during the year ended 30th June, 1896.

This reduction of nearly $4,000 is in part due to the amalgamation of certain inspection divisions, which was recommended by the undersigned in 1889, but up to the spring of 1896 was not carried out. The changes were as follows :—

The Inspection Division of King's County, N.B., has been abolished and has been amalgamated with the Division of St. John.

The Division of London, Ontario, has in the same manner been merged in the Division of Windsor.

The Divisions of Kingston and Belleville, Ontario, have been thrown into one, and that of Orillia added to the Division of Toronto. These changes and others in contemplation reduce the pay-list of this branch of the service by several thousand dollars, and it is confidently expected that the deficit accruing in respect of the inspection of weights and measures, gas and electric lighting will after the current year be reduced to about $20,000 instead of some $36,000 in 1896 and $40,000 in 1890.

3. Appendix "A" gives a summary statement of the receipts and expenditure 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	64,589	64,441	148	0·22
Measures of capacity, Dominion	81,359	81,200	159	0·19
Lineal measures	4,510	4,455	55	1·21
Balances, equal arms	11,626	11,528	198	1·70
do steelyards	3,780	3,709	71	1·87
do platform scales	23,015	22,362	653	2·83
Irregular weights	822	821	1	.....
do measures	228	228	.....	.....

Inspection of Gas.

5 The total revenue collected during the fiscal year ended 30th June, 1897, for the inspection of gas and gas-meters, was $17,271.75, as compared with $17,824,00 collected during the year ended 30th June, 1896.

6. The total expenses were $19,139.00, as against $21,335.51 expended during the year ended 30th June, 1896.

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

8. A statement of the illuminating power and purity of gas inspection 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	.....	Stratford	12	.....
Belleville	43	.....	St. Catharines	11	.....
Berlin	12	.....	St. Thomas	11	.....
Brantford	12	.....	Toronto	105	.....
Brockville	12	.....	Windsor	10	1
Chatham	10	.....	Woodstock	11	.....
Cobourg	11	.....	Montreal	107	.....
Cornwall	12	.....	Quebec	12	.....
Dundas	12	.....	Sherbrooke	12	2
Galt	12	.....	Fredericton	12	2
Guelph	12	.....	Moncton	4	.....
Hamilton	12	.....	St. John, N.B,	86	26
Ingersoll	11	.....	Halifax	19	.....
Kingston	37	.....	Pictou	10	.....
Listowel	12	.....	Yarmouth	9	.....
London	35	.....	Charlottetown	42	.....
Napanee	3	.....	Winnipeg	12	.....
Ottawa	24	.....	Nanaimo	12	.....
Owen Sound	12	.....	New Westminster	12	.....
Peterborough	12	.....	Vancouver	12	.....
Port Hope	11	.....	Victoria	22	.....
Sarnia	11	.....			

TESTS FOR PURITY.

10. Gas has been tested for sulphur and ammonia at Ottawa, Toronto, Montreal, Quebec, St. John and Halifax.

In Ottawa total number of tests made was :—

For sulphur, 24 tests, never in excess.

For ammonia, 24 tests, never in excess.

For sulphuretted hydrogen, 24 tests, never present.

In Toronto :—

For sulphur, 24 tests, never in excess.

For ammonia, 24 tests, never in excess.

For sulphuretted hydrogen, 105 tests, never present.

In Montreal :—

For sulphur, 28 tests, never in excess.

For ammonia, 26 tests, never in excess.

For sulphuretted hydrogen, 141 tests, never present.

In Quebec :—

For sulphur, 24 tests, never in excess.

For ammonia, 24 tests, never in excess.

For sulphuretted hydrogen, 24 tests, never present.

St. John, N.B. :—

For sulphur, 48 tests, 3 times in excess.

For ammonia, 48 tests, time in excess.

For sulphuretted hydrogen, 86 tests, never present.

In Halifax :—

For sulphur, 20 tests, never in excess.

For ammonia, 20 tests, never in excess.

For sulphuretted hydrogen, 20 tests, never present.

11. In addition to the foregoing, tests for sulphuretted hydrogen have been made at each of the following places where illuminating power has been tested with the following results:—

Places.	Number of Tests.	Present.	Places.	Number of Tests.	Present.
Barrie	12		Port Hope	21	
Belleville	41		Sarnia	11	
Berlin	12		Stratford	12	
Brantford	11		St. Catharines	11	
Brockville	12		St. Thomas	11	
Chatham	10		Windsor	12	
Cobourg	22		Woodstock	11	
Cornwall	12		Sherbrooke	12	
Dundas	12		Fredericton	12	
Galt	12		Moncton	4	
Guelph	22		Pictou	10	
Hamilton	12		Yarmouth	9	
Ingersoll	11		Charlottetown	34	
Kingston	37		Winnipeg	12	
Listowel	12		Nanaimo	12	
London	33		New Westminster	12	
Napanee	10		Vancouver	12	
Owen Sound	12		Victoria	22	
Peterborough	12				

12. The details of gas-meter inspection will be found in Appendix "G." The result, as compared with last year, may be stated as follows :—

	Presented for Verification.	Rejected.
1895–96	13,774	185
1896–97	13,831	89

ELECTRIC LIGHT INSPECTION.

13. Since presenting my last report the provisions of the Electric Light Inspection Act have been put into operation in the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island.

14. Offices for testing electric light meters, &c., have been fitted up with the necessary apparatus at the following places :—

Windsor,	Ont.,	Montreal,	Que.,
London	do	Sherkrooke	do
Hamilton	do	Quebec	do
Toronto	do	St. John, N.B.	
Belleville	do	Halifax, N.S.	
Ottawa	do		

In each place the gas inspector has been appointed electric light inspector, and instructed in the use of the testing apparatus.

15. The total revenue collected during the year for registration and inspection of meters was $6,895.25.

16. The total expenditure was $8,998.71. Of this amount $6,027.50 was expended on general equipment.

17. In appendices "I" and "J" will be found the number of meters, &c., tested, and a list of the companies registering during the year.

E. MIALL,
Commissioner.

OTTAWA, 20th August, 1897.

APPENDIX A.

STATEMENT of Weights and Measures Expenditure and Receipts, for the Year ended 30th June, 1897.

Inspection Divisions.	Inspectors and Assistants.	Expenditure.							Receipts.
		Salaries.	Seizure Expenses.	Special Assistance	Rent.	Travelling Expenses.	Sundries.	Totals.	
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Belleville...	Johnson, Wm. Slattery, T. Irwin, S. Errett, R. W. Whitteker, W.	2,899 92	....	124 98	140 00	503 63	244 92	3,913 45	2,034 80
Hamilton...	Freed, A. T. McDonald, J. Marentette, A. Fitzgerald, E. W. Laidman, R. H. Wheatly, A. E.	5,099 80	.....	458 36	.....	769 70	122 96	6,450 82	7,393 99
Kingston...	Macdonald, J. A. Whitteker, Wm.	1,500 00	.....	416 60	90 00	243 93	184 24	2,434 77	1,239 71
London.....	Egan, J. Coughlin, D. Thomas, J. S.	2,333 20	6 28	.....	60 00	415 13	92 34	2,906 95	2,245 00
Orillia.....	Bolster, Geo. I. Elliott, T. H.	1,249 90	.....	350 00	.....	477 75	34 87	2,112 52	1,442 86
Ottawa.....	Code, A. Macdonald, J. A. Cosgrove, J. Gorman, M. Elliot, T. H. Winsor, J. Macfarlane, J., sr.	2,655 05	.....	.....	208 34	439 69	135 23	3,438 36	1,492 51
Toronto....	Piper, H. Milligan, R. J. Wright, R. J. Todd, T. Murdoch, J.	3,490 26	.....	.....	.....	702 59	95 29	4,288 14	3,992 01
Windsor....	Hayward, W J. Hughes, R. A. Coughlin, D. Thomas, J. S.	2,116 56	.....	.....	15 00	398 79	98 45	2,628 80	1,429 98
	Ontario. ...	21,344 69	6 28	1,349 94	513 34	3,951 21	1,008 35	28,173 81	21,270 86

APPENDIX A—*Continued.*

STATEMENT of Weights and Measures Expenditure and Receipts, &c.—*Continued.*

Inspection Divisions.	Inspectors and Assistants.	Expenditure.							Receipts.
		Salaries.	Seizure Expenses.	Special Assistance	Rent.	Travelling Expenses.	Sundries.	Totals.	
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Montreal.. .	Chalus, J. O.... Daoust, J. A.... Dorion, G. T.... Gervais, S .... Richard, J. U... Baker, J. S..... Hébert, J. A. P. Tomlinson, W.M. Fournier, L. A.. Dessert, V ...	7,133 05	....	.....	.....	871 99	239 48	8,294 52	7,960 28
Quebec.	Bourassa, P. E.. Guay, Geo. N... Kelly, M. J..... Pinhey, H ..... Chabot, F. X.... Guay, A..... .. Petit, J. B..... Moreau, A.....	4,466 64	.....	16 25	100 00	818 98	132 01	5,533 88	2,105 05
Three Rivers	Gravel, A. I ... Provost, J. J. .. Mongeon, C.....	1,386 81	.....	.....	.....	455 41	32 59	1,874 81	775 18
	Quebec	12,986 50	....	16 25	100 00	2,146 38	454 08	15,703 21	10,840 51
King's.....	Scovil, W. B.... Richard, D.	1,166 60	.....	.....	.....	175 26	9 15	1,351 01	314 75
St. John....	Wilmot, J. B... Cowan, E. .... Thériault, L .... Richard, D.....	2,300 00	....	....	.... ..	177 40	20 10	2,497 50	944 92
	New Brunswick	3,466 60	.....	... .	... .	352 66	29 25	3,848 51	1,259 67
Cape Breton	Tremaine, L. E. :	266 64	.....	.....	.....	326 29	41 30	654 23	102 30
Halifax.. ..	Ryan, J. B. .... Kelly, E... .... Frame, A. ... Waugh, R. J....	1,514 64	...	.....	375 00	39 80	150 16	2,079 60	544 75
Pictou.....	McKay, J ..... Chisholm, J. J.	1,500 00	... ..	.....	.....	125 18	37 15	1,662 33	352 80
Yarmouth..	Allison, C.....	1,000 00	....	.....	.....	116 64	19 31	1,135 95	294 12
	Nova Scotia ..	4,281 28	....	.....	375 00	607 91	247 92	5,512 11	1,293 97
Charl'ttet'n, P.E.I....	Reddin, J. ... . Davey, E. .... Hughes, H.....	1,908 86	.....	.. ....	.....	49 61	74 60	2,033 07	192 90

APPENDIX A—*Concluded.*

STATEMENT of Weights and Measures Expenditure and Receipts, &c.—*Concluded.*

Inspection Divisions.	Inspectors and Assistants.	Expenditure. Salaries.	Seizure Expenses.	Special Assistance	Rent.	Travelling Expenses.	Sundries.	Totals.	Receipts.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Winnipeg ..	Huggard, R. T.. Magness, R. .... Costello, J.W... Ross, H. E..... McDonald, A, W. Looby, J..... Girdlestone, R. J. M..... ...	3,508 26	.....	1,078 39	108 00	400 14	522 69	5,617 48	1,500 83
	District Inspector.	.....	.. ..	.....	... .	93 25	.....	93 25	.....
	Manitoba....	3,508 26	..	1,078 39	108 00	493 39	522 69	5,710 73	1,500 83
Victoria, B.C.....	Findley, H..... Leighton, W. K.	1,120 68	.....	.....	300 00	334 85	69 30	1,824 83	436 95

RECAPITULATION.

Ontario	21,344 69	6 28	1,349 94	513 34	3,951 21	1,008 35	28,173 81	21,270 86
Quebec.....	12,986 50	.....	16 25	100 00	2,146 38	454 08	15,703 21	10,840 51
New Brunswick.....	3,466 60	.....	.....	.....	352 66	29 25	3,848 51	1,259 67
Nova Scotia.....	4,281 28	.....	.....	375 00	607 91	247 92	5,512 11	1,293 97
Prince Edward Island	1,908 86	.....	....	.....	49 61	74 60	2,033 07	192 90
Manitoba	3,508 26	....	1,078 39	108 00	493 39	522 69	5,710 73	1,500 83
British Columbia.....	1,120 68	.....	.....	300 00	334 85	69 30	1,824 83	436 95
Inspector of Scale Factories....	750 00	..	.....	. . ....	140 98	0 46	891 44	.....
Commissioner of Standards	800 00	. ...	.....	.....	.....	.....	800 00	.....
General Contingencies.....	.....	....	.....	....	.....	1,592 17	1,592 17	.....
Printing	.....	...	....	.. ....	.....	289 70	289 70	.....
Stationery	.....	.....	.....	.....	.....	453 04	453 04	.....
Grand Totals..	50,166 87	6 28	2,444 58	1,396 34	8,076 99	4,741 56	66,832 62	36,795 69

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX

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

INSPECTION OFFICES.	WEIGHTS.						MEASURES OF CAPACITY.				
	Dominion.			Miscellaneous.			Dominion.			Miscellaneous.	
	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.
Ontario.											
Belleville	2,669	2,669	....	....	....	....	2,021	2,021	....	....	....
Hamilton	12,238	12,222	16	87	87	....	5,756	5,750	6	....	....
Kingston	1,269	1,227	42	8	8	....	5,275	5,187	88	11	11
London	2,090	2,090	....	....	....	....	12,306	12,306	....	....	....
Orillia	2,030	2,012	18	....	....	....	1,432	1,432	....	....	....
Ottawa	2,915	2,870	45	2	2	....	2,211	2,187	24	2	2
Toronto	4,583	4,583	....	249	249	....	13,549	13,549	....	....	....
Windsor	1,958	1,954	4	....	....	....	2,007	2,007	....	....	....
	29,752	29,627	125	346	346	....	44,557	44,439	118	13	13
Quebec.											
Montreal	17,161	17,150	11	29	29	....	20,677	20,670	7	192	192
Quebec	7,854	7,843	11	425	425	....	4,278	4,277	1	....	....
Three Rivers	2,378	2,377	1	3	3	....	2,256	2,225	31	....	....
	27,393	27,370	23	457	457	....	27,211	27,172	39	192	192
New Brunswick.											
King's	670	670	....	2	2	....	800	798	2	....	....
St. John	2,200	2,200	....	....	....	....	3,612	3,612	....	....	....
	2,870	2,870	....	2	2	....	4,412	4,410	2	....	....
Nova Scotia.											
Cape Breton	....	....	....	2	1	1	266	266	....	....	....
Halifax	1,271	1,271	....	....	....	....	1,555	1,555	....	20	20
Pictou	509	509	....	5	5	....	462	462	....	....	....
Yarmouth	547	547	....	12	12	....	529	529	....	3	3
	2,327	2,327	....	19	18	1	2,812	2,812	....	23	23
Prince Edward Island.											
Charlottetown	404	404	....	....	....	....	287	287	....	....	....
Manitoba.											
Winnipeg	1,480	1,480	....	1	1	....	1,970	1,970	....	34	34
British Columbia.											
Victoria	363	363	....	....	....	....	110	110	....	....	....

B.

1897, 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.		
Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.
130	130	.....	431	431	.....	143	143	.....	1,400	1,400	.....
572	544	28	3,159	3,053	106	1,487	1,453	34	5,392	5,092	300
188	188	.....	225	199	26	23	22	1	863	783	80
15	15	.....	369	354	15	209	189	20	1,118	1,083	35
321	321	.....	355	353	2	87	87	.....	1,061	1,059	2
274	274	.....	424	415	9	3	3	.....	1,253	1,228	25
608	608	.....	840	840	.....	406	406	.....	1,933	1,933	.....
41	41	.....	320	318	2	92	92	.....	947	942	5
2,149	2,121	28	6,123	5,963	160	2,450	2,395	55	13,967	13,520	447
1,488	1,477	11	2,702	2,699	3	963	961	2	4,680	4,648	32
221	210	11	1,112	1,101	11	105	101	4	803	778	25
196	191	5	335	331	4	19	18	1	484	482	2
1,905	1,878	27	4,149	4,131	18	1,087	1,080	7	5,967	5,908	59
4	4	.....	133	133	.....	10	10	.....	279	277	2
119	119	.....	356	356	.....	52	52	.....	538	536	2
123	123	.....	489	489	.....	62	62	.....	817	813	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	19	19	.....
29	29	.....	229	229	.....	38	38	.....	352	352	.....
15	15	.....	109	109	.....	14	14	.....	325	325	.....
135	135	.....	102	102	.....	23	23	.....	200	200	.....
179	179	.....	440	440	.....	75	75	.....	896	896	.....
17	17	.....	67	67	.....	13	13	.....	145	145	.....
137	137	.....	287	267	20	69	60	9	932	789	143
.....	.....	.....	71	71	.....	24	24	.....	291	291	.....

APPENDIX

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

RECAPIT

INSPECTION OFFICES BY PROVINCES.	WEIGHTS.						MEASURES OF CAPACITY.				
	Dominion.			Miscellaneous.			Dominion.			Miscellaneous.	
	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.
Ontario	29,752	29,627	125	346	346	....	44,557	44,439	118	13	13
Quebec	27,393	27,370	23	454	454	....	27,211	27,172	39	192	192
New Brunswick	2,870	2,870	....	2	2	...	4,412	4,410	2	....	.....
Nova Scotia	2,327	2,327	....	19	18	1	2,812	2,812	....	23	23
Prince Edward Island	404	404	....	.....	....	....	287	287	....	....	.....
Manitoba	1,480	1,480	....	1	1	....	1,970	1,970	....	.. .	.....
British Columbia	363	363	....	... ..	....	..	110	110	....	....	.....
Grand Totals	64,589	64,441	148	822	821	1	81,359	81,200	159	228	228

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

B—*Concluded.*

1897, 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.		
Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.	Brought for Verification.	Verified.	Rejected.
2,149	2,121	28	6,123	5,963	160	2,450	2,395	55	13,967	13,520	447
1,905	1,878	27	4,149	4,131	18	1,087	1,080	7	5,967	5,908	59
123	123	.....	489	489	.....	62	62	.....	817	813	4
179	179	.....	440	440	.....	75	75	.....	896	896	.....
17	17	.....	67	67	.....	13	13	.....	145	145	.....
137	137	.....	287	267	20	69	60	9	932	789	143
.....	.....	.....	71	71	.....	24	24	.....	291	291	.....
4,510	4,455	55	11,626	11,428	198	3,780	3,709	71	23,015	22,362	653

E. MIALL,
Commissioner.

APPENDIX

RETURN showing the number of Dominion Weights and Lineal Measures of each 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 lbs.	8 ozs.	4 ozs.	2 ozs.
Ontario.														
Belleville	....	....	...	....	5	13	45	166	151	374	431	380	317	270
Hamilton	...	40	..	....	15	6	271	218	2,128	3,352	2,976	798	665	641
Kingston	....	....	..	....	1	4	60	78	146	226	201	145	132	118
London	....	41	....	....	5	1	47	81	244	404	350	209	200	184
Orillia	..	....	....	....	....	2	38	91	213	366	368	235	209	185
Ottawa	...	....	..	....	10	10	108	157	274	496	456	355	306	281
Toronto	....	....	..	....	7	15	121	186	464	913	920	480	425	378
Windsor	....	...	....	....	1	1	46	92	170	371	342	216	202	187
Totals	....	81	....	....	44	52	736	1,069	3,790	6,502	6,044	2,818	2,456	2,244
Quebec.														
Montreal	....	91	1	2	34	46	946	759	1,480	2,625	2,647	2,183	2,142	1,893
Quebec	....	63	15	32	115	135	538	471	509	1,102	1,098	1,049	1,012	867
Three Rivers	....	...	....	2	11	7	185	180	228	382	364	322	314	216
Totals	....	154	16	36	160	188	1,669	1,410	2,217	4,109	4,109	3,554	3,468	2,976
New Brunswick.														
King's	...	....	....	....	....	3	21	36	69	167	136	80	61	44
St. John	....	....	...	....	....	7	93	193	119	488	381	271	222	189
Totals	...	....	....	....	....	10	114	229	188	655	517	351	283	233
Nova Scotia.														
Cape Breton	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Halifax	1	....	....	....	7	7	66	52	91	280	259	182	143	93
Pictou	....	....	....	....	....	5	6	40	33	135	105	51	40	40
Yarmouth	....	....	....	....	....	4	13	30	33	129	110	56	49	48
Totals	1	....	..	....	7	16	85	122	157	544	474	289	232	181
Prince Edward Island.														
Charlottetown	....	..	....	....	....	1	11	9	26	86	72	50	43	43
Manitoba.														
Winnipeg	....	....	....	....	2	5	49	23	237	325	284	120	112	106
British Columbia.														
Victoria	...	....	..	....	..	....	2	1	38	88	68	50	44	37

C.

Denomination presented for Verification in each Inspection Division, during the Fiscal 30th June, 1897.

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.
241	161	83	25	7	....	2,669	....	....	....	....	130	....	....	....	....	....	....	....	130	....
597	408	98	14	9	2	12,238	....	87	....	....	572	....	....	....	....	....	....	....	572	....
90	49	12	5	2	....	1,269	....	8	....	....	188	....	....	....	....	....	....	....	188	11
158	99	46	9	8	4	2,090	....	....	....	....	15	....	....	....	....	....	....	....	15	..
166	100	39	14	4	....	2,030	....	....	....	....	320	1	....	..	....	....	....	....	321	....
248	130	63	15	5	1	2,915	....	2	2	....	272	....	....	....	....	....	....	....	274	2
343	194	81	25	31	..	4,583	....	249	....	....	608	....	....	....	....	....	....	....	608	....
168	113	47	1	1	....	1,958	....	....	....	....	41	....	....	....	....	....	....	....	41	....
2,011	1,254	469	108	67	7	29,752	....	346	2	....	2,146	1	....	....	....	....	....	....	2,149	13
1,452	648	125	39	48	....	17,161	....	29	....	....	1,488	....	....	....	....	....	....	....	1,488	192
634	158	35	11	9	1	7,854	....	425	....	....	221	....	....	....	....	....	....	....	221	....
125	37	4	1	....	....	2,378	....	3	....	....	196	....	....	....	....	....	....	....	196	....
2,211	843	164	51	57	1	27,393	....	457	..	....	1,905	....	..	.	....	....	....	....	1,905	192
38	10	3	2	....	....	670	....	2	....	....	4	....	....	....	....	....	....	....	4	....
151	69	15	2	....	....	2,200	....	....	....	....	119	....	....	....	....	....	....	....	119	....
189	79	18	4	....	..	2,870	....	2	....	....	123	....	....	....	....	....	....	....	123	....
....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....
61	17	9	1	1	1	1,271	....	....	....	....	29	....	....	....	....	....	....	....	29	20
32	14	4	2	1	1	509	....	5	....	....	15	....	....	....	....	....	....	....	15	....
43	21	8	3	....	....	547	....	12	....	....	135	....	....	....	....	....	....	....	135	3
136	52	21	6	2	2	2,327	....	19	....	....	179	....	....	....	....	....	....	....	179	23
40	15	5	1	2	....	404	....	....	....	....	17	....	....	....	....	....	....	....	17	....
99	59	28	13	11	7	1,480	...	1	....	....	137	....	....	....	....	....	....	....	137	34
26	7	2	....	....	....	363	....	....	....	....	....	....	....	....	....	....	....	....	....	....

APPENDIX

RETURN showing the number of Dominion Weights and Lineal Measures of each 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	....	....	....	....	5	13	45	166	151	374	431	380	317	270
Hamilton	....	40	....	....	15	6	271	216	2,128	3,347	2,974	797	664	639
Kingston	....	....	....	....	1	4	53	70	142	218	194	140	130	117
London	....	41	....	....	5	1	47	81	244	404	350	209	200	184
Orillia	....	....	....	....	....	2	38	90	212	364	366	232	207	182
Ottawa	....	....	..	....	10	10	102	150	269	488	449	350	303	278
Toronto	....	....	..	....	7	15	121	186	464	913	920	480	425	378
Windsor	....	....	....	....	1	1	46	92	170	371	342	215	201	186
Totals	....	81	....	...	44	52	723	1,051	3,780	6,479	6,026	2,803	2,447	2,234
Quebec.														
Montreal	....	91	1	2	34	40	946	756	1,480	2,625	2,645	2,181	2,140	1,892
Quebec	...	63	15	32	115	134	538	469	509	1,098	1,096	1,048	1,011	867
Three Rivers	....	....	....	2	11	7	185	180	228	382	364	322	314	216
Totals	...	154	16	36	160	187	1,669	1,405	2,217	4,105	4,105	3,551	3,465	2,975
New Brunswick.														
King's	....	....	....	....	....	3	21	36	69	167	136	80	61	44
St. John	....	....	....	....	....	7	93	193	119	488	381	271	222	189
Totals	...	....	....	....	....	10	114	229	188	655	517	351	283	233
Nova Scotia.														
Cape Breton	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Halifax	1	...	....	....	7	7	66	52	91	280	259	182	143	93
Pictou	....	....	....	....	....	5	6	40	33	135	105	51	40	40
Yarmouth	....	....	....	....	....	4	13	30	33	129	110	56	49	48
Totals	1	...	....	....	7	16	85	122	157	544	474	289	232	181
Prince Edward Island.														
Charlottetown	...	....	....	....	...	1	11	9	26	86	72	50	43	43
Manitoba.														
Winnipeg	....	....	....	....	2	5	49	23	237	325	284	120	112	106
British Columbia.														
Victoria	....	....	....	...	....	....	2	1	38	88	68	50	44	37

Inland Revenues—Weights and Measures, Gas and Electric Light.

C—*Continued.*

Denomination, Inspected and Verified in each Inspection Division, during the Fiscal 30th June, 1897.

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.
241	161	83	25	7	....	2,669	....	....	....	....	130	....	....	....	..	..	..	....	130	....
596	407	97	14	9	2	12,222	....	87	....	....	544	....	....	....	..	..	..	....	544	....
90	49	12	5	2	....	1,227	....	8	....	....	188	....	....	....	..	..	..	....	188	11
158	99	46	9	8	4	2,090	....	....	....	....	15	....	....	....	..	..	..	....	15	....
163	99	39	14	4	....	2,012	....	....	....	..	320	1	....	....	..	..	..	....	321	....
247	130	63	15	5	1	2,870	....	2	2	....	272	....	....	....	..	..	..	....	274	2
343	194	81	25	31	....	4,583	....	249	....	....	608	....	....	....	..	..	..	....	608	....
167	113	47	1	1	....	1,954	....	....	....	....	41	....	....	....	..	..	..	....	41	....
2,005	1,252	468	108	67	7	29,627	....	346	2	....	2,118	1	....	....	..	..	..	....	2,121	13
1,451	648	125	39	48	....	17,150	....	29	....	....	1,477	....	....	....	..	..	..	....	1,477	192
634	153	35	11	9	1	7,843	....	425	....	....	210	..	..	....	..	..	..	....	210	....
125	36	4	1	....	....	2,377	....	3	....	....	191	....	....	....	..	..	..	....	191	....
2,210	842	164	51	57	1	27,370	....	457	....	....	1,878	....	....	....	..	..	..	....	1,878	192
38	10	3	2	....	....	670	....	2	....	....	4	....	....	....	..	..	..	....	4	....
151	69	15	2	....	....	2,200	....	....	....	....	119	....	....	....	..	..	..	....	119	....
189	79	18	4	....	....	2,870	....	2	....	....	123	....	....	....	..	..	..	....	123	....
....	..	....	....	....	....	.....	....	1	....	....	....	....	....	....	..	..	..	....	....	....
61	17	9	1	1	1	1,271	....	....	....	....	29	....	....	....	..	..	..	....	29	20
32	14	4	2	1	1	509	....	5	....	....	15	....	....	....	..	..	..	....	15	....
43	21	8	3	....	....	547	....	12	....	....	135	....	....	....	..	..	..	....	135	3
136	52	21	6	2	2	2,327	....	18	....	..	179	....	....	....	..	..	..	....	179	23
40	15	5	1	2	....	404	....	....	....	....	17	....	....	....	..	..	..	....	17	....
99	59	28	13	11	7	1,480	....	1	....	....	137	....	....	....	..	..	..	....	137	34
26	7	2	....	....	....	363	.. .	....	....	....	....	....	....	....	..	..	..	....	....	....

APPENDIX

RETURN showing the Number of Dominion Weights and Lineal Measures
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.														
Hamilton								2		5	2	1	1	2
Kingston							7	8	4	8	7	5	2	1
Orillia								1	1	2	2	3	2	3
Ottawa							6	7	5	8	7	5	3	3
Windsor												1	1	1
Totals							13	18	10	23	18	15	9	10
Quebec.														
Montreal								3			2	2	2	1
Quebec						1		2		4	2	1	1	
Three Rivers														
Totals						1		5		4	4	3	3	1
Nova Scotia.														
Cape Breton														

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

Inland Revenues—Weights and Measures, Gas and Electric Light.

C—*Concluded.*

of each Denomination, Rejected in each Inspection Division, during the Fiscal 30th June, 1897.

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 ft.	1 yard.	½ yard.	2 feet.	1 foot.	½ foot.	100 feet chains.	66 feet chains.	Tape or Riband.	Total Number.	Miscellaneous Measures.
1	1	1	....	....	....	16	....	....		....	....	28	....	....	....	..	..	..	....	28	....
.....	...	....	....	....	....	42	....	....		....	....	.....	....	....	....	..	..	..	....	....	....
3	1	....	....	....	....	18	....	....		....	....	.....	....	....	....	..	..	..	....	....	....
1	.....	....	....	....	....	45	....	....		....	....	.....	....	....	....	..	..	..	....	....	....
1	....	....	....	....	....	4	....	....		....	....	....	....	....	....	.	..	..	....	.....	....
6	2	1	....	....	....	125	....	....		....	....	28	....	....	....	..	..	..	....	28	....
1	.....	....	....	....	....	11	....	....		....	....	11	....	....	....	..	..	..	....	11	....
.....	.....	....	....	....	....	11	....	....		....	....	11	....	....	....	..	..	..	...	11	....
.....	1	....	....	....	....	1	....	....		....	....	5	....	....	....	..	..	..	....	5	....
1	1	....	....	....	....	23	....	....		....	....	27	....	....	....	..	..	..	....	27	....
.....	..	....	....	....	....	.....	....	1		....	....	.....	..	....	....	..	..	..	....	.....	....

E. MIALL,
Commissioner.

APPENDIX

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

INSPECTION DIVISIONS.	MEASURES OF CAPACITY. Dominion.										
	Bushel.	½ Bushel.	Peck.	Gallon.	½ Gallon.	Quart.	Pint.	½ Pint.	Gill.	½ Gill.	Total Number.
Ontario.											
Belleville	21	55	60	207	391	773	479	34	1	...	2,021
Hamilton	120	98	208	708	992	1,568	1,569	485	7	1	5,756
Kingston	314	1,251	633	1,123	523	781	494	153	2	1	5,275
London	....	157	224	1,421	1,913	4,007	3,270	1,314	....	....	12,306
Orillia	....	12	28	229	409	465	270	19	....	....	1,432
Ottawa	..	44	101	309	443	598	494	188	34	...	2,211
Toronto	24	27	203	1,237	2,400	4,618	4,059	959	22	....	13,549
Windsor	145	18	42	145	179	757	693	28	....	....	2,007
Total	624	1,662	1,499	5,379	7,250	13,567	11,328	3,180	66	2	44,557
Quebec.											
Montreal	....	605	1,069	2,641	3,682	5,012	5,194	2,058	414	2	20,677
Quebec	5	121	152	658	911	948	999	397	86	1	4,278
Three Rivers	1	136	54	299	411	611	462	219	59	4	2,256
Total	6	862	1,275	3,598	5,004	6,571	6,655	2,674	559	7	27,211
New Brunswick.											
King's	....	2	..	160	305	205	112	16	....	....	800
St. John	....	165	235	640	1,035	805	524	181	27	....	3,612
Total	....	167	235	800	1,340	1,010	636	197	27	....	4,412
Nova Scotia.											
Cape Breton	....	..	....	....	2	42	100	48	74	....	266
Halifax	1	65	76	233	243	340	322	208	65	2	1,555
Pictou	...	2	3	77	153	146	78	3	....	....	462
Yarmouth	10	7	12	102	188	121	72	14	3	....	529
Total	11	74	91	412	586	649	572	273	142	2	2,812
Prince Edward Island.											
Charlottetown	1	....	....	10	45	126	101	4	...	....	287
Manitoba.											
Winnipeg	97	10	9	241	387	754	410	59	2	1	1,970
British Columbia.											
Victoria	....	.....	.....	8	6	60	24	12	....	....	110

D.

Weighing Machines of each Denomination presented for Verification, in each Year ended 30th June, 1897.

BALANCES.

With Equal Arms.				Steelyards with Divided Arms.				Weigh Bridges or Platform Scales.						Totals.
5 lbs. and under.	5 lbs. to 50 lbs.	50 lbs. to 100 lbs.	100 lbs. and upwards.	500 lbs. and under.	500 lbs. to 1,000 lbs.	1,000 lbs. to 2,000 lbs.	2,000 lbs. and upwards.	250 lbs. and under.	250 lbs. to 500 lbs.	500 lbs. to 2,000 lbs.	2,000 lbs. to 4,000 lbs.	4,000 lbs. to 6,000 lbs.	6,000 lbs. and upwards.	
117	314	.....	.....	137	2	4	.....	544	110	507	119	37	83	1,974
1,349	1,810	.....	.....	1,461	22	4	.....	3,389	115	1,356	264	86	182	10,038
72	153	.....	.....	23	.....	.....	.....	346	138	296	20	14	49	1,111
97	272	.....	.....	204	3	2	.....	365	29	499	109	28	88	1,696
114	241	.....	.....	85	.....	.....	2	458	66	373	71	39	54	1,503
93	331	...	.....	3	.....	.....	.....	623	124	403	42	32	29	1,680
271	569	.....	.....	399	6	1	.....	730	92	621	246	54	190	3,179
91	229	.....	.....	91	.....	1	.....	369	45	351	70	34	78	1,359
2,204	3,919	.....	.....	2,403	33	12	2	6,824	719	4,406	941	324	753	22,540
711	1,991	...	.....	954	6	...	3	1,729	934	1,569	162	133	153	8,345
124	889	10	89	101	2	1	1	199	261	281	39	15	8	2,020
27	307	1	...	17	.....	.....	2	145	185	137	6	5	6	838
862	3,187	11	89	1,072	8	1	6	2,073	1,380	1,987	207	153	167	11,203
35	98	.....	.....	10	.....	.....	.....	165	57	48	1	4	4	422
75	281	.....	.....	51	.....	1	.....	244	164	85	12	6	27	946
110	379	.....	.....	61	.....	1	.....	409	221	133	13	10	31	1,368
.....	.....	.....	.....	.....	.....	.....	.....	1	1	2	.....	2	13	19
39	190	.....	.....	35	.....	1	2	144	57	120	10	6	15	619
27	80	1	1	14	.....	.....	.....	170	71	52	6	11	15	448
34	63	.....	5	23	.....	.....	.....	112	36	35	3	6	8	325
100	333	1	6	72	.....	1	2	427	165	209	19	25	51	1,411
25	42	.....	.....	13	.....	.....	.....	57	22	53	2	5	6	225
81	206	.....	.....	67	.....	2	.....	389	26	328	78	62	49	1,288
29	42	.....	.....	22	2	.....	.....	154	18	95	10	2	12	386

APPENDIX

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

INSPECTION DIVISIONS.	MEASURES OF CAPACITY. Dominion.										
	Bushel.	½ Bushel.	Peck.	Gallon.	½ Gallon.	Quart.	Pint.	½ Pint.	Gill.	½ Gill.	Total Number.
Ontario.											
Belleville	21	55	60	207	391	773	479	34	1	....	2,021
Hamilton	120	98	208	706	991	1,568	1,567	484	7	1	5,750
Kingston	311	1,223	607	1,100	515	781	494	153	2	1	5,187
London	....	157	224	1,421	1,913	4,007	3,270	1,314	....	....	12,306
Orillia	....	12	28	229	409	465	270	19	....	....	1,432
Ottawa	....	43	99	303	436	592	494	186	34	....	2,187
Toronto	24	27	203	1,237	2,400	4,618	4,059	959	22	....	13,549
Windsor	145	18	42	145	179	757	693	28	....	....	2,007
Total	621	1,633	1,471	5,348	7,234	13,561	11,326	3,177	66	2	44,439
Quebec.											
Montreal	....	603	1,068	2,641	3,682	5,010	5,193	2,057	414	2	20,670
Quebec	5	121	152	657	911	948	999	397	86	1	4,277
Three Rivers	....	125	48	295	411	606	459	218	59	4	2,225
Total	5	849	1,268	3,593	5,004	6,564	6,651	2,672	559	7	27,172
New Brunswick.											
Kings	....	2	..	158	305	205	112	16	....	....	798
St. John	....	165	235	640	1,035	805	524	181	27	....	3,612
Total	....	167	235	798	1,340	1,010	636	197	27	....	4,410
Nova Scotia.											
Cape Breton	....	....	.. ..	....	2	42	100	48	74	....	266
Halifax	1	65	76	233	243	240	322	208	65	2	1,555
Pictou	....	2	3	77	153	146	78	3	....	....	462
Yarmouth	10	7	12	102	188	121	72	14	3	....	529
Total	11	74	91	412	586	649	572	273	142	2	2,812
Prince Edward Island.											
Charlottetown	1	....	....	10	45	126	101	4	....	....	287
Manitoba.											
Winnipeg	97	10	9	241	387	754	410	59	2	1	1,970
British Columbia.											
Victoria	....	....	....	8	6	60	24	12	....	....	110

D—*Continued.*

Weighing Machines of each Denomination Inspected and Verified, in each Year ended 30th June, 1897.

BALANCES.

With Equal Arms.				Steelyards with Divided Arms.				Weigh Bridges or Platform Scales.						
5 lbs. and under.	5 lbs. to 50 lbs.	50 lbs. to 100 lbs.	100 lbs. and upwards.	500 lbs. and under.	500 lbs. to 1,000 lbs.	1,000 lbs. to 2,000 lbs.	2,000 lbs. and upwards.	250 lbs and under.	250 lbs. to 500 lbs.	500 lbs. to 2,000 lbs.	2,000 lbs. to 4,000 lbs.	4,000 lbs. to 6,000 lbs.	6,000 lbs. and upwards.	Total.
117	314	.. ..	.....	137	2	4	.....	544	110	507	119	37	83	1,974
1,332	1,721	.....	..	1,428	21	4	.....	3,267	103	1,250	243	82	147	9,598
55	144	.....	..	23	.....	....	.....	323	120	276	14	12	38	1,004
94	260	.. ...	.....	185	2	2	.....	344	26	471	106	28	87	1,606
112	241	.. .	.....	85	.....	.. .	2	458	66	373	71	39	52	1,499
88	327	...	.....	3	.....	.. ..	....	614	118	395	40	32	29	1,646
271	569	. ...	.....	399	6	1	. . .	730	92	621	246	54	190	3,179
89	229	. ...	.....	91	....	1	.....	369	45	347	70	34	77	1,352
2,158	3,805	.....	.....	2,351	31	12	2	6,649	680	4,240	909	318	703	21,858
710	1,989	....	.....	952	6	.. .	3	1,723	926	1,558	160	132	149	8,308
121	883	10	87	97	2	1	1	198	256	269	34	15	6	1,980
26	304	1	....	16	.....	..	2	145	183	137	6	5	6	831
857	3,176	11	87	1,065	8	1	6	2,066	1,365	1,964	200	152	161	11,119
35	98	.....	.. ...	10	... .	. .	.....	164	57	47	1	4	4	420
75	281	.. ..	.....	51	.....	1	.....	244	162	85	12	6	27	944
110	379	.....	.....	61	..	1	.....	408	219	132	13	10	31	1,364
.....	.....	.....	.....	... .	.....	...	....	1	1	2	.....	2	13	19
39	190	.....	.....	35	.....	1	2	144	57	120	10	6	15	619
27	80	1	1	14	.....	.....	.... .	170	71	52	6	11	15	448
34	63	.....	5	23	.....	.....	.....	112	36	35	3	6	8	325
100	333	1	6	72	.....	1	2	427	165	209	19	25	51	1,411
25	42	.....	.. ..	13	.....	.....	.....	57	22	53	2	5	6	225
77	190	.....	.....	58	.....	2	.....	321	21	285	66	56	40	1,116
29	42	.....	.....	22	2	.....	.....	154	18	95	10	2	12	386

APPENDIX

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

INSPECTION DIVISIONS.	MEASURE OF CAPACITY. Dominion.										
	Bushel.	½ Bushel.	Peck.	Gallon.	½ Gallon.	Quart.	Pint.	½ Pint.	Gill.	½ Gill.	Total Number.
Ontario.											
Hamilton				2	1		2	1			6
Kingston	3	28	26	23	8						88
London											
Orillia											
Ottawa		1	2	6	7	6		2			24
Windsor											
Totals	3	29	28	31	16	6	2	3			118
Quebec.											
Montreal		2	1			2	1	1			7
Quebec				1							1
Three Rivers	1	11	6	4		5	3	1			31
Totals	1	13	7	5		7	4	2			39
New Brunswick.											
Kings				2							2
St. John											
Totals				2							2
Manitoba.											
Winnipeg											

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

Inland Revenues—Weights and Measures, Gas and Electric Light.

D—*Concluded.*

Weighing Machines of each Denomination Rejected, in each Inspection Division, ended 30th June, 1897.

Balances.													
With Equal Arms.				Steelyards with Divided Arms.				Weigh Bridges or Platform Scales.						
5 lbs. and under.	5 lbs. to 50 lbs.	50 lbs. to 100 lbs.	100 lbs. and upwards.	500 lbs. and under.	500 lbs. to 1,000 lbs.	1,000 lbs. to 2,000 lbs.	2,000 lbs. and upwards.	250 lbs. and under.	250 lbs. to 500 lbs.	500 lbs. to 2,000 lbs.	2,000 lbs. to 4,000 lbs.	4,000 lbs. to 6,000 lbs.	6,000 lbs. and upwards.	Total Rejected.
17	89	.. ..	.....	33	1	.....	....	122	12	106	21	4	35	440
17	9	.....	.....	1	....	.....	.....	23	18	20	6	2	11	107
3	12	....	.....	19	1	.....	....	21	3	28	3	.....	1	91
2	...	... .	. ..	.....	.....	...	...	.....	.... .	.....	.....	.. ..	2	4
5	4	.....	.....	...	.....	. ..	....	9	6	8	2	..	.....	34
2	....	.....	.....	.....	.....	....	.....	..	.....	4	.....	... ..	1	7
46	114	....	....	53	2	.....	.... .	175	39	166	32	6	50	683
1	2	....	.....	2	.....	.....	.....	6	8	11	2	1	4	37
3	6	.....	2	4	.....	.... .	.....	1	5	12	5	.....	2	40
1	3	..	.....	1	.....	.....	.....	... ..	2	.....	.....	.....	....	7
5	11	.....	2	7	.....	.. ..	.....	7	15	23	7	1	6	84
... ..	.. .	.....	.. ...	.....	.....	.....	.....	1	.....	1	... ..	... .	.....	2
.....	.. ...	.....	.....	.....	.....	.....	.....	....	2	...	.....	.....	.....	2
.....	.....	.....	.....	.....	.... .	. ..	.	1	2	1	.....	.....	....	4
4	16	.....	....	9	.....	.	.....	68	5	48	12	6	9	172

E. MIALL,
Commissioner.

APPENDIX E.

STATEMENT of Gas Inspection Expenditure and Receipts for the Year ended 30th June, 1897.

Districts.	Inspectors.	Expenditure.						Receipts.
		Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	Total.	
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Barrie	Shanacy, M.	100 00	....	.....	.....	2 60	102 60	145 25
Belleville	Johnson, Wm.	250 00	.....	50 00	4 20	29 60	333 80	161 25
Berlin	Lynes, K.	100 00	.....	.....	.....	12 00	112 00	202 50
Brockville	.....	.....	99 96	.....	.....	8 33	108 29	93 00
Cobourg	Bickle, J. W.	100 00	.....	.....	39 30	32 45	171 75	237 50
Cornwall	Mulhern, M. M.	100 00	.....	.....	.....	50 40	150 40	37 00
Guelph	Broadfoot, S.	100 00	.....	.....	.....	12 30	112 30	107 00
Hamilton	McPhee, D. Dennis, W. A.	1,699 96	.....	18 00	61 65	41 05	1,820 66	988 50
Kingston	Burrows, W.	400 00	.....	45 00	.....	55 61	500 61	424 25
Listowel	Hawkins, A.St.Geo	100 00	.....	45 00	.....	.....	145 00	58 50
London	Williams, J.	1,000 00	.....	110 00	267 10	93 40	1,470 50	2,122 00
Napanee	Elliott, Geo. M.	41 65	.....	.....	6 50	38 42	86 57	111 00
Ottawa	Roche, H. G.	900 00	.....	300 00	.....	93 70	1,293 70	524 75
Owen Sound	Graham, W. J.	200 00	.....	125 00	.....	.....	325 00	60 25
Peterborough	Cahill, Thos.	200 00	.....	.....	.....	5 50	205 50	159 25
Sarnia	Hicks, W. H.	.....	.....	20 00	.....	2 00	22 00	135 75
Stratford	Rennie, Geo.	200 00	.....	.....	.....	5 50	205 50	155 50
Toronto	Johnstone, J. K. Pape, Jas.	2,199 92	.....	.....	27 00	44 91	2,271 83	4,315 25
	Totals	7,691 53	99 96	713 00	405 75	534 77	9,445 01	10,038 50
Montreal	Aubin, A. O'Flaherty, M. J.	2,199 84	.....	240 00	19 75	150 49	2,610 08	4,776 75
Quebec	Levasseur, N. Moreau, A. (Care)	1,300 00	.....	100 00	.....	52 75	1,452 75	360 75
Sherbrooke	Simpson, A. F.	100 00	.....	.....	.....	.....	100 00	39 50
	Totals	3,599 84	....	340 00	19 75	203 24	4,162 83	5,177 00
Fredericton	Purdia, S. A.	200 00	.....	.....	.....	1 50	201 50	83 75
Moncton	Lawlor, R. A.	250 00	.....	.....	47 14	1 15	298 29	50 00
St. John	Rowan, A.	1,000 00	.....	.....	18 16	29 95	1,048 11	836 25
	Totals	1,450 00	.....	.....	65 30	32 60	1,547 90	970 00
Halifax	Miller, A. Munro, H. D.	1,300 00	....	159 35	369 40	112 60	1,941 35	469 25
Charlottetown	Brace, R. K.	199 92	.....	.....	15 25	29 30	244 47	67 25
Winnipeg	Huggard, R. T.	166 60	.....	108 00	.....	22 25	296 85	187 75

APPENDIX E—*Concluded.*

STATEMENT of Gas Inspection, Expenditure and Receipts, &c.—*Concluded.*

Districts.	Inspectors.	Expenditure. Salaries.	Special Assistance.	Rent.	Travelling Expenses.	Sundries.	Total.	Receipts.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Nanaimo	Good, H. L.	99 96					99 96	42 00
New Westminster	Wolfenden, W.	100 00					100 00	49 25
Vancouver	Miller, J. E.	100 00				91 20	191 20	123 00
Victoria	Jones, Richard.	200 00		300 00			500 00	147 75
	Totals	499 96		300 00		91 20	891 16	362 00

RECAPITULATION.

Ontario	7,691 53	99 96	713 00	405 75	534 77	9,445 01	10,038 50
Quebec	3,599 84		340 00	19 75	203 24	4,162 83	5,177 00
New Brunswick	1,450 00			65 30	32 60	1,547 90	970 00
Nova Scotia	1,300 00		159 35	369 40	112 60	1,941 35	469 25
Prince Edward Island	199 92			15 25	29 30	244 47	67 25
Manitoba	166 60		108 00		22 25	296 85	187 75
British Columbia	499 96		300 00		91 20	891 16	362 00
General Contingencies				212 58	146 00	358 58	
Printing					158 14	158 14	
Stationery					79 76	79 76	
Lithographing					20 00	20 00	
Grand Totals	14,907 85	99 96	1,620 35	1,088 03	1,429 86	19,146 05	17,271 75

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Barrie :—									
July			20·86	16	0	1			
August			20·77	16	0	1			
September			20·83	16	0	1			
October			20·78	16	0	1			
November			21·98	16	0	1			
December			22·32	16	0	1			
January			21·80	16	0	1			
February			20·38	16	0	1			
March			20·67	16	0	1			
April			22·28	16	0	1			
May			19·88	16	0	1			
June			19·96	16	0	1			
					0	12			
Belleville :—									
July	20·83	18·80	19·55	16	0	3			
August	18·21	17·06	17·63	16	0	3			
September	20·75	17·06	18·55	16	0	6			
October	19·87	17·00	18·10	16	0	4			
November	23·45	20·51	21·68	16	0	5			
December	23·60	20·23	21·97	16	0	5			
January	23·92	20·06	21·62	16	0	4			
February	22·76	20·99	21·87	16	0	2			
March	18·23	18·21	18·22	16	0	2			
April	21·57	18·30	20·21	16	0	3			
May	21·45	21·29	21·37	16	0	2			
June	22·98	21·23	21·83	16	0	4			
					0	43			
Berlin :—									
July			17·32	16	0	1			
August			18·34	16	0	1			
September			16·96	16	0	1			
October			17·44	16	0	1			
November			19·13	16	0	1			
December			16·08	16	0	1			
January			18·50	16	0	1			
February			16·66	16	0	1			
March			18·50	16	0	1			
April			18·20	16	0	1			
May			27·20	16	0	1			
June			17·54	16	0	1			
					0	12			

F.

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	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	
									3	0	3	
									2	0	2	
									5	0	5	
									4	0	4	
									5	0	5	
									5	0	5	
									4	0	4	
									2	0	2	
									2	0	2	
									3	0	3	
									2	0	2	
									4	0	4	
									41	0	41	
									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.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Brantford:—									
July			20·70	16	0	1			
August			22·70	16	0	1			
September			21·20	16	0	1			
October			22·43	16	0	1			
November			20·33	16	0	1			
December			21·80	16	0	1			
January									
February			21·22	16	0	1			
March			20·65	16	0	1			
April			22·11	16	0	1			
May			21·78	16	0	1			
June			21·56	16	0	1			
					0	11			
Brockville:—									
July			18·67	16	0	1			
August			21·30	16	0	1			
September			23·07	16	0	1			
October			19·32	16	0	1			
November			19·27	16	0	1			
December			20·07	16	0	1			
January			18·33	16	0	1			
February			18·56	16	0	1			
March			18·55	16	0	1			
April			21·21	16	0	1			
May			23·02	16	0	1			
June			18·02	16	0	1			
					0	12			
Chatham:—									
July									
August									
September			17·12	16	0	1			
October			18·27	16	0	1			
November			19·50	16	0	1			
December			16·64	16	0	1			
January			16·86	16	0	1			
February			17·40	16	0	1			
March			17·55	16	0	1			
April			17·18	16	0	1			
May			16·36	16	0	1			
June			16·50	16	0	1			
					0	10			

Inland Revenues—Weights and Measures, Gas and Electric Light.

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
												No test.
									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	
									12	0	12	
												No test.
												do
									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	
									10	0	10	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Cobourg—									
July			18·04	16	0	1			
August			17·24	16	0	1			
September			17·60	16	0	1			
October			17·02	16	0	1			
November									
December			17·74	16	0	1			
January			17·49	16	0	1			
February			18·06	16	0	1			
March			16·97	16	0	1			
April			18·11	16	0	1			
May			18·05	16	0	1			
June			18·37	16	0	1			
					0	11			
Cornwall—									
July			18·80	16	0	1			
August			18·76	16	0	1			
September			18 76	16	0	1			
October			18·90	16	0	1			
November			18·67	16	0	1			
December			16·66	16	0	1			
January			17·32	16	0	1			
February			18·69	16	0	1			
March			17·85	16	0	1			
April			18·30	16	0	1			
May			18·69	16	0	1			
June			17·70	16	0	1			
					0	12			
Dundas—									
July			19·34	16	0	1			
August			20·65	16	0	1			
September			19·00	16	0	1			
October			19·99	16	0	1			
November			19·28	16	0	1			
December			19·57	16	0	1			
January			19·00	16	0	1			
February			19·18	16	0	1			
March			19·90	16	0	1			
April			19·13	16	0	1			
May			19·28	16	0	1			
June			19·18	16	0	1			
					0	12			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
												No test.
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									22	0	22	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
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									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.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Galt:—									
July			21·12	16	0	1			
August			21·41	16	0	1			
September			21·00	16	0	1			
October			21·84	16	0	1			
November			18·14	16	0	1			
December			20·00	16	0	1			
January			21·53	16	0	1			
February			21·85	16	0	1			
March			23·10	16	0	1			
April			22·99	16	0	1			
May			22·20	16	0	1			
June			22·24	16	0	1			
					0	12			
Guelph:—									
July			24·44	16	0	1			
August			23·21	16	0	1			
September			22·55	16	0	1			
October			24·53	16	0	1			
November			23·21	16	0	1			
December			24·36	16	0	1			
January			21.58	16	0	1			
February			24·06	16	0	1			
March			22·92	16	0	1			
April			24·05	16	0	1			
May			23·45	16	0	1			
June			23·90	16	0	1			
					0	12			
Hamilton:—									
July			17·35	16	0	1			
August			17·99	16	0	1			
September			17·65	16	0	1			
October			17·35	16	0	1			
November			18·00	16	0	1			
December			17·65	16	0	1			
January			17·35	16	0	1			
February			18·15	16	0	1			
March			18·06	16	0	1			
April			18·29	16	0	1			
May			17·85	16	0	1			
June			18·35	16	0	1			
					0	12			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	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	
									2	0	2	
									2	0	2	
									2	0	2	
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									22	0	22	
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									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.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Ingersoll—									
July			21·61	16	0	1			
August									
September			22·90	16	0	1			
October			23·11	16	0	1			
November			22·01	16	0	1			
December			19·23	16	0	1			
January			19·50	16	0	1			
February			19·73	16	0	1			
March			19·50	16	0	1			
April			19·30	16	0	1			
May			22·34	16	0	1			
June			20·44	16	0	1			
					0	11			
Kingston—									
July	24·19	23·05	23·76	16	0	3			
August	25·85	24·37	24·90	16	0	3			
September	23·35	22·44	22·72	16	0	4			
October	25·42	23·33	24·30	16	0	3			
November	23·58	22·63	23·07	16	0	3			
December	25·28	24·66	24·94	16	0	3			
January	26·87	23·86	25·33	16	0	3			
February	24·72	22·86	23·56	16	0	3			
March	23·74	23·17	23·47	16	0	3			
April	24·92	23·02	24·24	16	0	3			
May	23·82	24·34	23·02	16	0	3			
June	23·81	22·54	23·27	16	0	3			
					0	37			
Listowel—									
July			19·91	16	0	1			
August			22·03	16	0	1			
September			21·31	16	0	1			
October			20·62	16	0	1			
November			22·59	16	0	1			
December			22·80	16	0	1			
January			22·26	16	0	1			
February			22·51	16	0	1			
March			23·01	16	0	1			
April			22·23	16	0	1			
May			22·94	16	0	1			
June			21·65	16	0	1			
					0	12			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
									1	0	1	
												No 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	
									11	0	11	
									3	0	3	
									3	0	3	
									4	0	4	
									3	0	3	
									3	0	3	
									3	0	3	
									3	0	3	
									3	0	3	
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									3	0	3	
									3	0	3	
									37	0	37	
									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.						SULPHUR PER		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
London :—									
July	20·36	19·79	20·08	16	0	3			
August	19·30	19·24	19·27	16	0	2			
September	22 50	19·44	20·57	16	0	3			
October	22·00	18·04	20·36	16	0	3			
November	22·01	20·09	20·87	16	0	3			
December	20·00	19·23	19·54	16	0	3			
January	23·00	20·38	21·76	16	0	3			
February	19·73	19·50	19·63	16	0	3			
March	23·38	19·00	21·20	16	0	3			
April	24·40	19·81	20·07	16	0	3			
May	19·79	19·02	18·04	16	0	3			
June	20·00	19·00	19·44	16	0	3			
					0	35			
Napanee :—									
July			22·09	16	0	1			
August			20·95	16	0	1			
September									
October			19·72	16	0	1			
November									
December									
January									
February									
March									
April									
May									
June									
					0	3			
Ottawa :—									
July	21·82	21·78	21·80	16	0	2	15·94	13·01	14·37
August	22·40	21·49	21·94	16	0	2	15·96	15·08	15·47
September	21·68	21·30	21·49	16	0	2	15·39	14·75	15·07
October	22·28	2 ·74	21·01	16	0	2	13·86	13·13	13·94
November	21·38	21·05	21·21	16	0	2	14·75	14·30	14·52
December	21·84	21·57	21·70	16	0	2	15·61	15·10	15·35
January	22·01	21·08	21·54	16	0	2	15·26	14·29	14·77
February	22·18	21·90	22·04	16	0	2	14·81	14·43	14·62
March	21·76	21·65	21·70	16	0	2	17 82	14·70	16·26
April	22·44	21·23	21·83	16	0	2	13·33	12·86	13 09
May	22·25	21·49	21·87	16	0	2	15·48	14·92	15·20
June	21·75	21·61	21·68	16	0	2	15·03	14·63	14·83
					0	24			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard. Grains.	No. of times in excess of allowance.	No. of Tests.	Highest Grains.	Lowest. Grains.	Average Grains.	Standard. Grains.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
...	...	...	...	...	...	...	...	...	3	0	3	
	...	...					...	...	33	0	33	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	...	...	...	No test
...	...	...	...	...	...	...	...	...	...	...	...	do
...	...	...	...	...	...	...	...	...	4	0	4	
...	...	...	...	...	...	...	...	...	2	0	2	
...	...	...	...	...	...	...	...	...	...	...	...	do
...	...	...	...	...	...	...	...	...	...	...	...	do
...	...	...	...	...	...	...	...	...	...	...	...	do
...	...	...	...	...	...	...	...	...	...	...	...	do
		...					...	...	10	0	10	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
	0	24					0	24	24	0	24	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Owen Sound :—									
July			23·70	16	0	1			
August			22·50	16	0	1			
September			22·60	16	0	1			
October			22·30	16	0	1			
November			23·70	16	0	1			
December			22·36	16	0	1			
January			23·25	16	0	1			
February			22·00	16	0	1			
March			22·54	16	0	1			
April			21·82	16	0	1			
May			22·09	16	0	1			
June			22·10	16	0	1			
					0	12			
Peterboro' :—									
July			23·22	16	0	1			
August			20·80	16	0	1			
September			19·46	16	0	1			
October			23·50	16	0	1			
November			23·40	16	0	1			
December			21·31	16	0	1			
January			23·00	16	0	1			
February			21·67	16	0	1			
March			21·10	16	0	1			
April			20·00	16	0	1			
May			21·07	16	0	1			
June			19·30	16	0	1			
					0	12			
Port Hope :—									
July			17·48	16	0	1			
August			17·47	16	0	1			
September			17·31	16	0	1			
October			17·96	16	0	1			
November									
December			17·23	16	0	1			
January			17·71	16	0	1			
February			18·21	16	0	1			
March			16·80	16	0	1			
April			18·03	16	0	1			
May			17·56	16	0	1			
June			18·00	16	0	1			
					0	11			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	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	
									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	
												No test.
									2	0	2	
									1	0	1	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									21	0	21	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Sarnia:—									
July			19·53	16	0	1			
August			20·49	16	0	1			
September			19·99	16	0	1			
October			19·85	16	0	1			
November			20·00	16	0	1			
December									
January			18·62	16	0	1			
February			18·50	16	0	1			
March			18·78	16	0	1			
April			18·56	16	0	1			
May			19·85	16	0	1			
June			19·75	16	0	1			
					0	11			
Stratford:—									
July			16·99	16	0	1			
August			16·20	16	0	1			
September			16·78	16	0	1			
October			16·03	16	0	1			
November			17·77	16	0	1			
December			17·02	16	0	1			
January			16·85	16	0	1			
February			16·60	16	0	1			
March			16·78	16	0	1			
April			16·62	16	0	1			
May			16·57	16	0	1			
June			16·92	16	0	1			
					0	12			
St. Catharines:—									
July			19·44	16	0	1			
August			20·48	16	0	1			
September			19·50	16	0	1			
October			20·19	16	0	1			
November			21·80	16	0	1			
December			21·27	16	0	1			
January			19·34	16	0	1			
February			19·57	16	0	1			
March			20·09	16	0	1			
April			20·41	16	0	1			
May			20·45	16	0	1			
June									
					0	11			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
												No test.
									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	
									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	
												No test.
									11	0	11	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
St. Thomas :—									
July			16·53	16	0	1			
August									
September			19·16	16	0	1			
October			18·14	16	0	1			
November			18·68	16	0	1			
December			16·52	16	0	1			
January			19·34	16	0	1			
February			20·00	16	0	1			
March			18·84	16	0	1			
April			17·70	16	0	1			
May			19·74	16	0	1			
June			18·35	16	0	1			
					0	11			
Toronto :—									
July	21·14	13·17	20·45	16	0	9	7·20	7·11	7·15
August	20·85	19·17	20·17	16	0	9	12·01	8·59	10·30
September	20·80	19·99	20·37	16	0	9	11·14	7·10	9·29
October	21·04	19·08	20·24	16	0	9	14·05	12·50	13·27
November	20·87	19·87	20·26	16	0	8	9·02	5·26	7·14
December	20·71	19·17	20·20	16	0	9	14·56	12·87	13·71
January	20·93	19·63	20·27	16	0	9	9·01	6·41	7·71
February	20·84	19·51	20·27	16	0	8	10·29	8·49	9·29
March	21·05	19·34	20·45	16	0	9	8·34	6·32	7·33
April	21·60	19·56	20·64	16	0	9	11·46	6·82	9·14
May	21·16	19·78	20·50	16	0	8	12·26	8·42	10·34
June	21·35	20·42	20·85	16	0	9	9·92	5·93	7·92
					0	105			
Windsor :—									
July									
August			16·50	16	0	1			
September			16·28	16	0	1			
October			16·36	16	0	1			
November			17·20	16	0	1			
December			16·50	16	0	1			
January			16·22	16	0	1			
February			16·36	16	0	1			
March									
April			13·91	16	1	1			
May			17·00	16	0	1			
June			16·30	16	0	1			
					1	10			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains	Grains.	Grains.	Grains.						
									1	0	1	
												No 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	
									11	0	11	
35	0	2	·17	·12	·14	4	0	2	9	0	9	
35	0	2	·16	·02	·09	4	0	2	9	0	9	
35	0	2	·60	·04	·32	4	0	2	9	0	9	
35	0	2	·09	·02	·05	4	0	2	9	0	9	
35	0	2	·06	·04	·05	4	0	2	8	0	8	
35	0	2	·09	·01	·05	4	0	2	9	0	9	
35	0	2	·01	·01	·00	4	0	2	9	0	9	
35	0	2	·07	·01	·04	4	0	2	8	0	8	
35	0	2	1·52	·00	·76	4	0	2	9	0	9	
35	0	2	·25	·03	·14	4	0	2	9	0	9	
35	0	2	·04	·02	·03	4	0	2	8	0	8	
35	0	2	·51	·36	·43	4	0	2	9	0	9	
	0	24					0	24	105	0	105	
									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	No illuminating test
									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.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Woodstock :—									
July			21·23	16	0	1			
August									
September			22·96	16	0	1			
October			23·10	16	0	1			
November			19·23	16	0	1			
December			22·75	16	0	1			
January			22·40	16	0	1			
February			22·00	16	0	1			
March			19·50	16	0	1			
April			19·18	16	0	1			
May			23·20	16	0	1			
June			19·00	16	0	1			
					0	11			
Montreal :—									
July	20·30	18·10	18·81	16	0	9	31·26	11·79	21·52
August	19·90	18·08	18·96	16	0	9	24·09	16·39	20·24
September	20·08	18·00	19·15	16	0	9	15·95	9·81	12·83
October	20·36	18·01	19·39	16	0	8	22·87	18·98	20·92
November	19·79	18·22	19·04	16	0	9	24·13	18·61	21·37
December	20·01	18·01	19·09	16	0	9	27·08	18 74	22·91
January	19 76	18·07	18·97	16	0	9	21·21	19·33	20·27
February	19·52	17·01	17·90	16	0	10	21·00	15·23	18·61
March	19·22	17·59	18·80	16	0	9	32·97	18·43	26·91
April	19·80	17·02	18·58	16	0	8	20·19	18·46	19·32
May	20·85	18·65	19·54	16	0	9	17·19	16·39	16·79
June	21·27	19·38	21·23	16	0	9	11·88	7·90	9·64
					0	107			
Quebec :—									
July			17·79	16	0	1	18·75	14·82	16·78
August			17·25	16	0	1	20·21	17·73	18·97
September			17·11	16	0	1	23·20	16·83	20·01
October			17·63	16	0	1	22·84	18·05	20·44
November			17·16	16	0	1	15·28	13·88	14·58
December			17·75	16	0	1	17·84	17·51	17·67
January			17·09	16	0	1	20·05	18·09	19·07
February			17·53	16	0	1	20·33	16·10	18·21
March			17·33	16	0	1	20·78	20·38	20·56
April			17·72	16	0	1	20·22	20·11	20·16
May			17·21	16	0	1	15·65	14·97	15·31
June			17·93	16	0	1	19·84	14·88	17·36
					0	12			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	...	...	...	No 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	
	...	...					...	...	11	0	11	
35	0	2	·77	·00	·38	4	0	2	12	0	12	
35	0	2	·52	·50	·51	4	0	2	12	0	12	
35	0	3	...	...	...	4	0	3	12	0	12	
35	0	2	...	...	...	4	0	2	11	0	11	
35	0	2	...	...	...	4	0	2	9	0	9	
35	0	2	·51	·00	·25	4	0	2	12	0	12	
35	0	2	·50	·25	·37	4	0	2	12	0	12	
35	0	2	2·05	1·00	1·52	4	0	2	13	0	13	
35	0	5	1·80	·90	1·25	4	0	3	12	0	12	
35	0	2	·50	·50	·50	4	0	2	11	0	11	
35	0	2	...	...	...	4	0	2	12	0	12	
35	0	2	·50	·25	·37	4	0	2	13	0	13	
	0	28					0	26	141	0	141	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
	0	24					0	24	24	0	24	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Sherbrooke:—									
July			18·25	16	0	1			
August			18·46	16	0	1			
September			16·63	16	0	1			
October			17·30	16	0	1			
November			16·14	16	0	1			
December			17·05	16	0	1			
January			17·57	16	0	1			
February			18·25	16	0	1			
March			14·85	16	1	1			
April			15·74	16	1	1			
May			16·77	16	0	1			
June			16·33	16	0	1			
					2	12			
Fredericton:—									
July			17·76	16	0	1			
August			17·55	16	0	1			
September			16·69	16	0	1			
October			17·97	16	0	1			
November			17·25	16	0	1			
December			15·81	16	0	1			
January			17·28	16	0	1			
February			16 45	16	0	1			
March			16·04	16	0	1			
April			15·99	16	0	1			
May			17·22	16	0	1			
June			16·85	16	0	1			
					0	12			
Moncton:—									
July									
August									
September									
October	17·05	16·34	16·69	16	0	2			
November									
December									
January									
February	16·50	16·33	16·41	16	0	2			
March									
April									
May									
June									
					0	4			

F.—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	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	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									1	0	1	
									12	0	12	
												No test.
												do
												do
									2	0	2	
												do
												do
												do
									2	0	2	
												do
												do
												do
												do
									4	0	4	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
St. John :—									
July	18·50	15·48	16·93	16	0	7	31·67	20·97	24·44
August	20·12	17·89	18·82	16	0	7	19·33	8·09	13·59
September	17·38	15·15	15·99	16	5	8	21·18	7·76	13·00
October	16·77	12·66	14·99	16	7	8	26·13	22·53	24·59
November	17·39	14·96	15·93	16	5	8	24·67	18·54	22·27
December	16·82	15·87	16·41	16	1	8	44·29	13·98	29·75
January	16·75	15·27	16·13	16	3	8	43·99	17·65	26·02
February	16·77	15·69	16·14	16	3	7	28·04	10·15	22·85
March	17·16	16·75	17·01	16	0	4	16·60	10·72	14·21
April	16·87	16·47	16·68	16	0	7	20·27	15·51	17·30
May	16·93	15·84	16·36	16	0	7	21·97	20·50	21·32
June	16·71	15·12	16·10	16	2	7	23·04	18·75	20·53
					26	86			
Halifax :—									
July	18·56	18·31	18·43	16	0	2	10·81	10·36	10·58
August	18·30	18·28	18·29	16	0	2	8·20	4·08	6·14
September	18·25	17·87	18·06	16	0	2	9·11	4·80	6·95
October	.....	.....	17·64	16	0	1	.....	.....	9·14
November	18·15	17·85	18·00	16	0	2	10·05	9·40	9·72
December	18·10	17·50	17·80	16	0	2	9·31	9·00	9·15
January	18·05	17·50	17·77	16	0	2	14·11	12.45	13·28
February	17·40	16·88	17·14	16	0	2	10·77	9·67	10·22
March	.....	.....	17·85	16	0	1	.....	.....	8·78
April	17·87	17 66	17·76	16	0	2	9·88	9·38	9·63
May	.....	.....	17·49	16	0	1	7·20	7·11	7·15
June	.....	.....	.....	.....	.....	.....	.....	.....	.....
					0	19			
Pictou :—									
July	.....	.....	21·90	16	0	1	.....	.....	.....
August	.....	.....	18·30	16	0	1	.....	.....	.....
September	.....	.....	18·02	16	0	1	.....	.....	.....
October	.....	.....	18·96	16	0	1	.....	.....	.....
November	.....	.....	18·25	16	0	1	.....	.....	.....
December	.....	.....	18·40	16	0	1	.....	.....	.....
January	.....	.....	17·81	16	0	1	.....	.....	.....
February	.....	.....	18·35	16	0	1	.....	.....	.....
March	.....	.....	.....	.....	.....	.....	.....	.....	.....
April	.....	.....	18·31	16	0	1	.....	.....	.....
May	.....	.....	18·22	16	0	1	.....	.....	.....
June	.....	.....	.....	.....	.....	.....	.....	.....	.....
					0	10			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
35	0	4	3·36	2·80	3·05	4	0	4	7	0	7	
35	0	4	4·60	2·61	3·71	4	1	4	7	0	7	
35	0	4	5·14	1·16	3·02	4	1	4	8	0	8	
35	0	4	1·50	·60	1·05	4	0	4	8	0	8	
35	0	4	1·96	·54	1.35	4	0	4	8	0	8	
35	2	5	...	...	...	4	0	5	8	0	8	
35	1	4	...	...	...	4	0	4	8	0	8	
35	0	5	...	...	...	4	0	5	7	0	7	
35	0	3	...	...	...	4	0	3	4	0	4	
35	0	4	...	...	...	4	0	4	7	0	7	
35	0	4	...	...	...	4	0	4	7	0	7	
35	0	3	...	...	...	4	0	3	7	0	7	
	3	48					2	48	86	0	86	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	1	...	...	...	4	0	1	1	0	1	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	1	...	...	...	4	0	1	1	0	1	
35	0	2	...	...	...	4	0	2	2	0	2	
35	0	2	...	...	...	4	0	2	2	0	2	
...	...	...	...	...	...	...	...	...	...	...	...	No test.
	0	20					0	20	20	0	20	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	...	...	...	No test.
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	1	0	1	
...	...	...	...	...	...	...	...	...	...	...	...	No test.
	...	...					...	...	10	0	10	

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

INSPECTION OFFICES.	ILLUMINATING POWER.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Yarmouth—									
July			16·32	16	0	1			
August			16·78	16	0	1			
September			16·39	16	0	1			
October			16·67	16	0	1			
November			17·00	16	0	1			
December			17·12	16	0	1			
January			16·67	16	0	1			
February			17·64	16	0	1			
March									
April									
May			17·41	16	0	1			
June									
					0	9			
Charlottetown—									
July									
August									
September	21·08	17·66	19·63	16	0	5			
October	21·48	18·82	20·49	16	0	5			
November	22·12	17·30	19·99	16	0	4			
December	20·08	18·85	19·46	16	0	5			
January	20·04	17·83	18·96	16	0	4			
February	20·53	17·09	18·97	16	0	3			
March	23·65	18·33	20·51	16	0	4			
April	20·42	17·77	19·18	16	0	4			
May	21·62	18·66	20·37	16	0	4			
June	20·73	19·31	20·13	16	0	4			
					0	42			
Winnipeg—									
July			19·30	16	0	1			
August			20·00	16	0	1			
September			20·60	16	0	1			
October			20·09	16	0	1			
November			20·33	16	0	1			
December			20·43	16	0	1			
January			20·97	16	0	1			
February			19·80	16	0	1			
March			20·60	16	0	1			
April			20·45	16	0	1			
May			21·35	16	0	1			
June			20·05	16	0	1			
					0	12			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	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	
									...	...	...	No test.
									.....	.....	.....	do
									1	0	1	
									....	...	....	do
									9	0	9	
									.....	.....	.....	No test.
									.....	.....	.....	do
									5	0	5	
									1	0	1	
									4	0	4	
									1	0	1	
									3	0	3	
									4	0	4	
									4	0	4	
									4	0	4	
									4	0	4	
									4	0	4	
									34	0	34	
									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.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Nanaimo—									
July			20·08	16	0	1			
August			20·40	16	0	1			
September			19·15	16	0	1			
October			17·51	16	0	1			
November			17·48	16	0	1			
December			20·71	16	0	1			
January			18·96	16	0	1			
February			18·74	16	0	1			
March			19·67	16	0	1			
April			20·03	16	0	1			
May			19·14	16	0	1			
June			18·65	16	0	1			
					0	12			
New Westminster—									
July			17·88	16	0	1			
August			17·65	16	0	1			
September			17·37	16	0	1			
October			17·45	16	0	1			
November			17·72	16	0	1			
December			18·25	16	0	1			
January			18·19	16	0	1			
February			17·84	16	0	1			
March			18·14	16	0	1			
April			17·68	16	0	1			
May			17·62	16	0	1			
June			18·25	16	0	1			
					0	12			
Vancouver—									
July			16·15	16	0	1			
August			17·44	16	0	1			
September			17·35	16	0	1			
October			17·89	16	0	1			
November			18·42	16	0	1			
December			18·55	16	0	1			
January			18·42	16	0	1			
February			17·89	16	0	1			
March			16·58	16	0	1			
April			16·40	16	0	1			
May			17·16	16	0	1			
June			17·61	16	0	1			
					0	12			

F—*Continued.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	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	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.						SULPHUR PER 100		
	Highest.	Lowest.	Average.	Standard.	No. of times below Standard.	No. of Tests.	Highest	Lowest.	Average
	Candles.	Candles.	Candles.	Candles.			Grains.	Grains.	Grains.
Victoria :—									
July	18·12	17·98	18·05	16	0	2	.....	.....	.....
August	18·10	18·01	18·05	16	0	2	.....	.....	.....
September	18·26	18·00	18·13	16	0	2	.....	.....	.....
October	18·12	17·94	18·03	16	0	2	.....	.....	.....
November	.....	.....	.....	.....	.....	.....	.....	.....	.....
December	18·24	18·07	18·15	16	0	2	.....	.....	.....
January	18·38	18 20	18·29	16	0	2	.....	.....	.....
February	18·37	18·10	18·33	16	0	2	.....	.....	.....
March	18·36	18·24	18·30	16	0	2	.....	.....	.....
April	18·26	18·00	18·13	16	0	2	.....	.....	.....
May	18·95	18·44	18·69	16	0	2	.....	.....	.....
June	18·70	18·62	18·66	16	0	2	.....	.....	.....
					0	22			

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

F—*Concluded.*

Inspected during the Year ended 30th June, 1897.

Cubic Feet.			Ammonia per 100 Cubic Feet.						Sulphuretted Hydrogen.			Remarks.
Standard.	No. of times in excess of allowance.	No. of Tests.	Highest	Lowest.	Average	Standard.	Times in excess of allowance.	No. of Tests.	No. of times absent.	No. of times present.	No. of Tests.	
Grains.			Grains.	Grains.	Grains.	Grains.						
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
												No test.
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									2	0	2	
									22	0	22	

E. MIALL,
Commissioner.

APPENDIX G.

STATEMENT of Gas Meters presented for Verification, Verified, Verified after first Rejection, and Rejected during the Year ended 30th June, 1897.

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	95	....	95	3	25	62	....	....	3	....	1	1	93	2
Belleville	113	....	113	44	32	36	....	....	....	1	....	....	112	1
Berlin	127	....	127	41	34	52	....	....	....	....	....	....	127	....
Brantford	23	....	23	5	3	15	....	....	....	....	....	....	23	....
Brockville	60	....	60	3	35	20	....	....	1	....	....	1	59	1
Chatham	80	....	80	22	27	27	....	....	....	4	....	....	76	4
Cobourg	167	....	167	15	63	82	....	1	2	....	1	3	163	4
Cornwall	1	....	1	1	....	....	....	....	....	....	....	....	1	....
Dundas	8	....	8	....	....	8	....	....	....	....	....	....	8	....
Galt	100	....	100	2	31	67	....	....	....	....	....	....	100	....
Guelph	71	....	71	1	14	56	....	....	....	....	....	....	71	....
Hamilton	480	....	480	140	45	295	....	....	....	....	....	....	480	....
Ingersoll	31	....	31	9	10	12	....	....	....	....	....	....	31	....
Kingston	347	....	347	55	101	188	....	....	....	....	....	....	347	....
Listowel	21	....	21	10	5	6	....	....	....	....	....	....	21	....
London	640	....	640	156	127	345	1	....	3	....	7	1	632	8
Napanee	36	....	36	13	7	16	....	....	....	....	....	....	36	....
Ottawa	391	....	391	7	29	347	....	....	....	1	3	4	383	8
Owen Sound	26	....	26	15	....	11	....	....	....	....	....	....	26	....
Peterborough	114	....	114	23	12	79	....	....	....	....	....	....	114	....
Port Hope	20	....	20	3	5	12	....	....	....	....	....	....	20	....
Sarnia	109	....	109	83	11	14	....	....	....	....	....	1	108	1
Stratford	111	....	111	33	24	54	....	....	....	....	....	....	111	....
St. Catharines	188	....	188	45	17	125	....	....	....	....	....	1	187	1
St. Thomas	133	....	133	33	29	58	2	2	4	2	3	....	128	5
Toronto	3,634	....	3,634	673	817	2,139	....	....	....	3	1	1	3,629	5
Windsor	683	....	683	102	130	436	....	2	8	....	4	1	678	5
Woodstock	105	....	105	31	43	31	....	....	....	....	....	....	105	....
Montreal	4,515	....	4,515	790	1,129	2,570	....	....	....	2	16	8	4,489	26
Quebec	198	....	198	126	34	36	....	1	....	....	1	....	197	1
Sherbrooke	3	....	3	2	1	....	....	....	....	....	....	....	3	....
Fredericton	51	....	51	....	15	33	....	....	....	1	....	2	48	3
St. John	697	....	697	185	164	348	....	....	....	....	....	....	697	....
Halifax	138	50	88	95	24	19	....	....	....	....	....	....	138	2
Yarmouth	95	....	95	30	17	46	....	....	....	....	1	1	93	9
Charlottetown	29	....	29	6	8	6	....	....	....	3	....	6	20	..
Winnipeg	58	....	58	25	6	27	....	....	....	....	....	....	58	....
Nanaimo	6	....	6	....	3	1	....	....	....	....	2	....	4	2
Vancouver	47	....	47	9	13	24	....	....	....	....	....	1	46	1
Victoria	80	....	80	28	18	34	....	....	....	....	....	....	80	....
Totals	13,831	50	13,781	2,864	3,111	7,737	3	6	21	17	40	32	13,742	89

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX H.

STATEMENT of Electric Light Inspection Expenditures and Receipts for the Year ended 30th June, 1897.

Districts.	Inspectors.	Expenditure.				Receipts.		
		Salaries.	Travelling Expenses.	Sundries.	Totals.	Registration Fees.	Inspection Fees.	Totals.
		$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Belleville	Johnson, Wm		98 66	11 92	110 58	300 00	131 25	431 25
Hamilton	McPhie, D.		46 25	3 90	50 15	335 00	235 25	570 25
London	Williams, J		13 00	22 28	35 28	480 00	196 25	676 25
Ottawa	Roche, H. G.		7 50	11 97	19 47	280 00	944 50	1,224 50
Toronto	Johnstone, J. K		97 50	5 50	103 00	645 00	390 50	1,035 50
			262 91	55 57	318 48	2,040 00	1,897 75	3,937 75
Montreal	Aubin, A			1 10	1 10	220 00	871 75	1,091 75
Quebec	Le Vasseur, L.N			4 01	4 01	25 00	201 00	226 00
Sherbrooke	Simpson, A. F.					155 00	20 50	175 50
				5 11	5 11	400 00	1,093 25	1,493 25
St. John	Rowan, A		12 34	0 75	13 09	125 00	89 75	214 75
Halifax	Miller, A.		81 45	0 75	82 20	325 00	669 00	994 00
Winnipeg	Magness, R					25 00	230 50	255 50
Victoria	Jones, Richard		18 00	63 00	81 00			

RECAPITULATION.

Ontario		262 91	55 57	318 48	2,040 00	1,897 75	3,937 75
Quebec			5 11	5 11	400 00	1,093 25	1 493 25
New Brunswick		12 34	0 75	13 09	125 00	89 75	214 75
Nova Scotia		81 45	0 75	82 20	325 00	669 00	994 00
Manitoba					25 00	230 50	255 50
British Columbia		18 00	63 00	81 00			
Chief Electrical Engineer	1,830 06	575 65	88 62	2,494 33			
General Contingencies			5,963 22	5,963 22			
Printing			22 66	22 66			
Stationery			41 62	41 62			
	1,830 06	950 35	6,241 30	9,021 71	2,915 00	3,980 25	6,895 25

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX I.

STATEMENT showing the number of Electric Light Meters verified, rejected, and verified after first rejection, in each Inspection Division, for the fiscal year ended 30th June, 1897.

DIVISIONS.	Number presented.	Verified as coming within the Error Tolerated by Law.			Rejected.			Verified after first rejection as coming within the Error Tolerated by Law,		
		Correct.	Fast.	Slow.	Unsound.	Fast.	Slow.	Correct.	Fast.	Slow.
Belleville	127	41	51	35						
Hamilton	182	75	41	66						
London	122	50	34	38						
Ottawa	666	97	304	253	5	3	3			1
Toronto	342	8	298	36						
Windsor	129	68	25	36						
Montreal	673	140	383	122		26	2			
Quebec	216	25	73	107	3	1	2	3	1	1
Sherbrooke	22	1	4	16			1			
St. John	71	7	37	25		2				
Halifax	439	157	221	11	11	38		1		
Winnipeg	196	7	158	31						
Vancouver	23	18	3	2						
Totals	3,208	694	1,632	778	19	70	8	4	1	2

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

APPENDIX J.

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act during the year ended 30th June, 1897.

Districts.	From whom Collected.	Serial Nos.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fee.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Belleville	Trenton Electric Company (Limited)	1	C. I. R., Belleville	1896-97	95	1,250	2,200	25 00	
	R. R. Casement & Co., Madoc	2	do do	1896-97	.....	350	350	10 00	
	Stormont Electric Light and Power Company	1	do Cornwall	1896-97	.....	1,350	1,350	25 00	
	Corporation of the Village of Alexandria	2	do do	18 6-97	...	450	450	10 00	
	Kingston Light, Heat and Power Company	1	do Kingston	1896-97	105	2,000	3,050	25 00	
	Napanee Water and Electric Light Company (Limited)	2	do do	1896-97	35	35	385	10 00	
	Peterborough Light and Power Company	1	do Peterborough	1896-97	...	.....	...	25 00	
	H. W. Foulds & Co., Hastings	2	do do	1896-97	8	176	256	10 00	
	Lakefield Electric Light Company	3	do do	1896-87	20	.....	200	10 00	
	W. C. Harrison, Norwood	4	do do	1896-97	29	170	460	10 00	
	Light, Heat and Power Company of Lindsay (Limited)	5	do do	1896-97	78	5,100	5,880	25 00	
	The Fenelon Falls Electric Light Company (Limited)	6	do do	1896-97	.....	380	380	10 00	
	Corporation of the Village of Campbellford	7	do do	1896 97	22	435	655	10 00	
	Bowmanville Electric Light Company	8	do do	1896-97	36	256	616	25 00	
	Port Hope Electric Light and Power Company (Limited)	9	do do	1896-97	37	900	1,270	25 00	
	Millbrook Electric Light Company (Limited)	10	do do	1896-97	10	600	700	10 00	
	Cobourg Electric Light and Power Company (Limited)	11	do do	1896-97	45	805	1,255	25 00	
	Colborne Electric Company	12	do do	1896-97	20	250	450	10 00	
									300 00
Hamilton	Paris Electric Light Company	1	do Brantford	1896-97	40	400	800	10 00	
	Brantford Electric and Operating Company (Limited)	2	do do	1896-97	85	2,200	3,050	25 00	
	F. J. Barkey, Tilsonburg	3	do do	1896-97	26	260	520	10 00	
	Simcoe Gas and Water Company	4	do do	1896-97	40	180	580	10 00	
	Woodstock Electric Light, Power and Street Railway Company (Limited)	5	do do	1896-97	20	700	900	25 00	
	Ingersoll Electric Power and Light Company	6	do do	1896-97	49	540	1,030	25 00	
	Brantford Street Railway Company (Limited)	7	do do	1896-97	.....	2,700	2,700	25 00	
	D. C. Beattie, Norwich	8	do do	1896-97	18	48	228	10 00	
	Port Rowan Electric Supply Company	9	do do	1896-97	19	96	286	10 00	
	James Munro, Embro	10	do do	1896-97	...	151	151	10 00	
	Port Dover Electric Light Company	11	do do	1896-97	9	298	388	10 00	
	Hamilton Electric Light and Power Company	1	do Hamilton	1896-97	435	10,000	14,350	25 00	
	Simpson Light and Power Company, Hamilton	2	do do	1896-97	.....	200	200	10 00	

APPENDIX J—*Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the year ended 30th June, 1897.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fee.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Hamilton—*Conc.*	Dunnsville Electric Light Company	1	C. I. R., St. Catharines	1896-97	30	689	989	25 00	
	Corporation of the Town of Niagara	2	do do	1896-97	..	850	850	25 00	
	Welland Electric Light Company	3	do do	1896-97	30	475	775	10 00	
	Hagersville Electric Light Company	4	do do	1896-97	22	5	225	10 00	
	J. W. Van Dyke Electric Plant, Grimsby	5	do do	1896-97		400	400	10 00	
	Niagara Falls Electric Light, Heat and Power Company	6	do do	1896-97	49	1,100	1,590	25 00	
	St. Catharines Electric Light and Power Company (Limited)	7	do do	1896-97	79	1,200	1,990	25 00	
									335 00
London	Sarnia Gas and Electric Light Company	1	do London	1896-97	60	300	900	10 00	
	F. N. Saylor, Strathroy	2	do do	1896-97	25	40	290	10 00	
	Fitzgerald & Sauermann, Watford	3	do do	1896-97	23	53	283	10 80	
	St. Thomas Gas Company	4	do do	1896-97	85	300	1,150	25 00	
	Hamilton & Prout, Forest	5	do do	1896-97	11	300	410	10 00	
	London Electric Company (Limited)	6	do do	1896-97	350	7,000	10,500	25 00	
	Petrolia Electric Light, Heat and Power Company (Limited)	7	do do	1896-97	39	1,500	1,890	25 00	
	Aylmer Electric Light Company	8	do do	1896-97	30	60	360	10 00	
	H. C. Baird & Son, Parkhill	9	do do	1896-97	20	80	280	10 00	
	W. W. Gordon, Glencoe	10	do do	1896-97	33	37	370	10 00	
	Corporation of the Town of Mitchell	1	do Stratford	1896-97	41	450	860	10 00	
	Exeter Electric Light, G. N. Howard	2	do do	1895-97	10	400	500	10 00	
	Seaforth Electric Light, Heat and Power Company (Limited)	3	do do	1896-97	50	900	1,400	25 00	
	Stratford Gas Company	4	do do	1896-97	110	700	1,800	25 00	
	Clinton Electric Light Company	5	do do	1896-97	20	710	910	10 00	
	Cook Brothers Electric Light Company, Hensall	6	do do	1896-97	..	400	400	10 00	
	Palmerston Electric Light Company	7	do do	1896-97	17	400	570	10 00	
	St. Mary's Electric Light Company	8	do do	1896-97	20	400	600	10 00	
	Corporation of the Town of Goderich	9	do do	1896-97	32	800	1,120	25 00	
	Blyth Electric Light Company	10	do do	1896-97	19	160	350	10 00	
	Wingham Electric Light Company	11	do do	1896-97	62	1,000	1,620	25 00	
	Leamington Electric Light Company (Limited)	1	do Windsor	1896-97	15	600	750	10 00	
	People's Electric Company, Windsor	2	do do	1896-97	4	3,500	3,540	25 00	
	George Munro, Thamesville	3	do do	1896-97	7	225	295	10 00	
	Corporation of the Village of Tilbury	4	do do	1896-97	25	18	268	10 00	

	Chatham Gas Company (Limited)	5	do	do	1896-97	65	800	1,450	25 00		
	Hiram Walker & Sons (Limited), Walkerville	6	do	do	1896-97	1	1,300	1,310	25 00		
	Smith & Henderson, Blenheim	7	do	do	1896-97	23	93	323	10 00		
	J. & W. McMaster, Ridgetown	8	do	do	1896-97	17	287	457	10 00		
	Wm. Laing, Essex	9	do	do	1896-97	35	12	362	10 00		
	Wallaceburg Electric Light Company (Limited)	10	do	do	1896-97	46	5	465	10 00		
	Amherstburg Electric Light, Heat and Power Company (Limited)	11	do	do	1896-97	....	800	800	10 00		
	J. E. Gordon, Dresden	12	do	do	1896-97	9	185	275	10 00		
										480	00
Ottawa	Albert MacLaren Electric Light Company, Buckingham	1	do	Ottawa	1896-97	....	1,000	1,000	10 00		
	Ottawa Electric Company	2	do	do	1896-97	550	57,240	62,740	25 00		
	Hull Electric Company	3	do	do	1896-97	...	891	891	10 00		
	Citizen's Electric Light Company, Smith's Falls	1	do	Perth	1896-97	....	1,000	1,000	25 00		
	Smith's Falls Electric Light Company (Limited)	2	do	do	1896-97	22	2,000	2,220	25 00		
	Electric Light Company of Pembroke	3	do	do	1896-97	24	700	940	25 00		
	Electric Light Company of Carleton Place	4	do	do	1896-97	40	1,300	1,700	25 00		
	Almonte Electric Light Company	5	do	do	1896-97	24	1,500	1,740	25 00		
	Perth Electric Light Company (Limited)	6	do	do	1896-97	46	20	480	10 00		
	Pakenham Electric Light Company	7	do	do	1896-97	....	330	330	10 00		
	A. A. Wright & Co., Renfrew	8	do	do	1896-97	12	500	620	10 00		
	Arnprior Electric Light Company	9	do	do	1896-97	22	650	870	25 00		
	Star Electric Light Company of Eganville	10	do	do	1896-97	....	350	350	10 00		
	Mackay & Guest, Renfrew	11	do	do	1896-97	....	960	960	10 00		
	Electric Light Company of Eganville	12	do	do	1896-97	....	440	440	10 00		
	Tay Electric Light Company, Perth	13	do	do	1896-97	....	1,500	1,500	25 00		
										280	00
Toronto	Guelph Light and Power Company	1	do	Guelph	1896-97	110	2,200	3,300	25 00		
	Berlin Gas Company	2	do	do	1896-97	41	191	60	10 00		
	Galt Gas Light Company (Limited)	3	do	do	1896-97	61	100	710	10 00		
	John Shearer, Blair and Preston	4	do	do	1898-97	....	700	700	10 00		
	Jas. Fenwick, Preston	5	do	do	1896-97	28	12	292	10 00		
	Howes & Leighton, Harriston	6	do	do	1896-97	35	24	374	10 00		
	A. Groves, Fergus	7	do	do	1896-97	25	700	950	10 00		
	Corley & Collins, Mount Forest	8	do	do	1896-97	14	400	540	10 00		
	Jacob Morley, New Hamburg	9	do	do	1896-97	28	66	346	10 00		
	Chesley Incandescent Electric Light Plant	1	do	Owen Sound	1896-97	...	400	400	10 00		
	Thos. Andrews, Thornbury	2	do	do	1896-97	8	310	390	10 00		
	Owen Sound Electric, Illuminating and Manufacturing Company (Limited)	3	do	do	1896-97	60	....	600	10 00		
	Robertson, Rowland & Co., Walkerton	4	do	do	1896-97	23	909	1,130	25 00		
	Durham Electric Light Company	5	do	do	1896-97	12	309	420	10 00		
	Kincardine Electric Light Company	6	do	do	1896-97	17	600	770	10 00		
	Hanover Electric Light Company	7	do	do	1896-97	15	835	985	10 00		
	Southampton Electric Light Company	8	do	do	1896-97	22	50	270	10 00		
	Wiarton Electric Light Company	9	do	do	1896-97	25	40	290	10 00		
	Corporation of the Town of Collingwood	10	do	do	1896-97	35	960	1,310	25 00		
	Minnis Bros., Markdale	11	do	do	1896-97	....	450	450	10 00		
	Meaford Electric Light Company, W. Moore & Sons	12	do	do	1896-97	25	350	600	10 00		
	John Bearman, Scone	13	do	do	1896-97	22	210	430	10 00		
	Donald McIntyre, Paisley	14	do	do	1896-97	7	170	240	10 00		

APPENDIX J—*Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act during the year ended 30th June, 1897.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fee.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Toronto—*Conc.*	Lakefield and Whitby Electric Light Company	1	C. I. R., Toronto	1896-97	25	250	500	10 00	
	Mattawa Electric Light and Power Company (Limited)	2	do do	1896-97		853	853	10 00	
	Midland Electric Company (Limited)	3	do do	1896-97	25	500	750	10 00	
	Tottenham Electric Light Company	4	do do	1896-97		203	203	10 00	
	Barrie Electric Light Company	5	do do	1896-97	40	3,500	3,900	25 00	
	Water, Light and Power Company, Burk's Falls	6	do do	1896-97		500	500	10 00	
	Oakville Electric Light Plant, Robt. McGowan	7	do do	1896-97	31	650	960	10 00	
	Corporation of the Town of Bracebridge	8	do do	1896-97		1,735	1,735	25 00	
	Tagona Water and Light Company, Sault Ste. Marie	9	do do	1896-97	52	821	1,341	25 00	
	Creemore Electric Light Company	10	do do	1896-97		300	300	10 00	
	Milton Electric Light and Power Company (Limited)	11	do do	1896-97	20	400	600	10 00	
	Stayner Electric Light Company	12	do do	1896-97		562	562	10 00	
	Estate Agnes D. Hulton, Brampton	13	do do	1896-97	26	600	860	10 00	
		14	do do	1896-97	20	250	450	10 00	
	Toronto Electric Light Company (Limited)	15	do do	1896-97	1,400	45,000	59,000	25 00	
	Penetanguishene and Midland Electric Street Railway, Light and Power Company (Limited)	16	do do	1896-97	13	900	1,030	25 00	
	J. Bourke, Electric Light, North Bay	17	do do	1896-97		820	820	10 00	
	Corporation of the Town of Newmarket	18	do do	1896-97		817	817	10 00	
	Huntsville Electric Light Company	19	do do	1896-97		600	600	10 00	
	Glen Williams Electric Light Company, Georgetown	20	do do	1896-97	16	400	560	10 00	
	Corporation of the Town of Orillia	21	do do	1896-97	44	2,600	3,040	25 00	
	I. J. Gould, Uxbridge	22	do do	1896-97	45	6	456	10 00	
	Cannington Electric Light Company	23	do do	1896-97	10	360	460	10 00	
	Alexander Hobson, Beaverton	24	do do	1896-97		350	350	10 00	
	W. H. Summerfeldt, Sutton	25	do do	1896-97		250	250	10 00	
	Alliston Milling Company	26	do do	1896-97	13	500	630	10 00	
	Markham Electric Light Company	27	do do	1896-97		350	350	10 00	
	Oshawa Electric Light Company		do do	1895-96	30	1,000	1,300	10 00	
									645 00
Montreal	Corporation of the Town of Joliette	1	do Joliette	1896-97	33	1,250	1,580	25 00	
	The Royal Electric Company, Montreal	1	do Montreal	1896-97	1,450	58,000	72,500	25 00	

	Town of Maisonneuve	2	do	do	1896-97	26	344	604	10 00	
	Corporation of the Town of Lachine	3	do	do	1896-97	42	1,130	1,550	25 00	
	The Gazette Printing Company	4	do	do	1896-97		1,800	1,800	25 00	
	Beauharnois Electric Light Company	5	do	do	1896-97		98	98	10 00	
	Valleyfield Electric Light Company (Limited)	6	do	do	1896-97	52	800	1,320	25 00	
	Temple Electric Company	7	do	do	1896-97	30	1,950	2,250	25 00	
	La Compagnie de Lumière Electrique Impériale	8	do	do	1896-97		4,160	4,160	25 00	
	Citizen's Light and Power Company (Limited)	9	do	do	1896-97	252	3,300	5,820	25 00	
										220 00
Quebec	Montmorency Electric Power Company	1	do	Quebec	1896-87	408	13,000	17,080	25 00	
										25 00
Sherbrooke	La Compagnie des Pouvoirs Hydrauliques de St. Hyacinthe	1	do	St. Hyacinthe	1896-97	2	4,000	4,020	25 00	
	Coaticook Electric Light Company	1	do	Sherbrooke	1896-97	28	950	1,230	25 00	
	S. H. C. Miner, Granby	2	do	do	1896-97	35		350	10 00	
	Stanstead Electric Light Company	3	do	do	1896-97	26	600	860	10 00	
	Richmond County Electric Company	4	do	do	1896-97		887	887	10 00	
	G. K. Nesbitt, Cowansville	5	do	do	1896-97		300	300	10 00	
	Farnham Electric Light Company	6	do	do	1896-97		450	450	10 00	
	Sherbrooke Gas and Water Company	7	do	do	1896-97	70	3,200	3,900	25 00	
	St. John's Electric Light Company	8	do	do	1896-97	24	720	960	10 00	
	W. H. Frost, Waterloo	9	do	do	1896-97		893	893	10 00	
	French Bros,, Sawyerville	10	do	do	1896-97		90	90	10 00	
										155 00
St. John, N. B.	The Saint John Railway Company	1	do	St. John	1896-97	351	7,842	11,352	25 00	
	Carleton Electric Light Company, St. John	2	do	do	1896-97	30	425	725	10 00	
	Fredericton Gas Light Company	3	do	do	1896-97	75	200	950	25 00	
	Small & Fisher Company (Limited), Woodstock	4	do	do	1896-97		400	400	10 00	
	Sackville Electric Light and Telephone Company (Limited)	5	do	do	1896-97		420	420	10 00	
	St. Stephen Electric Light Campany	6	do	do	1896-97	40	320	720	10 00	
	City of Moncton Light and Water Department	7	do	do	1896-97	80	1,000	1,800	25 00	
	Sussex Water and Electric Company	8	do	do	1896-97		350	350	10 00	
										125 00
Halifax	Sydney Gas and Electric Light Company	1	do	Cape Breton	1896-97		1,600	1,600	25 00	
	North Sydney Electric Light Company (Limited)	2	do	do	1896-97		900	900	25 00	
	Prince Edward Island Electric Company	1	do	Charlottetown	1896-97	85	2,800	3,650	25 00	
	Full Electric Light Company, Charlottetown	2	do	do	1896-97	4	800	840	10 00	
	Summerside Electric Light Company (Limited)	3	do	do	1896-97		862	862	10 00	
	Windsor Electric Light and Power Company (Limited)	1	do	Halifax	1896-97		1,850	1,850	25 00	
	Dartmouth Gas, Electric Light Heating and Power Company (Limited)	2	do	do	1896-97		996	996	10 00	
	Acadia Edison Electric Company, Wolfville	3	do	do	1896-97		800	800	10 00	
	Kentville Electric Light and Power Company (Limited),	4	do	do	1896-97	1	600	610	10 00	
	Oxford Electric Light Company	5	do	do	1896-97		151	151	10 00	
	Halifax Electric Tramway Company (Limited)	6	do	do	1896-97	240	6,360	6,600	25 00	
	Halifax Gas Light Company (Limited)	7	do	do	1896-97	58	2,574	3,154	25 00	
	Chamber's Electric Light and Power Company (Limited), Truro	8	do	do	1896-97	60	3,600	4,200	25 00	
	R. C. Ewin, Shubenacadie	9	do	do	1896-97		300	300	10 00	
	Lunenburg Gas Company (Limited)	10	do	do	1896-97		750	750	10 00	
	Edison Electric Light and Power Company (Limited), Springhill	11	do	do	1896-97		600	600	10 00	
	Bridgewater Electric Light, Water and Power Company (Limited)	12	do	do	1896-97		500	500	10 00	

APPENDIX J—*Concluded.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act during the year ended 30th June, 1897.

Districts.	From whom Collected.	Serial No.	By whom Collected.	Certificate for Fiscal Year.	Number of Lamps.			Registration Fee.	Totals.
					Arc.	Incandescent.	Totals.		
								$ cts.	$ cts.
Halifax—*Conc.*	Canada Electric Light Company (Limited), Amherst	13	C. I. R., Halifax	1896-97	30	1,800	2,100	25 00	
	New Glasgow Electric Company (Limited)	1	do Pictou	1896-97	26	2,500	2,760	25 00	325 00
Winnipeg	Citizen's Telephone and Electric Company (Limited)	1	do Winnipeg	1896-97	...	2,000	2,000	25 00	25 00
	Grand Total								2,915 00
	LESS—Refunds as per Statement No. 16, page 37, Part I								90 00
	Total agreeing with Statement No. 23, page 50, Part I								2,825 00

* Each arc lamp is reckoned as equal to 10 incandescent.

E. MIALL,
Commissioner.

INLAND REVENUE DEPARTMENT,
OTTAWA, 20th August, 1897.

REPORT, RETURNS AND STATISTICS

OF THE

INLAND REVENUES

OF THE

DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED 30TH JUNE

1897

PART III

ADULTERATION OF FOOD

PRINTED BY ORDER OF PARLIAMENT

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1898

CONTENTS

REPORT

OF THE

COMMISSIONER OF INLAND REVENUE

INSPECTION OF FOODS, DRUGS AND FERTILIZERS.

To the Honourable
The 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 30th June, 1897.

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

Description.	Genuine.	Adulterated.	Doubtful.	Sold as Compound.	Not Classed.	Sold Illegally.	Total.
Pepper	122	37	14	2	4	.....	179
Ginger	61	30	3	.....	4	.....	98
Vinegar	44	39	25	.....	12	.....	120
Honey	158	14	5	.....	4	.....	181
Paris Green	2	.....	.....	.....	.....	.....	2
Cream of tartar	62	30	6	.....	1	.....	99
White lead	47	47	.....	1	11	.....	106
Fertilizers	42	7	3	.....	9	17	78
Mustard	3	47	1	10	5	.....	66
	541	251	57	13	50	17	929

There does not appear to be any feature calling for special comment, beyond the remarks made by the individual analysts.

I have the honour to be, sir,

Your obedient servant,

EDWARD MIALL,
Commissioner.

OTTAWA, 24th December, 1897.

REPORTS OF PUBLIC ANALYSTS.

LABORATORY OF THE OFFICIAL ANALYST,
HALIFAX, N.S., 19th August, 1897.

The Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit my annual report on the samples of food and drugs, &c., received for analysis during the year ending 30th June, 1897. Of the 90 samples received, I have found 58 to be genuine, 20 adulterated, 8 doubtful, and 4 sold illegally; details as follows:—

Name.	Genuine.	Adulterated	Doubtful.	Sold Illegally.	Total.
Pepper	11	3	1	0	15
Vinegar	1	7	7	0	15
Honey	24	0	0	0	24
Cream of Tartar	10	0	0	0	10
White Lead	6	10	0	0	16
Fertilizers	6	0	0	4	10
	58	20	8	4	90

I have the honour to be, sir,
Your obedient servant,
MAYNARD BOWMAN.

CHEMICAL LABORATORY, 85 GERMAIN ST.,
SAINT JOHN, N.B., 15th September, 1897.

To the Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit my annual report on samples of food, drinks and drugs, received by me for analysis during the year ending 30th June, 1897, as follows:—

Samples.	Genuine.	Sold as Compound.	Adulterated	Doubtful.	Total.
Pepper	10	0	9	3	22
Ginger	7	0	4	2	13
Vinegar	4	0	8	1	13
Honey	21	0	0	0	21
Cream of Tartar	13	0	5	0	18
Mustard	1	5	3	0	9
	56	5	29	6	96

Pepper.

Twenty-two samples were examined, of which 10 were found to be genuine and nine adulterated, besides three that have been classed as doubtful. The adulterati on of this condiment is still carried on to a large extent, and only constant watchfulness will keep this in check.

Ginger.

This is also found to be quite largely adulterated. There is no valid reason for the addition of starch to this substance except to increase the profit of the manufacturer or vendor.

Vinegar.

Two-thirds of the samples were found to be adulterated.

Honey.

All the samples were found to be pure and of excellent quality.

Cream of Tartar.

Of 18 samples examined, 13 were found to be genuine and five adulterated.

Mustard.

Of nine samples only one was strictly pure, while three were adulterated and five sold as mixtures.

I have the honour to be, sir,

Your obedient servant,

W. F. BEST,
Official Analyst.

PUBLIC ANALYST'S OFFICE,
QUEBEC, 16th August, 1897.

The Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to present a report of work done in my laboratory during the year ending 30th June, 1897. During that time 125 samples have been examined, as shown in the following table:—

Date on which Reported.	Samples.	Genuine.	Adulterated.	Doubtful.	Sold Illegally.	Sold as Mixture.	Total.
August 13, 1896....	Pepper	8	6	1	0	0	15
October 9, 1896....	Ginger.....	9	6	0	0	0	15
November 12, 1896.	Vinegar.....	8	4	3	0	0	15
December 31, 1896.	Honey.....	23	0	1	0	0	24
February 13, 1897..	Cream of Tartar...	6	4	0	0	0	10
March 25, 1897.....	White Lead	11	5	0	0	0	16
April 30, 1897.....	Fertilizers	6	0	1	3	0	10
May 20, 1897.....	Pepper	9	0	1	0	0	10
June 28, 1897.....	Mustard	0	9	0	0	1	10
		80	34	7	3	1	125

NOTE —Besides these samples, ten fertilizers sent the department by the manufacturers were analysed here. These were standard samples, and therefore they are not entered in the above report.

I have the honour to be, sir,

Your obedient servant,

DR. M. FISET,
Public Analyst.

LABORATORY OF INLAND REVENUE,
MONTREAL, 15th September, 1897.

To the Commissioner of Inland Revenue,
Ottawa.

SIR,—I beg to submit to you my report for the year ending 30th June, 1897. Under the Adulteration Act and Fraudulent Marking Act, I have received 135 samples, viz.:—Peppers, 28; ginger, 17; vinegar, 22; honey, 27; cream of tartar, 11; white lead, 19; mustard, 11. Of these I find 65 genuine, 54 adulterated and 16 doubtful. Besides these I have received under the Fertilizers Act 11 samples sold in this district, of which I find six up to standard and five without standard, and therefore sold illegally, the Act not having been complied with.

I have also received 12 samples of fertilizers from the department for the purpose of fixing standards, making a total of 158 samples for the year.

The results of analysis I herewith tabulate:—

Samples.	Sold Illegally.	Genuine.	Adulterated.	Doubtful.	Total.
Pepper	0	17	9	2	28
Ginger	0	8	8	1	17
Vinegar	0	1	10	11	22
Honey	0	22	3	2	27
Cream of Tartar	0	5	6	0	11
Mustard	0	0	11	0	11
White Lead	0	12	7	0	19
Fertilizer	5	6	0	0	11
	5	71	54	16	146

The subjects for remark are so fully covered by the bulletins already issued by the department that I can only add my concurrence therein.

I have the honour to be, sir,

Your obedient servant,

JOHN BAKER EDWARDS, Ph.D., D.C.L., F.C.S.,
Official Analyst, Montreal.

OTTAWA, 5th August, 1897.

The Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour of submitting to you my annual report of the results of my analysis of samples of food, &c., for the year ending 30th June, 1897.

During the year I have analysed and reported upon 125 samples. Of these I have found 70 genuine or unadulterated, 4 sold as compound, 35 adulterated, and 16 doubtful, as may be seen in the table annexed:—

Designation.	Genuine.	Sold as Compound.	Adulterated.	Doubtful.	Total.
Pepper	10	0	6	6	22
Ginger	10	0	3	0	13
Vinegar	10	0	2	1	13
Honey	17	0	6	0	23
Cream of Tartar	12	0	3	6	21
White Lead	2	0	12	0	14
Fertilizers	8	0	0	2	10
Mustard	1	4	3	1	9
	70	4	35	16	125

I have the honour to be, sir,

Your obedient servant,

F. X. VALADE, M.D.,
Public Analyst.

SCHOOL OF SCIENCE,
TORONTO, 30th September, 1897.

To the Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit the annexed report of the work done in my laboratory, under the Adulteration of Food Act, during the past year.

During the year ending 30th June, 1897, 135 samples were analysed. Of these 86 were reported genuine, 34 adulterated, three sold as compounds and two sold illegally, as shown in the following table.

Samples analysed for the year ending 30th June, 1897:—

Samples.	Genuine.	Adulterated.	Sold as Compound.	Sold Illegally.	Total
Pepper	13	0	2	0	15
Ginger	13	2	0	0	15
Vinegar	7	6	0	0	13
Paris Green	2	0	0	0	2
Honey	19	4	0	0	23
Cream of Tartar	6	5	0	0	11
Fertilizers	7	2	0	2	11
White Lead, dry	2	0	0	0	2
White Lead, in oil	6	6	1	0	13
Pepper	10	0	0	0	10
Mustard	1	9	0	0	10
	86	34	3	2	125

Besides the foregoing, there were also submitted to me for analysis and report ten standard samples of agricultural fertilizers.

I have the honour to be, sir,
Your obedient servant,
W. HODGSON ELLIS,
Official Analyst.

OFFICE OF PUBLIC ANALYST,
LONDON, 30th June, 1897.

To the Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to submit to you my report of work done in my laboratory during the past year. During this period 115 samples have been examined as follows:—

Name of Samples.	Genuine.	Adulterated.	Sold Illegally.	Doubtful.	Total.
Pepper, white	10	2	0	0	12
Pepper, black	10	0	0	0	10
Ginger, ground	8	5	0	0	13
Vinegar, white wine	6	2	0	0	8
Vinegar, malt	3	0	0	0	3
Vinegar, cider	3	0	0	2	5
Vinegar, pure grape	1	0	0	0	1
Honey	19	0	0	2	21
Cream of Tartar	6	4	0	0	10
Fertilizers	4	2	3	0	9
White Lead	7	7	0	0	14
Mustard	0	9	0	0	9
	77	31	3	4	115

The first lot of fertilizers were standard samples sent from Chief Analyst's office, and new samples substituted by the manufacturers, consequently I have not classified them as genuine or otherwise; and in the second lot three of the samples were not found in the bulletin: these I classed as sold illegally.

I would specially call your attention to the report on mustard, all of which were adulterated; some to the extent of 60 to 70 per cent of adulterant. The other samples most largely adulterated are white lead, ginger and cream of tartar. In the case of white lead, in some of the samples there was over 60 per cent of adulterant present.

I have the honour to be, sir,

Your obedient servant,

FRANKLIN T. HARRISON.

ST. JOHN'S COLLEGE,
WINNIPEG, 3rd August, 1897.

The Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to present a tabulated statement showing the general results of the analysis of samples submitted to me by the department during the year ended 30th June, 1897:—

Name.	Genuine.	Adulterated.	Not Classed.	Total.
Pepper	14	2	4	20
Mustard	0	3	5	8
Ginger	6	2	4	12
Vinegar	0	0	12	12
Honey	13	1	4	18
Fertilizers	5	3	9	17
Cream of Tartar	4	3	1	8
White Lead	1	0	11	12
	43	14	50	107

I have the honour to be, sir,

Your obedient servant,

EDGAR T. KENRICK.

APPENDIX A—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of					
				Moisture or Loss at 100 C.	Alcoholic Extract, essentially Piperine or Resin.	Ash.			
						Total.	Insoluble in Water.	Soluble in Water.	Soluble in Hydrochloric Acid.
1896.	*M. Bowman, Analyst, Halifax.*			p.c	p.c.	p.c.	p.c.	p.c.	p.c.
Aug. 20..	Pepper, W. H. Schwartz & Sons, Halifax.	10600	16438	9·61	....	6·74	3·95	2·79	.....
do 20..	Black pepper, Davison Bros., Halifax	10601	16439	9·82	.....	6·65	2·81	3·84	.....
do 20..	White do Brown & Webb do	10602	16440	11·83	....	2·07	1·75	0·32	....
do 20..	do do W. H. Schwartz & Sons Halifax.	10603	16441	12·79	.....	4·15	3·47	0·68	.....
do 21..	Black pepper, J. P. Wambolt, Halifax	10604	16442	9·72	.....	8·78	5·24	3·54	.....
do 21..	White do J. P. Mott & Co., Dartmouth, N.S.	10605	16443	9·88	.....	2·91	2·17	0·74	.....
do 21..	Black pepper, Simpson Bros. & Co., Halifax.	10606	16444	7·91	.....	4·33	1·76	2·57	.....
do 24..	White pepper, J. D. McKenzie, Pictou, N.S.	10607	16445	10·22	....	2·67	1·96	0·71	..
do 24..	Black pepper, G. A. Pyke, Halifax.	10608	16446	10·26	....	4·70	2·30	2·40	.....
do 24..	White do A. Wells & Co., Montreal, Que.	10609	16447	10·57	.....	2·77	2·19	0·58	.....
do 25..	Black pepper, J. P. Mott & Co., Halifax.	10610	16448	9·85	....	5·25	2·70	2·55	....
do 25..	Black pepper, Dearboru & Co., St. Johns, N. B.	10611	16449	9·95	.....	4·15	2·02	2·13	.....
do 25..	White pepper, Thompson, Bradshaw & Co., Toronto.	10612	16450	10·10	.....	2·44	1·51	0·93	.....
do 25..	White pepper, H. S. & A. Ewing & Co., Montreal.	10613	16451	11·86	.....	3·25	2·64	0·61	.....
do 25..	White pepper, W. G. Dean & Sons.	10614	16452	10·86	.....	2·60	2·12	0·38	.....
	W. F. Best, Analyst, St. John, N.B.								
July 27..	White Pepper, Vendor	9853	15019	12·07	.....	1·30	1·16	0·14	.....
do 27..	do do	9854	15020	12·01	.....	1·33	1 15	0·18	.....
do 27..	do do	9855	15021	12·06	.....	1·29	1·14	0·15	.....
do 27..	do Dearborn & Co., St. John, N.B.	9856	15022	12·04	.....	1·31	1·17	0·14	.....
do 27..	Black Pepper, Dearborn & Co., St. John, N.B.	9857	15023	11·90	.....	4·10	2·30	1·80	.....
do 28..	Black Pepper, Vendors..... ..	9858	15024	11·90	.....	4·10	2·30	1·80	.....
do 28..	do C. E. MacMichael, St. John, N.B	9859	15025	11·93	.....	4·00	2·30	1·70	.....
do 28..	White Pepper, Jardine & Co., St. John, N.B.	9860	15026	12·36	.....	2·49	1·92	0·57	.....
do 28..	White Pepper, S. H. & A. S. Ewing, Montreal.	9861	15027	12·05	....	1·36	1·21	0·15	.....
do 28..	White Pepper, Pure Gold Co., Toronto, Ont.	9862	15028	12·40	.....	2·47	1·87	0·60	.....
do 28..	Black Pepper, not known.....	9863	15029	11·50	.....	6·36	3·58	2·78	.....
do 28..	do Dearborn & Co., St. John, N.B.	9864	15030	10·96	....	4·12	2·52	1·60	.....
do 28..	Black Pepper, G. M. Barker, St. John, N.B.	9865	15031	11·90	.....	4·09	2·28	1·81	.....

PEPPER—Tabulated Statement.

Analysis.			Microscopic Examination.	Analyst s Remarks.	Name and Address of Vendor of Sample.
Insoluble in Acid; Sand.	Petroleum Ether Extract.	Volatile Oil.			
p.c.	p.c.	p.c.			
1·31	....	....	Pepper only....	Genuine	A. Q. Doyle & Co., Halifax.
0·29	.....	..	do	do	K. O'Neil, 143 Lower Water St., Halifax.
0·34	....	....	do	do	W. C. Anderson, 101 Granville St., Halifax.
0·21	.....	.....	Rice and wheat starch. ...	Adulterated with rice and wheat flour.	H. W. Ross, 206 Argyle St., Halifax.
1·84	.....	.....	No foreign starches	Doubtful, ash being excessive.	J. G. Restie, Portland St., Halifax.
0·27	....	....	Pepper only.....	Genuine.....	Alex. Hay, Dartmouth.
0·29	.....	....	do	do	Sutherland Bros., Dartmouth.
0·44	....	..	do	do	R. Dyer, Pictou, N.S.
0·63	.....	....	do	do	N. Frazer do
0·62	....	...	do	do	D. McEachern, Pictou, N.S
0·60	...	....	do	do	B. D. Rogers, Stetterton, N.S.
0·22	.....	.....	do	do	Junior Association, Stetterton, N.S.
0·21	.....	.....	Wheat starch and a little mustard cake.	Adulterated	G. McIntosh, Stetterton, N.S.
0·32	.....	....	Pepper only	Genuine.....	J. W. Snook, Truro.
0·37	.....	.....	Wheat starch and mustard cake.	Adulterated	W. H. Smith & Co., Truro.
0·22	.....	....	No foreign substances detected.	Not adulterated.....	Dearborn & Co., 95 Prince Wm. St., St. John, N.B.
0·20	.....	.....	do do	do	E. J. Kennedy, 84 King St., St. John, N.B.
0·20	.....	.....	do do	do	Puddington & Merritt, 55 Charlotte St., St. John, N.B.
0·23	.....	.....	do do	do	P. Nase & Son, Indiantown Ferry.
0·55	.....	.....	do do	do	J. E. Cowan, 99 Maria St., St. John, N.B.
0·55	....	.....	do do	do	A. Lordly & Co., 226 Paradise Row, St. John, N.B.
0·56	.....	.....	do do but much fine dust.	do	Green & Ushor, 49 Winter St., St. John, N.B.
0·33	.....	....	No foreign substances detected.	do	W. R. Logan, Fredericton, N.B.
0·20	....	.....	do do	do	G. T. Whelpley, Fredericton, N.B.
0·31	.....	.....	do do	do	Halt, Morrison & Co., Fredaricton, N.B.
1·00	.....	....	Adulterated with a small amount of Olive Stone powdered.	Adulterated....	J. Gibson & Son, Fredericton, N.B.
0·16	...	.....	do do	do	D. W. Eastbrooke & Son, Fredericton, N.B.
0·50	....	.....	No foreign substance detected.	Not adulterated.....	Zerna & Co., Fredericton, N.B.

APPENDIX A.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Ash.					
				Moisture or Loss at 100C.	Alcoholic Extract, essentially Piperine or Resin.	Total.	Insoluble in Water.	Soluble in Water.	Soluble in Hydrochloric Acid.
1896.	*Dr. M. Fiset, Analyst, Quebec.*			p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
July 22..	Black Pepper, M. Tibadeau, Quebec	10238	16082	...	...	5·92	2·78	3·14	...
do 22..	White Pepper do ..	10239	16083	...	...	2·84	1·82	1·02	...
do 22..	Black Pepper ...	10240	16084	...	...	6·00	3·62	2·38	...
do 22..	do ...	10241	16085	...	...	5·92	3·94	1·98	...
do 22..	White Pepper. ...	10242	16086	...	...	2·16	1·62	0·54	...
do 22..	do ...	10243	16087	...	...	2·90	2·50	0·44	...
do 22..	Black Pepper ...	10244	16088	...	...	7·68	5·65	2·03	...
do 22..	White Pepper. ...	10245	16089	...	...	3·72	3·06	0·66	...
do 23..	do ...	10246	16090	...	...	3·64	2·84	0·87	...
do 23..	Black Pepper ...	10247	16091	...	...	6·10	2·62	3·48	...
do 23..	White Pepper. ...	10248	16092	...	...	3·03	2·38	0·65	...
do 23..	Black Pepper. ...	10249	16093	...	...	5·10	2·30	2·80	...
do 23..	White Pepper, Laporte, Martin & Co.	10250	16094	...	...	3·20	2·54	0·66	...
do 23..	White Pepper, Hudon, Hubert & Co.	10251	16095	...	...	5·10	2·30	2·80	...
do 24..	White Pepper ...	10252	16096	...	...	2·82	2·34	0·48	...
	Dr. J. B. Edwards, Analyst, Montreal, Que.								
July 21..	White pepper, Marrotte & Leblanc, Montreal.	9360	16077	12·63	...	3·15	...	...	...
do 21..	White pepper, E. H. & A. S. Ewing, Montreal, Que.	9361	16078	11·05	...	2·15	...	...	...
do 21..	Black pepper ...	9364	16081	9·18	...	4·60	...	...	...
do 21..	do ...	9365	16079	10·14	...	3·45	...	...	...
do 21..	White pepper ...	9366	16080	10·23	...	3·65	...	...	...
do 21..	White pepper, Marrotte & Leblanc, Montreal.	9367	15988	13·64	...	3·65	...	...	...
do 21..	Black pepper, Marrotte & Leblanc, Montreal.	9368	15989	10·02	...	5·40	...	...	...
do 21..	White pepper ...	9369	15990	13·38	...	3·3	...	...	...
do 21..	Black do ...	9370	15991	10·72	...	3·50	...	...	...
do 21..	White pepper, The F. F. Daley Co., Hamilton.	9371	15992	12·33	...	1·40	...	...	...
do 21..	Black pepper, Z. Chaput fils et Cie, Montreal.	9372	15993	14·43	...	8·60	...	...	...

PEPPER—Tabulated Statement—*Continued.*

Analysis.			Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble in Acid; Sand.	Ether Petroleum Extract.	Volatile Oil.			
p.c.	p.c.	p.c.			
0·88	....	.....	Too many dark particles and too much fibrous tissue.	Unadulterated	J. Butin, 40 Church St., Quebec.
0·46	.....	.....	Pepper tissue only.	do	P. Roussell, 32 La Chapelle St., Quebec.
1·30	.....	....	do	do but sand rather high.	N. St. Pierre, 51 Bridge St., Quebec.
1·72	.....	.....	Pepper tissue only, but pepper dust probably present.	do	do
0·22	.....	.....	Pepper tissue only.	do	M. A. Lafortune, 46 St. Joseph St., Quebec.
0·14	.....	....	Rice, flour and pepper tissue	Adulterated	do
1·64	...	....	Wheat and rice starches, cayenne, roasted shells and charcoal.	do	do
0·38	.....	.....	Pepper tissue only.	Unadulterated.....	P. R. Geroux, 29 St. Joseph St., Quebec.
0·48	...	.....	Much wheat starch and some rice starch.	Adulterated	L. Jutras, Richmond, Que.
0·64	...	....	Pepper tissues only.	Unadulterated....	do
0·26	.....	.....	do	do	G. E. Robitaille & Co., Sherbrooke, Que.
0·66	.....	....	Much wheat starch present.	Adulterated	do
0·22	....	....	Wheat and rice starches, cocoa nut shells.	do	A. Quanlot, Sherbrooke, Q.
0·54	....	.....	Rice flour; granules small but seem too many for pepper.	Doubtful.....	do
0·60	.....	.....	Rice flour present.	Adulterated	J. D. Champigny, Sherbrooke, Que.
0·20	4·40	.....	Contains a few fragments of mustard husk; no foreign starch.	Genuine	J. O. Levesque, 2010 St. Catherine St., Montreal, Que.
.....	5·21	.....	No foreign tissue or starch.	do	D. Gratton, 2094 St. Catherine St., Montreal.
0·62	7·05	.....	do do ..	do	D. Gratton, 2094 St. Catherine St., Montreal.
0·37	3·21	...	No foreign starches; mustard and wheat husks.	Adulterated; 10 to 15 per cent foreign materials.	J. J. Hayes & Co., 147½ Vitré St., Montreal.
0·55	4·17	...	Contains mustard husks, wheat and pea starch.	Adulterated 7½ to 10½ per cent.	L. W. Telmosse & Co., 266 St. Lawrence St., Mont.
0·55	3·03	...	Contains mustard husks, wheat and pea starch.	Adulterated 5 to 7½ per cent.	S. Gougeon, 34 Latour St., Montreal, Que.
2·78	5·55	....	Mustard husks and foreign starches; cayenne.	Adulterated 10 to 15 per cent.	S. Gougeon, 34 Latour St., Montreal, Que.
0·33	2·59	.....	Mustard husks and foreign starches; cayenne.	Adulterated 8 to 10 per cent.	M. F. Lafortune, 116 St. Maurice St.
1·95	1 87	....	Chiefly pepper stems and milling, charcoal and a few pepper cells.	Adulterated	M. F. Lafortune, 116 St. Maurice St.
0·40	2·61	.....	Contains mustard husks and milling and foreign starches.	Adulterated to the extent of from 15 to 20 per cent.	Pringle, Shark & Co., Huntingdon, Que.
0·64	6·414	....	No foreign starches; excess of wood stems.	Genuine	Pringle, Shark & Co., Huntingdon, Que.

APPENDIX A.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of					
				Moisture or Loss at 100C.	Alcoholic Extract essentially Piperine or Resin.	Ash.			
						Total.	Insoluble in Water.	Soluble in Water.	Soluble in Hydrochloric Acid.
1896.	*Dr. J. B. Edwards, Analyst, Montreal, Que.*—Con.			p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
July 21..	Black pepper, Forbes Bros., Hamilton.	9373	15994	9·727	.....	7·50	....	.....	.....
do 21..	Black pepper, Pure Gold Co.....	9374	15995	12·13	.....	3·50	....	.....	.....
do 21..	do	9375	15996	12·67	.....	2·60	...	.....	.....
do 21..	White pepper	9376	15997	12·27	.....	2·65	...	.....	.....
do 21..	Black do	9377	15998	11·59	.....	7·70	.....	.....	.....
do 21..	White do	9378	15999	11·38	.....	2·05	.....	.....	.....
	Dr. F. X. Valade, Analyst, Ottawa.								
July 20..	White Pepper, H. H. Brennan, Ottawa.	10732	15454	11·20	7·20	2 85	....	.....	.....
do 20..	White Pepper.....	10733	15455	10·50	9·25	3·00	.....	.....	.....
do 20..	White Pepper, Bate & Co., Ottawa.	10734	15456	10·60	8·80	2·40	.....	.....	.....
do 20..	White Pepper, Mayell, London, Ont.	10735	15457	10·45	10·25	3·25	.....	.....	.....
do 20..	White Pepper, Caverhill & Hughes, Montreal.	10736	15458	11·40	8·70	2·50	.....	.....	.....
do 20..	Black Pepper, Brennan, Ottawa...	10737	15459	10·65	13·50	8·15	.....	.....	.....
do 20..	do Goodall Bros., Wellington Street.	10738	15460	11·55	10·95	5·65	.....	.....	.....
do 20..	Black Pepper. S. Major, Ottawa...	10739	15461	8·80	10·20	16·18	.....	.....	.....
do 20..	do do	10740	15462	9·55	14·20	5·90	.....	.....	.....
do 20..	do Mayell, London, Ont.	10741	15463	9·80	15·77	6·75	.....	.....	.....
do 20..	do Ewing, Montreal....	10742	15464	10·50	11·80	4·90	.....	.....	.....
do 20..	White Pepper, Snowdrift Co., Brantford.	10743	15465	9·75	7·80	2·63	.....	.....	.....
do 20.	White Pepper.....	10744	15466	10·88	8·15	2·75	.....	.....	.....
	Dr. W. H. Ellis, Analyst, Toronto.								
July 29..	White pepper, Piper, wholesale merchant, Toronto, Ont.	8702	15467	10·90	7·79	1·30	1·15	0·15	.....
do 29..	do	8703	15468	11·20	8·29	1·20	1·10	0·10	.....
do 29..	White pepper, Todhunter & Mitchell, Toronto, Ont.	8704	15469	11·10	7·51	2·90	2·35	0·55	.....
do 29..	do	8705	15470	11·00	7·08	1·65	1·35	0·30	.....
do 29..	do	8706	15471	11·20	6·99	2·20	1·75	0·45	.....
do 29..	Black pepper, Todhunter & Mitchell, Toronto, Ont.	8707	15472	10·30	8·33	5·05	3 10	1·95	.....
do 29..	Black pepper, Dalton Bros., Toronto, Ont.	8708	15473	10.30	9·03	6·55	4·15	2·40	.....

PEPPER—Tabulated Statement—*Continued.*

Analysis.			Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble in Acid; Sand.	Petroleum Ether Extract.	Volatile Oils.			
p.c.	p.c.	p.c.			
0·39	5·123	.....	Contains no foreign starch or tissue.	Genuine	James Henry, Huntingdon, Que.
0·20	2·82	.....	Contains rice and pea flour, not determined, 15 to 20 per cent.	Adulterated	R. E. Kelly, Huntingdon, Que.
.....	1·82	.....	Contains ground peas, wheat starch and millings.	Adulterated 25 to 30 per cent.	R. E. Kelly, Huntingdon, Que.
0·15	2·22	....	No foreign starch or tissue.	Genuine	W. Gale, Ormstown, Que.
0·85	4·53	.....	Contains pea flour, mustard husks and millings.	Adulterated 20 to 25 per cent.	do do
.....	2·08	.....	No foreign tissue	Genuine	J. McGerrigle, Ormstown, Que.
0·35	2·45	.....	Contains rice flour 10 per cent.	Doubtful.....	C. Esmond, cor. Kent and Albert Sts., Ottawa.
0·15	2·70	.....	Buckwheat flour, about 8 per cent.	do	Mrs. McGralt, cor. Maria and Bay Sts., Ottawa.
0.25	2·00	....	Wheat flour, about 15 per cent.	Adulterated.....	J. St. Amand, Bay St., Ottawa.
0·40	2·70	.....	Buckwheat flour, less than 5 per cent.	Genuine.....	Sherwood Bros., 270 Bank St., Ottawa.
0·35	2·15	.....	Buckwheat flour, less than 5 per cent.	do	J. G. Stewart, 273 Bank St., Ottawa.
1·85	5·15	.....	No foreign vegetable matter.	Doubtful, yields too great an amount of ash.	W. Schwitzer, 486 Rideau St., Ottawa.
1·35	3·65	.....	Buckwheat flour, about 5 per cent.	Genuine.....	J. Goodall, 55 Augusta St., Ottawa, Ont.
1·15	12·00	.....	Wheat flour, about 25 per cent.	Adulterated, contains a large amount of mineral matter.	Thos. Renaud, Clarence St., Ottawa.
1·65	3·65	.....	Wheat and rice flour, about 5 per cent.	Genuine.....	R. Charlebois, Clarence St,, Ottawa.
1·50	3·90	.....	No foreign matter.....	do	T. Stevens, Carleton Place, Ont.
1·10	3·00	....	Rice flour, about 15 per cent and a little wheat flour.	Adulterated.....	Weekes Bros., Carleton Place, Ont.
0·10	2·02	.....	Wheat flour, about 15 per cent.	do	H. Richardson, Carleton Place, Ont.
0·45	2·35	...	Buckwheat flour, about 10 per cent.	Doubtful.....	G. Edwards, Carleton Place, Ont.
.....	.....	1·26	No foreign substance.....	Genuine	A. F. Baker, 302 Yonge St. Toronto
.....	.....	1·12	do	do	A. Sinclair, 320 Yonge St., Toronto.
.....	.....	0·89	do	do	W. Eddy, 365½ Yonge St., Toronto.
.....	.....	0·78	do	do	J. G. Gibson, 525 Yonge St., Toronto.
.....	.....	0·95	do	do	Martin McMullin, 441 Yonge St., Toronto.
.....	.....	1·36	do	do	do
.....	...	1·47	do	do	C. L. Bond, 559 Queen St., West, Toronto.

APPENDIX A.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Moisture or Loss at 100C.	Result of Alcoholic Extract, essentially Piperine or Resin.	Result of Ash. Total.	Result of Ash. Insoluble in Water.	Result of Ash. Soluble in Water.	Result of Ash. Soluble in Hydrochloric Acid.
1896.	*Dr. W. H. Ellis, Analyst, Toronto.* —Concluded.			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
July 29..	Black pepper, Dalton Bros., Tor., Ont.	8709	15474	10·70	10·61	6·50	4·10	2·40	.....
do 29..	Black pepper, McKee, Smith & Co., Toronto, Ont.	8710	15475	10·20	8·46	3·60	1·95	1·65	.....
do 29..	Black pepper, Todhunter and Mitchell, Toronto, Ont.	8711	15476	10·90	7·56	4·40	2·25	2·15	.....
do 29..	Black pepper, Dalton Bros., Tor., Ont.	8712	15477	10·20	9·15	6·20	4·20	2·00	.. .
do 29..	Black pepper, Todhunter & Mitchell, Toronto, Ont.	8713	15478	9·90	8·46	4·25	2·10	2·15	... .
do 29..	White pepper, Todhunter & Mitchell, Toronto, Ont.	8714	15479	11·00	6·85	2·40	1·75	0·65	... .
do 29..	"Compound," Dalton Bros., Tor., Ont.	8715	15480	11·10	7·44	2·40	1·90	0·50	.....
do 29..	Compound.....	8716	15481	10·60	7·32	3·25	2·60	0·65	.....
	F. T. Harrison, Analyst, London, Ont.								
July 29..	White pepper, Perkins, Ince & Co., Toronto.	8958	15657	11·20	.....	1·70	1·40	0·30	.....
do 29..	Black pepper, Smith, McKay & Co., Toronto.	8959	15658	10·88	.....	5·71	3·01	2·70	.....
do 30..	Black pepper, Beattie & Co., St Mary's.	8960	15659	10·17	....	4·17	2·27	1·90	.....
do 30..	Black pepper, Gorman & Eckart, London, Ont.	8961	15660	11·37	....	4·25	1·93	2 32	.....
do 30..	White pepper, A. M. Smith & Co., London, Ont.	8962	15661	10 20	.....	3·30	2·58	0·72	.... .
do 30..	Black pepper, M. Masureth.....	8963	15662	10·35	.....	4·26	2·05	2·21	.....
do 30..	White pepper, Hamilton Spice Co..	8964	15663	10·30	....	1·60	1·40	0·20	.....
do 30..	White pepper, S. H. & A. S. Ewing, Montreal.	8965	15664	11·60	....	2·30	2·02	0·28	.....
do 30..	White pepper.....	8966	15665	8·70	.....	17·59	15·80	1·79	.....
do 30..	White pepper, Gorman & Eckart, London, Ont.	8967	15666	11·38	.....	0·93	0·90	0·03	....
do 30..	Black pepper, Snowdrift Co., Brantford.	8968	15667	9·90	....	5·73	3·15	2·63	.....
do 30..	White pepper, S. H. & A. S. Ewing, Montreal.	8969	15668	10·35	... ..	3·02	2·58	0·44	.. .
do 30..	Black pepper, T. B. Escott, London.	8970	15669	11·45	....	4·25	1·90	2·35	.....
	Prof. E. B. Kenrick, Analyst, Winnipeg, Man.								
Aug. 7..	Black Pepper, Thompson, Codville & Co., Winnipeg.	11003	14743	12·52	.....	6·15	3·01	3·14	.....
do 7..	Black Pepper, Williams & Hunter, Winnipeg.	11005	14744	12·52	.....	6·79	3·31	3·48	.....
do 7..	Black Pepper, Todhunter & Mitchell, Toronto.	11006	14745	12·50	.....	5·47	3·14	2·33	....
do 7..	White Pepper, Dyson, Gibson & Co., Winnipeg.	11007	14746	13·73	.....	1·87	1·66	0·21	.....

PEPPER—Tabulated Statement—*Continued.*

Analysis.			Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor.
Insoluble in Acid; Sand.	Petroleum Ether Extract.	Volatile Oil.			
p. c.	p. c.	p. c.			
.....	.....	1·68	No foreign substance.....	Genuine	Dawson Bros., 445 Queen St., West, Toronto.
.....	.....	1·48	do	do	Shields & Co., 308 Queen St., Toronto.
.....	.....	1·84	do	do	T. Guay, 318 Queen St., Toronto.
.....	.....	1·79	do	do	J. Sumner.
.....	.....	0·46	do	do	C. M. Webb, 273 Queen St., West, Toronto.
.....	.....	1·32	do	do	Stapleton & Co.
.....	.....	0·25	.....	This sample compound and from small amount of volatile oil seems mixed with unknown adulterant.	G. Carlton.
.....	.....	0·17	.....	do ...	T. Hooper.
0·27	.....	.....	Pepper only.....	Pure	E. Flaherty, Stratford.
0·88	.....	.....	do	do	Walsh Bros., Stratford.
0·33	.....	.....	do	do	A. Beattie & Co., St. Mary's.
0·27	.....	.....	do	do	F. W. Hutton, St. Mary's.
0·72	.....	.....	do	do	G. McLean, St. Mary's.
0·41	.....	.....	do	do	R. D. McKellar, Glencoe.
0·25	.....	.....	do	do	A. Finlayson, Glencoe.
0·32	.....	.....	do	do	H. Malcomson, Chatham, Ont.
8·53	.....	.....	Wheat flour and much dirt and a little pepper.	Adulterated.....	Taylor & Williamson, Chatham.
0·15	.....	.....	Pepper only, very little tissue.	Pure.....	Harward & Kitchen, Chatham.
0·65	.....	.....	Pepper.....	do	F. Mann, Windsor.
0·48	.....	.....	do	do	G. H. Main, Windsor.
0·35	.....	.....	do	do	Smith & Duck, Windsor.
.....	.....	.....	Pepper.....	Genuine.....	Mrs. Cranston, Winnipeg
.....	.....	.....	do	do	R. Crawford do
.....	.....	.....	do	do	B. Hendry do
.....	.....	.....	do with a little foreign starch.	Doubtful.....	D. J. Taylor do

APPENDIX A.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of					
				Moisture or Loss at 100°C.	Alcoholic Extract, essentially Piperine or Resin.	Ash.			
						Total.	Insoluble in Water.	Soluble in Water.	Soluble in hydrochloric Acid.
1896.	*Prof. E. B. Kenrick, Analyst, Winnipeg, Man.—Con.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Aug. 7..	White Pepper, A. MacDonald & Co., Winnipeg.	11008	14747	13·65	....	2·79	2·46	0·33	...
do 7..	White Pepper.....	11009	14748	13·27	.....	2·79	2·32	0·47	.....
do 8..	Black Pepper, Dyson, Gibson & Co., Winnipeg.	11010	14749	12·80	.....	4·31	1·63	2·68	....
do 8..	Black Pepper, Dominion Spice Mills, Toronto.	11011	14750	12·72	...	7·10	3·20	3·90	.....
do 8..	Black Pepper, Todhunter & Mitchell, Toronto.	11012	14751	12·71	...	6·57	3·64	2·93	....
do 8..	White Pepper	11013	14752	13·07	....	3·13	2·73	0·40	....
do 8..	do Pure Gold Co., Toronto.	11014	14753	13·50	....	3·15	2·81	0·34	.....
do 8..	do Williams & Hunter, Winnipeg.	11015	14754	13·24	....	3·24	2·83	0·41	....

PEPPER—Tabulated Statement—*Concluded.*

Analysis.			Microscopic Examination.	Analyst's Remarks.	Name and address of Vendor of Sample.
Insoluble in Acid; Sand.	Petroleum Ether Extracted.	Volatile Oil.			
p. c.	p. c.	p. c.			
.....	.....	...	Pepper.....	Genuine.....	A. McKinny, Winnipeg.
.....	....	.....	do	do	T. E. Williams do
... .	.....	.....	.....	Doubtful	W. H. McQuean do
.....	.....	.....	do	Genuine.....	F. Cloutier do
.....	.. .	.....	.....	Doubtful	C. D. Anderson do
.. .	.....	.....	Pepper and wheat.....	Adulterated	A. McMillan do
.....	.....	.....	....	Doubtful	J. G. Hargrave do
. ..	.....	.....	Pepper, with foreign starch.	Adulterated	Hodges & Co. do

APPENDIX B.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of			
				Moisture or Loss at 100°C.	Petroleum Ether Extract.	Alcoholic Extract.	Extractive.
1897.	*W. F. Best, Analyst, St. John, N.B.*			p. c.	p. c.	p. c.	p. c.
Sept. 16	Ground Ginger, Dearborn & Co., St. John	9866	15032	10·20	.....	.....	3·25
do 16	do Lordly & Co., St. John, N.B	9867	15033	10·10	.....	.....	4·15
do 16	do C. & E. M. McMichael...	9868	15034	10·20	.....	.....	3·65
do 16	J. Findlay	9869	15035	9·15	.....	.....	3·95
do 16	Ground Ginger, F. F. Dalley & Co., Hamilton	9870	15036	10·20	.....	.....	5·25
do 16	Ground Ginger, Pure Gold Co., Toronto..	9871	15037	10·08	.....	.....	4·20
do 16	do Dearborn & Co., St. John	9872	15038	11·30	.....	.....	4·40
do 16	do	9873	15039	11·00	.....	.....	3·95
do 16	do Canada Drug Co., St. John	9874	15040	10·10	.....	.....	4·05
do 16	do Merritt Bros. & Co	9875	15041	9·61	.....	.....	5·00
do 16	do Barker & Sons, St. John .	9876	15042	9·60	.....	.....	3·75
do 16	do S. H. & A. S. Ewing.....	9877	15043	9·50	.....	.....	4·30
do 16	do Baird & Peters	9878	15044	9·55	.....	.....	3·75
	Dr. M. Fiset, Analyst, Quebec.						
Aug. 20	Ground Ginger	10253	16118	.....	.....	.....	.....
do 20	do	10254	16119	.....	.....	.....	.....
do 20	do	10255	16120	....	.....	.....	.....
do 20	do Pure Gold Co.....	10256	16121	... .	.....	.....	.....
do 20	do	10257	16122	.....	.. ...	.....	.....
do 20	do	10258	16123	.....	.....	.....	.....
do 20	do	10259	16124	.....	.....	.....	.....
do 20	do	10260	16125	.....	.....	.....	.....
do 20	do	10261	16126	.....	.....	.....	.....
do 20	do	10262	16127	.....	.....	.....	.....
do 20	do	10263	16128	.....	.....	.....	.....
do 20	do	10264	16129	.....	... ...	.....	.....
do 20	do Pure Gold Co.....	10265	16130	.....	.....	.....	.....
do 20	do	10266	16131	.....	.....	.....	.....
do 20	do	10267	16132	.....	.. ..	....	.....

GINGER—Tabulated Statement.

Analysis. Ash. Total.	Ash. Soluble.	Ash. Insoluble.	Ash. Alkalinity of Soluble.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
6·10	.....	....	....	Shows only flour of ginger.....	Pure	P. O. Scovil, St. John.
6·05	.....	.....	.....	do do	do	A. Foster, St. John.
6·09	.....	.....	.....	No foreign starch	do	Alston & McBeach, St. John.
6·10	.....	.....	.....	do	do	W. A. McGee, St. John
3·15	..	.....	.....	Contains turmeric and ground ginger...	Adulterated with turmeric	M. L. Bonnell, St. John, N.B.
4·00	.....	.....	.....	Shows foreign starches as well as ground ginger.	Adulterated with wheat flour.	J. L. Armstrong & Bros. St. John, N.B.
7·00	.....	.....	.. .	No foreign starches.....	Not adulterated.	King & Noble, St. John
4·15	.....	.....	.....	Foreign starches as well as ground ginger	Adulterated with wheat flour.	Lordly & Co., St. John
4·15	.....	.....	.....	Shows foreign starch and ginger	Adulterated with a small amount flour.	Huestis & Mills, Sussex
5·65	.....	.....	.....	Shows only ground ginger.....	Not adulterated.	Mitchell & Dryden.
6·14	.....	.....	.....	No foreign tissue or other admixture ...	do	Gross & Co., Moncton
5·75	.....	.....	.....	Ground ginger, no foreign starch.....	do	E. E. Oyer & Co.
5·50	.....	.....	.....	do do	do	S. Melanson.
4·42	.....	.....	.....	Brownish yellow, shows no admixture with foreign starches.	Pure	Geo. Lambert, Lévis, Que.
6·90	.....	.....	....	do	do	John Sutcliffe.
4·16	. . .	.....	....	Dull yellow, shows no foreign starches..	do	G. B. Prevost & Co., Quebec.
4·38	.....	....	.....	do	do	J. Lavard, Quebec.
5·60	.. .	....	...	Light brown, shows no adulteration....	do	G. Boivin & Co., Quebec.
5·86	.....	.....	.....	Shows an admixture of 20 p. c. wheat flour.	Adulterated ..	Dion et Frère, Quebec.
4·44	.....	....	... .	Brownish yellow, shows no admixture with foreign starches.	Unadulterated	E. H. Pelletier, Quebec.
5·60	.....	....	.....	Shows an admixture of 20 to 25 p.c. wheat flour.	Adulterated ..	Josh. Picard, Quebec.
2·41	.....	....	... .	Shows an admixture of wheat flour and turmeric, 50 to 60 p.c.	do ..	L. Mercier, Quebec.
5·44	.....	.....	.....	Shows an admixture of 30 to 35 p.c. wheat flour, little turmeric, dark substance like shells.	do ..	Fortier & Corriveau, Quebec.
6·92	.....	.....	.....	Brownish yellow, shows no admixture..	Unadulterated	E. Turcotte, Quebec.
5·34	.....	.....	.....	Dull yellow, shows no admixture with foreign starch.	do ..	M. W. Colemon, Quebec.
6·08	.....	.....	...	Shows an admixture of 10 to 15 p.c. wheat flour.	Adulterated ..	P. E. Bégin, Lévis, Que.
4·48	.....	.....	.....	Yellow, shows an admixture of 10 to 15 p.c. rice flour.	do ..	J. Buchanan, Lévis, Que.
4·28	. . .	.....	.....	Dull yellow, shows no foreign starches..	Pure	G. & E. Couture, Lévis, Que.

APPENDIX B.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of			
				Moisture or Loss at 100°C.	Petroleum Ether Extract.	Alcoholic Extract.	Extractive.
1896.	*Dr. J. B. Edwards, Analyst, Montreal.*			p. c.	p. c.	p. c.	p. c.
Aug. 17	Ground Ginger	11501	16101	10·92	3·36	.....	.....
do 17	do	11502	16102	10·77	3·58	.....	.....
do 17	do Ewing, Heron & Co.	11503	16103	9·49	3·92	.....	.....
do 17	do	11504	16104	10·21	2·73	.....	.....
do 17	do Marrotte & Leblanc	11505	16105	9·94	2·21	.....	.....
do 17	do J. G. Duffy & Co.	11506	16106	10·58	4·54	.....	.....
do 17	do	11507	16107	10·17	2·46	.....	.....
do 17	do	11508	16108	10·50	3·46	.....	.....
do 17	do	11509	16109	10·75	3·125	.....	.....
do 17	do Dominion Spice Co., Toronto.	11510	16110	10·99	3·87	.....	.....
do 17	do	11511	16111	9·05	4·53	.....	.....
do 17	do	11512	16112	10·78	2·84	.....	.....
do 17	do	11513	16113	10·68	2·38	.....	.....
do 17	do	11514	16114	11·08	3·09	.....	.....
do 17	do	11515	16115	10·72	3·06	.....	.....
do 17	do	11516	16116	10·93	2·37	.....	.....
do 17	do C. Lacaille & Co., Montreal	11517	16117	10·75	2·78	.....	.....
	Dr. F. X. Valade, Analyst, Ottawa.						
Aug. 19	Ground Ginger, Bate & Sons, Ottawa	10745	16801	11·2	.....	8·1	.....
do 19	do	10746	16802	10·2	.....	7·3	.....
do 19	do Major, Ottawa	10747	16803	10·4	.....	8·75	.....
do 19	do	10748	16804	10·6	.....	8·7	.....
do 19	do Bate & Sons, Ottawa	10749	16805	11·7	.....	6·1	.....
do 19	do McCarthy, Druggist	10750	16806	10·9	.....	7·75	.....
do 21	do Evans Sons, Montreal	10751	16807	10·9	.....	6·8	.....
do 21	do	10752	16808	11·65	.....	10·1	.....

GINGER—Tabulated Statement—*Continued.*

Analysis. Ash. Total.	Soluble.	Insoluble.	Alkalinity of Soluble.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
6·75	.....	....	.....	Contains foreign starches, viz., wheat and millings, 10 to 12 p.c.	Adulterated under Food Act.	Gouin Frères, cor Ste. Catherine and St. Hubert St.
6·85	.....	.....	.....	do do ..	do ..	J. G. Stafford, 246 St. Antoine St.
4·20	.....	.....	.....	do do ..	do ..	M. Dwyer, 114 Fulford St., Montreal.
2·90	.....	.....	.....	Contains wheat flour and maize, 15 to 20 p.c.	do ..	O. Renaud, 1231 St. James St., Montreal.
3·10	.....	.....	.....	do do ..	do ..	E. W. Farrell, 1000 St. James St., Montreal.
5·10	.....	.....	.....	No foreign starch	do ..	J. H. Howard, 319 Roy St., Montreal.
3·20	.....	.....	.....	Contains maize starch.....	....	S. Bremner, 318 Roy St., Montreal.
4·90	.....	..	.. ..	No foreign starch	....	A. Renaud, 133 Roy St., Montreal.
4·25	.....	....	.....	do do ..	.....	C. J. Wright, Aylmer, Que.
5·35	.....	....	.....	do do ..	....	C. Devlin, Aylmer, Que.
12·55	.....	.....	...	Ash evolves H_2 by Hcl. iron reaction; contains wheat starch and maize, mustard husks.	Adulterated to the extent of 10 to 15 p.c.	Mrs. Chabot, Aylmer, Que.
4·50	....	.....	..	No foreign starch.....	Genuine.....	O. Lebrun, Hull, Que.
3·85	.....	...	.....	do do ..	do	B. Carrière do
4·75	..	....	....	do do ..	do ..	E. Carrière do
3·60	.....	.....	.....	do do ..	do	T. Dudevoir & Co., Maisonneuve, Que.
4 00	.....	.....	.....	Contains wheat starch and millings.....	Adulterated to extent of 15 to 20 p.c.	Bois & Pigeon, Maisonneuve, Que.
4·90	.....	....	.....	No foreign starch	Genuine	C. Belleron & Bros.
3·88	.....	.. ..	.....	Small quantity of turmeric.....	Genuine.....	J. Tweedy, 130 Rochester St., Ottawa.
4·10	.....	...	.....	Very little wheat and turmeric.....	do	S. Stitt, 141 Rochester St., Ottawa.
5·05	..	.....	.....	About 10 per cent. wheat flour and a little turmeric.	Adulterated ..	L. Ellard, 261 Rochester St., Ottawa.
4·0	.....	.....	....	Wheat flour and turmeric in small quantity.	Genuine.....	W. H. Scripture, Druggist, Theodore St.
3·95	.....	.....	.....	do do do ..	do	W. Waterson, 141 Nicholas St., Ottawa.
6·75	.....	...	.....	About 10 per cent wheat flour and turmeric.	Adulterated ..	M. A. Bélanger, 138 Rideau St., Ottawa.
4·0	.....	.....	....	Very little wheat and turmeric.....	Genuine.....	A. E. Brethour, Druggist, Bank St., Ottawa
4·05	.....	...	.....	do do	do	John Edgar, Bank St., Ottawa.

APPENDIX B—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of			
				Moisture or Loss at 100°C.	Petroleum Ether Extract.	Alcoholic Extract.	Extractive.
1896.	*Dr. F. X. Valade. Analyst, Ottawa.*—Con.			p. c.	p. c.	p. c.	p. c.
Aug. 21	Ground Ginger, Lyman Sons, Montreal...	10753	16809	10·7	.....	10·85	.....
do 22	do Bate & Sons, Ottawa.....	10754	16810	11·65	.....	7·15	.....
do 22	do do do	10755	16811	11·7	.....	10·3	.....
do 22	do do do ...	10756	16812	10·2	.....	6·0	.....
do 22	do do do	10757	16813	11·7	.....	10·3	.....
	W. H. Ellis, Analyst, Toronto.						
Sept. 2	Ground Ginger	8717	16814	11·60	5·62	.....	.....
do 2	do	8718	16815	11·60	5·53	.....	.....
do 2	do A. Piper & Co., Hamilton.	1719	16816	11·80	5·95	.....	.....
do 2	do Lyman, Knox & Co., Toronto	8720	16817	11·50	6·13	.....	.....
do 2	do	8721	16818	5·80	2·39	.....	.....
do 2	do	8722	16819	11·40	5·92	.....	.....
do 2	do	8723	16820	11·20	5·72	.....	.....
do 2	do Pure Gold Co., Toronto...	8724	16821	11·60	5·60	.....	.....
do 2	do Todhunter, Mitchell & Co., Toronto.	8725	16822	11·70	5·56	.....	.....
do 2	do W. G. Dun, Hamilton.....	8726	16823	11·70	5·39	.....	.....
do 2	do J. Turner, Hamilton.....	8727	16824	11·65	5·93	.....	.....
do 2	do W. G. Dun, Hamilton.....	8729	16825	12·00	4·81	.....	.....
do 2	do Lumsden Bros., Hamilton.	8730	16826	11·30	6·04	.....	.....
do 2	do Snowdrift Co., Brantford..	8731	16827	11·40	3·91	.....	.....
do 2	do F. F. Dailey & Co., Hamilton.	8732	16828	11·20	4·32	.....	.....

GINGER—Tabulated Statement—*Continued.*

Analysis. Ash. Total.	Soluble.	Insoluble.	Alkalinity of Soluble.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
5·05	.....	.....	.....	About 5 per cent wheat and turmeric and a little ginger fiber.	Adulterated 5 p.c. wheat and turmeric ginger not sifted.	R. B. W. Robinson, Druggist, Bank St., Ottawa.
4·05	.....	.....	.....	A little wheat and turmeric.....	Genuine.....	J. Templeman, 2 Emily St., Ottawa.
4·11	.....	.....	.....	do do	do	A. P. Johnson, 370 Concession St., Ottawa
3·60	.....	.....	.....	do do	do	C.G. Culbert, Druggist, Rideau St., Ottawa.
4·0	.....	.....	.....	do do	do	H. C. Ellis, Somerset and Concession Sts.
4·80	.....	.....	.....	No foreign starch.....	Genuine.....	T. W. Dutton, 1498 Queen St., Toronto.
5·00	.....	.....	.....	do	do	T. Bletsoe, 1484 Queen St. West, Toronto.
4·80	.....	.....	.....	do	do	R. Hickman & Co., 1424 Queen St., Toronto.
5·10	.....	.....	.....	do	do	Murchison & Co., 1418 Queen W., Toronto.
2·05	.....	.....	.....	Cornstarch mixed with ginger.....	Adulterated by admixture with farinaceous matter.	W. H. Smith, 118 Dundas St., Toronto.
4·95	.....	.....	.....	No foreign starch.....	Genuine.....	H. G. Horton, 138 Dundas St., Toronto.
4·65	.....	.....	.....	do	do	D. Barnett, Dundas St., Toronto.
4·40	.....	.....	.....	do	do	A. Hudson, 154 Dundas St., Toronto.
4·90	.....	.....	.....	do	do	J. McHambly, 192 Dundas St., Toronto.
4·00	.....	.....	.....	do	do	A. L. Reeves, jr., King St. W., Toronto.
6·10	.....	.....	.....	do	do	Mrs. Dixon, King St. W., Toronto.
3·85	.....	.....	.....	do	do	A. Mitchell, 82 York St., Hamilton.
4·30	.....	.....	.....	do	do	C. Philips, 39 McNab St., Hamilton.
3·02	.....	.....	.....	Foreign starch mixed with ginger	Adulterated with farinaceous matter.	E. Hudon, 8 Market Sq., Hamilton.
5·15	.....	.....	.....	No foreign starch.....	Genuine.....	A. Waddell & Co., James St., Hamilton

APPENDIX B.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by the Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of			
				Moisture or Loss at 100°C.	Petroleum Ether Extract.	Alcoholic Extract.	Extractive.
1896.	*F. T. Harrison, Analyst, London.*			p.c.	p.c.	p.c.	p.c.
Aug. 18	Ground Ginger, Snowdrift Co., Brantford.	8971	15670	11·45	.....	.....	.....
do 19	do Phœnix Coffee and Spice Co., Toronto.	8972	15671	12·12	.....	.....	.....
do 19	do G. F. Mather & Sons, Toronto.	8973	15672	12·02	.....	.....	.....
do 19	do McKee, Smith & Co., Toronto.	8974	15673	12·10	.....	.....	.....
do 19	do Snowdrift Co., Brantford.	8975	15674	11·39	.....	.....	.....
do 20	do Perkins Medicine Co., Toronto.	8976	15675	11·90	.....	.....	.....
do 20	do A. M. Smith, London.....	8977	15676	11·97	.....	.....	.....
do 21	do Coffee and Spice Mills Co., Hamilton.	8978	15677	11·95	.....	.....	.....
do 21	do Pure Gold Spice Co.....	8979	15678	11·66	.....	.....	.....
do 21	do Gorman & Eckart, London.	8980	15679	12·15	.....	.....	.....
do 21	do do do	8981	15680	11·47	.....	.....	.....
do 21	do Orient Mills Co., Toronto..	8982	15681	11·70	.....	.....	.....
do 21	do Gorman & Eckart, London.	8983	15682	11·75	.....	.....	.....
	E. B. Kenrick, Analyst, Winnipeg, Man.						
Sept. 21	Ground Ginger, Sutherland & Campbell....	11016	14755	10·67	3·78	.....	14·53
do 21	do Dyson, Gibson & Co.....	11017	14756	11·22	3·98	.....	14·04
do 21	do	11018	14757	10·98	4·02	.....	15·48
do 23	do Todhunter, Mitchell & Co., Toronto.	11019	14758	10·36	3·52	.....	10·56
do 23	do	11020	14759	12·20	3·81	.....	13·00
do 23	do	11021	14760	11·07	3·67	.....	14·30
do 23	do Williams & Hunton.....	11022	14761	12·31	3·62	.....	12·45
do 23	do Dyson, Gibson & Co.....	11023	14762	11·61	3·57	.....	14·80
do 23	do Williams & Hunton.....	11024	14763	12·45	3·93	.....	9·82
do 24	do Dyson, Gibson & Co.....	11025	14764	12·20	3·50	.....	14·52
do 24	do Williams & Hunton.....	11026	14765	11·75	3·03	.....	13·32
do 24	do Dyson, Gibson & Co.....	11027	14766	12·32	3·54	.....	12·03

GINGER—Tabulated Statement—*Concluded.*

Analysis. Ash. Total.	Ash. Soluble.	Ash. Insoluble.	Ash. Alkalinity of Soluble.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p.c.	p.c.	p.c.	p.c.			
2·28	.....	.....	.....	Corn starch	Adulterated with corn starch.	O. Cooper, Clinton, Ont.
4·10	.....	.....	. . .	No foreign substance identified..... ..	Pure though chemical tests give turmeric.	J. W. Irwin, Clinton, Ont.
4·44	.....	. ....	.....	do do	Pure.....	C. H. Naivin, Goderich.
3·90	.... .	.....	.....	do do	do	Geo. Price, Goderich..
3·09	....	. ..	. . .	Corn starch is present.	Adulterated with corn starch.	G. M. Elliot do ..
3·65	.. ...	.....	.....	Shows corn starch and wheat flour... .	Adulterated .	J. A. Stewart, Exeter.
5·59	.....	.....	.....	No foreign substance detected.....	Pure.....	G. J. Johnston do ..
3·67	.....	.....	.....	do do	do	A. J. Dyer, Ingersoll
3·85	.. ..	....	.....	do do	do	C. A. O'Neill do
4·33	... ..	.....	.....	Wheat flour and probably a little turmeric	Adulterated ..	J. Gibson & Son do
4·42	.....	.....	.....	No foreign substance detected..... ...	Pure.	Waddell Bros., St. Thomas.
3·93	.....	... ..	....	do do	do	E. B. Brown, St. Thomas.
4·77	.....	.....	.....	Wheat flour.....	Slightly adulterated with wheat flour.	Black & McCann, St. Thomas.
6·87	3·06	3·81	0·124	.. ..	Genuine.....	A. Elliott & Co., Winnipeg.
6·99	3·01	3·98	0·133	.....	do	D. A. Ritchie, Winnipeg.
7·14	3·15	3·99	0·133	....	do	E. Turnbull, Winnipeg.
4·24	2·28	1·96	0·103	... .	Doubtful.....	Ferguson Bros., Winnipeg.
4·84	2·01	2·81	0·207	....	do	J. W. Cockburn, Winnipeg.
6·57	3·02	3·55	0·120	... .	Genuine.....	F. Keane, Winnipeg..
4·43	2·43	2·00	0·051	....	Doubtful.....	W. German, St. Boniface.
7·08	3·17	3·91	0·151	....	Genuine.....	E. Guilbeault, St. Boniface.
3·35	1·73	1·62	0·041	Apparently contains wheat or other foreign starch.	Adulterated ..	T. Pelletier, St. Boniface.
6·73	3·07	3 66	0·124	... .	Genuine.....	A. Macdonald & Co., Winnipeg.
4·83	2·03	2·80	0·197	....	Doubtful.....	G. Augusthad, Winnipeg.
5·16	1·74	3·42	0·904	Apparently contains wheat or other foreign starch.	Adulterated ..	A. Hollangrist, Winnipeg.

APPENDIX C.—INSPECTION OF

Date of Collection.	Description of Sample and Name and Address of Furnisher, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Specific Gravity at 15·5°C.	Total Solids in 100cc.	Ash in 100cc.	Reaction of Ash.	Total Free Acid in100cc. As Acetic Acid, $C_2H_4O_2$.	Total Free Acid in100cc. As Acetic Anhydride.	Total Organic Acid as Free and Combined as Acetic.	Sulphuric Acid in 100cc.
1896.	*M. Bowman, Analyst, Halifax, N.S.*			p.c.	p.c.	p.c.		p.c.	p.c.	p.c.	p.c.
Oct. 12.	XX Cider Vinegar, T. McCready & Sons, St. John, N.B.	10615	16454	1·0099	1·186	0·307	Alkaline.	3·24	..	.....	.....
	XX White Wine Vinegar, Bauld & Gibson, Halifax.	10616	16454	1·0079	0·207	0·060	do ..	4·65	.....	... ..	.....
do 13.	White Wine Vinegar, Davidson Bros., Halifax.	10617	16456	1·0070	0·023	0·011	do ..	4·54	.....	.....	.....
do 13.	White Wine Vinegar, J. Tobin & Co., Halifax.	10618	16457	1·0044	0·063	0·011	do ..	2·80	.....	.. ...	.....
do 14.	Malt Vinegar, Halifax Breweries, Ltd.	10619	16458	1·0182	3·307	0·512	do ..	3·29	....	.....	. ..
do 14.	Cider Vinegar, Davidson Bros., Halifax.	10620	16459	1·0104	0·202	0·005	Neutral..	6·50	....	....	.....
do 14.	XX White Wine Vinegar, T. A. S. De Wolfe & Son, Halifax.	10621	16460	1·0070	0·245	0·047	Alkaline.	4·34	..	. ....	... .
do 20.	Pure White Wine Vinegar, Lefebvre & Co., Montreal	10622	16461	1·0089	0·483	0·172	do ..	4·34	... .	....	.....
do 20.	Proof Vinegar, Lefebvre & Co., Montreal.	10623	16462	1·0090	0·379	0 039	do ..	6·20	. ..	.....	.... .
do 20.	Table Acid Vinegar, Brown & Webb, Halifax.	10624	16463	1·0075	0·024	0·003	do ..	4·97	.....	....	.....
do 20.	XX Cider Vinegar, Black & Co., Truro, N.S.	10625	16464	1·0063	0·258	0·034	do ..	3·45	... ..	.....	.... .
do 21.	XXX White Wine, Lefebvre & Co., Montreal.	10626	16465	1·0067	0·268	0·029	do ..	4·09	....	....	.....
do 21.	Cider Vinegar, McCready & Son, St. John, N.B.	10627	16466	1·0079	0·360	0·042	do ..	4·34	.....	.....	... .
do 22.	Cider Vinegar, P. Payment, Falmouth, N.S.	10628	16467	1·0105	1·442	0·349	do ..	2·74	....	....	... .
do 22.	Sovereign Cider Vinegar, Simson Bros., Halifax..	10629	16468	1·0091	0·795	0·086	do ..	4·30	....	..	.
	W. F. Best, Analyst, New Brunswick.										
Oct. 22.	Cider Vinegar, Vendors..	9879	14045	1·012	.....	...	.. ..	4·8	.....	.....	.... .
do 22.	White Wine Vinegar, Vendor.	9890	15046	1·005	.....	.....	....	3·6	.....	.. ..	.....
do 22.	Cider Vinegar, Vendors..	9881	15047	.....	.....	.....	.....	.....	.....	. .	.....
do 22.	Malt Vinegar, Vendors...	9882	15048	... ...	.....	.....	.....	.....	.....	.....	.....
do 23.	do do	9883	15049	1·011	.....	.....	.....	6·6	..	.....	.....
do 27.	Cider Vinegar, Dearborn & Co., St. John.	9884	15050	1·008	...	..	.. ..	5·4	.....	... .	.. ..
do 27.	Cider XXX Vinegar, M. Lebvre, Montreal.	9885	15051	1·009	.....	.....	.....	5·1	.. .	. ...	.....
do 27.	Cider XXC Vinegar, T. McCready & Son, St. John.	9886	15052	1·008	.. .	...	.....	4·2	.....	.....	.....
do 28.	White Wine Vinegar, T. B. Barker & Son, St. John.	9887	15053	1·011	.....	...	.....	6·10	....	...	.....

VINEGAR—Tabulated Statement.

Analysis.					Analyst's Remarks.	Name and Address of Vendor of Sample.
Test for Phosphoric Acid by Am. molybdate.	Test for Reducing Sugar by Fehling.	Test for H_2S.	Alcohol in 100cc. by wt.	Permanganate Test.		
	p.c.	p.c.	p.c.	p.c.		
.....	Heavy.	.....	..	1·1	Adulterated, deficient in Acetic acid and contains impure acetic acid as represented by the permanganate test.	Forsyth, jr., Dartmouth, N.S.
.....	Trace..	....	.....	1·2	do do ..	J. A. Casey, Dartmouth, N.S.
.....	do ..	....	.....	0·1	Not wine vinegar.....	J. C. Henley & Son, Halifax
.....	do ..	.....	.....	0·9	Adulterated, not wine vinegar, contains impure acetic acid.	A. D. Palmer, Halifax.
.....	do ..	.....	.....	0·6	Adulterated, contains impure acid and deficient in acetic acid.	Hubley & Teas, Halifax.
.....	Slight..	.....	.....	0·45	Not cider vinegar, impure acetic acid present, mineral acid present.	I. S. Lounds, Halifax.
.....	do ..	...	.....	0·1	Not wine vineger; doubtful.....	T. Lynch, Halifax.
.....	do ..	.....	.....	0·2	Contains impure acetic acid.....	W. McKay, New Glasgow.
.....	do ..	.....	.....	0·1	Unadulterated.....	J. McArthur, New Glasgow.
.. .	Trace..	.....	.....	0·15	Probably contains impure acetic acid....	J. McLeod, Westville.
.....	Slight..	.....	.....	0·15	Not cider vinegar, is deficient in acetic acic and probably contains impure acetic acid.	H. E. Munroe, Westville.
... . .	do ..	.....	... ..	0·1	Not wine vinegar.....	S. M. Bentley & Co., Truro
.... .	do ..	....	.....	0·28	Below the strength of proof and contains impure acetic.	W. T. Archibald & Co.
.. . ..	Heavy.	.....	.....	0·32	Deficient in acetic acid, probably contains impure acetic acid.	W. H. Payment, Windsor, N.S.
.....	Slight..	.....	.....	1·4	Not cider vinegar, contains impure acetic acid, adulterated.	Dodge & Burns, Windsor, N.S.
.....	. .. ..	.....	.....	0·8	Slightly adulterated with impure acetic acid, as indicated by permanganate test.	T. McCready & Son, St. John, N.B.
.....	.....	.....	.....	1·4	Adulterated with impure acetic acid, as indicated by permanganate test.	R. Armstrong, St. John.
.....	..... .	....	.....	1·3	Adulterated with impure acetic acid.....	G. A. Troop & Co., St. John.
.... .	.....	...	. .	0·2	Not adulterated.....	W. T. Rutledge, St. John.
.... .	.....	.....	....	0·5	Doubtful.....	W. A. Fairweather, St. John.
.....	....	.....	....	1·8	Adulterated	Munchie Bros., St. Stephens
.....	... . :	....	.....	1·1	do	E. M. Ganong, St. Stephens
.....	.... .	.....	.....	0·2	Not adulterated.....	F. E. Rose, St. Stephens.
... ...	..... .	.....	.....	2·4	Adulterated	John Connor, Woodstock.

APPENDIX C.—INSPECTION OF

Date of Collection.	Description of Sample and Name and Address of Furnisher, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Specific Gravity at 15·5°C.	Total Solids in 100cc.	Ash in 100cc.	Reaction of Ash.	Total Free Acids in 100cc. As Acetic Acid, $C_2H_4O_2$.	Total Free Acids in 100cc. As Acetic Anhydride.	Total Organic Acid as Free and Combined as Acetic.	Sulphuric Acid in 100cc.
1896.	*W. F. Best, Analyst, New Brunswick.*—Con.			p.c.	p.c.	p.c.		p.c.	p.c.	p.c.	p.c.
Oct. 28.	Cider Vinegar, A. J. Teed, St. Stephen.	9888	15054	1·008	.....	.....	.....	3·6	.....	.....	....
do 30.	Malt Vinegar, W. J. Rutledge, St. John.	9889	15055	1·008	.....	.....	.....	3·6	.....	.....	.....
do 30.	Malt Vinegar, Jardine & Co., St. John.	9890	15056	1·020	....	.....	.....	5·1	.....	.....	....
do 30.	Cider Vinegar, A.F. Randolph & Co., Fredericton	9891	15057	1·008	...	.....	.....	4·8	.....	.....	.....
	Analyst, Dr. M. Fiset, Quebec.										
Oct. 15.	Malt Vinegar, W. Wilson, Toronto.	10268	16151	1·0198	3·156	0·328	Alkaline.	4·87	....	4·80	.....
do 15.	White Wine Vinegar, W. Wilson, Toronto.	10269	16152	1·0072	0·189	0·030	do ..	4·22	.....	4·27	.....
do 15.	White Wine Vinegar.....	10270	16153	1·0084	0·169	0·027	do ..	5·01	....	5·02	.....
do 15.	do	10271	16154	1·0105	0·356	0·060	do ..	5·88	.....	5·90	.....
do 21.	White Wine Vinegar, A. Robitaille, Quebec.	10272	16155	1·0127	0·942	0·033	do ..	6·43	.....	6 52	... .
do 21.	White Wine Vinegar, Eureka Vinegar Works, Quebec.	10273	16156	1·0116	1·013	0·070	do ..	5·95	.....	5·95	....
do 21.	White Wine Vinegar, Wm. Wilson, Toronto.	10274	16157	1·0125	0·487	0·035	do ..	7·03	....	7·13	....
do 21.	White Wine Vinegar, Bouchard Père et Fils, Bordeaux.	10275	16158	1·0208	1·381	0·143	do ..	10·36	.....	10·37	.....
do 22.	White Wine Vinegar, by Vendors, from acid.	10276	16159	1·0112	1·013	0·024	do ..	4·75	.....	4·73	.....
do 22.	White Wine Vinegar, by Vendors, from acid.	10277	16160	1·0119	1·025	0·019	do ..	5·21	....	5·14	. ...
do 22.	White Wine Vinegar.....	10278	16161	1·0116	0·723	0·037	do ..	6·34	.....	6·31	.....
do 22.	White Wine Vinegar, H. M. Ballman, Bordeaux.	10279	16162	1·0126	0·132	0·022	do ..	7·99	....	7·99	.....
do 22.	White Wine Vinegar, M. Lefebvre & Co.	10280	16163	1·0085	0·170	0·056	do ..	5·31	.....	5·31	.....
do 22.	White Wine Vinegar, Brosseau & Co.	10281	16164	1·0090	0·249	0·024	do ..	5·50	. .	5·47	.....
do 22.	White Wine Vinegar, Brosseau & Co.	10282	16165	1·0068	0·102	0·017	do ..	4·75	...	4·73	..
	Analyst, Dr. J. B. Edwards, Montreal.										
Oct. 6.	White Wine Vinegar, Vendors.	11518	16134	1·0213	4·334	0·276	do ..	5·184	4·406	4·99	.....
do 6.	Cider Vinegar, Vendors..	11519	16135	1·0108	2·02	0·246	do ..	3·864	3·281	3·912	.....
do 6.	Cider Vinegar, T. Lamoureux.	11520	16136	1·0075	0 134	0·016	do ..	4·94	4·20	4·72	.....

VINEGAR—Tabulated Statement—*Continued.*

Analysis.					Analyst's Remarks	Name and Address of Vendor of Sample.
Test for Phosphoric Acid by Am. molybdate.	Test for Reducing Sugar by Fehling.	Test for H_2S.	Alcohol in 100cc. by wt.	Permanganate Test.		
	p.c.	p.c.	p.c.	p.c.		
.....	... ...	.....	... .	1·1	Adulterated.....	W. P. Craig, Woodstock.
.....	.....	.....	.....	0·1	Not adulterated.....	W. H. Vanwart, Fredericton.
.....	..... .	.....	.....	0·2	do	Yerxa & Co., Fredericton.
.....	.....	.....	.....	1·9	Adulterated with a small amount of impure acetic acid.	G. T. Whelpley, Fredericton.
Heavy ppte.	0·552	Light brown	.....	0·4	Below standard in acetic acid; purity a little doubtful.	A. Johnston & Co., Sherbrooke.
Slight..	... ...	None.	.....	0·1	Genuine	W. B. Murray, Sherbrooke.
do ..	.....	do ..	... ..	0·1	do	C. E. Therien do
Trace..	..... .	do ..	.... .	0·65	Probably contains some impure acetic acid and is adulterated.	S. Fortier do
None..	0·233	Light brown	.... .	0·1	Genuine	O. Gagnon, Quebec.
Slight..	Slight..	do ..	.....	0·1	do	O. Larose & Co,, Quebec.
do ..	0·102	do ..	.... .	0·1	An approximate estimation of copper present shows 0·0008 per cent. slightly contaminated from vessels used.	M. W. Coleman do
Trace..	0·103	Black ppte.	.....	0·2	do do ..	do do
None.	0·768	Slight	.....	4·9	Contains impure acetic acid and is below standard; sugar in great quantity.	Dronin Frères & Co.
do ..	0·243	None.	.....	4·2	Adulterated; contains impure acetic acid.	do
Slight..	0·114	do ..	....	0·15	Genuine	J. Turcotte, Quebec.
do ..	Trace..	do ..	....	0·15	do	J. M. Spenard, Three Rivers, Que.
do ..	None..	do ..	.....	1 65	Adulterated with impure acetic acid.....	do do
None..	do ..	do ..	.....	0 1	Genuine	M. Lafontaine, Three Rivers, Que.
Trace..	do ..	Slight	. ...	1·5	Adulterated with impure acetic acid....	Philip Rheault & Co., Three Rivers.
eavy ppte.	1·75	Brown	....	0·1	Adulteration under act doubtful, being dilute acetic acid, and misnamed white wine vinegar.	T. Lamoureux & Co., Montreal.
do ..	1·43	None.	.. ...	0·2	Adulteration under act doubtful, being under strength and yielding alcohol.	do do
..	Trace..	do ..	....	0 2	Adulteration under act doubtful; below strength, low extract and empyrematic odor.	J. W. Guérin, Montreal.

APPENDIX C.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Specific Gravity at 15·5°C.	Total Solids in 100cc.	Ash of 100cc.	Reaction of Ash.	Total Free Acid in 100cc. As Acetic Acid $C_2H_4O_2$.	Total Free Acid in 100cc. As Acetic Anhydride.	Total Organic Acid as Free and Combined as Acetic.	Sulphuric Acid in 100cc.
1896.	*Analyst, Dr. J. B. Edwards, Montreal*—Con.			p.c.	p.c.	p.c.		p.c.	p.c.	p.c.	p.c.
Oct. 6.	Malt Vinegar	11526	16137	1·0152	1·536	0·026	Alkaline.	6·81	5·788	6·81	
do 6.	White Wine Vinegar	11527	16138	1·0145	1·264	0·014		6·88	5·84	6·86	
do 8.	do	1152	16139	1·0072	0·224	0·018		4·728	4·018	4·84	
do 8.	White Wine Vinegar, M. Lefebvre, Montreal.	11522	16140	1·00964	0·190	0·014		6·504	5·523	6·45	
do 9.	Malt Vinegar, M. Lefebvre, Montreal.	11523	16141	1·0119	0·794	0·062		6·264	5·32	6·31	
do 12.	White Wine Vinegar	11524	16142	1·0056	0·120	0·008		5·68	4·78	5·66	
do 12.	do	11525	16143	1·00768	0·168	0·018		5·16	4·386	5·06	
do 16.	Malt Vinegar, M. Lefebvre & Co., Montreal.	11528	16144	1·0128	0·844	0·046		7·10	6·03	6·98	
do 16.	White Wine Vinegar, M. Lefebvre & Co.	11591	16145	1·0077	0·1040	0·020		6·67	5·669	6·50	
do 16.	White Wine Vinegar, Brosseau & Co.	11530	16146	1·0091	0·166	0·026		5·688	4·83	5·688	
do 16.	White Wine Vinegar	11531	16147	1·0068	0·114	0·018		4·70	3·995	4·63	
do 27.	White Wine Vinegar, M. Lefebvre & Co.	11532	16148	1·0078	0·018	0·018		5·52	4·73	5·52	
Oct. 27.	Malt Vinegar, Sir R. Burnett & Co., London, Eng.	11533	16149	1·0170	3·214	0·304	Alkaline.	4·488	3·81	4·56	
do 27.	White Wine Vinegar, H. & M. Bullman, Bordeaux	11534	16150	1·0098	0·106	0·014	do	6·31	5·36	6·28	
Nov. 11.		11535	16166	1·0081	0·46	0·018	do	5·54	4·71	5·35	
11.	English Vinegar	11536	16167	1·0097	0·134	0·014	do	6·38	5·80	6·36	
do 11.	French Vinegar	11537	16168	1·0097	0·134	0·022	do	6·20	5·27	6·07	
do 11.	Spanish Vinegar	11539	16169	1·0818	0·132	0·022	do	5·35	4·54	5·32	
do 11.	Italian Vinegar	11540	17170	1·0089	0·522	0·052	do	5·016	4·26	5·088	
	Analyst, Dr. F. X. Valade, Ottawa.										
Oct. 7.	Vinegar, from Hamilton.	10758	16829	1·0087	0·196	0·024	Alkaline.	5·72	4·86	5·53	
do 9.	XXX Vinegar, Bate & Sons, Ottawa.	10759	16830	1·0076	0·120	0·026	do	4·99	4·24	4·73	
do 7.	Vinegar, T. A. Lytle & Co., Toronto.	10760	16831	1·0108	0·220	0·026	do	7·06	6·00	6·53	
do 7.	Proof Vinegar, Badgerow, Scott & Co., Toronto.	10761	16832	1·0114	0·590	0·030	do	6·90	5·86		
do 7.	Vinegar, Haaz & Co., Kingston.	10762	16833	1·0098	0·414	0·042	do	5·52	4·69	5·52	
do 7.	Vinegar, W. Wilson, Toronto.	10763	16834	1·0094	0·308	0·030	do	5·71	4·85	5·02	
do 7.	Vinegar, S. J. Major, Ottawa.	10764	16835	1·0073	0·368	0.038	do	4·01	3·41	3·17	
do 7.	Vinegar, Haaz & Co., Kingston.	10765	16836	1·0092	0·134	0·020	do	6·31	5·36	6·36	
do 9.	Vinegar, Dominion Vinegar Works Co. Hamilton	10766	16837	1·0077	0.164	0·020	do	5·03	4·28	4·13	

VINEGAR—Tabulated Statement—*Continued.*

Analysis.					Analyst's Remarks.	Name and Address of Vendor of Sample.
Test for Phosphoric Acid by Am. Molybdate.	Test for Reducing Sugar by Fehling.	Test for H_2S.	Alcohol in 100cc. by wt.	Permanganate Test.		
	p.c.	p.c.	p.c.	p c.		
Heavy ppte.	.. ....	Brown	.....	3·1	Adulterated under act with wood and saccharine impurities, made from impure wood acetic acid.	Marrotte Leblanc & Co., Montreal.
None..	None..	None.	.....	3·1	do do ..	do do
Ppte ..	.... .	.....	.....	1·0	Under the act adulterated, below strength, empyrematic flavour, mislabelled white wine.	S. Bremner, Montreal.
.....	.....	.....	... ..	0·8	do do ..	L. Lavallée, Montreal.
Ppte ..	.... .	.. ..	....	0·2	Genuine	C. E. E. Authier, Montreal.
. ....	.. ...	....	. . .	0·8	Adulterated under the act, being diluted acetic acid, misnamed white wine vinegar.	J. E. Ecrément, Montreal.
.....	.....	.....	.....	1·3	do do ..	Trudeau et Fils, Montreal.
. ....	.....	....	.....	0·15	Adulterated under act, being diluted acetic acid with excess of sulphuric acid.	E. Gauthier, Valleyfield, Que.
.....	.....	.....	.. .	0·5	Adulterated under the act, being made from impure acetic acid.	do do
.....	.... ..	.....	.....	0·15	do do ..	L. Gendron, Quebec.
.....	.....	.....	.....	1·4	do do ..	O. Séquin, Valleyfield, Que.
.....	.... .	.....	.....	0·8	do do ..	Z. Turcotte, Quebec.
Ppte ..	.....	.....	.....	0·3	Adulterated as made from impure acetic acid and below standard in acid.	P. Z. St. Marie, Valleyfield, Que.
... ...	.... .	....	.....	0·1	Adulterated under act as being dilute acetic acid of fair quality miscalled white wine vinegar.	do do
Slight ppte.	.....	.....	.....	0·25	Not adulterated under act being dilute acetic acid mislabelled vinegar.	Laporte, Martin & Co.
Traces.	.....	....	....	0·2	do do ..	do do
Slight.	.... .	.. ...	.....	.....	do do ..	do do
do .	.....	. .	... .	0·2	do do ..	do do
do .	.... .	. ...	....	0·1	do do .	do do
. . . .	.....	.. .	.....	0·1	Unadulterated..	P. Dunlop, Albert and Hill St., Ottawa.
... .	.....	....	....	0·5	Adulterated, contains some impure acetic acid.	R. Carpenter, Albert St., Ottawa.
Slight.	.....	. ....	...	0·1	Unadulterated	W. H. Colborne, Albert and Wellington Sts.
.... .	. . .	....	.....	0·2	Doubtful...	J. J. Kyle, Wellington St., Ottawa.
.....	.... .	.....	.....	0·1	Unadulterated.....	P. Glavey, 37 York St., Ottawa.
. ....	.... .	.....	.....	0·1	do	M. A. Casey, Clarence and Dalhousie Sts.. Ottawa.
.....	.....	.....	.....	0·1	Adulterated by metallic contamination..	C. Desrosier, Dalhousie St., Ottawa.
..... .	.. ...	....	.....	0·1	Unadulterated.....	A. Beaudet, Dalhousie St., Ottawa.
.....	.....	.... .	.....	0·1	do	H. T. Murray, Brockville.

APPENDIX C.—INSPECTION OF

RESULT OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Specific Gravity at 15·5°C.	Total Solids in 100cc.	Ash in 100cc.	Reaction of Ash.	Total Free Acid in 100c. As Acetic Acid, $C_2H_4O_2$.	Total Free Acid in 100c. As Acetic Anhydride.	Total Organic Acid as Free and Combined as Acetic.	Sulphuric Acid in 100cc.
1896.	*Analyst, Dr. F. A. Valade, Ottawa.*—Con.			p. c.	p. c.	p. c.		p. c.	p. c.	p. c.	p. c.
Oct. 9.	Vinegar, W. Wilson, Toronto.	10767	16838	1·0078	0·284	0·030	Alkaline.	4·63	3·94	4·51	.....
do 9.	Vinegar, Gilmour & Co., Brockville.	10768	16839	1·0073	0·220	0·024	do ..	5·26	4·47	5·04	.....
do 9.	Vinegar, Badgerow, Scott & Co., Toronto.	10769	16840	1·0064	0·306	0·034	do ..	3·99	3·39	3·31	.....
do 9.	Vinegar, T. A. Lytle & Co., Toronto.	10770	16841	1·0080	0·166	0·016	do ..	5·45	4.63	4·78	.....
	Analyst, Dr. W. H. Ellis, Toronto.										
Oct. 21.	White Wine Vinegar, Brosseau & Co., Montreal	8733	16842	1·007	0·35	0·06	.....	3·79	.....	.....	.....
do 21.	White Wine Vinegar, A. Haaz, Kingston.	8734	16843	1·008	1·72	0·02	.....	1·64	.....	.....	.....
do 22.	White Wine Vinegar, A. Haaz, Kingston.	8735	16844	1·006	0·18	0·02	.....	4·36	.....	.....	.....
do 22.	Cider Vinegar, Vendors..	8736	16845	1·012	2·49	0·37	.....	2·79	.....	.....	.....
do 24.	do do ..	8737	16846	1·008	1·42	0 17	.....	2·75	.....	.....	...
do 24.	White Wine, W. Wilson, Toronto.	8738	16847	1·008	0·42	0·04	.....	4·28	.....	.....	.....
do 24.	White Wine, Badgerow & Co., Toronto.	8739	16848	1·0095	0·45	0·05	.....	5·18	.....	.....	.....
do 24.	Malt Vinegar	8740	16849	1·011	1·36	0·21	.....	3·87	.....	.....	.....
do 24.	Cider Vinegar, Lytle, Toronto.	8741	16850	1·021	4·42	0·62	.....	3·68	.....	.....	.....
do 23.	White Wine, Brosseau & Co., Montreal.	8748	16851	1·007	0·19	0·04	.....	4·63	.....	.....	.....
do 23.	Cider Vinegar, Hilton, Oakville, Ont.	8743	16852	1·018	2·90	0·40	.....	4·31	.....	.....	.....
do 23.	White Wine, Allen, Norwich, Ont.	8744	16853	1·008	0·38	0·04	.....	5·04	.....	.....	.....
do 23.	White Wine, Yapp, Hamilton.	8745	16854	1·008	0·22	0·03	.....	4·88	.....	.....	.....
	Analyst, F. T. Harrison, Toronto.										
Oct. 8.	White Wine Vinegar, Badgerow, Scott & Co., Toronto.	8984	15683	1·008	0·299	0·026	.....	4·97	.....	.....	.....
do 8.	Malt Vinegar, Jas. Wilson & Co., Toronto.	8985	15684	1·019	3·14	0·323	.....	5·43	.....	.....	.....
do 9.	X White Wine Vinegar, Hamilton Vinegar Works.	8986	15685	1·005	0·137	0·022	.....	3·02	.....	.....	.....
do 9.	XXX White Wine Vine-	8987	15686	1·007	0·290	0·043	.....	5·06	.....	.....	.....

VINEGAR—Tabulated Statement—*Continued.*

Analysis.					Analyst's Remarks.	Name and Address of Vendor of Sample.
Test for Phosphoric Acid by Am. Molybdate.	Test for Reducing Sugar by Fehling.	Test for H_2S.	Permanganate Test.	Alcohol in 100cc.		
	p. c.	p. c.	p. c.	p. c.		
Heavy.	.. ..	.....	....	0·1	Unadulterated.....	R. McHenry & Co., Brockville.
None.	....	.....	.....	0·1	do	A. Cameron, Brockville.
Heavy.	.....	.....	...	0·1	do	T. Brown & Co., Brockville.
.....	.....	.....	.....	0·1	do	Fitzsimmons Bros., Brockville.
.....	.....	.. ..	.....	0·1	Genuine	R. Martin, Kingston.
.....	... ..	.....	.....	0·5	Free from metallic contamination and mineral acids, but by permanganate test contains impure acetic acid; adulterated.	W. N. Dollar, Kingston.
.....	.....	.....	.. ...	0·1	Genuine	W. H. Ketcheson, Belleville.
.... ..	.....	.....	.....	0·65	By permanganate test contains impure acetic acid and is therefore adulterated.	R. J. Grahame, Belleville.
.....	.....	...	....	1·3	Deficient in strength and gives pyroligneous acid by permanganate test; adulterated.	L. Patterson & Co., Toronto.
.....	... ...	.....	....	0·1	Genuine	D. Bradshaw, Toronto.
.....	.. .. .	.....	.....	0·1	do	W. Barbor, Toronto.
.... ..	.....	.....	.....	0·5	Free from metallic contamination and sulphuric acid, but by permanganate test contains pyroligneous acid.	F. Frank, Toronto.
.....	.....	.....	.....	0·1	Genuine	O. H. Housberger, Toronto.
.....	.....	....	.....	0·4	Adulterated by containing lead, permanganate test shews pyroligneous acid.	Lumsden Bros., Hamilton.
.....	.... .	... ..	.....	0·1	Genuine	H. Bewlay, Hamilton.
.....	.....	.....	.....	0·5	No metallic impurity, no mineral acid, but by permanganate shows pyroligneous acid.	M. S. Bradt & Co., Hamilton.
.....	.....	.... .	.....	0·1	Genuine	J. M. Rosseau, Hamilton.
.....	.....	.....	0·05	.....	Pure spirit vinegar.....	E. Adams, London, Ont.
.....	.....	.....	0·3	.....	Pure malt vinegar.....	Jas. Wilson & Co., London, Ont.
.....	. . ..	...	0·05	.....	Made from spirits, but is below standard strength.	Pool & Co., London, Ont.
.....	.....	.....	0·15	.....	Contains a little added acetic acid.....	S. Allan, Norwich.

APPENDIX C.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Specific Gravity at 15·5°C.	Total Solids in 100 cc.	Ash in 100 cc.	Reaction of Ash.	Total Free Acid in 100 c.		Total Organic Acid as Free and Combined as Acetic.	Sulphuric Acid in 100 cc.
								As Acetic Acid, $C_2H_4O_2$.	As Acetic Anhydride.		
1896.	*Analyst, F. T. Harrison, Toronto.—Concluded.*			p. c.	p. c.	p. c.		p. c.	p. c.	p. c.	p. c.
Oct. 9.	Cider Vinegar, Vendor...	8988	15687	1·015	2·132	0·190	.. ..	4·60	...	.....	.....
do 10.	Wine Vinegar, Vendor...	8989	15688	1·012	1·246	0·083	.....	7·12	...	.....	.....
do 10.	White Wine Vinegar, D. J. Lytle & Co., Toronto.	8990	15689	1·008	0·246	0·024	.....	5·18	.....	.....	.....
do 10.	Crab Apple Cider Vinegar, S. W. Lowell, Whitby, Ont.	8991	15690	1·013	1·848	0·357	.....	4·51	...	.....	...
do 12.	XX Cider Badgerow, Scott & Co., Toronto.	8992	15691	1·010	0·966	0·118	.....	4·71	...	...	..
do 12.	Malt Vinegar, W. Wilson, Toronto.	8993	15692	1·019	3·41	0·324	.....	5·50	...	.....	...
do 12.	XXX White Wine Vinegar, Hamilton Vinegar Works.	8994	15693	1·009	0·208	0·048	.....	5·41	....	...	..
do 12.	Cider Vinegar, A. Neigh, London.	8995	15194	1·010	1·696	0·392	.....	3·99	.....	.....	....
do 13.	Cider Vinegar, Vendor...	8996	15695	1·019	2·90	0·226	.....	3·96	.....	....	.....
do 30.	XX White Wine Vinegar, Hamilton Vinegar Co.	8997	15696	1·005	0·114	0·018	.....	3·78	.....	...	...
do 30.	XXX White Wine Vinegar, Dominion Vinegar Works.	8998	15697	1·008	0·222	0·022	.....	5·02	...	.....	.....
Nov. 30.	Malt Vinegar, W. Wilson, Toronto.	8999	15698	1·019	3·26	0 30	.....	5·33	.....	.....	.....
do 30.	Wine Vinegar, Vendor ..	9000	15715	1·0095	0·907	0·067	.....	4·71	.....	..	.....
1896.	*Analyst, Prof. E. B. Kenrick, Winnipeg, Man.*										
Oct. 20.	Malt Vinegar, Vendors ..	11028	14767	1·0265	5·01	0·524	.....	5·05	.....	...	.....
do 20.	Fruit Vinegar, Vendor...	11029	14768	1·0164	2·52	0·323	.....	4·10	.....	.....	.....
do 20.	Cider, Vendor.....	11030	14769	1·0152	2·26	0·297	.....	4·26	..	.....	.....
do 20.	White Wine, Vendor.....	11031	14770	1·0126	0·55	0·140	.....	6·75	.....	...	.....
do 21.	Malt Vinegar, Vendor ...	11032	14771	1·0282	5·72	0·213	.....	5·16	....	.....	.....
do 21.	White Wine, Vendor.....	11033	14772	1·0327	5·35	0·224	.....	5·48	.....	.....	.....
do 21.	do	11034	14773	1·0094	0·088	0·036	.....	6·31	...	.....	.....
do 21.	Malt Vinegar.....	11035	14774	1·0105	0·95	0·076	.....	4·76	.....	....	...
do 22.	White Wine Vinegar, Macdonald & Co.	11036	14775	1·0137	1·79	0·095	.....	4·49	.....	...	.....
do 22.	Malt Vinegar, Williams & Hilton.	11037	14776	1·0112	1·03	0·12	.....	4·84	...	.....	...
do 22.	Canadian Malt, Vinegar, Williams & Halton.	11038	14777	1·0185	3·18	0·261	.....	4·83	.....	.....	...
do 22.	Malt Vinegar, Williams & Hilton.	11039	14778	1·0051	1·12	0·029	.....	3·43	.....	.....	.....

VINEGAR—Tabulated Statement—*Concluded.*

Analysis.					Analyst's Remarks.	Name and Address of Vendor of Sample.
Test for Phosphoric Acid by Am. Molybdate.	Test for Reducing Sugar by Fehling.	Test for H_2S.	Permanganate Test.	Alcohol in 100cc.		
	p. c.	p. c.	p. c.	p. c.		
			0·8		Probably contains a little added acetic acid.	S. Allan, Norwich.
			0·3		Pure vinegar made from grapes, bitartrate of potassium, 0·32 per cent.	C. A. Lees, Port Dover.
			0·05		Pure spirit vinegar	D. J. McLeod, Tilsonburg.
			0·4		Unadulterated	W. H. McCutcheon, Lon., Ont.
			0·2		Of doubtful purity	Eagan Bros., St. Thomas.
			0·3		Pure malt vinegar	W. E. Ross, St. Thomas.
			0·05		Pure spirit vinegar	Black & McCance, St. Thomas.
			0·4		Unadulterated	G. Rountree, London.
			0·4		do	L. V. Ludoic, London.
			0·5		do	Geo. Watts & Son., Brantford.
			0·5		do	J. Ford, Brantford.
			0·3		do	J. T. Wallace, Brantford.
			0·08		do	C. A. Lees, Port Arthur.
			0·6		Adulterated within the meaning of 57-58 Vic., cap. 37, in that it does not possess the distinguishing characteristics stated in 2nd column B.	Blackwood Bros., Win.
			0·7		do	Blackwood Bros., Win.
			0·7		do	do
			1·0		do	do
			0·6		do	The Dyson Gibson Co., Winnipeg.
			0·8		do	do
			0·9		do	Williams & Hilton, Win.
			0·7		do	do
			0·3		do	C. Reid & Co., Winnipeg.
			0·6		do	Galbraith & Co., Winnipeg.
			0·6		do	Williams & Hilton, Win.
			0·5		do	W. J. Smith, Winnipeg.

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis.						
				Observations by Saccharimeter.				By Fehling Solution.		
				Direct Reading.	Invert Reading.	Temperature—Centigrade.	Sucrose by Clerget's Formula.	Reducing Sugar Direct.	Reducing Sugar after Inversion.	Sucrose.
1896.	*M. Bowman, Analyst, Halifax, N.S.*					°	p. c.	p. c.	p. c.	p. c.
Dec. 16	Honey, W. D. Black, Truro, N.S.	10630	15079	—18·10	—21·60	18·5	2·62	78·29	...	...
do 16	do	10631	15080	—18·40	—22·30	18·0	2·93	78·70	.....	.....
do 16	do	10632	15081	—15·00	—17·84	20·0	2 11	78·45	....	...
do 16	Honey, Vendor.....	10633	15082	—18·00	—22·04	18·0	3·02	76·79	...	.....
do 16	do	10634	15083	— 9·60	—12·48	19·0	2 16	73·61	...	.....
do 16	Honey, W. D. Black, Truro, N.S.	10635	15084	—14·32	—16·88	20·0	1·92	75·05	...	...
do 17	do	10636	15085	—14·46	—18·88	19·5	3·32	77·09	.....	.....
do 17	Honey, F. W. Jones, Bedford, P.Q.	10637	15086	— 8·70	—13·60	20·2	3·69	74·44	.....	....
do 17	Honey, Kerry Watson & Co., Montreal.	10638	15087	—11·10	—17·60	20·0	4·59	75·55	.....	...
do 17	Honey, M. J. Lewis, Central Onslow, N.B.	10639	15088	—12·56	—19·60	20·5	5·31	76·55	.....	..
do 18	Honey, A. McKay, Stellarton, N.S.	10640	15089	—17·80	—23·04	20·5	3·95	76·25	.....	.....
do 18	do	10641	15090	—17·80	—21·20	19·2	2·55	75·35	.....	.....
do 18	Honey, R. Grahume, New Glasgow.	10642	15091	—18·80	—20·80	19·2	1·50	75·50	.....	.....
do 18	Honey, Vendor.....	10643	15092	—18·72	—21·60	20·5	2·17	77·95	.....	.....
do 21	Honey, W. D. Black, Truro, N.S.	10644	15093	—13·60	—17·72	20·5	3·11	77·60	.....	.....
do 21	Honey, Canadian Honey Co., Halifax, N.S.	10645	15094	— 4·00	—16·40	19 5	9·32	69·30	.....	.....
do 21	Honey, W. D. Black, Truro, N.S.	10646	15095	—20·60	—23·20	19·2	1·95	76·20	.....	.....
do 21	Honey, Canadian Honey Co., Halifax.	10647	15096	— 9·60	—16·50	19·0	5·19	74·19	.....	...
do 21	Honey, E. F. Beeler, Berwick, N.S.	10648	15097	—15·60	—17·60	19·0	1·50	74·00	...	.....
do 21	Honey, W. D. Black, Truro, N.S.	10649	15098	—16·00	—17·92	19·0	1·44	73·92	...	.....
do 21	Honey, E. S. Goudge, Edinburgh St., Halifax.	10650	15099	—14·04	—15 88	19·8	1·41	73·06	.....	...
do 21	Honey, Brown & Webb, Druggists, Halifax.	10651	15100	—17·36	—21·84	19·0	3·35	74·09	....	.....
do 22	Honey, W. D. Black, Truro, N.S.	10652	15101	—17·00	—18·60	19·5	1·32	73·60	....	...
do 22	Honey, F. A. Gemmill, Stratford, Ont.	10653	15102	—16·20	—19·80	19·5	2·70	77·60	.....	...
	Analyst, W. F. Best, N.B.									
Dec. 3	Henry Evans & Sons, Montreal.	9892	15058	—15·2	—17·6	25	1·82	75·20	77·32	1·90
do 3	Honey, S. McDiarmid, King street.	9893	15059	— 6·0	—13·2	25	5·47	74·50	80·50	5·60
do 3	Honey, Colpitts Bros., Sussex Vale.	9894	15060	—12·0	—22·0	25	7·60	61·52	69·32	7.50
do 3	Honey, W. D. Black, Truro, N. S.	9895	15061	—11·2	—14·4	25	2·40	69·10	71 54	2·40
do 3	do do	9896	15062	— 5·2	—15·2	25	7·60	64·51	72·50	7·52
do 3	do do	9897	15063	— 2·40	—16·0	25	10·34	64·02	74·85	10·35
do 4	Colpitts Bros., Pleasant Vale, Albert Co., N.B.	9898	15064	— 2·40	—16·0	25	10·34	74·87	74·85	10·35
do 4	do do	9899	15065	— 5·0	—16·1	25	8·36	70·13	79·21	8·60

HONEY.—Tabulated Statement.

Water.	Ash.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c			
17·21	0·05		Genuine	E. M. Lockwood, Amherst, N.S.
17·85	0·03		do	R. H. Tremaine do
16·30	0·10		do	Blackwood Bros. do
17·35	0·06		do	C. L. McLeod do
18·43	0·10		do	B. W. Baker do
20·44	0·13		do	do do
16·30	0·04		do	A. F. Ross & Co., Truro, N.S.
16·54	0·38		do	E. E. McNutt do
16·03	0·05		do	W. F. Odell do
19·55	0·22		do	W. H. Snook & Co. do
17·50	0·08		do	Geo. Carew, New Glasgow, N.S.
17·10	0·37		do	A. C. Bell do
17·12	0·03		do	A. Chisholm do
17·07	0·47		do	J. W. Frazer do
18·78	0·05		do	A. M. Boutillier, Halifax, N.S.
17·83	0·20		do	H. W. Cameron do
19·35	0·04		do	C. E. Huggins do
17·64	0·06		do	E. W. Crease do
23·59	0·25		do	W. C. Anderson do
21·16	0·04		do	H. A. Taylor do
21·61	0·38		do	Hattie & Mylins do
18·31	0·10		do	Brown Bros. & Co. do
20·58	0·03		do	E. S. Blackie do
18·38	0·04		do	H. W. Cameron do
14·65	0·12	Nothing abnormal noted	Genuine	W. Hawker & Sons, St. John, N.B.
17·90	0·25	do	do	W. C. R. Allan, St. John, N.B.
16·15	0·10	do	do	W. A. Porter, St. John, N.B.
14·25	0·22	do	do	J. S. Armstrsng & Bros., St. John, N.B.
18·10	0·50	do	do	Canada Drug Co., St. John, N.B.
18·25	0·38	do	do	G. Davidson, St. John, N.B.
18·30	0·30	do	do	G. A. Moore, St. John, N.B.
14·20	0·14	do	do	E. H. Turnbull, St. John, N.B.

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. By Saccharimeter. Direct Reading.	Invert Reading.	Temp. in ° Centigrade.	Sucrose by Clerget's Formula.	Fehling Solution. Reducing Sugar direct.	Reducing Sugar after Inversion.	Sucrose.
1896.	*Analyst, W. F. Best, N. B.*—Con.						p. c.	p. c.	p. c.	p. c.
Dec. 4	Honey, W. D. Black, Truro, N. S.	9900	15066	—12·0	—22·0	25	7·60	65·16	73·76	8·12
do 5	Honey, Simcoe Canning Co., Simcoe, Ont.	9901	15067	— 6·0	—15·2	25	6·99	54·32	61·52	6·86
do 5	Honey, W. D. Black, Truro, N. S.	9902	15068	—11·2	—14·4	25	2·40	69·10	71·54	2·40
do 5	G. Davidson, Staff B, City Market, St John.	9903	15069	— 7·6	—16·8	25	6·96	60·37	70·45	6·72
do 7	Honey, S. R. Wilcox, Newton, N. B.	9904	15070	— 8·0	—18·8	25	8·2	65·16	73·76	8·12
do 7	Honey, Vendor	9905	15071	— 7·60	—16·8	25	6·99	61·52	69·31	7·50
do 8	do	9906	15072	—12·0	—22·0	25	7·60	61·51	69·32	7·50
do 8	do	9907	15073	— 5 10	—16·0	25	8·35	70·13	79 20	8·60
do 9	Honey, W. D. Black, Truro, N. S.	9908	15074	—11·2	—14·4	25	2·40	69·10	71·55	2·40
do 9	Honey, Colpitts Bros.	9909	15075	— 5·2	—15·2	25	7·60	64·50	72·50	7·50
do 10	do do	9910	16076	— 5·0	—16·0	25	8·36	70·13	79·21	8·60
do 11	Honey, Lyman Bros. & Co., Montreal.	9911	15077	—10·0	—15·2	25	3·25	68·63	72·64	3·57
do 11	Honey, W. D. Black, Truro, N. S.	9912	15078	—22·8	—28·0	25	4·41	66·03	70·40	4·40
	Analyst, Dr. M. Fiset, Quebec.									
Nov. 30	Honey, J. Casavant, St. Dominique, Que.	10283	16180	— 5·5	—20 6			69·03	73·08	3·85
do 30	Honey, J. W. Calder, Lancaster, Ont.	10284	16181	—12·0	—17·7			76·93	77 66	0·69
do 30	Honey	10285	16182	— 9·0	—16·0			70·0	73·11	2·95
do 30	Honey, E. J. Berry, Brome, P. Q.	10286	16183	— 8·0	—15·4			73·07	78·88	5·52
Dec. 1	Honey	10287	16184	—19·0	—24·2			75·44	78·55	2·95
do 1	do	10288	16185	— 8 5	—17·5			75·31	79·72	4·16
do 1	do	10289	16186	—11·5	—14·3			76·32	76·80	0·46
do 1	do	10290	16187	—11·0	—18·7			77·29	78·74	1·38
do 1	do	10291	16188	—13·0	—19·2			73·40	76·08	2 55
do 2	do C. Silver, New London.	10292	16189	—11·0	—13·2			77·28	78·50	1·16
do 2	do	10293	16190	—12·0	—12 6			77·04	79·47	2·31
do 2	do H. Silver, Shipton.	10294	16191	— 3·0	—13·1			76·80	76·99	0·18
do 2	do Mrs. J. Gibson, Dunnville.	10295	16192	— 8·5	—17·6			74·98	79·60	4·38
do 2	Honey, Vendor, Bee Keeper.	10296	16193	— 9·1	—15·9			73·09	74·08	0·37
do 2	do do	10297	16194	—13·5	—15·5			72·53	75·44	2·76
Dec. 2	Honey	10298	16195	— 8·5	— 15·7			73.95	75·59	1 56
do 9	do	10299	16	— 15·0	— 17·6			73·50	74·08	0·55
do 9	do J. Blais, St. Foyes	10300	16206	— 7·0	— 15·9			72·33	77·19	4·62
do 9	do	10301	16207	— 11·0	— 15·9			65·92	68·83	2·76

HONEY—Tabulated Statement—*Continued.*

Water	Ash.	Microscopic Examinations	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.			
15·80	0·12	Nothing abnormal noted	Genuine.....	F. E. Williams, St. John, N.B.
14·65	0·50	do	do	S. McDiarmid, St. John, N.B.
13·0	0·20	do	do	P. Nase & Sons, St. John, N.B.
12·10	0·55	do	do	Brown & Davidson, St. John, N.B.
14·40	0·20	do ...	do	Huestiss & Millar, Sussex.
12·0	0·50	do	do	John Asbill, Sussex.
16·10	0·15	do	do	Colpitts Bros., Sussex.
15·20	0·60	do	do	do
14·00	0·20	do	do	Fairweather Bros., Sussex.
15·10	0·60	do	do	E. E. Ayer, Moncton.
16·65	0·65	do	do	Watson Lutes, Moncton.
15·30	0·12	do	do	Brown Bros., Chatham, N.B.
16·75	0·10	do	do	W. T. Harris, Chatham, N.B.
25·40	0·16	Crystals of dextrose	Unadulterated. Sample slightly fermented.	P. O. Oliver, Sherbrooke, Que.
21·53	0·19	do	Unadulterated.....	T. Cowan, Sherbrooke, Que.
25·58	0·12	Crystals of dextrose and some pollen grains.	do	R. Johnson, Sherbrooke, Que.
25·25	0.26	Crystals of dextrose..... ..	do	Wm. Murray, Sherbrooke, Que.
29·31	0·13	do	do	Woodman & McKee, Coaticooke.
24·83	0·09	do	do	J. Auslet, Coaticooke.
24·88	0·12	Very beautiful crystals of dextrose and very many pollen grains.	do	H. C. Fontaine, Coaticooke.
25·99	0·11	Crystals of dextrose and only one pollen grain on slide.	do	S. Bachaird, Coaticooke.
28·02	0 29	Crystals of dextrose and many pollen grains.	do	C. F. Wiggett, Lennoxville.
24·67	0·26	Crystals of dextrose.....	do	H. P. Wales, Richmond, Que.
24·55	0·35	do	do	H. Desmaris, Richmond, Que.
26·49	0·34	do	do	Gibson Bros., Dunville, Que.
25·74	0·10	Few crystals visible, seemingly dextrose, one grain of pollen on slide.	do	do do
27·05	0·22	Crystals of dextrose and some pollen grains.	do	Mrs. J. A. Gibson, Dunville, Que.
28·57	0·24	do do	do	do do
26·26	0·25	Very little on slide, very little pollen, a few thick crystals.	Unadulterated..... .	H. G. Silver, Shipton.
32·60	0·15	Crystals of dextrose.....	do	L. W. Bergeron, Quebec.
27·70	0·09	do	do	C. S. Riverin do
33·00	0·09	do	Doubtful, reducing sugar rather low and water high.	J. B. Côté do

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis.						
				By Saccharimeter.				Fehling Solution.		
				Direct Reading.	Invert Reading.	Temp. in ° Centigrade.	Sucrose by Clerget's Formula.	Reducing Sugar Direct.	Reducing Sugar after Inversion.	Sucrose
1896.	*Dr. M. Fiset, Analyst, Quebec.* —Con.						p. c.	p. c.	p. c.	p. c.
Dec. 9	Honey	10302	16208	— 3·5	— 16·3	.....	.....	72·14	76·41	4·06
do 9	do Dr. Gauvreau, Charlesbourg.	10303	16209	— 8·5	— 18·7	.....	.....	72·53	77·39	4·62
do 9	Honey	10304	16210	— 7·0	— 15·7	..	.....	71·36	77·77	6·08
do 9	do	10305	16211	— 17·0	— 19·2	.....	..	72·14	72·53	0·37
do 9	do G. Hunt, Beauport, Que	10306	16212	— 10·0	— 16·5	.....	.....	72·53	76·60	3·86
	Dr. J. B. Edwards, Analyst, Montreal.									
Nov. 23	Honey, Jos. Lamoureau, Montreal.	11541	16171	+ 93·5 +101·7	+ 87·4 + 98·3	18	4·5	53·47	59·79	4·10
do 23	Honey	11542	16172	— 11·00	— 14·32	18	2·54	67·66	70·38	2·68
do 23	do	11543	16173	— 13·5	— 16·5	18	2·3	74·85	79·23	4·14
do 24	do vendor, beekeeper	11544	16174	— 12·0	— 15·4	18	2·4	70·09	73·40	3·14
do 24	do	11545	16175	+ 12·0	+ 17·6	18	21·8	60·03	77·28	16·38
do 24	do A. E. Hoschal, Beamsville.	11546	16176	— 12·0	— 15·4	18	2·5	68·54	72·91	4·15
do 24	Honey	11547	16177	— 6·5	— 16·0	18	6·9	72·67	78·74	5·76
do 24	do	11548	16178	— 16·0	— 17·1	18	0·8	75·34	77·77	2·30
do 24	do	11549	16179	— 14·7	— 18·0	18	3·5	68·83	73·33	4·22
Dec. 3	do G. W. Holmes, Athens, Ont.	11550	16196	— 11·0	— 15·4	18	3·4	73·88	82·63	8·21
do 3	Honey, G. Peck, Albury	11551	16197	— 16·0	— 17·6	18	1·3	74·85	76·80	1·85
do 3	do vendor	11552	16198	+100	+ 94·6	18	4·0	55·90	67·56	11·07
do 3	do	11453	16199	+ 26	— 16·5	18	.....	44·96	76·31	29·78
do 3	do J. Langlois & Co., Montreal.	11554	16200	— 7·0	— 16·5	18	7·0	.....	.....	.....
do 7	Honey, vendor	11555	16201	— 21	— 22	18	0·8	78·26	82·63	4·15
do 7	do	11556	16202	— 11	— 16·5	18	4·1	72·91	82·63	9·23
do 7	do J. Cousineau	11557	16203	— 14	— 16·5	17	1·9	70·72	75·34	4·38
do 7	do	11558	16204	— 12	— 17	18	3·4	74·42	72·42	0·00
do 11	do W. A. Goodfellow, Godmanchester, Que.	11559	16213	— 11	— 16·5	18	4·1	74·13	75·85	1·61
do 11	Honey, A. Lennox, Godmanchester, Que.	11560	16214	— 15·5	— 15·4	18	1·5	72·42	74·85	2·30
do 11	Honey, S. Goodfellow, Huntingdon, Que.	11561	16215	— 11·0	— 16·5	18	4·1	71·69	74·37	2·54
do 11	Honey, vendor	11562	16216	— 9·0	— 16·5	18	5·5	71·94	79·23	6·92
do 14	do F. Benoit	11563	16217	— 14·0	— 17·0	18	2·2	71·69	75·34	3·46
do 14	do	11564	16218	— 11·0	— 14·8	18	2·8	71·69	75·34	3·46
do 14	do vendor	11565	16219	— 9·0	— 16·5	18	5·6	70·72	75·83	4·85
do 15	do B.T.Graves, Westmount	11566	16220	— 8·0	— 18·0	18	7·95	69·99	78·26	8·84
do 15	do vendor	11567	16221	— 17·0	— 17·6	18	0·5	73·78	74·85	0·997

HONEY—Tabulated Statement—*Continued.*

Water.	Ash.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.			
26·50	0·13	Crystals of dextrose	Unadulterated	J. A. Moisan, Quebec.
26·20	0·12	do	do	E. Lafrance do
27 30	0·07	do	do	T. E. Gauvreau Bros., Quebec.
28·50	0·25	do	do	do do
26·60	0·05	Crystals of dextrose and some pollen grains.	do	M. Boyce & Son, Quebec.
21·25	0·30		Adulterated with glucose	G. V. Frappier, 2150 St. James St., St. Henri.
22·30	0·18	Pollen fairly abundant and crystals of cane and grape sugar.	Genuine	O. Decarrie, St. Henri.
20·55	0·10	do do	do	F. X. St. Denis, 3624 Notre Dame St., St. Henri.
22·35	0·12	Crystals and pollen fairly abundant, but a dark viscous syrup.	do	J. M. Harrigan, Outremont, Que.
21·15	0·11	Pollen scarce.	Adulterated by the addition of cane sugar.	F. X. Martel, 1117 St. Lawrence St., Montreal.
20·95	0·184	Crystals of cane and grape; pollen scarce.	Genuine	H. Corbeil, 701, St. Lawrence St., Montreal.
20·80	0·26	do do	Direct polarization low; adulteration doubtful.	John Scanlon, Bleury St., Montreal
22·50	0·10		Genuine	Baker & Co., 78 University St., Montreal.
23·60	0·12		do	J. O'Shaughnessy, 86 Victoria square, Montreal.
21·16	0·24	Pollen scarce	do	C. Langlois & Co., St. Paul St., Montreal.
21·69	0·14	Pollen and crystals few	do	do do
23·07	0·32		Adulterated with glucose	Lamoureux & Co., 188 Amherst St., Montreal.
22·46	0·12		Adulterated with an admixture of cane sugar.	L. P. Forest, 1978 St. Catharines St., Montreal.
22·30	0·24	No pollen observed; a few burst starch cells.	Doubtful	A. Porrier, 1938 St. Catharine St., Montreal.
22·15	0·8	Pollen scarce; a red syrup.	Genuine	E. J., 151 Parke Ave., St. Henri, P.Q.
22·90	0·14	Pollen fairly abundant; a dark dull syrup.	do	F. X. Chevalier, St. Henri.
25·30	0·10	do do	do	A. Maloche, Ste. Cunégonde.
24 8	0·11	A few pollen grains, syrup dark, fermented and dirty.	Genuine, but of very low quality.	A. Lussier do
19·15	0·20	Pollen abundant; syrup dark and opaque.	Genuine	John Hunter, Huntingdon, Que.
21·7	0·09	do do	do	J. Henry do
21·35	0·112	Normal	do	G. A. Kyle do
20·25	0·84	Normal; syrup pale amber.	do	J. X. Galipeau do
22·8	0·14	A little pollen; nothing abnormal.	do	T. Desmarcheir, Côte de Neiges.
22·15	0·24	Pollen abundant	do	J. A. Gougeon do
22·85	0·06	Only a trace of pollen.	Adulteration doubtful	F. Benoit do
23·35	0·080	Pollen scarce.	do	A. A. Perry & Co., Westmount.
24·65	0·12	Pollen fairly abundant.	Genuine	B. F. Graves do

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. By Saccharimeter. Direct Reading.	Invert Reading.	Temp. in° Centigrade.	Sucrose by Clerget's Formula.	Fehling Solution. Reducing Sugar direct	Reducing Sugar after Inversion.	Sucrose.
1396	*Analyst, Dr. F. X. Valade, Ottawa.*						p. c.	p. c.	p. c.	p. c.
Nov. 19	Honey, G. Kemp, Navan, Ont.	10771	16857	— 14·4	— 16·2	20	1·66	65·40	67·16	1·671
do 19	Honey, G. Kemp, Navan, Ont.	10772	16858	— 11·0	— 18·5	20	5·66	63·86	68·52	4·43
do 19	Honey, R. MacDonald, Greenfield, Ont.	10773	16859	— 11·0	— 16·2	20	3·93	69·29	72·60	4·09
do 19	Honey, G. H. Burroughs, Goulbourn. Fallowfield, Ont	10774	16860	— 14·4	— 18·7	20	3·25	62·29	68·92	6·39
do 19	Honey, S. J. Major, Ottawa, Ont.	10775	16861	+ 67·04	+ 63·09	20	0·00	50·46	54·82	4·14
do 19	Honey, R. Lindsay, Oxford Mills, Ont.	10776	16862	— 13·9	— 13·9	20	0·00	67·38	69·82	2·32
do 19	Honey, from Billings' Bridge..	10777	16863	— 13·3	— 14·8	20	1·13	64·44	67·84	3·23
do 19	Honey, E. Hostal, Beamsville.	10778	16864	— 12·3	— 16·6	20	3·25	63·93	72·65	8·25
do 19	Honey, S. J. Major.....	10779	16865	+ 66·9	+ 61·9	20	3·65	49·32	55·04	5·43
do 19	Honey, G. Kemp, Navan, Ont.	10780	16866	— 13·0	— 17·8	20	4·64	66·48	74·13	5·37
do 19	Honey.....	10781	16867	+ 75·0	+ 68·9	22	2·28	47·11	51·70	4·36
do 19	Honey, D. O'Meara, Bowesville, Ont.	10782	16868	— 15·0	— 18·0	22	3·12	67·73	75·26	1·14
do 19	Honey, G. H. Burroughs, Goulbourn, Ont.	10783	16869	— 14 2	— 18·3	22	3·12	63·31	67·67	4·14
do 19	Honey, A. C. Dunlop, Carleton Place.	10784	16870	— 11·4	— 16·0	20·6	3·47	62·51	68·98	6·05
do 19	Honey, E. McEvoy, Bowesville, Ont.	10785	16871	— 13·3	— 16·0	20·6	2 04	67·84	68·12	0·27
do 21	Honey, O. Kemp, Navan.....	10786	16872	— 10·4	— 13·3	20·6	2·19	71·98	74·12	2·03
do 21	do S. J. Major, Ottawa..	10787	16873	+ 69·3	+ 63 2	20·6	4·61	47·40	53·06	5·38
do 21	do Mr. O'Brien	10788	16874	— 9·2	— 14·1	20·6	3·70	66·99	68·41	1·35
do 21	do S. J. Major.....	10789	16875	+ 71·2	+ 66·5	21	3·56	50·97	53·85	2·74
do 21	do	10790	16876	— 8·8	— 14·7	21	4·47	63·82	68·24	4·20
do 21	do Vendor.....	10791	16877	— 9·4	— 13·9	21	3·41	67·56	74·02	6·14
do 21	do J. Lamoureau, Montreal.	10792	16878	+100·2	+ 95·0	21	3·94	45·92	51·25	5·06
do 21	Honey..	10793	16884	— 6·7	—13·4	21	5·08	64·55	71·18	6·30
	Analyst, Dr. W. H. Ellis, Toronto.									
Nov. 27	Honey, C. E. Saunders, Agerton, Ont.	8749	16878	+ 12·	— 21 5	19·5	17·7	67·20	82 37	14·41
do 27	Honey	8750	16879	— 16 4	— 21·5	19·5	3·83	77·05	78·73	1·59
do 27	do	8751	16880	— 10·2	— 16·2	19·0	4·50	75·60	76·60	0·95
do 27	Honey, John Hawley, Church street, Toronto.	8752	16881	+ 4·6	— 20·0	19·0	18·47	63·45	79·81	15·54
do 27	Honey, West Virginia Preserving Co., West Virginia.	8753	16882	+147·0	+135·2	18	8·83	46·18	48·57	2·27
do 27	Honey, Rutherford & Harrison, Toronto.	8754	16883	— 13·2	— 18·3	18	3·81	75·60	75·74	0·13
do 27	Honey, W. B. Bulton, Ringwood, Ont.	8755	16884	— 5·3	— 19·2	18	10·43	75·10	76·81	1 62

HONEY—Tabulated Statement—*Continued.*

Water.	Ash.	Microscopical Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.			
35·43	0·05		Genuine, trace of Cl.	Mrs. Green, O'Connor St., Ottawa.
25·88	0·10		Genuine	G. J. Miller, do
33·50	0·05		Genuine, trace of Cl.	J. E. Edwards, Bank St., Ottawa.
35·18	0·02		Genuine	D. McLeod, do
31·00	0·15		Adulterated with glucose, perhaps cane sugar, Chlorine, H_2SO_4 and calcium.	J. H. Primeau, Duke St.
36·30	0·10		Genuine	Bedingfield & McCusker, Queen St.
36·55	0·015		do	N. D. Fraser, Queen St.
33·25	0·15		do	W. York, Queen St.
34·33	0·10		Adulterated with glucose, contains much chlorine.	Mrs. M. Legendre. Queen St.
34·2	0·10		Genuine	W. Madden, Queen St.
33·18	0·10		Adulterated with glucose, and perhaps cane sugar, much chlorine.	R. Legendre, Queen St.
33·6	0·05		Genuine	W. H. Wooding, Bank St.
36·55	0·10		do	W. J. Eastcott, Bank St.
33·18	0·15		do	Wall & Co., Market Square.
33·88	0·02		do	J. H. Johnston.
33·75	0·015		do	J. H. Johnston.
32·55	0·10		Adulterated with glucose, perhaps cane sugar, much chlorine.	P. L. Foisy, Dalhousie St.
36·13	0·10		Genuine	L. Malette, St. Patrick St.
33·78	0·02		Adulterated with glucose, much chlorine.	J. B. Robillard, Clarence St.
34·43	0·05		Genuine, traces of Cl. & Ca	T. R. Davies, Rideau St.
33·2	0·20		do do	C. W. Post, Trenton, Ont.
29·2	0·03		Adulterated with glucose.	S. J. Major, Murray St., Ottawa.
34·53	0·05		Genuine, traces of chlorine	Robt. Peters & Co., Toronto.
15·56	0·06	Pollen Grains	Honey, mixed with cane sugar.	Robt. Peters & Co., 154 King St., Toronto
15·68	0·04	do	Genuine	do do
15·18	0·25	do	do	do do
17·08	0·14	do	Mixed with cane sugar	H. Lindsay, 60 King St., Toronto.
15·19	0·03	do	Adulterated by admixture with glucose.	Rossin House Grocery, Toronto.
16·93	0·02	do	Genuine	Mr. McAuliff, corner York and Adelaide Sts., Toronto.
16·15	0 26	do	do	Caldwell & Hodgins, 250 Queen St. West.

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Observations by Saccharimeter. Direct Reading.	Invert Reading.	Temperature in ° Centigrade.	Sucrose by Clerget's Formula.	By Fehling Solution. Reducing Sugar Direct.	Reducing Sugar by Inversion.	Sucrose.
1886.	*Analyst, Dr. W. H. Ellis, Toronto.*—Con.						p.c.	p.c.	p.c.	p.c.
Nov. 27	Honey, H. Ross, Queen street, Toronto.	8756	16885	— 8·7	— 18·9	18	7·64	72·90	77·67	4·53
do 27	Honey, Moyer, Toronto	8757	16886	— 10·4	— 16·5	18	4·58	76·20	76·81	0·58
do 27	do J. Hawley, Toronto...	8758	16887	+ 4·5	— 19·8	18	18·31	64·15	78·95	14·06
do 27	do	8759	16888	— 8·0	— 18·0	18	7·54	76·55	77·24	0·65
do 28	do C. E. Saunders, Agerton, Ont.	8760	16889	— 3·5	— 19·1	18	11·76	71·70	77·88	5·87
do 28	Honey	8761	16890	— 17·0	— 19·1	18	1·58	75·80	77·03	1·17
do 28	do Graham & McLean, Toronto.	8762	16891	— 6·4	— 19·0	18	9·49	68·55	76·81	7·84
do 28	Honey, J. F. Switzer, Streetsville.	8763	16892	— 10·0	— 17·2	18	13·03	73·90	77·55	3·46
do 28	Honey, Moyer, Spadina Ave., Toronto.	8764	16893	— 14·3	— 16·2	18	0·69	73·15	75·28	2·02
do 28	Honey, S. Jewell, Toronto....	8766	16894	— 15·5	— 20·0	18	3·38	75·60	77·88	2·16
do 28	do	8767	16895	— 13·3	— 18·1	18	3·61	74·15	77·02	2·73
do 28	do	8768	16896	— 9·7	— 27·7	18	13·58	67·35	77·24	9·39
do 28	do E. Cliff & Sons, Altona, Ont.	8769	16897	— 9·7	— 17·7	18	6·01	75·35	76·81	1·38
do 28	do J. F. Young, Toronto.	8770	16898	— 13·5	— 19·8	18	4·73	73·90	77·24	3·17
do 28	do Mr. Hall, Toronto....	8771	16899	— 12·5	— 17·9	18	4·05	74·15	74·46	0·29
do 28	do Moyer, Toronto... ...	8772	16900	— 11·9	— 20·2	18	6·23	75·60	78·10	2·37
	F. T. Harrison, Analyst, London, Ont.									
Nov. 21	Honey, S. Stitt, Leadbury, Ont.	9001	15699	— 7·0	— 8·1	18	0·9	68·30	68·77	0·44
do 23	do J. Hinchly, Constance.	9002	15700	— 7·0	— 9·0	18	2·3	73·19	75·08	2·00
do 23	Clover Honey, vendor... .. .	9003	15701	— 7·2	— 8·9	18	1·9	69·9	71·8	1·8
do 23	Buckwheat Honey, vendor....	9004	15702	— 10·5	— 11·5	18	1·2	72·3	74·0	1·6
do 23	Pure Clover Honey	9005	15703	— 7·0	— 10·5	18	3·9	70·38	73·09	2·6
do 23	Honey, vendor.....	9006	15704	— 5·6	— 9·6	18	4·5	70·8	70·8	.....
do 23	do	9007	15705	— 4·0	— 10·0	18	6·7	70·74	74·5	3·7
do 23	do Mr. Petril, near Brantford.	9008	15706	— 5·0	— 9·1	18	4·6	69·20	70·94	1·52
do 24	do E. G. Bodwell, Salford.	9009	15707	— 4·8	— 0·1	18	4·8	69·06	71·74	2·55
do 24	do O. E. Robinson, Ingersoll.	9010	15708	— 10·5	— 12·5	18	2·3	72·55	73·98	1·36
do 24	do E. G. Hollingshead, Culloden.	9011	15709	— 7·5	— 11·0	18	3·9	70·07	74·58	4·2
do 25	do vendor.....	9012	15710	— 4·0	— 6·9	18	3·3	71·3	75·58	4·0
do 25	do W. Fulton, Brewster..	9013	15711	— 5·0	— 15·9	18	13·0	64·9	75·73	10·0
do 25	do P. Brennan, Wildwood	9014	15712	— 5·5	— 10·7	18	5·8	71·1	72·24	1·08
do 25	do J. Worden, St. Paul...	9015	15713	+ 0·5	— 10·7	18	13·0	63·49	73·71	9·71
do 25	do J. Young, near Embro.	9016	15714	— 5·8	— 9·3	18	3·9	73·24	73·84	0·56
do 25	do Mr. Brunson, Glenmore	9017	15716	— 8·0	— 9·9	18	2·2	70·87	74·50	3·35
do 25	do R. J. Young, Tilsonburg.	9918	15717	— 6·8	— 9·1	18	3·1	72·10	73·80	1·64
Dec. 1	do D. McFarlane, Tilsonburg.	9019	15718	— 7·0	— 9·9	18	3·2	72·31	72·34	...
do 1	do Waddell Bros., St. Thomas.	9020	15719	— 6·0	— 9·9	18	4·4	71·74	72·42	0·64
do 2	do vendor.....	9021	15720	— 5·0	— 9·0	18	4·6	69·83	74·93	4·8

HONEY—Tabulated Statement—*Continued.*

Water.	Ash.	Microscopical Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p.c.	p.c.			
14·73	0·06	Pollen grains	Genuine	H. Hope, 292 Queen St. West. Toronto.
15·21	0·14	do	do	S. Hazlett, 434 Queen St. West.
16·43	0·11	do	Mixed with cane sugar.	J.F. Moorish, 267 Yonge St., Toronto.
15·10	0·16	do	Genuine	F.S. Roberts, 290 Yonge St., Toronto.
16·10	0·15	do	do	A. F. Barker, 302 Yonge, St.
17·39	0·02	do	do	Mr. S. K. Oliver, 93 Church St.
16·99	0·03	do	do	P. Macdonald, 120 Church St.
16·28	0·08	do	do	Kelly Bros., 90 Queen St.. Toronto.
17·97	0·15	No pollen grains	Genuine	G. Noble, 185 Wilton Ave., Toronto.
16·94	0·03	Pollen grains	do	A. Nettleton, 137½ Church St. do
17·55	0·18	do	do	G. F. Smedley, Wilton Ave. do
17·15	0·05	No pollen grains	do	F. Hall, 146 Queen St. E. do
14·86	0·20	Pollen grains	do	J. & W. McFarren, Queen and Sherbourne Sts., Toronto.
15·20	0·03	do	do	A. E. Varcoe, 182 Queen St., Toronto.
13·70	0·12	do	do	W. Forster, Queen and Jarvis Sts., Toronto.
15·20	0·06	do	do	J. Verner, 283 Parliament St., Toronto.
32·77	0·17	No foreign substance detected	Unadulterated	T. Daly, Seaforth, Ont.
28·2	0·10	do do	do	Robb Bros. do
27·6	0·16	do do	do	J. B. Hall, Woodstock.
30·4	0·23	do do	do	do do
26·8	0·26	do do	do	do do
27·2	0·20	do do	do	J. H. Shaver, Cainsville, Ont.
26·2	0·15	do do	do	F. J. Davis do
28·7	0·15	do do	do	A. L. Vanstone, Brantford.
23·8	0·10	do do	do	Dundas & Menhmic, Ingersoll.
30·8	0·39	do do	do	E. E. Dundas do
27·5	0·03	do do	do	Robinson Bros. do
25·4	0·10	do do	do	J. Newton, Thamesford.
28·2	0·06	do do	Apparently contains a little added sucrose.	Turville Bros., London.
34·2	0·8	do do	Unadulterated	Somerville & Co. do
27·5	0·25	do do	Apparently contains a little added sucrose.	A. Beattie & Co., Stratford.
25·0	0·06	do do	Unadulterated.	E. O. Flaherty do
29·1	0·20	do do	do	W. B. Hogart, Tilsonburg.
29·7	0·06	do do	do	W. J. Wilkins do
26·5	0·05	do do	do	H. C. Buchner do
28·1	0·15	do do	do	H. H. Waddell.
24·8	0·15	do do	do	S. Pettit.

APPENDIX D.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis. Observations by Saccharimeter. Direct Reading.	Invert Reading.	Temperature in ° Centigrade.	Sucrose by Clerget's Formula.	By Fehling Solution. Reducing Sugar Direct.	Reducing Sugar by Inversion.	Sucrose.
1886.	*E. B. Kenrick, Analyst, Winnipeg.*						p.c.	p.c.	p.c.	p.c.
Dec. 29	Honey, A. Maynard, Winnipeg.	11040	14779	— 10·9	— 19·6	14	6·40	71·62	.....	.....
do 29	do do ..	11041	14780	— 11·0	— 22·0	14	8·09	71·74	.....	.....
1897.										
Jan. 4	Honey, Bright & Johnson, Winnipeg.	11042	14781	— 15·5	— 20·5	14	3·68	74·03	.....	.....
do 4	Honey, S. A. Deadman, Brussels, Ont.	11043	14782	— 19·7	— 23·1	14	2·50	77·51	.....	.....
do 4	Honey.....	11044	14783	— 13·5	— 21·3	14	5·74	71·82	2·55	.....
do 6	do A. Maynard, Winnipeg	11045	14784	— 11·4	— 22·6	14	8·24	69·65	8·77	.....
do 6	do	11046	14785	— 8·2	— 19·8	14	8·53	72·44	8·47	.....
do 6	do W. M. Artley, Walter's Falls.	11047	14786	— 19·1	— 21·7	14	1·91	74·74	2·32	.....
do 7	do	11048	14787	+ 34·7	— 24·0	14	43·16	42·48	42·44	.....
do 7	do W. C. Wells, Phillipston.	11049	14788	— 16·1	— 19·5	14	2·51	73·01	.....	.....
do 7	do E. C. Williams, Onemee.	11050	14789	— 13·4	— 17·8	14	3·24	74·38	2·98	.....
do 8	do vendors.....	11051	14790	— 11·2	— 17·2	14	4·41	71·38	.....	.....
do 8	do J. Stewart, Meaford...	11052	14791	— 16·5	— 19·6	14	2·28	74·60	.....	.....
do 8	do vendor.....	11053	14792	— 17·9	— 19·1	14	0·88	71·32	.....	.....
do 11	do The Macdonald Co., Winnipeg.	11054	14793	— 17·0	— 20·6	14	2·65	73·25	.....	.....
do 11	do A. Maynard, Winnipeg	11055	14794	— 4·9	— 19·7	14	10·88	69·23	.....	.....
do 11	do W. C. Wells, Phillipston, Ont.	11056	14795	— 13·9	— 19·6	14	4·19	78·08	.....	.....
do 11	do A. Maynard, Winnipeg	11057	14796	— 17·9	— 19·9	14	1·47	76·36	1·35	.....

HONEY—Tabulated Statement—*Concluded.*

Water.	Ash.	Microscopical Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p.c.	p.c.			
18·36	.....	....	Free from added cane or starch sugar.	W. F. Calder, Winnipeg, Man.
16·83	.....	.. ..	Doubtful ; contains an abnormal proportion of cane sugar.	J. L. Wells & Co. do
17·33	.....	....	Free from added cane or starch sugar.	W. H. McLean do
16·33	.....	....	do do .	E. Hunter & Co. do
16·70	.....	....	do do ..	Mrs. Cranston do
16·65	.....	.. . .	Doubtful ; contains an abnormal proportion of cane sugar.	R. Crawford do
16·51	.....	.. . .	do do ..	Irish & Cleveland do
19·74	....	....	Free from added cane or starch sugar.	E. Galbraith do
14·62	.....	....	Adulterated with cane sugar.	Sutherland & Campbell do
16·11	.....	.. ..	Free from added cane or starch sugar.	Thompson, Codville & Co., Winnipeg. Man.
16·11	.....	....	do do ..	Turner, McKeand & Co., Winnipeg, Man.
17·23	.....	.....	do do ..	Bright & Johnson, Winnipeg, Man.
18·26	...	.. ..	do do ..	The A. McDonald Co. do
22·42	.....	.....	do do ..	M. Cormier do
18·40	.....	....	do do ..	J. Jesselwick do
16·83	.....	....	Doubtful ; contains an abnormal percentage of cane sugar.	C. D. Anderson do
15·52	.....	.....	Free from added cane or starch sugar.	K. McKenzie & Co. do
.....	... ..	....	do do ..	J. C. Sproule do

APPENDIX E.—INSPECTION OF CREAM

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Moisture.	Ash.	Total Acidity.	Available Acidity.	Potassium Bitartrate.	Calcium Tartrate.	Calcium Sulphate.	Sulphuric Acid.
1897.	*M. Bowman, Analyst, Halifax.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Jan. 13	Cream of Tartar, T. B. Baker & Son, St. John, N.B.	10654	15112	1·85	....	.....	.....	88·26	9·81	.....	.....
do 13	Cream of Tartar, Brown & Webb, Halifax, N.S.	10655	15113	1·48	.....	.....	.....	90·33	6·50	.....	.....
do 14	Cream of Tartar, Simson Bros., Halifax.	10656	15114	1·77	...	.....	....	87·33	12·02	.....	.....
do 14	Cream of Tartar, Lyman, Sons & Co., Montreal.	10657	15115	1·92	.....	.....	....	87·33	10·07	.....	.....
do 15	Cream of Tartar, J. P. Mott & Co., Halifax.	10658	15116	1·15	....	.....	.....	91·37	7·86	.....	.....
do 15	Cream of Tartar, W. H. Schwartz, Halifax.	10659	15117	1·63	....	.....	.....	89·34	8·54	.....	.....
do 16	Cream of Tartar, J. P. Mott & Co., Halifax.	10660	15118	1·38	.....	.....	.....	90·33	8·58	.....	.....
do 16	Cream of Tartar, Bauld, Gibson & Co.	10661	15119	2·12	.....	.....	.....	86 29	12·09	.....	.....
do 16	Cream of Tartar, John Tobin & Co., Halifax.	10662	15120	1·05	.....	.....	.....	93·34	3·70	.....	.....
do 16	Cream of Tartar, Simson Bros., Halifax.	10663	15121	1·76	.....	.....	.....	88·26	9·36	....	....
	W. F. Best, Analyst, St. John, N.B.										
Jan. 8	Cream of Tartar, vendor, imported crystals ground by White & Colwell.	9913	15103	1·3	....	....	....	91·0	7·7	.....	.....
do 8	Cream of Tartar, Merritt Bros., St. John.	9914	15104	3·1	.....	.....	.....	94·5	2·4	.....	.....
do 8	Cream of Tartar, vendors...	9915	15105	2·0	.....	...	.....	94·5	4·5	...	.....
do 8	Cream of Tartar, Merritt Bros., St. John.	9916	15106	2·0	....	.....	.....	95·0	3·0	.....	.....
do 8	Cream of Tartar, Canadian Drug Co., St. John.	9917	15107	1·70	.....	.....	.....	90·30	8·0	.....	.....
do 9	Cream of Tartar, Dearborn & Co., St. John.	9918	15108	1·45	.....	.....	.....	92·50	6·05	.....	.....
do 9	Cream of Tartar, C M. Bostwick & Co.	9919	15109	1·80	.....	.....	.....	90·00	8·20	.....	.....
do 9	Cream of Tartar, Dearborn & Co., St. John.	9920	15110	1·20	.....	.....	.....	88·50	10·30	.....	.....
do 9	Cream of Tartar, J. Finley, St. John.	9921	15111	1·55	.....	.....	.....	91·25	7·20	....	.....
do 14	Cream of Tartar.....	9922	16234	.....	.....	.....	.....	...	.. ..	.....	.....
do 14	Cream of Tartar, N. Turcotte, Quebec.	9923	16236	.....	.....	....	.....	.....	.....	.....	.....
do 14	Cream of Tartar.....	9924	16239	.....	.....	.....	....	.....	.....	....	.....
do 14	do	9925	16241	.. ..	.....	.....	.....	.. ..	..	....	.....
Feb. 5	Cream of Tartar, Canadian Drug Co., St. John.	9926	15122	....	.....	.....	.....	.....	...	....	.....
do 5	Cream of Tartar, C. & E. McMichael.	9927	15123	.. ..	.....	.....	.....	.....	.....	.....	.....

OF TARTAR—Tabulated Statement.

Analysis.						Microscopic Examination.	Analyst's Remarks	Name and Address of Vendor.
Alumina.	Acid Phosphate of Lime.	Lime Sulphate.	Phosphoric Acid.	Starch.	Lime.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
.....	.....	.....	.....	.. .	....	....	Unadulterated....	F. L. Roop, Middleton, N.S.
.....	.....	.....	...	.....	....	....	do	Dr. S. N. Miller, Middleton, N.S.
... .	....	.....	....	. .	.....	....	Unadulterated, but of low grade.	Dodge & Dennison, Kentville, N.S.
.....	. .	....	..	....	.. .	.....	Unadulterated....	R. S. Masters, Kentville, N.S.
.....	.....	...	.....	....	.....	....	do	J. Lynch & Son, Windsor, N.S.
....	.....	.....	....	....	. .	....	do	Mylie, Smith & Co., Halifax, N.S.
.....	....	.. ..	....	.....	.....	.....	do	E. Donahoe & Son, Halifax, N.S.
. . .	.....	.....	.....	.....	...	... .	Unadulterated, but of low grade.	J. A. McKaskey, Halifax, N.S.
.....	...	...	....	..	.....	....	Unadulterated....	James Scott & Co., Halifax, N.S.
.. ..	.....	. . .	...	....	.....	... .	do	J. R. Rawley, Halifax, N.S.
. ...	....	... ..	.....	.. ..	....	Nothing abnormal...	Unadulterated, no terra alba.	E. J. Kennedy, 84 King St., St. John.
. ...	.....	.....	.....	.. ..	.....	do ..	do ..	Puddington & Merritt, 55 Charlotte St., St. John
....	.. ..	...	.....	.. ..	.....	do ..	do ..	M. & H. Gallagher, 36 Charlotte St., St. John
.....	... ..	...	.....	.....	.....	do ..	do ..	J. S. Armstrong & Bro., 32 Charlotte St.
.....	. ...	.....	.....	..	.....	do ..	do ..	McPherson Bros., 181 Union St., St. John.
....	.....	. ...	.....	...	. ...	do ..	do ..	P. Nase & Son, 1 Main St., St. John.
.....	.....	.. .	....	.....	.....	do ..	do ..	D. J. Purdy, 325 Main St., St. John.
.....	....	..	.....	....	..	do ..	Unadulterated but contains excess of tartrate of lime.	Vanwart Bros., cor. Duke & Charlotte sts.
.....	.....	.....	....	. .	.....	do ..	Unadulterated....	W. A. McGee, 143 Princess St.
70·0	.....	.....	.....	25·0	.....	.....	No cream of tartar, a mixture of alum and a little wheat flour.	N. Vézina, Quebec.
....	80·0	.	.....	20·0	....	... ...	Not cream of tartar, a mixture of acid phosphate with starch.	A. Laroche, Quebec.
....	75·0	... .	....	25·0	.....	....	do ..	P. Renaud, Quebec.
.....	80·0	.....	....	20·0	... ..	....	do ..	E. Pouliot, Quebec.
.....	.....	....	...	.....	.....	....	Bitartrate of potash not adulterated.	P. F. McKenna, St. Stephen, N.B.
.....	.....	.....	.....	. ...	.....	... ...	do ..	Wm. Robinson, St. Stephen, N.B.

APPENDIX E—INPSECTION OF CREAM

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Moisture.	Ash.	Total Acidity.	Available Acidity.	Potassium Bitartrate.	Calcium Tartrate.	Calcium Sulphate.	Sulphuric Acid.
1897.	*W. F. Best, Analyst, St. John, N.B.*—Con.			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Feb. 5	Cream of Tartar, Almon J. Teed & Co., St. Stephen.	9928	15124	....	....	....	.....	.....	.....	....	....
do 5	Cream of Tartar, C. & E. MacMichael, St. John.	9929	15125	....	....	.....	.....	.....	.....	....	....
do 5	Cream of Tartar, A. Lordly & Co.	9930	15126	....	....	....	.....	45·0	.....	35·0	.....
	Dr. M. Fiset, Analyst, Quebec										
Jan. 14	Cream of Tartar.....	10307	16234	.....	....	.....	224	23·80	.....	.....	5·57
do 14	do M. Thebadeau, Quebec.	10308	16235	.	....	1044·0	472	88·73	13·00	.....	.....
do 14	Cream of Tartar, N. Turcotte, Quebec.	10309	16236	....	....	.....	554	6·13	....	31·57	18·57
do 14	Cream of Tartar.....	10310	16237	.....	.....	1036·0	478	89·86	10·40	.....	....
do 14	do Ewing, Herron & Co., Montreal.	10311	16238	.....	...	1040·0	484	90·99	9·36	.....	....
do 14	Cream of Tartar.....	10312	16239	....	.....	.....	470	16·65	....	53·35	31 38
do 14	do Giroux Bros., Quebec.	10313	16240	...	....	1070·0	522	98·13	3·38	.....	....
do 14	Cream of Tartar.....	10314	16241	....	....	.....	370	6·20	....	6·80	11·30
do 14	do Kerry, Watson & Co., Montreal.	10315	16242	.....	.....	1038·0	476	88·36	12·74	.....	.....
do 14	Cream of Tartar, W. W. Brunet, Quebec.	10316	16243	.....	.....	1032·0	464	87·23	13·52	.....	....
	Dr. J. B. Edwards, Montreal.										
1896.											
Dec. 22	Cream of Tartar, S. H. & A. S. Ewing, Montreal.	11568	16222	2·55	.....	.....	.....	70·50	13·00	.....	.....
do 22	Cream of Tartar, J. J. Duffy & Co., Montreal.	11569	16223	1·55	.....	...	.....	91·186	9·75	....	....
do 22	Cream of Tartar, Marrotte, Leblanc & Co.	11570	16224	1·40	.....	6·35	5·50	.....	.....	....	6·59
do 22	Cream of Tartar, vendors...	11571	16225	1·70	.....	4·85	.....	91·18	9·10	.....	.....
do 22	do N. Quintal et Fils, Montreal.	11572	16226	1·65	.....	5·75	555·0	.....	.....	.....	....
do 22	Cream of Tartar, not known	11573	16227	2·15	.....	1035·0	465·0	87·42	14·95	.....	.....
1897.											
Jan. 7	do	11574	16228	1·50	.....	1035·0	465·0	87·42	13·65	.....	.....
do 7	do N. Quintal. et Fils.	11575	16229	2·15	.....	585·0	260·0	.....	.....	...	6·60
do 7	Cream of Tartar, Caverhill, Hughes & Co.	11576	16230	1·65	.....	.....	475·0	89·3	11·7	.....	.....
do 7	Cream of Tartar, Marrotte, Leblanc & Co., Montreal.	11577	16232	2·0	.....	575·0	530·0	.....	.....	....	.....
do 7	Cream of Tartar, D.C. Brossean.	11578	16233	3·12	.....	30·0	240·0	.....	.....	.....	.....

OF TARTAR—Tabulated Statement—*Continued.*

Analysis.						Microscopic Examination.	Analyst's Remarks	Name and Address of Vendor.
Alumina.	Acid Phosphate of Lime.	Lime Sulphate.	Phosphoric Acid.	Starch.	Lime.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
.....	.....	.....	.....	.....	.....	.....	Unadulterated	Mrs. Gregory, St. Stephen.
.....	.....	.....	.....	.....	.....	.....	do	A. M. McKenzie, Milltown.
.....	.....	.....	.....	20·0	.....	.....	Adulterated	H. H. Butler & Co., Milltown.
3·20	.....	.....	.....	68·0	.....	Contains wheat starch	Adulterated	N. Vézina, Quebec.
.....	.....	.....	.....	.....	.....	.....	Genuine, but contains rather much calcium tartrate.	E. Gagnon, Quebec.
0·23	44·30	.....	26·90	18·0	.....	Contains maize starch	Adulterated	A. Laroche, Quebec.
.....	.....	.....	.....	.....	.....	No starch	Genuine	E. Bérouard, Quebec.
.....	.....	.....	.....	.....	.....	do	do	J. B. Morin, Quebec.
.....	30·00	.....	18.17	.....	.....	Trace of maize starch	Adulterated	P. Renaud, Quebec.
.....	.....	.....	.....	.....	.....	.....	Genuine	V. Giroux, Quebec.
3·00	16·00	....	9.70	57·00	6·80	Maize starch	Adulterated	E. Pouliot, Quebec.
.....	.....	.....	.....	.....	.....	No starches	Genuine	J. L. Laroche, Quebec.
.....	.....	.....	.....	.....	.....	do	Genuine, but contains excess of calcium tartrate.	A. Martineau, Quebec.
.....	.....	5·79	.....	12·96	.....	Abundance of wheat starch or flour.	Adulterated to extent 12 to 15 p.c.	P. Elliott, 48 Bathurst St., Montreal.
.....	.....	.....	.....	.....	.....	No starch or gypsum.	Genuine	T. P. Brophy, 798 Dorchester St.
.....	....	14·17	17·269	.....	6·098	Contains cornstarch or maize about 6.46 p.c	Adulterated under Act.	Bicks, Corner & Co., St. Sacrement St.
.....	.....	.....	.....	.....	.....	No starches	Genuine	Ewing, Heron & Co., St. Sacrement St.
.....	6·15	13·619	17·58	6·65	....	Maize starch	Adulterated	T. C. Hirsch, 17 Chaboillez Square.
.....	.....	.....	.....	.....	.....	No starch, no gypsum	Genuine	C. J. Spénard, 429 St. James St.
.....	.....	.....	.....	.....	.....	do do ..	do	J. J. Foster, 299 Laval Ave.
.....	....	6·60	10·23	3·60	6·96	Maize, starch and 12·69 p.c. cane sugar	Adulterated under Act, misnamed cream of tartar, is a baking powder.	J. Lauche.
.....	.....	.....	.....	.....	.....	No starch, no gypsum	Genuine	M. J. McKerly, 252 Duluth Avenue.
.....	.....	13·98	18·22	.....	6·34	Maize starch, 6·$\frac{3}{4}$ ...	Adulterated, misnamed cream of tartar.	Tizon & Guillett, 416 Lagauchetière St.
.....	.....	9·26	.....	.....	12·11	Maize starch	Adulterated, under Act and miscalled cream of tartar, for which it is a fraudulent substitute.	J. H. Lesage, 1308 De Montigny.

APPENDIX E.—INSPECTION OF CREAM OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Moisture.	Ash.	Total Acidity.	Available Acidity.	Potassium Bitartrate.	Calcium Tartrate.	Calcium Sulphate.	Sulphuric Acid.
1896.	*Dr. F. X. Valade. Analyst, Ottawa.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Dec. 17	Cream of Tartar, S. H. & A. S. Ewing, Montreal.	10804	16901	.....	36·35	1065·0	532·0	100·0	None.	....	None.
do 17	Cream of Tartar.....	10805	16903	.....	36·40	1050·0	530·0	99 64	do	.....	do
do 17	do	10806	16904	.....	43·80	460·0	....	.	. . .	. .	4·52
do 17	Cream of Tartar, L. Chaput Fils, Montreal.	10807	16905	. . .	36·27	1040·0	475·0	89·54	11·25	....	.....
do 17	Cream of Tartar.....	10808	16906	.....	36·20	940·0	480·0	90·24	None.	.....	.....
do 17	do S.H. & A. S. Ewing.	10809	16916	.....	36·28	908·7	442·5	83·19	3·08	.....	2·71
do 17	Cream of Tartar, P. Baskerville Bros., Ottawa.	10810	16918	.....	36·33	970·0	510·0	95·88	.....	.... .	.....
do 17	Cream of Tartar, Bate & Sons.	10811	16919	.....	39·08	850·0	412·5	77·55	3·25	.....	5·19
do 17	Cream of Tartar, H.N. Bate & Co.	10812	16920	.....	36·48	938·7	485·0	91·18	.. ..	.....	.....
do 17	Cream of Tartar, Evans & Sons, Montreal.	10813	16921	.....	36·63	920·0	480·0	90·24	....	.....	. ...
do 17	Cream of Tartar.....	10814	16922	.....	36·45	1010·0	515·0	96·82	....	.....	... ..
do 16	do	10794	15486	.....	39·6	817·5	385·0	72·38	6·18	. . .	10·83
do 16	Cream of Tartar, Snowdrift Co., Brantford.	10795	15487	....	41·65	737·6	360·5	67·77	2·16	.....	14·68
do 16	Cream of Tartar, Snowdrift Co., Brantford.	10796	15488	.....	40·55	752·74	371·8	69·90	1·19	.....	12·13
do 16	Cream of Tartar, Snowdrift Co., Brantford.	10797	15489	. . .	64.10	.....	202·5	...	.....	.....	.....
Feb. 2	Cream of Tartar, would not give name.	10798	15490	.....	36·00	860·0	408·75	76·85	5·53	....	.....
do 2	Cream of Tartar, S. J. Major, Ottawa.	10799	15492	.....	40·1	795·0	380·0	71·44	4·55	....	12·32
do 2	Cream of Tartar, Baskerville Bros.	10801	15494	.....	36·28	1045·0	507·5	95·41	3·90	.....	.....
do 2	Cream of Tartar.....	10800	15493	....	36·33	1068·0	531·7	99·96	.....	.....	. ....
do 2	do	10802	15495	.....	39·85	820·0	375·0	70·5	9·10	....	12·95
do 2	do H. N. Bate & Sons, Ottawa.	10803	16905	.....	36·25	1040·0	476·2	89·54	11·25	.....	.....

TARTAR—Tabulated Statement—*Continued.*

Analysis.						Microscopic Examination.	Analyst's Remarks	Name and Address of Vendor of Sample.
Alumina.	Acid Phosphate of Lime.	Lime Sulphate.	Phosphoric Acid.	Starch.	Lime.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
.....	.....	.....	..	....	....	.....	Genuine.....	Thos. Martin, 167 Rideau St., Ottawa.
.....	.....	..	.....	.....	....	....	do	P. L. Foisy & Son, 297 Dalhousie St.
0·38	8·98	5·13	5·44	8·61	.....	Cornstarch.....	On boiling sample with water effervesses, becomes alkaline 90cc. H'_2SO_4 required to decompose excess of carbonate left by 100 grains boiled with water. Acid phosphate powder containing alum.	J. Casey, 294 Dalhousie St.
.....	...	....	.....	.....	..	....	Genuine...	O. Latremouille, 416 Sussex St.
.....	.....	...	.....	.....	....	....	do	J. Bambrick, Byward Market Sq.
.. ..	.....	4·78	.....	....	....	.....	do	Wall & Co., Byward Market Sq.
.. .	.. ..	.....	.....	.....	....	....	do	J. L. Burke, 303 Bank St.
... .	.....	9·11	....	.....	... ..	Cornstarch	Adulterated	Bate & Co., 426 Bank St
.....	...	....	.. ..	.....	....	... .	Genuine..... ...	John Edgers, 365 Bank.
..	.....	. ..	.....	....	.. ..	.....	do	W. M. Woodburn, druggist, Bank & Gilmour
....	....	..	.....	... .	.....	.....	do	Geo. Paterson, Almonte
.....	....	19·00	....	... ...	.....	....	Adulterated with terra alba or hydrated sulphate of calcium.	Alex. Millar, Pembroke
.....	.....	25·76	....	.....	.....	....	do ..	Fenwick, Hendry & Co., Kingston.
... .	.....	21·29	.....	0·55	.....	....	do ..	do ..
.....	4·09	76·35	2·48	15·59	.....	Contains cornstarch.	Adulterated, having been sold as compound and contains starch.	do ..
.....	. .	9·00	....	7·6	.....	Contains cornstarch.	Adulterated	Gilmour & Co., Brockville.
....	..	21·62	....	.....	.....	....	do with terra alba.	A. Groulx, Church and King Sts., Ottawa.
.. ..	.....	.....	....	....	.....	....	Genuine.	Mrs. M. A. Bower, 480 Cumberland St.
....	.....	.....	.. ..	.....	....	... .	do	J. Mundy, 361 St. Prtrick St.
.....	. ..	22·73	.....	....	.....	....	Adulterated with terra alba.	Mrs. Kate Bower, 447 Cumberland St.
.....	.....	.....	....	....	.....	... .	Genuine.....	J. Bambrick, By Ward Market Square.

APPENDIX E.—INSPECTION OF CREAM OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Moisture.	Ash.	Total Acidity	Available Acidity.	Potassium Bitartrate.	Calcium Tartrate.	Calcium Sulphate.	Sulphuric Acid.
1896.	*W. H. Ellis, Analyst, Toronto, Ont.*			p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
Dec. 19	Cream of Tartar, Snowdrift	8793	15491	1·25	36·65	.....	.....	69·40	10·45	.....	.....
1897.	Co., Brantford.										
Jan. 7	Cream of Tartar, (Box labelled "Pure.")	8773	16907	1·93	38·90	.....	.....	72·61	3·52	.....	.....
do 7	Cream of Tartar, (Box labelled "Substitute.")	8774	16908	.....	.....	.....	.....	.....	.....	.....	.....
do 7	Cream of Tartar, Pure Gold Co., Toronto.	8775	16909	1·30	35·80	.....	.....	87·98	10·71	.....	.....
do 7	Cream of Tartar.....	8776	16910	1·65	35·72	.....	.....	85·42	12·95	.....	.....
do 8	do Pure Gold Co., Toronto.	8777	16911	1·85	35·90	.....	.....	87·12	9·52	.....	.....
do 8	Cream of Tartar.....	8778	16912	2·15	35·85	.....	.....	86·25	11·95	.....	.....
do 8	do Snowdrift Co., Brantford.	8779	16913	1·90	35·20	.....	.....	87·98	9·52	.....	.....
do 8	Cream of Tartar, Pure Gold Co., Toronto.	8780	16914	1·35	35·67	.....	.....	88·84	8·33	.....	.....
do 8	Cream of Tartar, Compound	8781	16915	1·70	38·05	.....	.....	76·59	6·9	.....	.....
do 8	.....	8782	16916	1·60	35·10	.....	.....	87·13	11·31	.....	.....
1896.	*F. Harrison, Analyst, London, Ont.*										
Dec. 17	Cream of Tartar, R. M.	9022	15721	0·25	32·8	.....	.....	88·2	9·2	.....	.....
1897.	Fullerton.										
Jan. 6	Cream of Tartar, McKee, Smith & Co., London.	9023	15722	1·55	36·8	.....	.....	90·24	7·0	.....	.....
do 6	Cream of Tartar, Martin & Sons, Toronto.	9024	15723	1·9	33·2	.....	.....	81·1	5·2	.....	4·3
do 6	Cream of Tartar, Dalton Bros.	9025	15724	1·7	36·65	.....	.....	85·0	4·5	.....	2·1
do 7	Cream of Tartar, Pure Gold Mfg. Co., Toronto.	9026	15725	0·2	34·4	.....	.....	99·7	trace..	.....	.....
do 7	Cream of Tartar, Hamilton Coffee and Spice Co.	9027	15726	1·55	33·75	.....	.....	90·6	7·3	.....	.....
do 7	Cream of Tartar, E. Blair & Co., Toronto.	9028	15727	2·0	36·4	.....	.....	87·0	7·5	.....	.....
do 8	Cream of Tartar, T.B. Escott & Co., London, Ont.	0029	15728	8·6	55·2	.....	.....	.....	.....	.....	.....
do 8	Cream of Tartar, Gorman & Escott, Toronto.	9030	15629	0·30	36·5	.....	.....	98·8	0·7	.....	.....
do	do do	9031	15730	0·25	35·15	.....	.....	96·5	1·3	.....	.....
	E. B. Kenrick, Analyst, Winnipeg, Man.										
Jan. 25	Cream of Tartar, The Martin Bole Wynne Co.	11058	14797	0·23	36·77	.....	.....	100·18	.....	.....	.....
do 25	Cream of Tartar.....	11059	14798	2·70	36·81	.....	.....	90·86	6·50	.....	.....
do 26	Cream of Tartar, Williams & Hilton, Winnipeg.	11060	14799	2·10	36·63	.....	.....	70·14	.....	.....	.....

TARTAR—Tabulated Statement—*Continued.*

Analysis.						Microscopic Examination.	Analyst's Remarks	Name and Address of Vendor of Sample.
Alumina.	Acid Phosphate of Lime.	Lime Sulphate.	Phosphoric Acid.	Starch.	Lime.			
p.c.	p.c.	p.c.	p.c.	p.c.	p.c.			
11·30	2·60	18·90	.....	5·80	.....	.....	Adulter'd with 18% calcium sulphate.	T. Kinnear & Co., Toronto, Ont.
...	...	20·44	...	...	...	.....	Adulter'd with 20% calcium sulphate.	M. Carbon, Peterboro', Ont.
12·05	...	51·8	25·6	...	.....	.....	A Cream of Tartar substitute.	do do
.....	...	.....	.....	.....	.....	.....	Genuine.	E. Brown & Co., Toronto, Ont.
...	.....	.....	.....	.....	...	.....	do	J. D. Tully, Druggist Toronto.
.....	.....	.....	.....	.....	.....	.....	do	Swan Bros., King St. Toronto.
....	..	.....	.....	.....	...	.....	do	R. Donald, 134 King St., Toronto.
.....	.....	.....	.....	.....	.....	.....	do	F. S. Roberts, Yonge St., Toronto.
.....	.....	2·16	...	.....	...	.....	Contains 2% calcium sulphate.	W. Forster, Queen St., Toronto.
...	2·09	12·72	...	.....	.....	.....	Adulter'd with 12% calcium sulphate.	W. McMullan, Yonge St., Toronto.
.....	.....	.....	.....	.....	.....	.....	Genuine.	J. L. Gibson, Yonge St., Toronto.
.....	.....	2·1	...	.....	...	No starch.	Unadulterated	Snowdrift Baking Powder Co., Bantford.
...	...	.....	...	.....	.....	No starch or foreign substance detected.	do ..	McMurray & Wiltsie, Clinton, Ont.
...	.....	8·1	.....	2·5	4·2	Cornstarch.	Adulterated	N. Robson, Clinton, Ont.
.....	...	4·1	.....	4·6	3·0	do	do	H. J. Horton, Goderich, Ont.
..	.....	.....	.....	.....	.....	No starch or foreign substance.	Pure.	Sturdy Bros. do
...	.....	.....	.....	.....	.....	A few granules of cornstarch probably accidently present.	Unadulterated	W. J. Levy, Mitchell, Ont.
.....	....	0·5	.....	.....	.....	Slightly adulterated.	.....	R. M. Berley, do
.....	....	69·1	....	27·0	22·8	Cornstarch 4.5% Tartaric Acid.	Adulterated ...	Pickard & Fleming, St. St. Mary's, Ont.
.....	...	.....	...	.....	.....	No starch or foreign substance.	Pure.	J. McAdam, St. Mary's Ont.
...	.....	.....	.....	...	...	do do	do	W. H. McCutcheon, London.
.....	...	.....	..	...	...	.....	Genuine.	E. T. Howard, Druggist, Winnipeg.
.....	.....	.....	....	.....	...	.....	do	R. B. Bailey & Co., Winnipeg.
.....	4·15	13·06	.....	11·12	.....	Wheat starch.	Adulterated with wheat starch, phosphate and sulphate of lime.	A. Eiliott & Co., Winnipeg.

APPENDIX E.—INSPECTION OF CREAM OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of							
				Moisture.	Ash.	Total Acidity.	Available Acidity.	Potassium Bitartrate.	Calcium Tartrate.	Calcium Sulphate.	Sulphuric Acid.
1897.	*E. B. Kenrick, Analyst, Winnipeg, Man.*—Con.			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Jan. 26	Cream of Tartar, Lyman Sons & Co., Winnipeg.	11061	17001	2·31	36·88	.....	.....	91·61	6·12	.....	.....
do 26	Cream of Tartar, The Martin Bole Wynne Co.	11062	17002	2·72	48·53	.....	.....	12·80	.....	.....	.....
do 26	Cream of Tartar, Compound, Dyson, Gibson & Co.	11063	17003	2·42	64·34	.....	.....	trace..	.....	.....	.....
do 27	Cream of Tartar, Todhunter & Mitchell, Toronto.	11964	17004	2·84	36·73	.....	.....	90·11	6·88	.....	.....
do 27	Cream of Tartar, Todhunter & Mitchell, Toronto.	11065	17005	3·40	36·69	.....	...	88·23	8·10	.....	.....

TARTAR—Tabulated Statement—*Concluded.*

Analysis.						Microscopic Examination.	Analyst's Remarks	Name and Address of Vendor of Sample.
Alumina.	Acid Phosphate of Lime.	Lime Sulphate.	Phosphoric Acid.	Starch.	Lime.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
.....	.....	.....	....	....	.....	.....	Genuine.....	J. C. Gordon, Winnipeg.
.....	41·53	17·88	.....	24·76	.....	Wheat starch.....	Adulterated with wheat starch, phosphate and sulphate of lime.	J. C. Sproule, Winnipeg.
.....	45·16	39·50	.....	13·56	....	Corn starch.....	Sold as compound, consists mainly of phosphate and sulphate of lime and cornstarch.	E. Turnbull, Winnipeg.
.....	...	.....	.....	....	....	.....	Genuine.....	Francis & Sons, Winnipeg.
.....	....	.....	.....	.....	.....	.....	do	A. R. Christie, Winnipeg.

APPENDIX F.—INSPECTION OF

Date of Collection.	Description of Sample and Address of Furnisher, as given by Vendor	No. of Analyst's Certificate.	No. of Sample.	Result of				
				Oil.	Oxide of Lead.	Carbon Dioxide.	Sulphate of Barium	Basic Carbonate of Lead.
1897.	*M. Bowman, Analyst, Halifax.*			p.c.	p.c.	p.c.	p.c.	p.c.
Mar. 9..	White Lead, Henderson & Potts, Halifax	10664	16501				40·17	
do 9..	do do	10665	16502				51·17	
do 9..	do do	10666	16503				49·74	
do 9..	do do	10667	16504				53·39	
do 10..	do do	10668	16505				15·46	
do 10..	do do	18669	16506				42·69	
do 10..	do do	10670	16507				25·04	
do 10..	do do	10671	16508				36·60	
do 10..	do do	10672	16509				39·06	
do 11..	do Brandon Bros., London, Eng.	10673	16510					
do 11..	do dry	10674	16511	7·80				
do 11..	do	10675	16512	8·20				
do 11..	do dry	10676	16513					
do 11..	do W. Johnson, Montreal	10677	16514	8·42				
do 11..	do do	10678	16515	7·30				
do 11..	do Henderson & Potts	10679	16516				3·49	
	Dr. M. Fiset, Analyst. Quebec.							
Mar. 11..	White Lead in oil, Robertson & Co., Montreal.	10327	16263	6·98				
do 11..	Dry White Lead, P. D. Dodds & Co.	10328	16264					
do 11..	White Lead in oil, Baylis Manufacturing Co.	10329	16265	6·50				
do 11..	do A. Ramsay & Son	10330	16266	5·98			16·50	
do 11..	do J. Robertson & Co.	10331	16267	4·48			34·75	
do 11..	do Elephant brand	10332	16268	6·60				
do 11..	do Pure	10333	16269	7·16				
do 11..	do (dry) J. E. Martineau, Quebec	10334	16270					
do 11..	White Lead, B. N. A. Paint Co	10335	16271	9·26			51·50	
do 11..	do Stamp No. 905831	10336	16272	7·20				
do 11..	do A. Ramsay & Son	10337	16273	6·02			36·00	
do 11..	do pure	10338	16274	6·70				
do 12..	do Decorators, Stamp No. 868432	10339	16275	7·02				
do 12..	do Elephant, No. 921493	10340	16276	6·14				
do 12..	Extra White Lead	10341	16277	8·12			33·25	
do 12..	Tiger Brand, pure	10342	16278	7·24				
	Dr. J. B. Edwards, Analyst, Montreal.							
Mar. 2..	White Lead, Canada Paint Co.	11590	16244	9·82			65·90	24·28
do 2..	do Montreal Rolling Mills Co.	11591	16245	7·70			57·50	34·80

WHITE LEAD—Tabulated Statement.

Analysis.		Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble Residue.	Water or Loss.		
p.c.	p.c.		
.....	.....	Adulterated.....	Stairs, Sons & Morrow, 174 Water St., Halifax.
.....	.....	do	W. B. Arthur, 282 Water St., Halifax
.....	.....	do	A. L. Melvin & Co., 69 Gottingen St., Halifax.
.....	.....	do	Cragg Bros., 151 Barrington St., Halifax.
.....	.....	do	A. J. Grant & Co., 65 Upper Water St., Halifax.
.....	.....	do	M. O. Crowell, 8 Upper Water St., Halifax.
.....	.....	do	B. Fuller & Son, 292 Upper Water St., Halifax.
.....	.....	do	A. M. Bell, 69 Upper Water St., Halifax.
.....	.....	do	Henderson & Potts.
.....	.....	Genuine.....	do
.....	.....	do	do
.....	.....	do	J. E. M. Taylor, 245 Brunswick St.
.....	.....	do	Brown & Webb, Druggists.
.....	.....	do	Hepp & Co., 78 Argyle St.
.....	.....	do	Martin & Moore, Barrington St.
.....	.....	Adulterated.....	do do
.....	.....	Absence of foreign substances proved ; genuine...	Jos. Dion, 782 St. Valier St., Quebec.
.....	.....	Genuine; this sample contains traces of barium sulphate, but not enough to be considered.	do do
.....	.....	Genuine.....	A. Dombrowski, 773 St. Valier St.
.....	.....	Adulterated with barium sulphate.....	do do
.....	.....	do do	do do
.....	.....	Absence from foreign substance proved ; genuine.	L. C. Giguère, 314 St. Joseph St., Quebec.
.....	.....	do do	J. A. Couture, 264½ St. Joseph St., Quebec.
.....	.....	do do	W. Brunet & Co., St. Joseph St., Quebec.
.....	.....	Adulterated with barium sulphate.....	J. E. Martineau, 135 St. Joseph St., Quebec.
.....	.....	Genuine ; absence of foreign substance proved....	do do
.....	.....	Adulterated with barium sulphate.....	H. & J. Young, Bridge St., Quebec.
.....	.....	Genuine ; absence of foreign substances.....	do do
.....	.....	do do	J. Godin et fils, Des Forges St., Three Rivers.
.....	.....	do do	do do
.....	.....	Adulterated with barium sulphate.....	L. G. Jourdain, Des Forges St., Three Rivers.
.....	.....	Genuine.....	do do
.....	.....	Largely adulterated with Sulphate of Barium...	Roy Bros., 167 St. Lawrence St., Montreal.
.....	.....	do do	D. P. Cottingham, 1822 Notre Dame St., Montreal.

APPENDIX F.—INSPECTION OF

Date of Collection.	Description of Sample and Address of Furnisher, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of				
				Oil.	Oxide of Lead.	Carbon Dioxide.	Sulphate of Barium	Basic Carbonate of Lead.
1897.	*Dr. J. B. Edwards, Analyst, Montreal*—Con.			p.c.	p.c.	p.c.	p.c.	p.c.
Mar. 3..	White Lead, Decorators	11592	16246	8·99	.....	.....	.....	91·01
do 3..	do Canada Paint Co	11593	16247	8·38	.....	.....	.....	91·62
do 3..	Dry White Lead, Canada Life Co	11594	16248	.....	.....	.....	.....	100·00
do 3..	White Lead, Tiger brand, Assn. No. 881555	11595	16249	8·02	.....	.....	.....	91·98
do 4..	do Green Seal brand	11596	16250	8·32	.....	.....	.....	91·68
do 4..	do P. D. Dodds & Co	11597	16251	7·00	.....	.....	10·20	82·80
do 4..	do Lion brand	11598	16252	7·15	.....	.....	.....	92·85
do 4..	do White Rose brand, Assn. No. 928852	11599	16253	7·63	.....	.....	.....	92·37
do 9..	do Baylis Manufacturing Co., Montreal	11601	16254	6·81	.....	.....	.....	93·19
do 9..	do Marked Government standard	11602	16255	7·18	.....	.....	.....	92·82
do 9..	Extra White Lead, Wm. Howe, Ottawa	11603	16256	7·08	.....	.....	33·50	59·42
do 9..	White Lead, Green Seal, pure	11604	16257	7·47	.....	.....	.....	92·53
do 10..	do A. Ramsay & Sons	11605	16258	8·00	.....	.....	.....	92·00
do 15..	American White Lead	11606	16259	11·97	.....	.....	73·95	.....
do 15..	White Lead, dry	11607	16260	.....	.....	.....	.....	.....
do 15..	do Canada Paint Co	11608	16261	7·25	.....	.....	50·50	42·25
do 15..	do P. D. Dods & Co	11609	16262	7·78	.....	.....	9·30	82·92
	Analyst, F. X. Valade, Ottawa.							
Mar. 1..	White Lead (No. 1 Warranted), Canada Paint Co.	10815	16926	7·72	.....	.....	65·57	.....
do 1..	do British North American Colour Co.	10816	16927	7·41	.....	.....	65·95	.....
do 1..	do A. Ramsay & Son, Montreal	10817	16928	6·50	.....	.....	42·45	.....
do 1..	do (No. 1 Warranted), Canada Paint Co.	10818	16929	8·27	.....	.....	58·89	.....
do 2..	do (Ass'rs Label 912510), W. Hill, Montreal.	10819	16930	9·89	.....	.....	.....	.....
do 2..	do A. Ramsay & Son.	10820	16931	6·51	.....	.....	39·27	.....
do 2..	do P. D. Dods, Montreal	10821	16932	7·40	.....	.....	5·19	.....
do 2..	do dry	10822	16933	.....	.....	.....	4·13	.....
do 2..	do British North American Colour Co.	10823	16934	8·58	.....	.....	65·72	.....
do 2..	do Montreal Rolling Mills Co	10824	16935	6·91	.....	.....	50·38	.....
do 16..	do Dry	10825	16936	.....	.....	.....	43·5	.....
do 16..	do (No. 1 Warranted)	10826	16937	8·49	.....	.....	58·45	.....
do 17..	do (Ass'n No. 679953), A. Ramsay & Son	10827	16938	6·51	.....	.....	.....	.....
do 17..	do (No. 1 Warranted)	10828	16939	8·40	.....	.....	56·18	.....

WHITE LEAD—Tabulated Statement—*Continued.*

Analysis.		Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble Residue.	Water or Loss.		
p.c.	p.c.		
.....	.....	Genuine.....	J. W. Stewart & Co., 23 Bleury St.
.....	.....	do	do do
.....	.....	do	do do
.....	.....	do	Grant & Boulard, 306 St. Lawrence St.
.....	.....	do	L. M. Denis, 313 St. Lawrence St.
...	.....	Adulterated to the extent of 10% with barytes . . .	do do
..	.....	Genuine, but deficient in oil.....	F. Martineau, 1381 St. Catherine St.
.....	.....	do	John Miller & Son, 1325 St. Catherine St.
....	.....	No foreign mineral; genuine....	C. G. Marston, Main St., Hull.
.....	.....	Genuine..	F. Barrett, Wellington Se., Hull.
.....	.....	Adulterated to the extent of ⅓ with barium sulphate.	Antoine Parent, Victoria St., Hull.
.....	.....	Genuine.....	B. Carrière, Victoria St., Hull.
...	.....	do	Tétrault & Murot, 1760 St. Catherine St., Montreal.
.....	.....	Adulterated, containing no white lead, but 14·08 per cent zinc oxide.	A. Pallascio, 396 St. James St., Montreal.
.....	.....	Genuine; soluble in nitric acid; clean blowpipe bead.	Leduc & Co., Notre Dame St., Montreal.
...	.....	Adulterated to the extent of 50 per cent with barytes.	C. A. Sharpe, 1641 Notre Dame St., Montreal.
.....	.....	Adulterated to the extent of 9 to 10 per cent with barytes.	P. Gagnier, 1996 St. Catherine St., Montreal.
.....	.....	Adulterated.....	W. Grahame, Bank St., Ottawa.
.....	.....	do	Grant Bros., Sparks St., Ottawa.
.....	.....	do	Miles Birkett, 334 Wellington St.
.....	.....	do	A. Workman & Co., Wellington St.
.....	.....	Genuine	J. Strang, Nicholas St.
.....	.....	Adulterated.....	E. G. Laverdure et Cie., William St.
.....	.....	do	J. B. Duford, Rideau St.
.....	.....	do	W. Strachan, Queen and Bridge Sts.
.....	.....	do	McKinley & Northwood, Rideau St.
..	.....	do	McDougall & Cuzner, Sussex St.
.....	.....	do	A. G. Dobbie & Co., Brockville.
.....	.....	do	do do
.....	.....	Genuine	S. C. Chown, Belleville.
.....	.....	Adulterated.....	J. Lewis & Co., Belleville.

APPENDIX F.—INSPECTION OF

Date of Collection.	Description of Sample and Address of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Results of				
				Oil.	Oxide of Lead.	Carbon Dioxide.	Sulphate of Barium	Basic Carbonate of Lead.
1897.	*Analyst, W. H. Ellis, Toronto, Ont.*			p.c.	p.c.	p.c.	p.c.	p.c.
Mar. 17..	White Lead, Canada Paint Co	8794	16940	8·98	77·23	12·45	...	.....
do 17..	Decorators' Pure White Lead, P. D. Dods & Co., Montreal.	8795	16941	8·25	74·17	10·60	4·62	.....
do 17..	White Lead, (Ass'n No. 901435), Canada Paint Co.	8796	16942	7·27	76·94	10·25	...	.....
do 17..	do W. H. Cottingham	8757	16943	8·31	43·84	...	24·90	...
do 18..	do Dry	8798	16944	...	86·25	11·40	.....	.....
do 18..	do J. Robertson & Co., Toronto	8799	16945	6·47	52·40	7·05	32·29	.....
do 18..	do (Gov't Standard No. 26543), J. Robertson & Co.	8800	16946	8·06	53·24	8·59	28·60	.....
do 18..	do (No. 10098), J. Robertson & Co	12001	16947	8·72	77·48	13·06	.....	.....
do 18..	do (Ass'rs No. rubbed off tin), Toronto Lead and Colour Co.	12002	16948	7·89	77·00	11·21	.....	...
do 18..	do (No. 1), Canada Paint Co	12003	16949	9·64	77·66	10·53	.....	.....
do 18..	do (Ass'n No. 832418), Canada Paint Co.	12004	16950	9·91	76·57	11·22	.....	.....
do 18..	do J. Robertson & Co	12005	16951	11·66	72·17	10·07	4·33	....
do 18..	do Canada Paint Co	12006	16952	...	86·05	11·30	.....	...
do 18..	do (Not sold as Pure), Ontario Lead and Barb Wire Works, Toronto	12007	16953	6·44	24·86	4·07	64·49	.....
do 18..	do (No. 923727), Canada Paint Co	12008	16954	11·59	74·87	11·49	.....	.....
	Analyst, F. T. Harrison. London, Ont.							
Mar. 3..	White Lead, P. D. Dods & Co., Montreal	9041	15731	.....	.....	.....	10·76	82·66
do 3..	do Somerville Lead and Barb Wire Co., Toronto.	9042	15732	...	...	...	19·75	72·88
do 3..	do Stewart & Wood, Toronto	9043	15733	...	.....	...	...	92·09
do 4..	do Dry	9044	15734	.....	.....	.....	17·25	81·51
do 4..	do Canada Paint Co.	9045	15735	.....	...	.....	.....	91·89
do 4..	do Jas. Robertson, Dominion and Lead Works, Toronto.	9046	15736	.....	.....	.....	.....	92·15
do 5..	do dry, Canada Paint Co	9047	15737	...	...	...	.....	95·61
do 5..	do Canada Paint Co	9048	15738	.....	.....	.....	...	90·79
do 5..	do do	9049	15739	.....	.....	.....	66·41	23·48
do 5..	do A. Ramsay & Son, Montreal	9050	15740	.....	..	.....	61·85	30·62
do 5..	do Acme White Lead Works, Windsor.	9051	15741	.....	.....	.....	.....	90·61
do 6..	do J. Robertson & Co., Montreal	9052	15742	..	...	.....	17·45	75·74
do 6..	do Montreal Rolling Mills	9053	15743	.....	...	.....	...	91·63
do 6..	do do	9054	15744	...	...	...	....	90·95

WHITE LEAD—Tabulated Statement—*Continued.*

Analysis.		Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble Residue.	Water or Loss.		
p.c.	p.c.		
.....	1·34	Genuine	J. W. Walker, Belleville, Ont.
4·62	2·36	Adulterated by admixture with 4·62 per cent of barium sulphate.	D. M. Waters, Belleville, Ont.
.....	5 54	Genuine	Dingwall & Ross, Port Hope.
.....	1·14	Adulterated by admixture of 24·90 per cent barium sulphate and 15·80 per cent. zinc oxide.	W. Braund, Port Hope.
.....	2·35	Genuine	Mrs. Thos. Bond, 1026 Queen St. W., Toronto.
.....	1·79	Adulterated by admixture with 32·29 per cent of barium sulphate.	R. Fletcher, Dundas St., Toronto.
.....	1·50	Adulterated by admixture with 28·60 per cent of barium sulphate.	Mrs. Thos. Bond, 1026 Queen St. W., Toronto.
.....	0·74	A sample of nearly normal lead carbonate	F.W. Wilkes, 106 Dundas St., Toronto.
.....	3·87	Genuine	Egles & Lemington, 675 Queen St. W., Toronto.
.....	2·17	do	C. F. Moorhouse, 220 Queen St. W., Toronto.
.....	2·30	do	W. C. McFarland, 391 Parliament St., Toronto.
.....	1·77	Adulterated with an admixture of 4·33 per cent barium sulphate.	do do
.....	2·65	Genuine	W. H. Lake, 608 Queen St. W., Toronto.
.....	0·04	Adulterated with 64·49 per cent of barium sulphate.	W. C. McFarland, 391 Parliament St.
.....	2·05	Genuine	G. W. Wallace, 437 Parliament St.
.....	.....	Adulterated with 10·76 per cent sulphate of barium.	Kastner & Mock, Stratford.
.....	.....	Adulterated with 19·75 per cent sulphate of barium.	A. J. Jeffery, Stratford, Ont.
.....	.....	Pure	F. A. Graber, Stratford, Ont.
.....	.....	Adulterated with 17·25 per cent sulphate of barium.	J. T. Pepper, Woodstock, Ont.
.....	.....	Unadulterated	W. C. McLend, Woodstock. Ont.
.....	.....	do	James Holmes, Woodstock, Ont.
.....	.....	Contains 1·25 per cent calcium sulphite probably accidental.	Morton & Adams, Chatham, Ont.
.....	.....	Pure	Westman Bros., Chatham, Ont.
.....	.....	Adulterated with 66·41 per cent barium sulphate.	Jas. Wilson & Bro., Windsor, Ont.
.....	.....	Adulterated with 61·85 per cent sulphate of barium.	D. L. Wigleson, Windsor, Ont.
.....	.....	Pure	Neveux, Clinton & Baxter, Windsor, Ont.
.....	.....	Adulterated by the addition of 17 45 per cent sulphate of barium.	Corvan, Hardman, Co., London, Ont.
.....	.....	Unadulterated, ground in oil	Jas. Reid & Son, London, Ont.
.....	.....	do do	Geo. Taylor & Sons, London, Ont.

APPENDIX F.—INSPECTION OF

Date of Collection.	Description of Sample and Address of Furnisher, as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of				
				Oil.	Oxide of Lead.	Carbon Dioxide.	Sulphate of Barium	Basic Carbonate of Lead.
1897.	*Analyst, E. B. Kenrick, Winnipeg.*			p. c.	p. c.	p. c.	p. c.	p. c.
April 2..	White Lead, in oil, G. F. Stephens & Co., Winnipeg.	11075	17006	6·97	.....	.....	53·22	39·81
do 2..	do in oil, British North American Colour Co., Winnipeg.	11076	17007	11·72	.....	.....	65·31	22·97
do 2..	do in oil, The Canadian Paint Co., Montreal.	11077	17008	8·43	.....	.....	68·35	23·22
do 2..	do do do	11078	17009	7·15	.....	.....	.....	92·85
do 2..	do in oil, Geo. D. Wood, Winnipeg.	11079	17011	13·33	.....	.....	63·20	23·47
do 2..	do in oil, The Merrick Anderson Co., Winnipeg.	11080	17012	11·50	.....	.....	68·63	19·87
do 2..	do in oil, Canada Paint Co., Montreal.	11081	17013	8·27	.....	.....	.....	91·73
do 2..	do in oil, Jas. Robertson & Co., Toronto.	11082	17014	7·02	.....	.....	.....	92·98
do 2..	do in oil.....	11083	17015	11·84	.....	.....	65·37	22·79
do 2..	do in oil, Canada Paint Co.....	11084	17016	8·25	.....	.....	.....	91·75
do 2..	do dry.....	11085	17017	.....	.....	.....	7·35	92·65
do 2..	do dry.....	11086	17018	.....	.....	.....	.....	.....

WHITE LEAD—Tabulated Statement—*Concluded.*

Analysis.		Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble Residue.	Water or Loss.		
p. c.	p. c.		
.....	.....	Not marked pure, genuine.....	Campbell Bros., Winnipeg, Man.
.....	.....	do do	Geo. D. Wood & Co., Winnipeg.
.....	.....	Labelled "Superfine White Lead," but is not marked pure or genuine.	G. F. Stephens & Co., Winnipeg, Man.
.....	.....	Genuine.....	J. H. Ashdown, Winnipeg, Man.
.....	.....	Labelled "No. 1 White Lead Quality Warranted," if this is considered the equivalent for pure or genuine then the sample is adulterated.	R. Wyatt, Winnipeg, Man.
.....	.....	do do	Grahame & Rolston, Winnipeg.
.....	.....	Genuine.....	J. H. Ashdown, Winnipeg.
.....	.....	do	The James Robertson Co., Winnipeg Man.
.....	.....	Labelled "No. 1 White Lead Quality Warranted," if this is considered the equivalent for pure or genuine the sample is adulterated.	E. Guilbeault, St. Boniface.
.....	.....	Genuine.....	F. W. Weir, Winnipeg.
.....	.....	Adulterated with barium sulphate if sold branded pure or genuine.	Campbell Bros., Winnipeg.
.....	.....	Pure basic carbonate of lead, genuine.....	G. F. Stephen & Co., Winnipeg.

APPENDIX G.—INSPECTION OF

Date of Collection.	Description of Sample and Name and Address of Manufacturer or Furnisher, when ascertained.	No. of Analysts's Certificate.	No. of Sample.	Result of Analysis.					
				Nitrogen as Ammonia.	Phosphoric Acid.				
					Soluble.	Reverted or Citrate.	Insoluble.	Total.	Total Available.
1897.	*Analyst, M. Bowman, Halifax, N.S.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
April 14	Victor Guano, Provincial Chemical Fertilizer Co., St. John, N.B.	10680	16517	2·08	2·30 0·51	4·48	4·29	9·59 9·28	.....
do 14	Vendor would give no information.....	10681	16518	..	trace..	.....	.....	1·48	.....
do 14	Soluble Pacific Guano, Pacific Guano Co., Boston, Mass.	10682	16519	..	5·76	.....	.....	12·06	.....
do 14	Potato Phosphate, Jack & Bell, Halifax, N.S.	10683	16520	4·35	1·36 3 07	1·28	4·16	8·96 8·51	.....
do 16	Ground Bone, S. Archibald, Truro, N.S..	10684	16521	5·02	0·32	2·43	19·96	21·95 22·71	.....
do 16	do J. W. Frazer, New Glasgow, N.S.	10685	16522	5·02	0·64	4·16	15·99	21·54 20·79	.....
do 21	Ground Bone, W. P. Churchill, Yarmouth, N.S.	10686	16523	4·90	0·64	2·63	20·15	23·23 23·42	.....
do 21	Bone Meal, Nova Scotia Fertilizer Co., Halifax, N.S.	10687	16524	4·70	0·51	3·33	20·79	24·02 24·63	.....
do 21	Intense Brand, Pidgeon Fertilizer Co., Windsor, N.S.	10688	16525	.....	trace..	.....	.....	7·35	.....
do 21	Eureka Phosphate, Pidgeon Fertilizer Co., N.S.	10689	16526	....	trace..	.....	.....	8·83	.....
	Analyst, Dr. M. Fiset, Quebec.								
April 7	Royal Bone Phosphate, Williams & Clark. Boston.	10343	16290	1·44	7·04	1·39	2·84	11·30	.....
do 7	Americus Corn Fertilizer, Williams & Clarke.	10344	16291	2·68	7·83	0·83	3·83	12·49	.....
do 7	Americus Potatoe Fertilizer, Williams & Clarke.	10345	16292	2·38	7·98	0·66	4·47	13·11	.....
do 7	Bone Phosphate, Bowker Fertilizer Co., Boston.	10346	16293	2·31	2·08	2·40	9·91	14·39	.....
do 8	Stockbridge Manure, Bowker Fertilizer Co., Boston.	10347	16294	3·31	6·50	0·86	5·27	12·63	.....
do 13	Bone Phosphate, Nichols Chemical Co., Capelton, Que.	10348	16295	0·61	14·04	0 35	0·96	15·35	.....
do 13	Capelton Superphosphate, Nichols Chemical Co.	10349	16296	0·54	7·19	0·81	3·51	11·51	.....
do 13	Reliance, Nichols Chemical Co.....	10350	16297	2·17	4·95	2·57	3·19	10·76	.....
do 13	Royal Canadian, Nichol Chemical Co	10351	16298	3·98	9·27	0·65	3·35	13·27	.....
do 13	Victor, Nichols Chemical Co., Capelton..	10352	16299	2·24	5·59	0·97	3·03	9·59	.....
	Analyst, Dr. J. B. Edwards, Montreal.								
April 5	Tankage, Montreal Union Abbatoir Co..	11610	16279	7·90	0·0	1·16	0·79	1·95	.....
do 5	Blood, Montreal Union Abbatoir Co.....	11611	16280	13 02	0·0	1·01	0·36	1·37	.....
do 5	Dry Tankage, Laing Packing Co., Farnham, Que.	11612	16281	6·80	0·0	5·77	11·03	16·80	.....
do 6	Pacific Guano, Pacific Guano Co., Boston.	11613	16282	2·72	4·79	4·57	2·47	11·83	.....
do 6	Soluble Pacific Guano, Pacific Guano Co., Boston.	11614	16283	3·11	4·95	2·55	2·37	9·87	.....

FERTILIZERS—Tabulated Statement.

Potash.	Moisture.	Total Nitrogen.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.		
1·82	15·32	.....	.....	E. H. O'Cain, Halifax, N.S.
.....	.....	.....	Without guarantee or standard analysis; sold illegally.	Saunders & McLean, Halifax, N.S.
.....	.....	...	do	E. M. Walker, Dartmouth.
5·66	5·64	.....	Nitrate.....	Jack & Bell, Halifax, N.S.
traces	8·38	.....	.....	S. Archibald, Truro, N.S.
traces	7·52	.....	.....	J. W. Frazer, New Glasgow, N.S.
traces	15·14	.....	.....	The Farmers and Citizens Co-operative Co., Yarmouth, N.S.
traces	8·78	.....	.....	De Wolfe & Lambert, Kentville, N.S.
.....	.....	.....	Without guarantee or standard analysis; sold illegally.	Pidgeon Fertilizer Co., Windsor, N.S.
.....	.....	.....	do	do
10·38	14·60	....	Not mentioned in Bulletin 46	A. H. Foss, Sherbrooke, Que.
9·27	14·45	.....	do	do
5·35	11·83	.....	do	do
3·57	8·40	.....	Rather below claim in available phosphoric acid, but above claim in other constituents	W. N. Irwin, Sherbrooke, Que.
6·70	7·55	.....	Somewhat low in available phosphoric acid if compared with No. 706 of Bulletin 46. The discription of brand is indefinite, it may be intended for No. 705.	do
0·39	18·48	.....	Good.....	P. J. Légaré, Quebec.
0·55	15·90	.....	do	do
2·47	13·08	.....	do	do
5·81	8·85	.....	do	do
2·86	12·45	....	do	do
0·0	5·60	.....	Of low value but without guarantee.....	Sold by manufacturer.
0·0	10·05	.....	Without guarantee or standard analysis and sold illegally.	do
0·0	3·41	.....	Up to standard; guaranteed.....	do
1·93	11·55	.....	Without guarantee or standard analysis and sold illegally.	J. W. Seal, Granby, Que.
2·18	11·55	.....	do	Bradford Bros., Granby, Que.

APPENDIX G.—INSPECTION OF

Date of Collection.	Description of Sample and Name and Address of Manufacturer or Furnisher, when ascertained.	No. of Analyst's Certificate.	No of Sample.	Result of Analysis.					
				Nitrogen as Ammonia.	Phosphoric Acid.				
					Soluble.	Reverted or Citrate.	Insoluble.	Total.	Total Available.
1897.	*Analyst, Dr. J. B. Edward, Montreal.*—Con.			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
April 6	Special Guano, Pacific Guano Co., Boston.	11615	16284	3·15	2·38	2·62	3·49	8·49	.....
do 7	Standard, Standard Fertilizer and Chemical Co.	11616	16285	2·79	5·91	3·45	3·91	13·27	.....
do 7	Special, Standard Fertilizer and Chemical Co.	11617	16286	5·03	6·88	1·54	1·97	10·39	.....
do 7	Special Pacific Guano, Pacific Guano Co .	11618	16287	2·89	7·35	2·55	2·73	12·63	.....
do 7	Soluble Pacific Guano, Pacific Guano Co., Boston.	11619	16288	3·08	4·47	5·05	2·79	12·31	.....
do 7	Eclipse Phosphate, Bradley Fertilizer Co	11620	16289	2·57	7·51	2·10	1·90	11·51	.....
	Analyst, Dr. F. X. Valade, Ottawa.								
April 7	No. 1 Fertilizer, vendors.....	10829	16956	2·7	8·16	4·39	2·80	15·35	12·55
do 7	Corn and Grass, vendors	10830	16957	3·38	8·24	2·39	3·36	13·99	10·63
do 7	Special Fertilizer, vendors	10831	16958	5·06	7·20	0·96	3·36	11·51	8·15
do 7	Standard Fertilizer, vendors.....	10832	16959	3·59	8·56	2·28	3·79	14·63	10·83
do 7	Pure Ground Bone, vendors	10833	16960	4·79	Trace.	6·03	17·67	23·72	6·05
do 7	Bradley's Dissolved Bone, Bradley Fertilizer Co.	10834	16961	1·61	4·32	3·59	3·44	11·35	7·91
do 7	Bradley's Potato Fertilizer, Bradley Fertilizer Co.	10835	16962	2·59	5·84	3·03	3·76	12·63	8·87
do 7	Bradley's B. D. Sea Fowl Guano, Bradley Fertilizer Co.	10836	16963	2·91	4·40	4·15	4·24	12·79	8·55
do 7	Bradley's Niagara Phosphate, Bradley Fertilizer Co.	10837	16964	1·26	4·72	2·63	3·12	10·47	7·37
do	B. D. Sea Fowl Guano, Bradley Fertilizer Co.	10838	16965	2·65	4·88	3·91	5·12	13·91	8·79
	Analyst, Dr. W. H. Ellis, Toronto.								
April 19	Bradley's Potato Fertilizer, Bradley Fertilizer Co.	12009	16966	2·46	.....	3·60	2·17	11·90	9·73
do 20	Pure Animal Fertilizer, Brand H., Harris & Co., Toronto.	12010	16967	9·23	.....	3·58	4·22	7·80	3·58
do 20	Pure Animal Fertilizer, Brand C., Harris & Co., Toronto.	12011	16968	7·61	0·93	6·24	7·29	14·46	.....
do 20	Bone Meal, W. Faint, Peterboro	12012	16969	4·33	0·00	8·57	17·02	25·59	8·57
do 20	Bradley's Vegetable and Potato Fertilizer, Bradley Fertilizer Co.	12013	16970	.....	5·06	2·62	3·84	.....	7·68
do 20	Peruvian Guano, Mapes Guano Co. New York.	12014	16971	8·06	0·80	4·96	4·35	10·11	5·76
do 20	Thomas Phosphate, H. & E. Albert London, Eng.	12015	16972	0·22	0·00	5·68	8·87	14·55	5·68
do 20	Albert's Concentrated Manure, H. & E. Albert, London, Eng.	12016	16973	12·18	12·13	2·07	0·64	14·84	14·20
do 20	Pure Fine Ground Animal Fertilizer, Maryland Fertilizer Co.	12017	16974	4·87	.....	8·96	18·04	27·00	8·96
do 20	Sure Growth Fertilizer, W. A. Freeman & Co., Hamilton.	19018	16975	3·26	6·23	2·85	1·92	11·00	9·08
do 20	Bone Meal, W. Faint, Peterboro.....	12019	16976	3·98	0·40	6·36	14·58	20·98	6·76

FERTILIZERS—Tabulated Statement—*Continued.*

Potash.	Moisture.	Total Nitrogen.	Analyst's Remarks.	Name and Address of the Vendor of Sample.
p. c.	p. c.	p. c.		
2·76	13·15	.....	Without guarantee or standard analysis and solid illegally.	Bradford Bros., Granby, Que.
2·18	17·40	...	Up to standard; guaranteed.....	Robinson & Tenny, Waterloo, Que.
6·89	16·15	....	do	do
3·63	10·40	.....	Without guarantee or standard analysis; sold illegally.	Allen, Taylor & Co., Waterloo, Que.
2·22	16·60	.....	do	do
2·20	13·75	.....	A little below standard; guaranteed.....	P. Hubert, Waterloo, Que.
1·21	7·22	....	Genuine.....	Standard Fertilizer Co., Smith's Falls, Ont.
4·46	7·50	.....	do	do do
6·05	6·14	.....	do	do do
1·80	7·42	.....	Below standard for potash.....	do do
None.	5·19	.....	Genuine...	W. Flint, Smith's Falls, Ont.
2·05	10·57	.....	do	Gardiner & Mulligan, Millbrooke, Ont.
2·90	7·89	.....	Potash is a little below standard.....	do do
1·6	9·51	.....	Genuine.....	do do
1·41	11·29	.....	do	do do
1·68	11·44	.....	do	W. J. Graham, Smith's Falls, Ont.
2·911	10·48	.....	Genuine.....	W. J. Graham, Smith's Falls, Ont.
0·27	7·53	. ...	do	Toronto Salt Works, Adelaide St., Toronto.
trace.	6·17	.. ...	do	do do
0·27	8·41	.....	do	W. Rennie, Adelaide St., Toronto.
6·02	11·26	.....	do	do do
1·56	7·80	.....	Unadulterated, but sold illegally; not registered according to Act.	do do
0·00	0·18	.....	Adulterated, because the phosphoric acid is below guarantee.	Steele Briggs Seed Company, Toronto.
21·15	4·70	.....	A very rich fertilizer, both in nitrogen, phosphoric acid and potash. Nitrogen a little low, according to guarantee.	do do
0·00	7·80	.....	Sold illegally; not registered according to Act.	do do
3·61	9·41	.....	Unadulterated.....	J. A. Simmers, King St., Toronto.
0·00	7·92	.....	do	do do

APPENDIX G.—INSPECTION OF

Date of Collection.	Description of Sample and Name and Address of Manufacturer or Furnisher, when ascertained.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis.					
				Nitrogen as Ammonia.	Phosphoric Acid.				
					Soluble.	Reverted or Citrate.	Insoluble.	Total.	Total Available.
1897.	*Analyst, F. T. Harrison, London, Ont.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
April 6	Crown Jewel Fertilizer, vendor.....	9055	15745	9·14	None	2·36	7·30	9·66	.....
do 6	Bone Meal, Michigan Carbon Works, Detroit.	9056	15746	1·62	Trace	6·46	23·22	29·68	.....
do 6	Dissolved Bone and Potash, Bradley Fertilizer Co.	9057	15747	1·28	4·86	4·10	2·62	11·56	.....
do 6	Sea Fowl Guano, Bradley Fertilizer Co..	9058	15748	4·32	3.51	4·31	3·13	10·95	.....
do 6	Potato Fertilizer, Bradley Fertilizer Co..	9059	15749	2·64	5·44	4·60	2·81	12·85	.....
do 6	Lawn Fertilizer, Bradley Fertilizer Co...	9060	15750	6·19	Trace	4·86	1·92	6·78	.....
do 7	Acid Phosphate, vendors.....	9061	15751	...	4·80	2·73	8·97	16·50	.....
do 7	Thomas' Phosphate, E. & H. Albert, London, Eng.	9062	15752	.....	....	8·18	7·04	15·22	.....
do 7	Complete Manure, Bradley Fertilizer Co.	9063	15753	3·78	3·68	5·28	2·64	11·64	.....
	Analyst, E. B. Kenrick, Winnipeg.								
April 5	Thomas' Phosphate, Chemical Works, late H. & E. Albert, London, Eng.	11089	15127	.....	Trace	6·59	11·12	17·71	.....
do 5	Bowker's Square Brand, Bowker Fertilizer Co., Boston, Mass.	11090	15128	1·76	1·48	2·39	7·41	11·28	.....
do 5	Special Potato Phosphate, Provincial Chemical Fertilizer Co., St. John, N.B.	11091	15129	0·83	3·20	1·11	3·45	7·76	4·31
do 5	Cumberland's Seeding Down, Cumberland Bone Posphate Co., Boston.	11092	15130	1·03	3·15	3·40	2·18	8·73	.....
do 5	Coe's Grass & Grain, E. Frank Coe, New York.	11093	15131	1·23	4·04	3·07	4·99	12·10	.....
do 5	Ceres Superphosphate, Nova Scotia Fertilizer Co., Halifax, N.S.	11094	15132	2·07	3·31	2·08	2·69	8·08	....
do 5	Soluble Pacific Guano, Soluble Pacific Guano Co., Boston, Mass.	11087	15133	2·16	4·33	3·10	.. ..	7·43	.....
do 5	Archibald's General Fertilizer, Archibald & Sons, Truro, N.S.	11088	15134	1·43	2·51	1·09	0·52	4·12	3·60

FERTILIZERS—Tabulated Statement—*Concluded.*

Potash.	Moisture.	Total Nitrogen.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.		
0·33	5·60	7 52	Sold illegally; not registered according to Act.	A. McInnis, London, Ont.
.....	2·58	1·34	do do	J. S. Pearce, LondonOnt.
2·16	11·55	1·05	Unadulterated	R. Nicholson, Strathroy, Ont.
5·12	5·55	3·56	do	Govenlock & Gammon, Sarnia, Ont.
3·27	6·10	2·17	do	do do
3·15	3·70	5·10	Sold illegally; not registered according to Act.	do do
.....	6·50	.....	Does not contain the guaranteed quantity of available phosphoric acid.	Canada Chemical Co., London, Ont.
.. ..	0·15	.....	do do	J. Pike, Woodstock, Cnt.
5·40	8·25	3·11	Unadulterated	W. Fripp do
.....	0·38	.....	Genuine	Wallace & Frazer, 90 Germain St., St. John, N.B.
2·35	6·45	....	do	D. J. Seeley & Son, Walker's Wharf, St. John.
8·31	·83	.....	Adulterated	P. Nase & Son, 1 Main St., St. John, N.B.
2·00	14·64	.....	Deficient in phosphoric acid	J. Horncastle & Co., 20 Main St., St. John.
2·32	6·35	.....	Genuine	J. McMulkin, Robertson's Wharf.
2·79	8·90	....	do	Humphrey & Teakles, Sussex, N.B.
3·49	13·40	....	do	Huestis & Mills, Sussex, N.B.
2·32	15·63	.....	Adulterated	W. B. McKay & Co., Sussex, N.B.

APPENDIX H.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of					
				Moisture or Loss at 100° C.	Volatile Oil.	Alcoholic Extract, essentially Piperine or Resin.	Petroleum Ether Extract.	Ash.	
								Total.	Soluble in Water.
1897	*Analyst, W. F. Best, St. John, N.B.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
May 25..	White Pepper, J. Mott & Co., Halifax.	9931	15135	11·95	.....	.....	.....	3·25	.....
do 25..	White Pepper, S. H. Ewing, Montreal.	9932	15136	11·86	.....	.....	.....	2·84	.....
do 25..	White Pepper, James Ryan, St. Johns.	9933	15137	11·56	.....	.....	.....	1·52	.....
do 26..	White Pepper, imported by vendors.	9934	15138	10·78	.....	.....	.....	3·60	.....
do 26..	White Pepper, imported by vendors.	9935	15139	11·35	.....	.....	.....	1·26	.....
do 26..	White Pepper, Ewing & Co., Montreal.	9936	15140	11·04	.....	.....	.....	3·74	.....
do 27..	White Pepper, Dearborn & Co., St. Johns.	9937	15141	9·99	.....	.....	.....	5·49	.....
do 27..	White Pepper, Lordly & Co., St. John	9938	15142	11·26	.....	.....	.....	3·62	.....
do 27..	White Pepper, Dearborn & Co., St. John.	9939	15143	11·50	.....	.....	.....	3·25	.....
	Analyst, Dr. M. Fiset, Quebec.								
May 6..	White Pepper.....	10353	16322	.....	.....	.....	.....	3·26	0·30
do 6..	Black Pepper.....	10354	16423	.....	.....	.....	.....	5·80	2·16
do 6..	Black Pepper, N. Turcotte, Quebec.	10355	16325	.....	.....	.....	.....	2·62	0·78
do 6..	Black Pepper, Langlois & Paradis..	10356	13326	.....	.....	.....	.....	5·88	2·08
do 6..	White Pepper, Langlois & Paradis..	10357	—16327	.....	.....	.....	.....	5·86	2·34
do 6..	White Pepper, vendor.....	10358	16324	.....	.....	.....	.....	1·28	0·22
do 6..	do do	10359	16328	.....	.....	.....	.....	3·80	0·22
do 6..	Black Pepper.....	10360	16329	.....	.....	.....	.....	6·32	2·02
do 6..	do do	10361	16330	.....	.....	.....	.....	6·20	2·20
do 6..	White Pepper.....	10362	16331	.....	.....	.....	.....	1·40	0·18
	Dr. J. B. Edwards, Analyst, Montreal, Que.								
May 3..	Black Pepper.....	11621	16311	11·30	.....	.....	11·60	6·00	2·00
do 4..	White Pepper, W. C. Brosseau & Co., Montreal.	11622	16312	12·33	.....	.....	8·30	.....	0·35
do 4..	White Pepper, Marrotte, Leblanc & Co.	11623	16313	11·88	.....	.....	6·78	5·65	1·65

PEPPER.—Tabulated Statement.

Analysis.			Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
Insoluble in hydrochloric Acid.	Insoluble in Water.	Nitrogen.			
p. c.	p. c.	p. c.			
. ...	0·30	3·05	No foreign substance detected.	Unadulterated	C. & E. McMichael, 40 Dock St., St. John.
.....	0·19	2·63	do do ..	do	W. A. Porter, 72 Mill St., St. John.
.....	0·19	1·42	do do ..	do	Rankin & Moulson, 16 German St.
....	0·48	3·55	do do ..	do	Dearborn & Co., 95 Prince William St.
.....	0·28	1·18	do do ..	do	C. J. Kennedy, 84 King St., St. John.
.....	0·55	2·18	do do ..	do	Jas. Ryan, No. 1 King St.
....	1·01	3·25	Shows foreign shells, apparently olive stone and considerable dirt.	Adulterated	King & Noble, 14 Main St.
.....	0·43	1·90	No foreign substance detected.	Genuine	Jas. Vanwart, Bridge St.
.....	0·38	2·15	do do ..	do	D. & C. Nase, Main St.
.....	0·44	2·96	Pepper tissue only.....	Genuine	H. Breton, 20 Deligny St., Quebec.
. ....	1·46	3·64	do do	do	H. Breton, 20 Deligny St., Quebec.
.....	0·60	1·84	do do	do	Joseph Voyer, 226 Richelieu St., Que.
.....	1·28	3·80	Contains a small quantity of tissue and a few stone cells resembling cocoa nut shells.	Doubtful.....	Joseph Boiteau.
.....	1·12	3·52	Pepper tissue only.....	Genuine.....	J. A. Bussière, 246 D'Aigillon St.
.... .	0·52	1·06	Pepper tissue only, too many black particles shows imperfect decortication.	do	J. A. Buissière, 246 D'Aigillon St.
.....	1	3·58	Pepper tissue only	do	M. Gauvin, 30 St. Gabriel St.
....	1·65	4·30	Pepper tissue only, seems to contain excess of the husk.	do	M. Gauvin, 30 St. Gabriel St.
.....	1·44	4·00	do do .	do	M. Moisan, 70 St. Julie.
.....	0·60	1·22	do do ..	do	M. Moisan, 70 St. Julie.
.....	... ..	4·00	No foreign starch or tissue.	Genuine.....	J. Bruchési, 2135 Notre Dame St.
.... .	... .	3·05	do do ..	do	C. W. Bursalo, 1067 St. James St.
.....	1·5	4·00	Minute particles of gypsum	Adulteration doubtful.	H. Poirier, 1938 St. Catherine St.

APPENDIX H.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis.					
				Moisture or Loss at 100° C.	Volatile Oil.	Alcoholic extract, essentially Piperine or Resin.	Petroleum Ether Extract.	Ash.	
								Total.	Soluble in Water.
1897.	*Dr. J. B. Edwards, Analyst, Montreal. Que.*—Con.			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
May 4..	Black Pepper, Marrotte, Leblanc & Co.	11624	16314	11·22	.....	. . .	9·59	5·95	1·95
do 4..	Black Pepper, W. C. Brosseau & Co.	11625	16315	12·02	.....	.....	10·02	5·50	1·90
do 4..	White Pepper	11626	16316	9·07	.....	.....	8·62	3·25	0·60
do 5..	do W. C. Brosseau & Co.	11627	16317	12·12	.....	....	7·27	4·65	0·90
do 5..	do Marrotte, Leblanc & Co	11628	16318	12·03	.....	.....	6·46	5·35	1·95
do 5 .	Black Pepper.....	11629	16319	11·34	.....	...	9·83	7·35	3·85
do 10..	do Toronto Spice Milling Co.	11630	16320	10·90	.....	.....	5·37	3·35	2·05
do 18..	do	11631	16321	10·87	.....	. ..	5·64	4·75	2·65
	Dr. F. X. Valade, Analyst, Ottawa.								
May 3..	Compound White Pepper, Globe Spice Mills Co., Montreal.	10839	16977	11·30	...	7·43	.....	2·60	... .
do 3..	Compouud White Pepper, S. J. Major, Ottawa.	10840	16978	10·90	.....	10·15	....	3·40	.....
do 3..	Pure Black Pepper	10841	16979	10·00	.....	13·18	.....	6·15	.....
do 3..	do do H. Brennan, Ottawa.	10842	16980	9·80	.....	12·78	.....	10·23	.....
do 3..	Pure White Pepper, H. N. Bate & Co., Ottawa.	10843	16981	11·60	.....	8·73	... .	2·10	.....
do 3.	Pure Black Pepper, Hamilton Coffee and Spice Co.	10844	16982	11·20	.....	6·23	.....	5·75	.....
do 6..	Compound White Pepper, Globe Spice Co., Montreal.	10845	16983	10·90	.....	13·18	....	2·75	.....
do 6..	Pure Black Pepper, F. A. Scott, Ottawa.	10846	16984	10·18	.....	10·50	...	8·73	....
do 6..	Pure Black Pepper, S. J. Major, Ottawa.	10847	16985	11·38	.....	13·95	.....	6·75	.....
	Dr. W. H. Ellis, Analyst, Toronto.								
May 17..	White Pepper, Pure Gold Mfg. Co., Toronto.	12020	16986	12·02	0·90	7·98	8·88	2·50	0·33
do 17..	White Pepper, not known.....	12021	16987	12·61	0·31	7·16	7·47	2·39	0·30
do 17..	Black Pepper, Dutton Bros., Toronto	12022	16988	10·69	1·90	8·30	10·20	3·69	0·50
do 17..	do Pure Gold Co.....	12023	16989	11·61	1·70	9·28	10·98	6·78	1·76
do 17..	White Pepper, not known.....	12024	16990	12·39	0·97	7·72	8·69	2·48	0·35
do 17..	do do	12025	16991	12·19	0·55	7·25	7·80	2·60	0·26
do 17..	Black Pepper, Pure Gold Co.....	12026	16992	11·36	2·03	8·69	10·72	6·39	2·12

PEPPER—Tabulated Statement—*Continued.*

Insoluble in hydrochloric Acid.	Insoluble in Water.	Nitrogen.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.			
.....	4·00	....	Contains mustard husks, wheat husks, and a little wheat flour.	Adulterated	Cash Grocery Co., cor. St. Catherine and Poupart Sts.
.... .	3·60	.....	No foreign starch or tissue.	Genuine..... . .	J. R. Beauchamp, 62 Dorchester St.
.....	2·65	... .	do do ..	do	Labucy & Leclair, 1340 Ontario St.
...	3·75	....	Containing mustard husks and less than 5% sulphate of lime.	Adulteration doubtful.....	J. Boyer, 191 Duluth Ave.
.....	3·40	.....	Containing mustard husks and from 6 to 8% sulphate of lime.	Adulterated 6 to 8% sulphate of lime.	D. J. Ouimet, 39 Cherrier St.
.....	3·50	....	No foreign starch or tissue.	Genuine.....	C. Beauchemin, 435 Marie Anne.
.....	.....	....	do do ..	More like white pepper than black.	H. Renaud, 17 St. Elizabeth St.
.....	2·10	.....	do do ..	Genuine, but of poor quality.	Joseph Renaud, 1370 Ontario St.
0·40	2·05	....	Chiefly corn flour, some wheat starch, a little cayenne and roasted peas.	....	J. Gagnon, 541 Bank St., Ottawa.
0·40	3·00	.....	Chiefly corn flour and little wheat flour.	.....	A. D. Helmer, cor. Bank Bank and 4th Avenue.
1·15	3·60	....	Pure pepper	Genuine.....	C. Moreland.
3·53	8·15	.....	A little wheat starch, ground shells, a few vegetable hairs; total foreign matter not more than 5%.	Has an excessive amount of ash, and is adulterated.	Mrs. J. Longley, Billings' Bridge.
0·03	1·90	.. .	A little wheat starch.....	Genuine.....	W. Linton, Billings' Bridge.
0·95	4·05	.....	Pure pepper	do	J. D. Smith do
0·40	2·25	.....	Chiefly corn flour; not much pepper.	.....	A. Garland, Hintonburg.
0·90	6·10	. ..	A little wheat starch and hard shell particles; total foreign matter under 5%.	Excessive ash, and is probably adulterated.	F. H. Gilchrist do
1·25	4·65	.....	Pure pepper	Genuine..... .	Z. Rouleau do
.....	2·17	2·00	No foreign substance.....	Genuine.....	J. Fee, Toronto.
.....	2·09	2·07	do	do	W. J. Cooke, Yonge St., Toronto.
.....	2·19	2·23	do	do	R. English, Toronto.
.....	5·02	2·18	do	do	J. F. Gibson do
.....	2·13	1·07	do	do	John Gilis, Peterboro'.
. ....	2 34	2·08	do	do	J. Dunn do
.....	4·27	2·21	do	do	Waller & Co. do

APPENDIX H.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher or Manufacturer as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis.					
				Moisture or Loss at 100° C.	Volatile Oil.	Alcoholic Extract, essentially Piperine or Resin.	Petroleum Ether Extract.	Ash. Total.	Ash. Soluble in Water.
1897.	*Dr W. H. Ellis, Analyst, Toronto.* —Con.			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
May 18..	White Pepper, Forbes Bros., Montreal.	12027	16963	10·44	0·72	5·72	6·44	2·56	0·36
do 18..	Black Pepper, Dalton Bros., Toronto	12028	16994	12·13	1·57	7·45	9·02	6·46	1·94
do 18..	do do ..	12029	16995	10·87	2·12	8·28	10·40	7·01	2·92
	F. T. Harrison, Analyst, London.								
May 4..	White Pepper, W. H. Gillard, Hamilton.	9064	15754	10·50	.....	.....	.....	2·48	0·48
do 4..	Black Pepper, Pure Gold Mfg. Co., Toronto.	9065	15755	10·00	. .	....	.....	5·80	2·37
do 4..	White Pepper, Gorman & Eckart, Toronto.	9066	15756	11·00	.....	.....	....	0·98	0·08
do 4..	Black Pepper, not known.....	9067	15757	12·10	.....	....	... .	5·05	1·85
do 4..	White Pepper, Gorman & Eckart, Toronto.	9068	15758	11·65	....	...	....	1·15	0·20
do 5..	White Pepper, W. H. Gillis & Co., Hamilton.	9069	15759	10·40	.....	. ..	.....	1·43	0·23
do 5..	Black Pepper, F. F. Dalley & Co., Hamilton.	9070	15760	11·30	. ....	.....	....	5·00	1·90
do 6..	Black Pepper, Snowdrift Baking Powder Co., Brantford.	9071	15761	11·10	.....	.....	...	6·00	2·30
do 6..	White Pepper, Snowdrift Baking Powder Co., Brantford.	9072	15762	8·85	.....	.... .	....	2·35	0·25
	Prof. E. B. Kenrick, Analyst, Winnipeg.								
May 11..	Black Pepper, Todhunter & Mitchell, Toronto.	11101	17019	12·3	.....	.....	6·1	5·24	2·13
do 11..	White Pepper, The Dyson, Gibson Co., Winnipeg.	11102	17020	12·9	.....	.....	5·1	3·55	0·47
do 12..	Black Pepper, The Dyson, Gibson Co., Winnipeg.	11103	17021	12·0	.....	.....	6·3	3·87	1·85
do 12..	White Pepper, Todhunter & Mitchell, Toronto.	11104	17022	14·0	.....	.....	5·4	1·74	0·21
do 13..	White Pepper, not known.....	11105	17023	12·1	.....	.....	4·9	4·01	0·69
do 13..	Black Pepper, G. F. G. Galt, Winnipeg.	11106	17024	10·8	....	.....	6.5	3·83	1·80
do 14..	White Pepper (compound), Sutherland & Campbell.	11107	17025	12·4	. ..	.....	5·0	3·58	0·58
do 14..	Black Pepper, Turner, McKeand & Co.	11108	17026	12·3	.....	.....	5·6	3·24	1·40

PEPPER.—Tabulated Statement—*Concluded.*

Insoluble in hydrochloric Acid.	Insoluble in Water.	Nitrogen.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.			
.....	2·20	2·09	No foreign substance	Genuine	W. Simson, Perth.
.....	4·52	2·15	do	do	T. A. Moore do
.....	4·09	2·26	do	do	Stone & Kirk do
0·43	2·00	.....	No foreign substance detected.	Unadulterated	H. T. Barker, Stratford.
1·25	3·43	.....	do	do	C. McIlhardy do
0·22	0·90	.....	do	do	Sommerville Co., London.
0·70	3·20	.....	do	do	A. J. Clark, 721 Richmond St.
0·25	0·95	.....	do	do	John Goodge, 474 Dundas St.
0·20	1·20	.....	do	do	J. A. Secord, St. Thomas.
1·10	3·10	.....	Pepper, also a few bits of foreign tissue.	do	W. A. Miner do
1·27	3·70	.....	No foreign tissue	do	W. J. Cherney, Windsor.
0·20	2·10	.....	Wheat flour	Adulterated with about 5 per cent wheat flour.	A. Minto & Co. do
.....	3·11	...		Genuine	R. J. Timing, Regina, Man.
.....	3·08	.....		do	The Dawson Co. do
.....	2·02	.....		do	W. M. Starr, Indian Head, Man.
.....	1·53	.....		do	E. J. Brooks, Indian Head, Man.
.....	3·32	.....		do	W. Muir, Brandon, Man.
.....	2·03	.....		do	J. Symington & Co. do
....	3·00	.....		do	R. J. Gilliand, Portage La Prairie.
.....	1·84	.....		do	A. Laurens, Portage La Prairie.

APPENDIX I.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No. of Analyst's Certificate.	No. of Sample.	Result of Analysis.									
				Moisture or Loss at 100° C.	Fixed Oil.	Volatile Oil.	Petroleum Ether Extract.	Extract by 84 per cent Alcohol.	Nitrogen.	Sulphur.	Ash.		
											Total.	Soluble in Water.	Insoluble in Water.
1897.	*Analyst, W. F. Best, St. John, N.B.*			p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
June 17	Mustard, sold as pure, G. N. Dean & Son, New York.	9940	15144	6·40	.....	.....	.....	.....	.....	.....	5·74	.....	0·16
do 17	Mustard, Compound, A. Colborn & Co., Philadelphia.	9941	15145	6·45	.....	.....	.....	.....	.....	.....	6·25	.....	0·48
do 17	Mustard, Compound, Pure Gold Co., Toronto.	9942	15146	8·60	.....	.....	.....	.....	.....	.....	8·10	....	1·30
do 17	Mustard, Compound, Jardine & Co., St. John, N.B.	9943	15147	6·82	.....	.....	.....	.....	.....	.....	3·36	.....	1·06
do 17	Mustard, (Pure), Jardine & Co., St. John, N.B.	9944	15148	8·50	.....	.....	.....	.....	.....	.....	3·76	.....	0·17
do 17	Mustard, Compound, J & J. Colman, London, England.	9945	15149	5·13	.....	.....	.....	.....	.....	.....	4·65	.....	0·86
do 17	Mustard, Pure, Dearborn & Co., St. John, N.B.	9946	15150	7·21	.....	.....	.....	.....	.....	.....	2·80	.....	0·05
do 17	Mustard, Admixture, Keen, London, Eng.	9947	15151	7·40	.....	.....	.....	.....	.....	.....	4·15	.....	1·10
do 17	Mustard, "Pure," J. & J. Colman, London, Eng.	9948	15152	5·13	.....	.....	.....	.....	.....	.....	4·08	.....	1·05
	Analyst, Dr. M. Fiset, Quebec.												
June 9	Mustard, Pure, Colman, England.	10363	16343	6·55	24·14	.....	.....	.....	.....	.....	3·36	0·36	3·00
do 9	Mustard, Pure, not known.	10364	16344	7·24	8·50	.....	.....	.....	.....	.....	2·45	0·43	3·02
do 9	do do	10365	16345	7·67	7·97	.....	.....	.....	.....	.....	0·33	3·43	1·68
do 9	L. P. Boisseau, Quebec...	10366	16346	6·74	8·76	.....	.....	.....	.....	.....	2·74	0·31	2·43
do 9	Mustard, Pure, Colman, England.	10367	16347	6·94	24·08	.....	.....	.....	.....	.....	3·63	1·32	2·31
do 9	Mustard, Pure, not known.	10368	16348	6·56	22·68	.....	.....	.....	.....	.....	3·65	0·77	2·88
do 10	Mustard, Compound, Colman, England.	10369	16349	6·80	25·80	.....	.....	.....	.....	.....	3·43	0·58	2·85
do 10	Mustard, Pure, A. Carrier, Levis.	10370	16350	8·46	7·32	.....	.....	.....	.....	.....	2·53	0·88	1·65
do 10	Mustard, Pure, not known.	10371	16350	6·44	25·92	.....	.....	.....	.....	.....	3·50	0·37	3·13
do 10	do do	10372	16351	6·62	25·32	.....	.....	.....	.....	.....	3·75	0·10	3·65

MUSTARD—Tabulated Statement.

Sand.	Insoluble in Hcl.	Probable Amount of Mustard.	Total Oil.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p.c.	p.c.	p.c.	p.c.			
.....	.....	.....	16·30	Mustard, flour and turmeric.	Adulterated with flour and turmeric in small quantities.	Dearborn & Co., St. John, N.B.
.....	.....	.....	17·50	Mustard, with a small amount of flour.	Compound	do do
.....	.....	.....	9·25	Mustard, with a litfle flour coloured with turmeric.	do	Jardine & Co., St. John, N.B.
.....	.....	.....	24·10	do do	do	Thos. Rippy, St. John.
.....	.....	.....	10·08	Adulterated with flour and turmeric.	Adulterated	J. J. Smith, Carleton, West Side.
.....	.....	.....	29·05	Mustard, with a little flour and turmeric.	Compound	W. D. Baskin, St. John, N.B.
.....	.....	.....	8·35	Adulterated with a large amount of flour and turmeric	Adulterated	C. W. Smith, St. John.
.....	.....	.....	28·30	Mixed with a small amount of flour and turmeric.	Compound	F. E. Williams, St. John.
.....	.....	.....	33·40	Mustard, nothing else detected	Pure	W. A. Porter, St. John.
0·10	.....	.....	.....	Mustard, (with some husks) wheat flour and turmeric.	Adulterated, probably contains 70 to 75 p.c. pure mustard.	A. Chouinard, Quebec.
0·37	.....	.....	.....	do do	Grossly adulterated, probably contains 20 to 30 p.c. of pure mustard.	L. Poulin, Quebec.
1·75	.....	.....	.....	Mustard, mustard cake or husk, wheat flour, turmeric and cayenne.	Grossly adulterated, probably contains 20 to 30 p.c. pure mustard.	J. Turcotte, Quebec.
0·46	.....	.....	.....	Mustard, wheat flour and turmeric.	Grossly adulterated, probably contains 20 to 30 p.c. pure mustard.	L. T. Demers, Quebec.
0·30	.....	.....	.....	Mustard (and some husks) wheat flour and turmeric.	Adulterated, probably contains 70 to 75 p.c. pure mustard.	L. T. Demers, Quebec.
0·13	.....	.....	.....	do do	Adulterated, probably contains 65 to 75 p.c. pure mustard.	A. Grant, Quebec.
0·15	.....	.....	.....	Mustard, (and a little husk) wheat flour, turmeric.	Good for a compound mustard, probably contains 75 to 80 p.c. pure mustard.	J. E. Paquet, Lauzon, P.Q.
0·34	.....	.....	.....	Mustard, mustard husk or cake, wheat flour, turmeric.	Grossly adulterated, probably contains 20 to 25 p.c. pure mustard.	Mde. Pelletier, Lauzon, P.Q.
0·32	.....	.....	.....	Mustard, (and a little husk) wheat flour, turmeric.	Adulterated, probably contains 75 to 80 p.c. pure mustard.	E. Ruell, Bienville, P.Q.
0·80	.....	.....	.....	do do	do do	L. H. Bégin, Levis, P.Q.

APPENDIX I.—INSPECTION OF

Date of Collection.	Description of Sample and Name of Furnisher as given by Vendor.	No of Analyst's Certificate.	No. of Sample.	Result of Analysis.									
				Moisture or Loss at 100° C.	Fixed Oil.	Volatile Oil.	Petroleum Ether Extract.	Extract by 84 p. c. Alcohol.	Nitrogen.	Sulphur.	Ash.		
											Total.	Soluble in Water.	Insoluble in water.
1897.	*Analyst, Dr. J. B. Edwards, Montreal.*			p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
June 1	Not known	11634	16332	9·16	.....	.....	8 01	.....	.....	.....	3·60	1·95	1·65
do 1	do	11635	16333	9·16	.....	.....	9·02	.....	.....	.....	4·15	1·85	2·30
do 2	G. J. Duffy & Co., Montreal.	11636	16334	7·43	.....	.....	6·55	.....	.....	.....	2·85	0·35	2·50
do 2	Ewing, Heron & Co., Montreal.	11637	16335	8·74	.....	.....	8·03	.....	.....	.....	2·95	0·85	2·10
do 3	Laporte, Martin & Co., Montreal.	11638	16336	10·70	.....	.....	1·93	.....	.....	.....	2·85	1·25	1·60
do 3	J. J. Duffy & Co., Montreal.	11639	16337	7·26	.....	.....	6·64	.....	.....	.....	3·00	0·70	2·30
do 4	Laporte, Martin & Co., Montreal.	11640	16338	8·20	.....	.....	15·02	.....	.....	.....	3·15	0·65	2·50
do 4	J. J. Duffy & Co., Montreal	11611	16339	8·42	.....	.....	6·22	.....	.....	.....	4·00	0·55	3·45
do 7	Hudon, Hébert & Co., Montreal.	11642	16340	7·04	.....	.....	24·66	.....	.....	.....	3·90	0·80	3·10
do 7	do do	11643	16341	7·57	.....	.....	19·55	.....	.....	.....	3·15	0·60	2·55
do 7	L. Chaput, fils & Co., Montreal.	11644	16342	9·98	.....	.....	4·24	.....	.....	.....	2·55	0·90	1·65
	Analyst, Dr. F. X. Valade, Ottawa.												
May 31	Mustard (bulk), Hamilton Spice & Coffee Co.	10848	12890	7·78	11·98	.....	.....	.....	.....	.....	3·05	.....	3·00
do 31	Superfine Mustard, Keen, England.	10849	12891	5·40	33·55	.....	.....	.....	.....	.....	4·05	.....	3·93
do 31	Mustard (Compd.), Keen, England.	10850	12892	6·78	17·45	.....	.....	.....	.....	.....	4·15	.....	3·85
do 21	Mustard, Wall, Market Square.	10851	12893	7 03	18·75	.....	.....	.....	.....	.....	3·13	.....	2·75
do 31	Mustard (Compd.), Keen, England.	10852	12894	7·10	19·75	.....	.....	.....	.....	.....	3·00	.....	2·73
do 31	do do	10853	12895	7·00	18·15	.....	.....	.....	.....	.....	3·10	.....	2·78
June 2	do do	10854	12896	7·15	20·85	.....	.....	.....	.....	.....	3·00	.....	2·83
do 2	Mustard, Toronto Spice & Coffee Co.	10855	12897	6·90	11·30	.....	.....	.....	.....	.....	3·25	.....	3·15
.....	.....	10856	12898	8·43	9·20	.....	.....	.....	.....	.....	3·95	.....	3·85

MUSTARD—Tabulated Statement—*Continued.*

Sand.	Insoluble in Hcl.	Probable Amount of Mustard.	Total Oil.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p.c.	p.c.	p.c.	p.c.			
.....	.. ..	.....	.....	Contains wheat flour, maize and turmeric.	Adulterated to the extent of at least 50 p.c.	L. C. Fortier, Montreal.
.....	.....	.....	.....	Contains wheat flour, maize, turmeric and cayenne.	Adulterated to the extent of 40 p.c.	J. N. Gagnon do
.....	....	.....	.....	Contains wheat and pea flour, maize and a little turmeric.	Adulterated to the extent of 40 p.c. and upwards.	N. Prézeau do
.....	... .	.....	....	Contains wheat flour, maize and turmeric.	Adulterated to the extent of 50 p.c. and upwards.	F. X. St. Amour do
.....	.. ..	.....	.....	Contains wheat flour, maize, turmeric and cayenne.	Largely adulterated, to the extent of 70 to 75 p.c.	N. Desnoyers do
.....	.....	.....	....	do do	Adulterated to the extent of from 25 to 30 p.c.	J. Chartier do
.....	...	. ...	.....	Contains cereal flour and millings, pea flour, turmeric and cayenne.	do do	N. Cousineau, Lachine P.O.
.....	.....	.....	....	Contains mixed cereals and millings, colored by turmeric	Adulterated to the extent of from 50 to 60 p.c.	H. L. P. Robert, Lachine P.O.
.....	.....	.....	.....	Contains maize and pea starch.	Adulterated to the extent of from 25 to 30 p.c.	L. Pepin, Sault au Récollets, P.Q.
.....	... .	.....	.....	Contains cereals and millings, turmeric and cayenne.	do do	J. Paquet, Sault au Récollets, P.Q.
.....	.....	.....	.....	Contains wheat flour, millings, turmeric and cayenne.	Adulterated to the extent of from 50 to 60 p.c.	Michaud Bros. & Co., Sault au Récollets, P.Q.
.....	0·38	32·97	. ...	Turmeric; wheat flour in large quantity.	Adulterated by admixture with about 50 p.c. flour and turmeric.	C.C.Cummings, Janeville
.....	0·05	98·93	.....	Wheat flour in small quantity	Genuine	J. Durocher do
.....	0·38	46·63	.....	Turmeric; wheat starch in large quantity, ginger small quantity.	Adulterated; contains about 10 p.c. of flour above the standard.	A. Gauthier do
.....	0·10	53·67	.....	do do	Adulterated by admixture of about 30 p.c. flour and turmeric.	Wm. Moore, New Edinburgh.
.....	0·05	56·73	.....	do do	Doubtful	Jas. Johnston, New Edinburgh.
.....	0·13	51·83	.....	do do	Adulterated; contains about 10 p.c. foreign matter more than standard.	Thos. Hoar, New Edinburgh.
.....	0·10	60·09	.....	do do	Adulterated with about 20 p.c. flour.	F. C. Daniels, 270 Bank St., Ottawa.
....	0·30	30·89	.....	do do	Adulterated with 50 p.c. wheat flour.	The Gilmour Grocery, 352 Bank St., Ottawa.
.. ..	0·25	24·46	.....	Turmeric, rice or buckwheat, wheat in large quantity.	Adulterated with flour and turmeric, about 30 p.c. more than standard adopted.	Gates & Hodgson, cor. Florence and Kent Sts.

APPENDIX I—INSPECTION OF

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				Moisture or loss at 100° C.	Fixed Oil.	Volatile Oil.	Petroleum Ether Extract.	Extract by 84 p. c. Alcohol.	Nitrogen.	Sulphur.	Ash		
											Total.	Soluble in Water.	Insoluble in Water.
1897.	*Analyst Dr W. H. Ellis, Toronto.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
June 4	Mustard, Toronto Coffee and Spice Co.	12030	15496	8·02	6·02	0.25	....	.....	2·99	.....	2·92	.....	2·76
do 4	Mustard, not known ...	12031	10497	8·11	10·60	0·46	.....	.....	3·64	.....	4·44	.....	3·63
do 4	do do	12032	15398	8·84	7·05	0·36	....	.....	3·28	.....	2·45	.....	2·33
do 4	Mustard Mixture, Myell, England.	12033	15499	6·47	16·95	0·76	.....	.....	4·57	.....	4·27	....	4·17
do 5	Mustard, Superfine, Keen, England.	12034	15500	4·86	36·16	0·58	... .	.. .	4·70	.....	3·94	.....	3·69
do 5	Mustard, Compound, not known.	12035	16996	7·79	9·45	0·60	.....	.....	3·57	.....	2·68	.....	2·61
do 5	Mustard, Compound, Pure Gold Manufacturing Co.	12036	16997	7·14	10·46	0·61	.....	.....	4·15	.....	2·91	.....	2·64
do 5	Mustard, W. G. Dunn & Co., Hamilton.	12037	16998	6·13	26·40	0·53	.....	.....	5·80	... .	5·24	.....	4·25
do 5	do do	12038	16999	5·59	25·66	0·59	.....	.. ..	5·67	.....	5·15	.....	4·38
do 5	Mustard, English, not known.	12039	17000	8·22	.....	0·27	.....	... .	2·61	....	3·72	.....	2·81
	Analyst, F. T. Harrison, London, Ont.												
June 2	Mustard, Compound, Gillard & Co., Hamilton.	9073	15763	8·05	.....	....	7·55	6·04	3·49	0·34	2·75	0·87	1·88
do 2	Mustard, Pure, A. M. Smith & Co., London, Ont.	9074	15764	6·80	.....	.....	19·67	17·00	6·32	1·29	6·10	0·65	5·45
do 2	do do	9075	15765	5·90	.....	.....	19·90	12·00	4·18	1·01	3·38	0·70	2·68
do 2	Mustard, Snowdrift Baking Powder Co., Brantford.	9076	15766	8·50	.....	.. .	8·15	8·40	3·54	0·48	3·33	0·38	2·95
do 3	Mustard.....	9077	15767	7·50	.....	.....	10·80	12 50	3·17	.....	3·56	0·41	3·15
do 2	Mustard, Gorman & Earckard, London, Ont.	9078	15768	6·18	.....	.....	15·40	10·20	4·37	0·67	4·35	0·45	3·90
do 3	Mustard, Snowdrift, Baking Powder Co, Brantford.	9079	15769	8·15	... .	.....	11·30	8·75	3·74	0·38	3·85	0·55	3·30
do 3	Mustard, J. P. Mayell, London, Ont.	9080	15770	8·60	.....	.....	12·10	10·00	3·50	0·45	3·15	0·35	2·80
do 3	Mustard, not known... .	9081	15771	7·95	.....	....	9·55	8·50	3·43	0·38	2·00	0·35	1·65

MUSTARD—Tabulated Statement—*Continued.*

Sand.	Insoluble in Hcl.	Probable Amount of Mustard.	Total Oil.	Microscopic Examination.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
.....	.....	.....	.....	Wheat starch	Adulterated with admixture of 50 p.c. farinaceous matter.	T. J. Michiel, Peterboro.
.....	.....	.....	.....	do	Mixed with about 20 p. c. farinaceous matter and has some fixed oils expressed.	J. H. Savigny do
.....	.....	.....	.....	do	Adulterated with about 60 p.c. of farinaceous matter.	W. G. Fowler do
.....	.....	.....	.....	do	Has some of the fixed oil expressed; adulterated.	W. H. Wrighton do
.....	.....	.....	.....	A very little wheat starch	Genuine, except that a very little wheat flour is mixed with it.	A. Reddock, 443 Parliament St., Toronto.
.....	.....	.....	.....	Wheat starch	Adulterated with about 50 p.c. of farinaceous matter.	Mrs. Spies, 405 Parliament St., Toronto.
.....	.....	.....	.....	do	do do	A. G. Marmion, 403 Parliament St., Toronto.
.....	.....	.....	.....	No starch present	Some of the oil is expressed; adulterated.	O. Taylor, 237 Gerrard, St., Toronto.
.....	.....	.....	.....	do	do do	D. H. Bee, 240 Gerrard St., Toronto.
.....	.....	.....	.....	Wheat starch	Adulterated with about 30 p.c. of farinaceous matter.	C. H. Wisker, Gerrard St., Toronto.
.....	0·18	.....	.....	Much wheat flour and a little turmeric.	Adulterated with wheat flour containing only 30 to 40 p.c. of mustard.	Horace J. Horton, Goderich, Cnt.
.....	0·80	.....	.....	No starch or foreign substance detected.	Mustard cake	T. G. Tipling, Goderich, Ont.
.....	0·10	.....	.....	Wheat flour	Adulterated with wheat flour, containing 65 to 70 p.c., pure mustard.	O. C. Whitley, Goderich, Ont.
.....	0·30	.....	.....	do	Adulterated with wheat flour, containing 30 to 40 p.c. of mustard.	W. J. Stenbury, 515 Richmond St., Goderich.
.....	0·85	.....	.....	do	Adulterated with wheat flour, containing 40 to 50 p.c. mustard.	Cleghorn & Russell, London, Ont.
.....	0·80	.....	.....	Much wheat flour and a little turmeric.	Adulterated with wheat flour, containing 50 to 60 p.c. pure mustard.	Geo. Shaw Craig & Wortley Rd., London, Ont.
.....	0·57	.....	.....	.....	Adulterated with wheat flour, containing 40 to 50 p.c. mustard.	Alfred Dougall, Windsor, Ont.
.....	0·30	.....	.....	.....	do do	Smith & Duck, Windsor, Ont.
.....	0·20	.....	.....	.....	Adulterated with wheat flour, containing 30 to 40 p.c. mustard.	C. R. Dougall, Windsor, Ont.

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				Moisture or Loss at 100° C.	Fixed Oil.	Volatile Oil.	Petroleum Ether Extract.	Extract by 84 per cent Alcohol.	Nitrogen.	Sulphur.	Ash.		
											Total.	Soluble in Water.	Insoluble in Water.
1897.	*Analyst, E. B. Kenrick, Winnipeg.*			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
June 21	Mustard, Compound, The Dyson, Gibson Co., Winnipeg.	11109	17027	8·1	.....	.....	8·9	.....	.....	.....	3·54	.....	.....
do 21	Mustard, Compound, J. J. Colman, London, Eng.	11110	17028	4·9	.....	.....	34·2	.....	.....	.....	4·60	.....	.....
do 21	Mustard, Williams & Hilton.	11111	17029	6·6	.....	.....	10·6	.....	.....	.....	3·66	.....	.....
do 21	Mustard, Compound, Keen, London, Eng.	11112	17030	7·1	.....	.....	18·6	.....	.....	.....	3·06	.....	.....
do 21	Mustard, Mackenzie, Mills & Co.	11113	17031	9·1	.....	.....	8·6	.....	.....	.....	3·78	.....	.....
do 21	Mustard, Compound, Keen, London, Eng.	11114	17032	7·0	.....	.....	17·9	.....	.....	.....	3·26	.....	.....
do 21	do do	11115	17033	7·3	.....	.....	19·8	.....	.....	.....	3·24	.....	.....
do 21	do do	11116	17034	7·1	.....	.....	7·2	.....	.....	.....	3·10	.....	.....

MUSTARD—Tabulated Statement—*Concluded.*

Sand.	Insoluble in Hcl.	Probable Amount of Mustard.	Total Oil.	Microscopic Examinations.	Analyst's Remarks.	Name and Address of Vendor of Sample.
p. c.	p. c.	p. c.	p. c.			
.....	.....	.....	.....	Wheat flour and turmeric....	.....	W. H. McLean, Winnipeg.
.....	.....	.....	.....	Small proportions of wheat flour and turmeric.	.....	C. Culland, Winnipeg.
.....	.....	.....	.....	Wheat flour, turmeric and mustard husks.	Adulterated	R. Burns, do
.....	.....	.....	.....	Wheat flour, turmeric and mustard husks.	.....	Hardy & Buchanan, Winnipeg.
.....	.....	.....	.....	Turmeric, mustard husks and much flour.	Adulterated.....	Mrs. A. E. O'Neil, Winnipeg.
.....	.....	.....	.....	Flour, turmeric and mustard husks.	.....	Mrs. Cranston, Winnipeg.
.....	.....	.....	.....	do do	.....	A. Macdonald, Winnipeg
.....	.....	.....	.....	do do	Adulterated	T. E. Williams do

APPENDIX J.

BULLETIN No. 46—FERTILIZERS, 1897.

E. MIALL, Esq.,
Commissioner of Inland Revenue.

SIR,—Since the publication of my report on Fertilizers for 1896 (Bulletin No. 44), 108 standard samples have been sent in for analysis, by manufacturers who propose to sell their goods in the Dominion during the present year. This number exceeds that of last year by 16, and the number of brands offered by United States manufacturers shows a proportionate increase. As regards the total quantity of fertilizers used in Canada, I am still unable to give reliable figures, as many of the manufacturers refuse to supply them.

While the quantity of artificial fertilizers made in Canada thus remains uncertain, the value of the fertilizers and materials for their manufacture imported into the Dominion is shown by the Trade and Navigation returns to have been as follows for the year ended 30th June, 1896:—

Fertilizers, compounded or manufactured	$43,356
Bones, crude, not manufactured, &c	11,082
Bone dust, bone black or charred bone and bone ash	23,819
German mineral potash	511
Kainite, or German potash salts for fertilizers	1,978
	$80,746

This does not include nitrate of soda ($4,035) and sulphate of ammonia ($6,904) part of which has no doubt been used in the manufacture of fertilizers. The above noted importations of bone dust and manufactured fertilizers, corresponding to over 2,000 tons, were mostly used in the Maritime Provinces, to the ports in which the freight rates from the United States are very low. At the same time it is to be noted that 2,270 tons of bones were exported from Ontario and Manitoba to the United States having a value of $24,589, besides "fertilizers" to the value of $36,187 from Ontario and Quebec. The latter item probably includes dried blood and "tankage" from our packing houses or abattoirs, and refuse bonecharcoal from the sugar refineries. Moreover, Canada exported in the year above mentioned 528 tons of mineral phosphate to Great Britain, besides leached and other ashes to the value of $48,883 to the United States. Strangely enough the latter valuable material is exported chiefly from the province of Ontario, whose agriculturists are supposed to be among the most intelligent in the Dominion. It therefore appears that while manufactured fertilizers are being imported in the Eastern provinces of Canada, a large amount of raw material for making them is exported from the west, and thus a state of affairs is found to exist which cannot be regarded as creditable to our intelligence or enterprise.

The analyses of the 108 samples of fertilizers above mentioned are given in the tables appended to this report, on the second line opposite the name of each brand, and immediately below the line on which are given the quantities of fertilizing constituents guaranteed by the manufacturers. The third column in the tables states the materials from which the different fertilizers were produced, in all cases where the information has been supplied by the manufacturers. A column headed "Relative

value per ton of 2,000 lbs." gives the value of each fertilizer based upon the following prices for the constituents:—

	Cents per lb.
Nitrogen in salts of ammonia or nitrates	13
Organic nitrogen in ground bone, fish, blood or tankage	12
Phosphoric acid, soluble in water	6
do soluble in ammonium citrate	5½
do insoluble, in ground bone or tankage	5
do insoluble, in Thomas's phosphate powder	3½
do in ground rock phosphate	1½
Potash contained in wood ashes	6
do in high grade potash salts	5¼

These rates are lower than in former reports, the change having become necessary in consequence of the fall in the market value of most descriptions of fertilizer materials. Since it is impossible in analysis to distinguish between insoluble phosphoric acid from apatite or rock phosphate and that from bone, the declaration of the manufacturer, as regards the materials used, is accepted and the calculations based upon it. This declaration also affects the percentage stated in the column headed "Phosphoric acid available" the insoluble phosphoric acid from apatite not being reckoned as "available." It may be remarked as regards the relative values that these figures afford no indication of the prices at which the goods ought to be sold to the consumer, because, among other reasons, no regard whatever has been paid to the cost of manufacturing or mixing.

In former reports on fertilizers I have introduced various statements regarding the care of manure, &c., which in my opinion cannot be given too wide a circulation among the farmers of the country. Since you are likely to authorize the publication of this report, it would seem advisable to make mention again of these matters of general interest to the agriculturist.

In many of the fertilizers described in this report 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 mentioned in the tables, 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 excrements 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 oxen 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 barnyard 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 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. This means a quantity of 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 be to a great extent relieved from the necessity of purchasing the nitrogen of artificial fertilizers.

Not only can the farmer thus 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 have 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, peas, 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 result up to the present hour.

Professor König of Münster 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 or oats no return was obtained from them. The application of artificial 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 lbs. 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 lbs. 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, the 300 lbs. kainite were applied here and ploughed in in the fall, 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 remunera-

tive 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 as 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 had 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, peas, beans, vetches, clover, lucerne, serradella, &c.,) or, as they have been called, renovating crops, and give them 300 lbs. kainite per morgen, with perhaps an addition of 20 lbs. phosphoric acid. After harvesting the nitrogen collectors, sow a nitrogen consumer, raising a grain or exhausting crop, giving it also 300 lbs. kainite and 20 lbs. 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 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 up to the present:—

1. "Peas, 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 vigorous 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, and 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 exhaustive crop.

"Practical inferences:—The ability of legumes to gather nitrogen from the air helps to explain the usefulness of clover alfalfa, peas, beans, vetches and cow peas

as renovating crops and enforces the importance of these crops to restore fertility to exhausted soils. The judicious use of mineral fertilizers (containing 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 barnyard 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 it 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. As regards the cheapest forms in which these inorganic constituents can be applied to crops there is no doubt that these are high grade superphosphate or Thomas phosphate powder for the available phosphoric acid, and kainite for the potash. There does not appear to be any 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. Some of the salts contained in the superphosphate and kainite would be useful with the sulphate of lime 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. Of course the same mixture could also be applied directly to the soil, and it is somewhat remarkable that among the special fertilizers offered for sale this year, there are none intended more particularly for leguminous plants. Such a mixture might be made up very cheaply and, in my opinion, would prove very advantageous to our farmers in cultivating beans, peas, clovers, &c., on impoverished soils.

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. A very decided advance has recently been made in saving these, and producing a cheap and inoffensive fertilizer, some notice of which would not seem to be out of place in this report.

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.

The first public mention of the usefulness of moss litter for this purpose 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. 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 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 possesses in its bogs and marshes inexhaustible quantities of this moss litter, which frequently occurs in beds several feet in thickness lying above the peat. Its manufacture has been attempted at Musquash in New Brunswick, and it is now being produced 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 reports that 100 lbs. of moss litter were sufficient for drying 800 lbs. 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 analyses gave the following results:—

	p. c.	lbs. pr. ton.		Value pr. ton.
Nitrogen	1·31	26·2	at 13c.	$3.41
Phosphoric acid	0·90	18·0	" 5	0.90
Potash	0·14	2·8	" 5¼	0.15
Water	65·47			$4.46

The valuation of ordinary fresh barn-yard manure with 75 per cent of water is about $2 per ton; consequently much better results might be expected agriculturally from the above described "moss manure."

Moss litter might also be applied with great advantage in public urinals. When a sample of it was supersaturated with urine and dried, and this process repeated several times, no offensive odours were developed, and the product was found on analysis to contain 12·41 per cent of nitrogen, which is equal to a valuation of $32.26 per ton.

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.

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

THOMAS MACFARLANE,
Chief Analyst.

11th March, 1897.

COMMERCIAL FERTILIZERS

1897

STATEMENT of the Results of examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizer.
651	Bradley Fertilizer Co., 92 State St., Boston, Mass	Manufacturers	Bone, bone black, phosphatic guano, bone phosphates, dried blood, meat and fish, sulphate of ammonia, nitrate of soda, muriate of potash and sulphuric acid.	Bradley's XL Superphosphate Guaranteed Found
652	do do	do		Bradley's Potato Fertilizer— Guaranteed Found
653	do do	do		B. D. Sea Fowl Guano— Guaranteed Found
654	do do	do		Farmers New Method Fert'r— Guaranteed Found
655	Bowker Fertilizer Co., Boston, Mass.	do		Stockbridge Strawberry Fert'r Guaranteed Found
656	W. A. Freeman Co., Hamilton, Ont.	do		Ground Tankage— Guaranteed Found
657	Bradley Fertilizer Co., 92 State St., Boston.	M. A. Ackerby, Fredericton, N.B		Bradley's XL Superphosphate Guaranteed Found
658	E. Frank Coe Company, Front St., New York	Manufacturers		Columbian Potato Fertilizer— Guaranteed Found
659	do do	do		Special Potato Fertiliz— Guaranteed Found
660		Farquharson & Son Charlottetown, P.E.I.		Basic Slag— Guaranteed Found
661	Montreal Union Abbatoir Co.	Manufacturers		Fertilizer— Guaranteed Found
662	Great Eastern Fertilizer Co., Rutland, Vt., U.S.	do		Great Eastern Grass and Oats Fertilizer— Guaranteed Found
663	do do	do		Great Eastern High Grade Corn Fertilizer— Guaranteed Found
664	do do	do		Great Eastern General Fertilizer— Guaranteed Found
665	do do	do		Great Eastern Potato Manure Guaranteed Found
666	Bradley Fertilizer Co., Boston, Mass.	do		Fine Ground Bone— Guaranteed Found
667	Standard Fertilizer Co., Boston, Mass.	D. W. Hoegg & Co., Fredericton, N.B		Standard Superphosphate— Guaranteed Found

Commercial Fertilizers registered for 1897.

Results of Analysis.										
Nitrogen.		Phosphoric Acid.							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	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ c.	
2·07 to 2·90 2·31	2·50 to 3·50 2·81	8 to 10 6·72	..... 2·87	..... 2·05	10 to 12 11·64	..... 9·59	1 to 2 2·87	..... 12·86	..... 21 82	651
2·06 to 2·88 2·47	2·50 to 3·50 3·00	6 to 7 5·24	3 to 4 4·99	2 to 3 2·05	11 to 14 12·28	9 to 11 10·23	3·25 to 4·35 4·23	.. 13·62	..... 24 20	652
2·06 to 2·88 2·40	2·50 to 3·50 2·92	5 to 6 5·44	3 to 4 4·79	2 to 3 2·24	10 to 13 12·47	8 to 10 10·23	1·50 to 2·50 1·95	..... 14·88	..... 21 85	653
·82 to 1·65 1·69	1 to 2 2·05	5 to 6 5·88	3 to 4 3·39	2 to 3 2·56	10 to 13 11·83	8 to 10 9·27	2·15 to 3·25 2·55	..... 14·16	..... 20 09	654
2·50 to 3·25 2·36	3 to 4 2·87	..... 8·12	..... 2·56	..... 2·24	7 to 9 12·92	6 to 7 10·68	4 to 5 4·28	..... 11·34	..... 24 95	655
..... 5·72	..... 6·95	..... 0·32	..... 11·84	..... 3·96	..... 16·12	..... 12·16	..... 1·06	..... 6·94	..... 31 80	656
..... 2·17	..... 2·64	..... 5·88	..... 3·90	..... 2·05	..... 11·83	..... 9·78	..... 4·92	..... 12·88	..... 23 78	657
1 to 1½ 1·24	1½ to 2 1·50	7 to 9 7·04	2 to 3 3·51	2 to 3 3·01	11 to 13 13·56	9 to 12 10·55	1·85 2·16	..... 6·72	..... 20 57	658
1·65 to 2·45 2·49	2 to 3 3·02	7 to 9 7·80	2 to 3 0·64	2 to 3 2·88	11 to 13 11·32	9 to 12 8·44	3·50 1·83	.. 8·24	.. 20 84	659
....	..... 0·00	....	..... 1·73	..... 10·23	..... 11·96	..... 1·73	..... 0·00	..... 0·14	..... 4 97	660
..... 7·09	..... 8·61	....	..... 1·28	..... ·77	..... 2·05	..... 1·28	..... 0·21	..... 7·26	..... 19 42	661
..... 0·35	..... 0·43	..... 6·71	..... 5·44	..... 1·92	..... 14·07	11 to 12 12·15	2 to 4 1.56	..... 14·88	..... 18 44	662
..... 3·74	3·72 to 4 4·53	..... 1·92	..... 7·35	1 to 2 2·56	..... 11·83	8 to 9 9·27	2 to 4 2·72	..... 10·92	..... 24 78	663
..... 1·38	1 to 1½ 1·67	..... 0·77	..... 9·04	1 to 2 2.34	..... 12·15	8 to 9 10·81	4 to 6 3·67	..... 15·10	..... 20 36	664
..... 2·32	2·72 to 3 2·82	....	..... 9·15	1 to 2 1·72	..... 10·87	8 to 12 9·15	4 to 6 4·67	..... 14·06	..... 22 45	665
..... 3·74	..... 4·53	..... Traces.	..... 7·29	..... 14·08	..... 21·37	..... 7·29	....	..... 8·50	..... 31 05	666
..... 1·63	..... 1·98	..... 5·12	..... 1·92	..... 2·11	..... 9·15	..... 7·04	..... 3·19	..... 12·10	..... 17 62	667

STATEMENT of the Results of examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizer.
669	H. & E. Albert, London, Eng.	Wallace & Frazer, St. John, N.B.	.....	Thomas' Phosphate Powder— Guaranteed..... Found .....
670	D. H. Foster, Syracuse, N.Y.	Manufacturer.....	Bone phosphate, guano, nitrate of soda, blood, meat, sulphate of potash, muriate of potash and sulphate of ammonia.	Read's Standard Superphosphate— Guaranteed..... Found .....
671	do do	do		Leader Guano— Guaranteed..... Found .....
672	H. & E. Albert, Biebrich on the Rhine, Germany.	Wallace & Frazer, 90 Germain St., St. John, N.B.	Phosphoric acid, potash and compound of nitrogen.	Albert's Concentrated Horticultural Manure— Guaranteed..... Found .....
673	Bradley Fertilizer Co., 92 State St., Boston, Mass	Manufacturers....	.....	Bradley's Ammoniated Dissolved Bones— Guaranteed..... Found .....
674	do do	do	.....	Bradley's Dissolved Bone with Potash— Guaranteed..... Found .....
675	do do	do	.....	Bradley's Dissolved Bone (Justice Brand)— Guaranteed..... Found .....
676	do do	do	.....	Bradley's Complete Manure for Potatoes and Vegetables— Guaranteed..... Found .....
677	do do	do	.....	Bradley's Niagara Phosphate— Guaranteed..... Found .....
678	J. W. Frazer, New Glasgow, N.S.	do	.....	Ground Bone— Guaranteed..... Found .....
679	Hiram Blanchet, Eastport, Maine, U.S.	do	.....	Fish, Bone and Potash Fertilizer— Guaranteed..... Found .....
680	do do	do	.....	Ground Fish Scrap Fertilizer— Guaranteed..... Found .....
681	The William Davies Co., Ltd., Toronto.	do	Blood, bones and tankage	Compound Fertilizer— Guaranteed..... Found .....
682	The Laing Packing and Provision Co., Ltd., St. Catherine St., Montreal	do	Dry tankage or the usual residue from the rendering of lard.	Tankage Fertilizer— Guaranteed..... Found .....
683	Robt. West, Hamilton, Ont.	do	Blood	Plant Food (Brand B)— Guaranteed..... Found .....
684	do do	do	Bones and flesh	Plant Food (Brand B. F.)— Guaranteed..... Found .....

Commercial Fertilizers registered for 1897—*Continued.*

Results of Analysis.										
Nitrogen.		Phosphoric Acid.							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	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
.....	.....	.....	.....	.....	18·57	.....	.....	.....	13 74	669
.....	Trace.	Trace.	6·46	9·47	15·93	7·46	.....	0·10	.....	
.....	1 to 2	.....	.....	.....	.....	8 to 10	4 to 6	.....	.....	670
1·13	1·37	6·72	3·07	1·09	10·88	9·79	4·60	13·70	20 27	
.....	1 to 2	.....	.....	.....	.....	7 to 9	2 to 4	.....	.....	871
1·15	1·40	6·08	3·39	1·09	10.56	9·47	3·55	12·40	18 61	
12·10	15·00	.....	.....	.....	14·09	.....	20·12	.....	.....	672
12·04	14·62	12·47	2·90	0·30	15·67	15·37	20·88	3·04	71 67	
1·65 to 2·40	2 to 3	5 to 6	2 to 3	1 to 2	8 to 11	7 to 9	1 to 2	.....	.....	673
2·40	2·91	4·49	3·06	3·97	11·52	7·55	1·89	11·02	20 47	
0·82 to 1·65	1 to 2	5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	2·15 to 3·25	.....	.....	674
1·12	1·37	4·60	4·36	2·56	11·52	8·96	1·84	14·72	17 50	
.....	.....	10 to 12	.....	1 to 2	13 to 16	12 to 15	.....	.....	.....	675
.....	.....	11·00	4·54	0·13	15·67	15·54	Trace.....	8·78	18 32	
3·73 to 4·52	4·50 to 5·50	6 to 8	2 to 3	1 to 2	9 to 12	8 to 10	6 to 7	.....	.....	676
4·25	5·16	6·40	3·52	1·28	11·20	9·92	5·79	8·92	29 11	
·82 to 1·65	1 to 2	5 to 6	2 to 3	1 to 2	8 to 11	7 to 9	1·08 to 1·63	.....	.....	677
1·06	.....	5·12	3·36	3·20	11·68	8·48	1·62	12·60	17 28	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	678
3·39	4·12	1·41	5·98	10·36	17·75	7·39	.....	9·32	26 77	
4·47	5·43	.....	.....	.....	5·15	.....	6·00	12·96	.....	679
2·15	2·61	Trace.....	1·66	2·05	3·71	1·66	6·03	13·72	15 37	
4·47	5·43	.....	.....	.....	5·15	.....	.....	12·96	.....	680
2·79	3·39	Trace.....	3·07	1.41	4·48	3·07	1·24	14·72	12 80	
8·75	10·62	·80	2·00	7·70	.....	.....	·15	9·87	.....	681
7·48	9·08	0·32	4·12	7·20	11·64	4·44	0·35	10·44	30 43	
4·12	5·00	.....	.....	.....	14·71	.....	.....	5·52	.....	682
6·89	8·37	0·64	4·36	7·16	12.16	5·00	0·37	7·50	29 66	
.....	12 to 15	.....	.....	.....	2 to 4	.....	.....	.....	.....	683
12·94	15·71	Trace.....	1.21	·39	1·60	1·21	.....	12·55	32 78	
.....	8 to 10	.....	.....	.....	9 to 14	.....	.....	.....	.....	684
5·40	6·56	.....	5·44	12·30	17·74	5·44	.....	3·30	31 24	

STATEMENT of the Results of Examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or brand of Fertilizer.
689	Collingwood Meat Co., Collingwood, Ont.	Manufacturers		Tankage— Guaranteed. Found
690	Crocker Fertilizer and Chemical Co., Buffalo, N.Y.	do	Bone, bone black, phosphatic guano.	Crocker's Special Potato Manure— Guaranteed. Found
691	do	do	Dried, blood, meat, sulphate of ammonia.	Crocker's Potato, Hop and Tobacco Phosphate— Guaranteed. Found
692	do	do	Nitrate of soda, high grade muriate and sulphate of potash and sulphuric acid.	Crocker's Ammoniated Wheat and Corn Phosphate— Guaranteed. Found
693	do	do		Crocker's Canadian Grain and Grass Phosphate— Guaranteed. Found
694	W. Harris & Co., Danforth Avenue, Toronto	do		Brand C— Guaranteed. Found
695	do	do		Brand H— Guaranteed. Found
696	Ingersoll Packing Co., Ingersoll, Ont.	do	Blood, tankage and bone from the hog.	Ingersoll Fertilizer— Guaranteed. Found
697	The Nova Scotia Fertilizer Co., Halifax, N.S.	do		Bone Meal— Guaranteed. Found
698	do	do		Ceres Superphosphate— Guaranteed. Found
699	do	do		Potato Phosphate— Guaranteed. Found
700	Canada Chemical Co., London, Ont.	do		Superphosphate Fertilizer— Guaranteed. Found
701	do	do		Prolific Brand Complete Fertilizer— Guaranteed. Found
702	do	do		Challenge Brand High Grade Complete Fertilizer— Guaranteed Found
703	Wm. Faint, Peterboro', Ont.	do		Pure Ground Bone— Guaranteed. Found

Commercial Fertilizers registered for 1897—*Continued.*

Results of Analysis.									Relative value per ton of 2,000 lbs.	Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.		
Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.	Soluble in Water.	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ c.	
6·10	7·41	Trace.....	7·42	1·37	8·79	7·42	.....	21·05	24 17	689
3·70 to 4·50 4·19	4·50 to 5·50 5·09	6 to 7 8·00	2 to 3 2·09	1 to 2 0·78	..... 10·87	8 to 10 10 09	5·40 to 6·40 6·30	..... 9·60	..... 29 39	690
2 to 3 2·59	2·50 to 3·50 3·15	7 to 8 8·79	3 to 4 1·78	1 to 2 0·94	..... 11·51	10 to 12 10·57	3·25 to 4·30 3·72	..... 10·15	..... 23 58	691
2 to 3 2·40	2·50 to 3·50 2·91	8 to 10 7·67	2 to 3 2·40	1 to 2 1·76	..... 11·83	10 to 13 10·07	1·60 to 2·70 1·96	..... 8·70	..... 21 41	692
1·64 to 2·50 2·28	2 to 3 2·77	4 to 5 3·98	2 to 3 2·27	1 to 2 5·66	..... 11·91	6 to 8 6·25	2 to 3 2·52	..... 4·8	..... 21 06	693
..... 4·00	..... 4·96	..... 0·26	..... 6·52	..... 6·01	..... 12·79	..... 6·78	..... Trace.....	..... 6·35	..... 23 09	694
..... 7·71	..... 9·36	..... 0·26	..... 2·30	..... 4.86	..... 7·42	..... 2·56	..... Trace.....	..... 3.80	..... 26 20	695
..... 7·32	..... 8·89	..... Trace.	..... 5·44	..... 6·87	..... 12·31	....	....	..... 6·65	..... 31 66	696
..... 3·95	4·53 4·80	....	..... 6·11	..... 17·11	22·66 23·34	....	....	..... 5·8	..... 33 31	697
..... 2·55	2 to 2·68 3·1	..... 2·72	..... 1·89	..... 6·10	9.25 to 10·70 10·71	....	2·14 to 2·44 2·14	..... 7·3	..... 19 81	698
..... 2·75	3·72 to 4·24 3·34	..... 2·23	..... 2·18	..... 4·38	7·85 to 9·25 8·79	....	4·70 to 5·21 4·00	..... 10·50	..... 20 26	699
....	....	..... 6·52	..... 3·46	..... 6·14	..... 16·12	11 to 13 9·98	....	..... 10·91	..... 17 77	700
..... 2·14	2·0 2·60	..... 3·86	..... 1·85	..... 4·15	..... 9·86	6 to 7 5·71	2 to 3 2·70	..... 6·82	..... 18 80	701
..... 2·24	2 to 3 2·72	..... 4·35	..... 2·57	..... 4·50	..... 11·42	7 to 9 6·92	3 to 4 3·36	..... 8·80	..... 21 46	702
..... 3·75	..... 4·55	..... 0·26	..... 5·88	..... 16·76	..... 22·90	..... 6·14	..... Trace.....	..... 4 70	..... 32 54	703

STATEMENT of the Results of examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizer.
704	Bowker Fertilizer Co., 43 Chatham Street, Boston, Mass.	Manufacturers....	Bone, bone black, phosphatic guano, dried blood, meat or fish, sulphate of ammonia or nitrate of soda, sulphate of potash or muriate of potash and sulphuric acid.	Stockbridge Potato and Vegetable Fertilizer-- Guaranteed..... Found.....
705		do ..		Stockbridge Corn and Grain Fertilizer— Guaranteed..... Found.....
706		do ..		Stockbridge Seeding Down Fertilizer— Guaranteed..... Found.....
707		do ..		Stockbridge Top Dressing Fertilizer. Guaranteed..... Found.....
708		do ..		Bowker's Potato Fertilizer— Guaranteed..... Found.....
709		do ..		Bowker's Potato and Vegetable Fertilizer— Guaranteed..... Found.....
710		do ..		Bowker's Hill and Drill Fertilizer— Guaranteed..... Found.....
711		do ..		Bowker's Vermont Fertilizer— Guaranteed..... Found.....
712		do ..		Bowker's Farm and Garden Fertilizer— Guaranteed..... Found.....
713		do .		Bowker's Square Brand Bone and Potash Fertilizer— Guaranteed..... Found.....
714		do		Bowker's fresh Ground Bone— Guaranteed..... Found.....
715		do		Bowker's Market Bone— Guaranteed..... Found.....
716	Bradley Fertilizer Co., 92 State St., Boston.	do	.....	Bradley's XL Phosphate— Guaranteed..... Found.....
717	do ..	do	.....	Bradley's Potato Fertilizer— Guaranteed..... Found.....
718	do ..	do	.....	B.D. Sea Fowl, Guano— Guaranteed..... Found.....

Commercial Fertilizers registered for 1897—*Continued.*

Results of Analysis.										
Nitrogen.		Phosphoric Acid.							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.	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
3¼ to 4¼	4 to 5	7·04	3·36	0·96	7 to 9	6 to 7	10 to 12	....	.....	704
3 02	3·67	7·04	3·36	0·96	11·36	10·40	8·90	11·67	29 70	
3 to 4	4 to 5	.....	....	.....	10 to 12	8 to 10	6 to 7	.....	.....	705
3·06	3·71	4·64	2·25	5·59	12·48	6·89	6 12	10·07	27 50	
2·50 to 3·25	3 to 4	4 to 5	2 to 3	.....	12 to 14	.....	10 to 12	.....	.....	706
2·64	3·21	5·76	4·63	4·32	14·71	10·39	8·07	9·13	31 13	
5 to 6	6 to 7	3 to 4	1 to 2	....	6 to 7	.....	6 to 7	.....	....	707
4·78	5·80	6·55	0·98	3·35	10·88	7·53	4·73	12·00	28 73	
.....	2 to 3	.....	.....	....	11 to 13	9 to 11	2 to 4	.....	.....	708
2·22	2·69	7·04	3·53	2·55	13·12	10·57	3·73	12·56	24 12	
.....	3 to 4	.....	.....	....	10 to 12	8 to 10	4 to 6	..	.....	709
2·50	3·04	7·04	1·75	3·51	12·30	8·79	5·00	12·18	25 13	
2·5 to 3·5	3 to 4	7 to 8	2 to 3	....	12 to 13	.....	2 to 3	.....	.....	710
2·63	3·19	9·92	0·81	3 03	13·76	10·73	2·32	12 94	24 57	
.....	2½ to 3½	....	.....	..	.....	8 to 10	3 to 4	.....	...	711
2·44	2·96	8·46	2·09	3·36	13·91	10·55	2·86	12·96	24 67	
.....	2 to 3	.....	.....	.....	10 to 12	8 to 10	2 to 3	.....	.....	712
2·40	2·91	6·08	3·54	3·50	13·12	9·62	2·45	11·48	23 02	
.....	2 to 3	.....	.....	.....	12 to 14	6 to 8	2 to 3	.....	.....	713
2·27	2·76	3·84	4·96	2·72	11·52	8·80	2·80	9·55	21 18	
.....	3 to 4	.....	.....	.....	18·22	.....	.....	.....	.....	714
3·50	4·25	1·92	7·83	14·39	24·14	9·75	.....	7·23	33 70	
.....	2 to 3	.....	.....	.....	16 to 20	.....	.....	.....	.....	715
2·78	3·38	1·12	6·08	14·87	22 07	7·20	.....	5·30	29 57	
7 to 2.90	2·50 to 3·50	8 to 10	.....	.....	10 to 12	.....	1 to 2	..	..	716
2·17	2·63	5·50	5·19	1·53	12·22	10·69	1·66	13·07	20 79	
2.06 to 2·88	2·50 to 3·50	6 to 7	3 to 4	2 to 3	11 to 14	9 to 11	3·25 to 4·35	.....	.....	717
2·30	2·79	9·34	1·47	1·98	12·79	10·81	3·96	5·07	24 49	
2·06 to 2·88	2·50 to 3·50	5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	1·50 to 2·50	.....	.....	718
2·63	3·19	9·59	1·61	1·40	12·60	11·20	2·33	6·90	23 44	

STATEMENT of the results of Examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizer.
719	Bradley Fertilizer Co., Boston.	Manufacturers....	.....	FarmersNewMethodFertilizer Guaranteed ..... Found .....
720	do	do	.....	Eclipse Phosphate— Guaranteed ..... Found .....
721	do	do	.....	Fine Ground Bone— Guaranteed ..... Found .....
722	The Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	do	Apatite & Bone Char....	Superphosphate of Lime— Guaranteed ..... Found .....
723	do	do	Nitrate of Soda, sulphate of ammonia, potash and magnesia, salts, mineral superphosphate, bone char and fine bone meal.	Special Fertilizer— Guaranteed ..... Found .....
724	do	do		No. 1 Fertilizer— Guaranteed ..... Found .....
725	do	do		Fruit Tree Fertilizer— Guaranteed ..... Found .....
726	do	do		Standard Fertilizer— Guaranteed..... Found .....
727	do	do		Corn and Grass Fertilizer— Guaranteed..... Found .....
728	The Nichols Chemical Co., Capelton, P.Q.	do	Canadian apatite dissolved in sulphuric acid, to which is added muriate of potash and sulphate of ammonia in quantities to agree with the analyses given.	The Capelton Superphosphate. Guaranteed..... Found .....
729	do	do		The Royal Canadian— Guaranteed..... Found .....
730	do	do		The Victor— Guaranteed..... Found .....
731	do	do		The Reliance— Guaranteed..... Found .....
732	do	do		No. 1 Grade— Guaranteed..... Found .....
733	do	do		Soluble Bone Phosphate— Guaranteed..... Found .....
734	E. Frank Coe Company, 133 to 137 Front St., New York City.	do	Dried blood, meat, fish guano, bone, phosphatic guanos, sulphate of potash and oil of vitriol.	E. Frank Coe's Special Potato Fertilizer— Guaranteed..... Found .....
735	do	do		Grass and Grain Fertilizer— Guaranteed..... Found .....
736	do	do		High Grade Ammoniated Bone Superphosphate— Guaranteed..... Found .....

Commercial Fertilizers registered for 1897—*Continued.*

Results of Analysis.										
Nitrogen.		Phosphoric Acid.							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	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.	
0·82 to 1·65 1·61	1 to 2 1·95	5 to 6 6·14	3 to 4 3·33	2 to 3 1·92	10 to 13 11·39	8 to 10 9·47	2·15 to 3·25 1·92	..... 15·50	..... 18 83	719
1 to 2 2·18	1¼ to 2¼ 2·65	8 to 9 4·80	2 to 3 6·21	2 to 3 3·00	12 to 15 14·01	10 to 12 11·01	1·50 to 2·50 1·95	. . . 12·82	..... 22 87	720
2·50 to 3·50 3·93	3 to 4 4·79	....	..... 6·79	..... 17·65	21 to 23 24·44	..... 6·79	....	..... 4·77	.. 34 55	721
.... 0·44	..... 0·55	12 to 14 8·65	2·87	. . . 4·22	14 to 16 15.74	. . . . 11·52	....	..... 10·40	..... 17 60	722
.... 4·53	3½ to 4½ 5 50	8 to 10 5·72	2·34	..... 2·94	10 to 12 11·50	..... 8·06	6 to 9 7·63	. . . 7·30	.... 31 13	723
..... 1·33	1½ to 2¼ 1·61	9 to 11 6·82	3·68	.... 3·96	12 to 14 14·46	..... 10·50	1 to 1½ 1·29	. . . 8·55	..... 19 81	724
.... 2·08	2 to 3 2·53	8 to 10 5·85	1·44	..... 3·07	10 to 12 10·36	..... 7·29	8 to 10 9·33	..... 7·85	.... 25 96	725
..... 2·49	2½ to 3½ 3·03	9 to 11 7·72	3·02	.... 3·20	11 to 13 13·94	..... 10·74	2 to 2½ 2·74	..... 8·56	..... 24 17	726
..... 2·21	2 to 3 2·68	..... 7·45	..... 2·40	.... 3·20	9 to 11 13·05	7 to 9 9·85	4 to 5 4·67	.... 8·60	..... 24 47	727
.... 0·21	..... 0·26	..... 4·92	..... 3·01	..... 3·07	..... 11·00	8 to 10 7·93	..... 0·13	..... 14·95	..... 12 97	728
..... 4·13	4 to 5 5·02	..... 8·13	..... 0·83	..... 0 96	..... 9·92	9 to 11 8·96	5 to 6 5·06	..... 9·48	..... 27 68	729
..... 4·07	2 to 3 4·94	..... 4·80	..... 1·76	..... 1·60	..... 8·16	7 to 9 6·56	3 to 4 5·33	..... 11·18	..... 25 48	730
.... 2·96	2 to 3 3·59	..... 3·84	.. .... 2·11	..... 1·41	..... 7·36	6 to 7 5·95	2 to 3 4·71	..... 12·06	..... 20 99	731
..... 0·35	..... 0·43	..... 10·40	..... 1·78	..... 2·37	..... 14·55	11½ to 14 12·18	.... 0·12	..... 13·86	..... 17 84	732
..... 0·57	..... 0·62	..... 1·41	..... 13·78	..... 0·32	..... 15·51	15 to 17 15·19	... . 0·81	..... 22·54	..... 19 54	733
1·65 to 2·45 1·80	2 to 3 2·19	7 to 9 7·20	2 to 3 2·88	2 to 3 2·24	11 to 13 12·32	9 to 12 10·08	3·50 to 4 4·35	..... 8·86	..... 22 94	734
·80 to 1·60 1·04	1 to 2 1·26	7 to 8 8·00	2 to 3 2·87	1 to 2 2 43	10 to 12 13·30	9 to 11 10·87	1·35 to 2 1·22	.... 13·18	..... 18 97	735
2 to 2·80 1·59	2½ to 3 1·94	7 to 9 7·51	2 to 3 3·20	2 to 3 2·24	11 to 13 12·95	9 to 12 10·71	1·85 to 2 2·51	.... 8·48	..... 21 23	736

STATEMENT of the results of Examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizer.
737	E. Frank Coe Co., 133 to 137 Frank St., New York City.	Manufacturers....	Dried blood, meat, fish guano, bone, phosphatic guanos, sulphate of potash and oil of vitriol.	Standard Grade Ammoniated Bone Superphosphate— Guaranteed ..... Found .....
738	do ..	do		Columbia Potato Fertilizer— Guaranteed ..... Found .....
739	Sam'l. Archibald & Sons, Truro, N S.	do	.....	Archibald's Pure Ground Bone— Guaranteed ..... Found .....
740	do ..	do	Bone char and sulphuric acid, muriate of potash, nitrate of soda and ashes.	Archibald's General Fertilizer— Guaranteed ..... Found .....
741	do ..	do		Archibald's Potato Phosphate— Guaranteed..... Found .....
742	do ..	do	Bone, phosphate of lime concentrated from bone char dissolved with sulphuric acid, muriate of potash, nitrate of soda.	Archibald's House Plant and Flower Garden Fertilizer— Guaranteed ..... Found .....
743	The W. A. Freeman Co., Ltd., Hamilton, Ont.	do	.....	Bone Meal— Guaranteed ..... Found .....
744	do ..	do	.....	Victoria Bone Meal— Guaranteed ..... Found .....
745	do ..	do	.....	Sure Growth— Guaranteed..... Found .....
746	do ..	do	.....	Potato Manure— Guaranteed ..... Found .....
747	do ..	do	.....	Bone and Potash— Guaranteed ..... Found .....
748	do .	do	.....	Celery and Early Vegetable— Guaranteed ..... Found .....
749	do ..	do	.....	Grass and Grain— Guaranteed..... Found .....
750	do ..	do	.....	Dissolved Bone— Guaranteed ..... Found .....
751	do ..	do	.....	Tankage— Guaranteed..... Found .....
752	Thos. Reid, St. John.	do ..	.....	Reid's Superphosphate— Guaranteed..... Found .....

Commercial Fertilizers registered for 1897—*Continued.*

Results of Analysis.										
Nittrogen.		Phosphoric Acid.							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	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ c.	
1¾ to 2¼	2 to 2½	6 to 8	2 to 3	1 to 2	9 to 11	8 to 10	1·35 to 2	....	.....	737
1·24	1·51	7·84	1·59	2·56	11·99	9·43	1·58	9·52	18 34	
1 to 1½	1½ to 2	7 to 9	2 to 3	2 to 3	11 to 13	9 to 12	1·85	...	.....	738
1·69	2·06	6·87	2·56	3·04	12·47	9·43	3·71	8·03	22 06	
.....	4·50 to 5	.....	.....	.....	22 to 23	.....	.....	.....	.....	739
4·08	4·95	0·80	11·99	8·64	21·43	12·79	....	8·30	33 40	
... .	3 to 3·50	.....	.....	.....	6 to 7	.....	3 to 3·50	.....	.....	740
1·86	2·26	1·28	0·80	2·24	4·32	2·08	3·19	9·18	12 85	
.....	3·50 to 4	.....	.....	.....	5 to 6	.....	3·50 to 6	..	...	741
1·84	2·23	1·28	0·56	1·28	3·12	1·84	4·77	7·04	13 23	
.....	10 to 12	....	.....	....	10 to 12	.....	8 to 10	...	... .	742
9·39	11·40	7·36	.....	0·08	7·44	7·36	12·49	3·76	46 43	
.....	3 to 5	.....	.....	.....	23 to 25	.....	.....	.....	.....	743
1·94	2·35	.....	10·22	16·32	26·54	10·22	.....	3·88	32 22	
.....	3 to 4	.....	.....	.....	18 to 20	.....	.....	.....	.....	744
3·73	4·53	0·18	8·05	10·66	18·89	8·23	.....	5·97	28 68	
.....	3½ to 5	.....	.....	.....	8 to 10	.....	3 to 4	.....	.....	745
4·27	5·19	5·85	3·83	1·10	10·78	9·68	6·55	5·48	29 46	
.....	3 to 4	.....	.....	.....	8 to 10	.....	5 to 7	.....	.....	746
3·72	4·52	6·66	2·78	1·13	10·57	9·44	8·93	2·73	30 49	
.....	2 to 3	.....	.....	.....	9 to 10	.....	6 to 8	.....	...	747
3·16	3·84	5·13	4·02	1·48	10·63	9·15	9·75	2·70	29 88	
.....	6 to 8	.....	.....	.....	9 to 10	.....	6 to 8	.....	.....	748
5·41	6·57	5·02	4·34	0·89	10·25	9·36	8·45	2·18	33 53	
.....	2 to 3	....	.....	.....	9 to 11	.....	1 to 2	.....	.....	749
1·11	1·35	3·64	3·55	0·91	8·10	7·19	6·63	0·88	18 80	
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	750
2·11	2·56	2·65	9·98	6·82	19·45	12·63	.. ....	0·85	26 04	
.....	6 to 7	.....	.....	.....	13 to 15	.....	.....	.....	.....	751
6·01	7·30	0·33	7·83	5·97	14·13	8·16	.....	8·56	39 40	
....	3·60	....	.....	.....	12·30	.....	2·75	20·50	. .	752
3·33	4·11	2·24	3·19	3·20	8·63	5·43	3·86	20·82	21 44	

STATEMENT of the Results of Examining 108 Samples of

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizer.
753	Provincial Chemical Fertilizer Co., Ltd., St. John, N.B.	Manufacturers		Imperial Superphosphate— Guaranteed Found
754	do	do		Potato Phosphate— Guaranteed Found
755	do	do		Fruit Tree Fertilizer— Guaranteed Found
756	do	do		Victor Guano— Guaranteed Found
757	do	do		Bone Meal— Guaranteed Found
758	W. P. Churchill, Yarmouth, N.S.	do		Ground Bone— Guaranteed Found
759	Great Eastern Fertilizer Co., Rutland, Vermont, U.S.	do		Great Eastern High Grade Corn Fertilizer— Guaranteed Found
760	do	do		Great Eastern General Fertilizer— Guaranteed Found
761	do	do		Great Eastern Grass and Oats Fertilizer— Guaranteed Found
762	do	do		Great Eastern Potato Manure— Guaranteed Found
763	do	do		Great Eastern High Grade Dissolved Bone— Guaranteed Found

Commercial Fertilizers registered for 1897—*Concluded.*

Results of Analysis.										
Nitrogen.		Phosphoric Acid.							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.	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.		
p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	$ c.	
.....	3·98	7·98	.....	8 87	16·85	.....	1·85	.....	....	753
.....	4·86	8·05	.....	8·49	16·54	.....	4·20	.....	....	754
.....	4·21	10·56	....	5·14	15·70	.....	4·63	.....	.....	755
.....	3·05	7·13	.....	8·25	15·38	.....	1·52	.....	.....	756
.....	4·78	.....	....	20·92	24·78	.....	.....	.....	....	757
..... 3·62	4·39	0·60	3·56	16·63	20·79	.....	trace.	8·54	29 96	758
2·88 to 3·75 3·13	3 50 to 4·50 3·80	6 to 8 1·92	2 to 3 7·36	1 to 2 1·92	... . 11·20	8 to 9 9·28	2 to 4 2·30	..... 13·50	..... 22 24	759
0·82 to 1·50 1·42	1 to 2 1·73	6 to 8 1·60	2 to 4 8·64	1 to 3 1·28	.. .... 11·52	8 to 12 10·24	4 to 6 4·60	.... 14·90	..... 20 94	760
..... 0·28	..... 0·34	9 to 12 6·24	2 to 3 5·92	1 to 2 2·24	.... 14·40	11 to 12 12·16	2 to 4 1·08	... . 12·48	..... 18 04	761
2·06 to 2·88 2·77	2·50 to 3 3·37	6 to 8 1·76	2 to 3 7·52	1 to 2 1·28	.... 10·56	8 to 12 9·28	4 to 6 4·67	... 14·90	..... 23 21	762
..... 0·36	..... . 0·44	11 to 13 10·24	3 to 5 5·12	2 to 3 2·08	..... 17·44	14 to 17 15·36	.....	. ..... 14·82	..... 20 86	763

APPENDIX K.

BULLETIN No. 47.—HONEY.—1897.

E. MIALL, Esq.
Commissioner of Inland Revenue.

SIR,—In the tables appended to this report are stated the results obtained in the examination of 183 samples of honey, collected in accordance with your instructions in November, December and January last. I beg respectfully to recommend their publication for the information of the public and more especially of those who are engaged in the business of bee-keeping. At the end of the tables will be found also the analysis of two samples supplied by R. F. Holtermann, of Brantford, Ont., as undoubtedly genuine honey.

The number of adulterated samples is very small, not exceeding 12 in the whole 180 or $6\frac{2}{3}$ per cent, and were reported for prosecution on the 19th inst. The chief adulterant is starch syrup of which some of the samples appear to consist almost exclusively, some genuine honey having been merely incorporated to flavour the product. It is not possible to characterise this admixture as injurious to health, and the product in question is deemed to be adulterated because, in the words of the Act "an inferior or cheaper substance has been substituted wholly or in part for the article."

It is to be remarked that none of the samples have been challenged on account of their containing an excessive quantity of water. It seems that, in estimating this element the analysts have not followed a uniform process. In this laboratory, the method adopted is to take 20 cubic centimeters of a five per cent solution, which correspond to 1 gramme of the honey, introduce it into a tube containing crysotile fibre, and dry in the water bath for 24 hours at a temperature of about 96° F. But even where this method has been followed we have samples of honey, otherwise unobjectionable which contain as much as 32·6 per cent of water, and range from this down, to 16·11 per cent. One of the samples supplied by Mr. Holtermann contained 27·1 per cent, and it does not appear to me possible to make any suggestion at present as regards the "limits of variability" which ought to be allowed in reference to the percentage of water in honey.

I have the honour to be, sir,

Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

24th March, 1897.

RESULTS of the Examination

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observation by Direct reading.	Observation by Invert reading.
1896.			Cts.	*Amherst, N.S.*			
Dec. 16	15079	3 lbs.	70	E. M. Lockwood, druggist..	W. D. Black, "Cloverdale apiary," Truro, N.S.	−18·10	−21·60
" 16	15080	" .	60	R. H. Tremaine, druggist ..	" " .	−18·40	−22·30
" 16	15081	" .	60	Black Bros., grocers.....	Uncertain	−15·00 −15·00	−17·84 −16·30
" 16	15082	" .	60	C. L. McLeod, grocer.....	W. D. Black, Truro, N.S..	−18·00	−22·04 −21·40
" 16	15083	" .	45	B. W. Baker, bee-keeper....	From vendors own apiary (14 hives) clover honey.	− 9·60	−12·48
" 16	15084	" .	45	" "	Golden rod honey.....	−14·32	−16·88
				Truro, N.S.			
" 17	15085	" .	70	A. F. Ross & Co., grocers...	W. D. Black, Truro, N.S..	−14·46 −20·60	−18·88 −21·70
" 17	15086	" .	75	E. E. McNutt, grocer.....	F. W. Jones, bee-keeper, Bedford, P.Q.	− 8·70	−13·60
" 17	15087	" .	90	W. F. Odell, druggist . .	Kerry, Watson & Co., Montreal.	−11·10	−17·60
" 17	15088	" .	75	W. H. Snook & Co., grocer.	M. J. Lewis, bee-keeper, Central Onslow, N.B.	−12·55	−19·60
				New Glasgow, N.S.			
" 18	15089	" .	60	G. Carew, druggist.....	A. McKay, Stellarton, N.S.	−17·80	−23·04
" 18	15090	" .	45	A. C. Bell, druggist.....	" " ..	−17·80	−21·20
" 18	15091	" .	45	A. Chisholm, grocer.....	R. Graham, bee-keeper, New Glasgow (14 hives).	−18·80 −15·00	−20·80 −18·00
" 18	15092	" .	60	J. W. Frazer	Vendor (15 hives).....	−18·72	−21·60
				Halifax, N.S.			
" 21	15093	" .	85	A. M. Boutillier, grocer, Gottingen St.	W. D. Black, Truro, N.S..	−13·60	−17·72
" 21	15094	" .	75	H. W. Cameron, druggist, 219½ Brunswick St.	Canadian Honey Co., Halifax, N.S.	− 4·00	−16·40
" 21	15095	" .	60	C. E. Huggins, 50½ Jacob St.	W. D. Black, Truro, N.S..	−20·60	−23·20
" 21	15096	" .	70	E. W. Crease, 147 Argyle St.	Canadian Honey Co., Halifax, N.S.	− 9·60	−16·50
" 21	15097	" .	75	W. C. Anderson, 101 Granville St.	E. F. Beeler, Berwick, N.S.	−15·60	−17·60
" 21	15098	" .	65	H. A. Taylor, druggist, 69 Barrington St.	W. D. Black, Truro, N.S..	−16·00	−17·92
" 21	15099	" .	40	Hattie & Mylins, druggists, 135 Hollis St.	E. S. Goudge, bee-keeper, "Willow Park Apiary," Halifax, N.S.	−14·04	−15·88
" 21	15100	" .	75	Brown Bros. & Co., druggists, Granville and Buckingham Sts.	Brown & Webb, wholesale druggists, Halifax, N.S.	−17·36	−21·84
" 22	15101	" .	75	E. S. Blackie, druggist, 17½ Spring Garden Road.	W. D. Black, Truro, N.S..	−17·00	−18·60
" 22	15102	" .	100	H. W. Cameron, druggist, 219½ Brunswick St.	F. H. Gemmill, Stratford, Ont.	−16·20	−19·80

The results which are given opposite the samples were obtained by Mr. Maynard Bowman, official results are by Mr. F. W. Babington, Ottawa.

of 183 Samples of Honey.

Results of Analysis.							Analyst's Remarks.	No of Sample.
Saccharimeter.		By Fehling Solution.			Water.	Ash.		
Temperature. — Centigrade.	Sucrose by Clergets formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
18·5	2·62	78·29	.....	.....	17·21	0·05	Genuine	15079
18·0	2·93	78·70	.....	.....	17·85	0·03	"	15080
20·0	2·11	78·45	....	.....	16·30	0·10	"	15081
23·0	1·00							
18·0	3·02	76·79	.....	....	17·35	0·06	"	15082
19·0	2·16	73·61	.....	.....	18·43	0·10	"	15083
20·0	1·92	75·08	.....	.....	20·44	0·13	"	15084
19·5	3·32	77·09	.....	.....	16·30	0·04	"	15085
23·0	0·80							
20·0	3·69	74·44	.....	....	16·54	0·38	"	15086
20·0	4·89	75·55	.....	.. ..	16·03	0·05	"	15087
20·5	5·31	76·55	.....	.....	19·55	0·22	"	15088
20·5	3·95	76·25	.....	.....	17·50	0·08	"	15089
19·2	2·55	75·35	.....	.....	17·10	0·37	"	15090
19·2	1·56	75·50	.....	. .....	17·12	0·03	"	15091
23·0	2·28	.....	.. . .	.....	.....	...	"	.....
20·5	2·17	77·95	.....	.....	17·07	0·47	"	15092
20·5	3·11	77·60	.....	.....	18·78	0·05	"	15093
19·5	9·32	69·30	....	.....	17·83	0·20	. ...	15094
19·2	1·95	76·20	.....	.....	19·35	0·04	"	15095
9·0	5·19	74·19	....	.....	17·64	0·06	"	15096
19·0	1·50	74·00	.....	.....	23·59	0·25	"	15097
19·0	1·44	73·92	.....	.....	21·63	0·04	"	15098
19·8	1·41	73·06	....	... .	21·16	0·38	"	15099
19·0	3·35	74·09	... .	....	18·31	0·10	"	15100
19·5	1·32	73·60	....	.....	20 58	0·03	"	15101
9·5	2·70	77·60	.....	.....	18·38	0·04	"	15102

analyst, Halifax, unless in cases where a second and lower line of figures is given; in that case, the latter

RESULTS of the Examination of

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observations by Direct Reading.	Observations by Invert reading.
1896.			Cts.	*St. John, N.B.*			
Dec. 3	15058	3 lbs.	75	W. Hawker & Son, druggists, 104 Prince William St.	Evans & Sons, Montreal...	—15·2	—17·6
" 3	15059	"	75	W. C. R. Allan, druggist, 35 King St.	S. McDiarmid, King St., St. John.	— 6·0	—13·2
" 3	15060	"	75	W. A. Porter, druggist, 215 Union St.	Colpitts Bros., Sussex Vale, N.B.	—12·0	—22·0
" 3	15061	"	75	J. S. Armstrong & Bros., grocers, 32 Charlotte St.	W. D. Black, Truro, N.S..	—11·2	—14·4
" 3	15062	"	75	Canada Drug Co., 60 Prince William St.	" " ..	— 5·2	—15·2
" 4	15063	"	70	G. Davidson, commission merchant, stall "B," city market.	A. Rouse, Corn Hill, N.B.	— 2·40 — 4·2	—16·0 —17·3
" 4	15064	"	75	G. A. Moore, druggist, 109 Brunswick St.	Colpitts Bros., Sussex Vale, N.B.	— 2·4	—16·0
" 4	15065	"	75	E. H. Turnbull, 91 Charlotte St.	" " ..	— 5·0	—16·0
" 4	15066	"	75	F. E. Williams, 80 Princess St.	W. D. Black, Truro.	—12·0	—22·0
" 4	15067	"	75	S. McDiarmid, druggist, 49 King St.	Simcoe Canning Co., Simcoe, Ont.	— 6·0 — 9·8	—15·2 —16·7
" 4	15068	"	60	P. Nase & Son, No. 1 Main St., North End.	W. D. Black, Truro.	—11·2	—14·4
" 4	15069	"	....	Brown & Davidson, 73 Sydney St.	G. Davidson, stall "B," city market.	— 7·6	—16·8
				Sussex, N.B.			
Dec. 7	15070	"	60	Huestis & Mills.....	S. R. Wilcox, N.B..	— 8·0	—18·8
" 7	15071	"	45	John Asbill.....	Vendor.	— 7·60	—16·82
" 8	15072	"	75	Colpitts Bros., Pleasant Vale	Vendors (84 hives)	—12·0	—22·0
" 8	15073	"	60	" " ..	"	— 5·10	—16·00
				Moncton, N.B.			
" 9	15074	"	75	Fairweather Bros., druggists	W. D. Black, Truro, N.S..	—11·2	—14·4
" 9	15075	"	45	E. E. Ayer, grocer.....	Colpitts Bros., Pleasant Vale	— 5·2	—15·2
" 10	15076	"	45	Watson Lutes.....	" " ..	— 5·0	—16·0
				Chatham, N.B.			
" 11	15077	"	75	Brown Bros., grocers	Lyman, Sons & Co., Montreal.	—10·0 —14·5	—15·2 —16·9
" 11	15078	"	65	W. T. Harris, grocer.	W. D. Black, Truro, N.S..	—22·8	—28·0

The foregoing results stated opposite the samples were reported by Mr. W. F. Best, official analyst, by Mr. W. F. Babington, Ottawa.

183 Samples of Honey—*Continued.*

Results of Analysis.							Analyst's Remarks.	No. of Sample.
Saccharimeter.		By Febling Solution.						
Temperature. — Centigrade.	Sucrose by Clerget's formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.	Water.	Ash.		
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c		
.....	1·82	75·20	77.32	1·90	14·65	0·12	Nothing abnormal noted. Not adulterated.	15058
.....	5·47	74·50	80 50	5·60	17·90	0·25	" "	15059
.....	7·60	61·52	69·32	7·50	16·15	0·10	" "	15060
.....	2·40	69·10	71·54	2·40	14·25	0·22	" "	15061
.....	7·60	64·51	72·50	7·52	18·10	0·50	" "	15062
.....	10·34	64·02	74·85	10·35	18·25	0·38	" "	15063
.....	9·92	.....	.....	.....	.....	.....	" "	
.....	10·34	64·02	74·87	10·35	18·30	0·30	" "	15064
.....	8·36	70·13	79·21	8·60	14·20	0·14	" "	15065
.....	7·60	65·16	73.76	8·12	15·80	0·12	" "	15066
.....	6·99	64·32	61·52	6·86	14·65	0 50	" "	15067
.....	5 23	.....	.....	.....	.....	.....	" "	
.....	2·40	69·10	71·54	2·40	13·00	0·20	" "	15068
.....	6·99	60·37	70·45	6·72	12·10	0·55	" "	15069
.....	8·21	65·16	73·76	8·12	14·40	0·20	" " ..	15070
.....	6·99	61·52	69·31	7·50	12·0	0·50	" " ..	15071
.....	7·60	61·52	69·32	7·50	16·10	0·15	" " ..	15072
.....	8·38	70·13	79·20	8·60	15·20	0·60	" " ..	15073
.....	2·40	69·19	71·55	2·40	14·00	0·20	" " ..	15074
.....	7·60	64·50	72·50	7·50	15·10	0·60	" ..	15075
.....	8·36	70·13	79·21	8·60	16·65	0·65	" " ..	15076
.....	3·25	68·63	72·64	3·25	15·30	0·12	" " ..	15077
.....	1·80	.....	.....	.....	.....	.....	" " ..	
.....	4·41	66·03	70·40	4·40	16·75	0·10	" " ..	15078

St. John, N.B., unless in cases where a second line of figures is given; in that case the latter results are

RESULTS of the Examination

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Sherbrooke, P.Q.*			
Nov. 30	16180	3 lbs.	50	P. Oliver	J. Casavant, St. Dominique, P.Q.	— 5·5	—20·6
" 30	16181	"	54	T. Cowan	J.W.Calder, Lancaster, Ont.	—12·0	—17·7
" 30	16182	2 jars.	40	R. Johnston & Co	Not known	— 9·0	—16·0
" 30	16183	4 "	60	Wm. Murray	E. J. Berry, Brome, P.Q.	— 8·0	—15·4
				Coaticook, P.Q.			
Dec. 1	16184	2 "	50	Woodman & McKee		—19·0	—24·2
" 1	16185	2 "	60	J. Anslet	Not known	— 8·5	—17·5
" 1	16186	2 "	60	H. C. Fontaine	"	—11·5	—14·3
" 1	16187	1 "	50	S. Bachand	"	—11·0	—18·7
				Lennoxville.			
" 1	16188	2 "	60	C. F. Wiggett	A. Robinson, Lennoxville	—13·0	—19·2
				Richmond, P.Q.			
" 2	16189	2 "	60	H. P. Wales	C. Silver, New London	—11·0	—13·2
" 2	16190	2 "	50	H. S. Desmarais		—12·0	—12 6
				Danville, P.Q.			
" 2	16191	2 "	70	Gibson Bros	H. Silver, Shipton	— 3·0	—13·1
" 2	16192	2 "	70	"	Mrs. J. Gibson, Danville	— 8·5	—17·6
" 2	16195	2 "	70	Mrs. J. A. Gibson	Vendor—Beekeeper	— 8·5	—15·9
				Shipton, P.Q.			
" 2	16193	3 lbs.	45	H. G. Silver	Vendor, bee-keeper. (Basswood honey.)	—9·1	—15·9
" 2	16194	"	45	"	Vendor. (Clover honey)	—13·5	—15·5
				Quebec.			
" 9	16205	"	60	L. N. Bergeron, 151 St. Joseph St.	Not known	—15·0	—17·6
" 9	16206	3½ lbs.	75	C. S. Riverin, Crown St	J. Blais, St. Forges	—7·0	—15·9
" 9	16207	3 lbs.	45	J. B. Cote, 381 St. John St.	" "	—11·0	—15·9

of 183 Samples of Honey—*Continued.*

Results of Analysis.								
Saccharimeter.		By Fehling Solution.			Water.	Ash.	Analysts' Remarks.	No. of Sample.
Temperature. — Centigrade.	Sucrose by Clerget's formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
.....	.....	69·03	73·08	3·85	25·40	0·16	Unadulterated; crystals of honey sugar observed.	16180
.....	.....	76·93	77·66	0·69	21·53	0·19	" "	16181
.....	.....	70·00	73·11	2·95	25·40	0·12	Unadulterated; crystals of honey sugar observed with some pollen grains.	16182
.....	.....	73·07	78·88	5·52	25·25	0·26	Crystals of honey sugar; unadulterated.	16183
.....	.....	75·44	78·55	2·95	29·34	0·13	" " ..	16184
.....	.....	75·3½	79·72	4·16	24·83	0·09	" " ..	16185
.....	.....	76·32	76·80	0·46	24·88	0·12	Very beautiful crystals of honey sugar and very many pollen grains; unadulterated.	16186
.....	.....	77·29	78·74	1·38	25·99	0·11	Crystals of honey sugar; a little pollen; unadulterated.	16187
.....	.....	73·40	76·08	2·55	28·02	0·29	Crystals of honey sugar, and many pollen grains; unadulterated.	16188
.....	.....	77·28	78·50	1·16	24·67	0·26	Crystals of honey sugar; unadulterated.	16189
.....	.....	77·04	79·47	2·31	24·55	0·35	" " ..	16190
.....	.....	76·80	76·99	0·18	26·49	0·34	" " ..	16191
.....	.....	74 98	79·60	4·38	25·74	0·10	Few crystals visible; a little pollen; unadulterated.	16192
.....	.....	73·95	75·59	1·56	26·26	0·25	A few thick crystals observed; very little pollen; unadulterated.	16195
.....	.....	73·69	74·08	0·37	27·05	0·22	Crystals of honey sugar and some pollen grains; unadulterated.	16193
.....	.....	72·53	75·44	2·76	28 57	0·24	" " ..	16194
.....	.....	73·50	74·08	0·55	32·60	0·15	Crystals of honey sugar; unadulterated.	16205
.....	.....	72·33	77·19	4·62	27·70	0·09	Crystals of honey sugar and some pollen; unadulterated.	16206
.....	.....	65·92	68·83	2·76	33·00	0·09	Crystals of honey sugar and some pollen; doubtful, the water percentage being high.	16207

RESULTS of the Examination of 183

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Quebec*—Con.			
Dec. 9	15208	3 lbs.	45	J. A. Moisan, St. John St.	.....	—3·5	—16·3
" 9	16209	"	50	E. Lafrance, 272 St. John St.	Dr. Gauvreau, Charlesbourg, P.Q.	—8·5	—18·7
" 9	16210	"	60	T. E. Gauvreau & Bros., 336 St. John St.	" "	—7·0	—15·9
" 9	16211	"	36	" "	" "	—17·0	—19·2
" 9	16212	"	45	M. Boyce & Son, St. George St.	G. Hunt, Beauport, P.Q.	—10·0	—16·5
The foregoing results stated opposite the samples were reported by Dr. M. Fiset, official analyst, Quebec.							
				St. Henri, P.Q.			
Nov. 23	16171	3 lbs.	36	J. V. Frappier, 2150 St. James St.	J. Lamoureau, Montreal	+ 93·5 +101·7	+87·45 +98·3
" 23	16172	"	33	O. Decaire, 2110 St. James St.	.....	— 11·	—14·3
" 23	16173	"	30	F. X. St. Denis, 3624 Notre Dame St.	.....	— 13·5	—16·5
				Outremont, P.Q.			
" 24	16174	"	30	J. M. Harrigan, Cemetery Road.	Vendor, bee-keeper	— 12·0	—15·4
				Montreal.			
" 24	16175	"	36	F. X. Martel, 1117 St. Lawrence St.	.....	+ 12·0	—17·6
						— 10·9	—16·8
" 24	16176	2¾ lbs.	43	H. Corbeil, 701 St. Lawrence St.	A. E. Hostal, Beamsville, Ont.	— 12·0	—15·4
" 24	16177	1 jar.	40	J. Scanlan, Bleury St.	Goold, Shapley, Muire Co., Brantford, Ont.	— 6·5	—16·0
						— 8·9	—15·6
" 24	16178	3 lbs.	30	Baker & Co., 78 University St.	.....	— 16·0	—17·1
" 24	16179	"	45	J. O'Shaughanny, 86 Victoria Square.	.....	— 14·75	—18·0
Dec. 3	16196	"	24	C. Langlois & Co., St. Paul St.	G. W. Holmes, Athens, Ont.	— 11·	—15·4
" 3	16197	1 tin.	35	" "	G. Peck, Albury, Ont.	— 16·	—17·6
" 4	16198	"	40	Lamoureaux & Co., 188 Amherst St.	Vendor	+100·	+94·
						+100·3	+96·4
" 5	16199	3 lbs.	36	L. P. Forest, 1978 St. Catherine St.	.....	+26·	—16·5
						+ 5·0	—14·6

Samples of Honey—*Continued.*

Results of Analysis.							Analysts' Remarks.	No. of Sample.
Saccharimeter.		By Fehling Solution.			Water.	Ash.		
Temperature. — Centigrade.	Sucrose by Clergets formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
°	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
.....	.....	72·14	76·41	4·06	26·50	0·13	Crystals of honey sugar; unadulterated.	16208
.....	.....	72·53	77·39	4·62	26 20	0·12	" " ..	16209
.....	.....	71·36	77·77	6·08	27·30	0·07	Crystals of honey sugar; a little pollen; unadulterated.	16210
.....	.....	72·14	72·53	0·37	28·50	0·25	" " ..	16211
.....	.....	72·53	76·60	3·86	26·60	0·05	Crystals of honey sugar and some pollen; unadulterated.	16212
18	4·5	53·47	59·79	4·10	21·25	·30	Adulterated with glucose ..	16171
20	2·55	.....	.....	.....	.....	.....	" "	
18	2·5	67·66	70·48	2·68	22·30	·18	Pollen fairly abundant, and crystals of honey sugar; genuine.	16172
18	2·3	74·85	79·23	4·14	20·55	·10	Crystals of honey sugar; pollen scarce; genuine.	16173
18	2·40	70·09	73·40	3·14	22·35	·12	A dark, viscous syrup; genuine.	16174
15	21·8	60·03	77·28	16·38	21·15	·11	Pollen scarce; adulterated by the addition of cane sugar.	16175
21	4·43	.....	.....	.....	.....	.....	Genuine.	
16	2·5	68·54	72·91	4·15	20·95	·18	Crystals of honey sugar; pollen scarce; genuine.	16176
15	6·9	72·67	78·74	5·76	20·80	·26	Crystals of honey sugar; pollen grains few; direct polarization low; adulteration doubtful.	16177
21	5·04	.....	.....	.....	.....	.....	Genuine.	
16	0·8	75·34	77·77	2·30	22·50	·1	Pollen fairly abundant; genuine.	16178
14	3·5	68·83	73·33	4·22	23·60	·12	A clear syrup; few pollen grains; genuine.	16179
21	3·4	73·88	82·63	8·21	21·16	·24	Pollen scarce; genuine.....	16196
22	1·3	74·85	76·80	1·85	21·69	·14	Pollen and crystals few; genuine.	16197
23	4 0	55·90	67·56	11·07	23·07	·32	Pollen and crystals very scarce; adulterated with glucose.	16198
21	2·93	.....	.....	.....	.....	.....	" "	
20	.....	44·96	76·31	29·78	22·46	·12	No pollen observed; adulterated with admixture of cane sugar.	1619
21	14·70	.....	.....	.....	.....	.....	Adulteration doubtful.	

RESULTS of the Examination

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Montreal*—Con.			
Dec. 5	16200	3 lbs.	35	H. Porrier, 1938 St. Catherine St.	C. Langlois & Co., Montreal.	— 7·0	—16·5
						— 8·0	—14·3
				St. Henri, P.Q.			
" 7	16201	3 jars.	45	E. J. Lefebvre, 151 Park Ave.	Vendor, (labelled Canadian honey).	—21·	—22·
" 7	16202	3 lbs.	36	F. X. Chevalier, St. James St.		—11·	—16·5
				St. Cunegonde, P.Q.			
" 7	16203	"	30	A. Meloche, 1623 St. James St.		—14·	—16·5
" 7	16204	"	36	A. Lussier, 1636 St. James St.		—12·	—17·
				Huntingdon, P.Q.			
" 11	16213	"	30	J. Hunter	W. A. Goodfellow, Godmanchester, P.Q.	—11·	—16·5
" 11	16214	"	25	J. Henry	A. Lennox, Godmanchester	—13·5	—15 4
" 11	16215	"	30	G. A. Kyle	S. Goodfellow, Huntingdon	—11·	—16·5
" 11	16216	"	25	J. X. Galipeau, Wellington St.	Vendor (bee-keeper)	— 9·	—16·5
				Cote des Neiges, P.Q.			
" 14	16217	"	30	T. Desmarchais, Main Road	F. Benoit, Coté de Neiges.	—14·	—17·
" 14	16218	"	36	J. A. Gougeon		—11·	—14·8
" 14	16219	"	30	F. Benoit	Vendor (bee-keeper)	— 9·	—16·5
						—13·	—17·6
				Westmount, Que.			
" 15	16220	1 jar.	45	A. A. Perry & Co., St. Catherine St.	B. T. Graves, Westmount.	— 8·	—18·
" 15	16221	3 lbs.	25	B. T. Graves	Vendor (bee-keeper)	—17·	—17·6

The results which are given opposite the samples were obtained by Dr. J. B. Edwards, official analyst, Mr. F. W. Babington, Ottawa.

				Ottawa.			
Nov. 19	16857	2 jars.	50	Mrs. Green, O'Connor St.	G. Kemp, Navan, Ont	—14·4	—16·2
						—10·0	—15·7
" 19	16858	2 "	50	G. J. Miller, O'Connor St.	" "	—11·0	—18·5
						—10·0	—15·3
" 19	16859	2 "	50	J. E. Edwards, Bank St.	R. MacDonald, Greenfield, Ont.	—11·0	—16·2
						—15·5	—19·3
" 19	16860	2 "	50	D. McLeod, Bank St.	G. H. Burroughs, Goulbourn, Fallowfield, Ont.	—14·4	—18·7
						— 8·7	—17·1

of 183 Samples of Honey—*Continued.*

Results of Analysis.								
Saccharimeter.		By Fehling Solution.			Water.	Ash.	Analysts' Remarks.	No. of Sample.
Temperature. — Centigrade.	Sucrose by Clergets formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
18	7·0	.....	.....	.....	22·30	·24	No pollen observed; a few burst starch cells; adulteration doubtful.	16200
.....	4·74	.....	.....	.....	.....	.....	Genuine.	
21	·8	78·26	82·63	4·15	22·15	·08	Pollen scarce; genuine.	16201
17	4·1	72·91	82·63	9·23	22·90	·14	Pollen fairly abundant; genuine.	16202
17	1·9	70·72	75·34	4·38	25·50	·10	" " ..	16203
17	3·4	72·42	72·42	.....	24·8	·11	Few pollen grains; syrup dark, fermented and dirty; genuine but of very low quality.	16204
19	4·1	74·13	75·83	1·61	19·15	·20	Pollen abundant; genuine..	16213
20	1·5	72·42	74·85	2·30	21·7	·09	"	16214
19	4·1	71·69	74·37	2·54	21·35	·11	Normal; genuine.....	16215
20	5·5	71·94	79·23	6·92	20·25	·08	"	16216
17	2·2	71·69	75·34	3·46	22 8	·14	A little pollen; genuine ...	16217
20	2·8	71·69	75·34	3·46	22·15	·24	Pollen abundant; genuine.	16218
19	5·6	70·72	75·83	4 85	22·85	·06	Only a trace of pollen; of doubtful quality.	16219
21	3·46	.....	.....	....	.....	. ..	Genuine.....	
19	7·95	69·99	78·26	8·84	23·35	·08	Pollen scarce; adulteration doubtful.	16220
19	·5	73·78	74·85	1·0	24·65	·12	Pollen fairly abundant; genuine.	16221

Montreal; unless where a second and lower line of figures is given, in which case the latter results are by

20	1·66	65·40	67·16	1·67	.....	0·05	Genuine.....	16857
19	4·25	70·68	... .	2·39	20·30	.....	" crystals observed..	
20	5·66	63·86	68·52	4 43	25·88	0·10	"	16858
19	3·96	71·94	.....	1·39	26·30	. .	" crystals observed..	
20	3·93	68·29	72·60	4·09	.....	0·05	"	16859
19	2·84	76·02	.....	1·10	23·30	.....	" crystals observed..	
20	3·25	62·29	68·92	6·39	.....	0·02	"	16860
19	7·89	71·85	....	2·76	19·00	.....	" clear; crystals and sediment observed	

RESULTS of the Examination of 183

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Ottawa*—Con.			
Nov. 20	16861	3 jars	60	J. H. Primeau, Duke St....	S. J. Major, Ottawa.....	+67·04	+63·09
						+71·1	+68·6
" 20	16862	4 lbs..	50	Bedingfield & McCusker, Queen St.	R. Lindsay, Oxford Mills, Ont.	—13·9	—13·9
" 20	16863	2 jars.	50	N. D. Fraser, Queen St	....	—13·3	—14·8
						—15 0	—15·0
" 20	16864	2 lbs..	35	W. York, Queen St.....	E. Hostal, Beamsville, Ont.	—12·3	—16·6
						—10·6	—15·6
" 20	16865	3 jars	45	Mrs. M. Legendre, Queen St.	S. J. Major, Ottawa.....	+66·9	+61·9
						+68·0	+63 8
" 20	16866	2 "	50	W. Madden, Queen St.	G. Kemp, Navan, Ont.....	—13·0	—17·8
						—15·0	—16·5
" 20	16867	3 "	30	R. Legendre, Queen St. ..	....	+75·0	+68·9
						+73·7	+67·2
" 20	16868	2 "	50	W. H. Wooding, Bank St. .	D. O'Meara, Bowesville, Ont.	—15·0	—18·0
						—17·2	—18·7
" 20	16869	2 "	50	W. J. Eastcott, Bank St ...	G. H. Burroughs, Goulburn, Ont.	—14·2	—18·3
						—13·5	—16·0
" 21	16870	3 "	45	P. Brankin, Market Square.	A. C. Dunlop, Carleton Place, Ont.	—11·4	—16·0
						—10·7	—12 1
" 21	16871	2 "	40	Wall & Co., Market Square.	E. McEvoy, Bowesville, Ont.	—13·3	—16·0
						—17·7	—19·0
" 21	16872	2 "	50	J. H. Johnston	O. Kemp, Navan.....	—10·4	—13·3
						—15·0	—14·8
" 21	16873	2 "	20	P. L. Foisy, Dalhousie St..	S. J. Major, Ottawa	+69·3	+63·2
						+73·7	+69·7
" 21	16874	2 "	40	L. Malette, St. Patrick St..	Mr. O'Brien, farmer, near Ottawa.	— 9·2	—14·1
						—14·0	.....
" 21	16875	3 "	45	J. B. Robillard, Clarence St.	S. J. Major, Ottawa	+71·2	+66·5
						+69 1	+65·5
" 21	16876	3 "	40	T. R. Davies, Rideau St....	.....	— 8·8	—14·7
						— 8·8	—10·2
" 21	16877	3 "	40	C. W. Post, apiarist, Trenton, Ont.	Vendor.....	— 9·4	— 13·9
						— 8·5	— 15·5
Dec. 2	15483	6 "	50	S. J. Major, Murray St., Ottawa.	J. Lamoureaux, Montreal.	+100·0	+ 95·0
						+101·5	+ 99·0

The foregoing the results stated opposite the number of the samples, on the upper line were obtained Mr. A. L. Tourchot, Ottawa.

Samples of Honey—*Continued.*

Results of Analysis.							Analysts Remarks.	No. of Sample.
Saccharimeter.		By Fehling Solution.			Water.	Ash.		
Temperature. — Centigrade.	Sucrose by Clergets formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
20	2·37	50·46	54·82	4·14	... ...	0·15	Adulterated with glucose and perhaps cane sugar.	16861
.....	1·87	56·10	.....	1·83	22·30	.....	Adulterated with starch glucose; clear and white.	
20	0·0	67·38	69·82	2·32	.....	0·10	Genuine.....	16862
.....	0·0	78·95	.....	None	23·50	.....	" semi-solid; brown coloured.	
20	1·13	64·44	67·84	3·23	.....	0·02	"	16863
20	0·00	73·30	....	0·82	25·00	.....	" crystals observed..	
20	3·25	63·93	72·65	8·28	.....	0·15	"	16864
20	3·76	74·66	.....	2·31	21·40	.....	" crystals observed..	
20	3·02	49·32	53·04	5·43	... ...	0·10	Adulterated with glucose..	16865
20	3·16	56·68	.....	2·58	26·20	....	Adulterated with starch glucose; clear and white.	
22	3·65	66·48	74 13	5·37	.....	0·10	Genuine	16866
20	1·13	74·57	... ...	0·72	22·80	.....	" clear, lemon yellow.	
22	4·64	47·11	51 70	4·36	.....	0·10	Adulterated with glucose, and perhaps cane sugar.	16867
20	4·89	53·76	.....	2·02	26·90	.....	Clear, white; adulterated with starch glucose.	
22	2·28	67·73	75·26	7·14	.....	0·05	Genuine	16868
20	1·13	77·53	.....	0·92	21·30	.....	" clear, lemon colour.	
22	3·12	63·31	67·67	4·14	.....	0·10	Genuine	16869
22	1·90	71·75	.....	5·72	24·90	....	" clear; yellow.	
20	3·47	62·51	68·98	6·05	.....	0·15	Genuine	16870
20	1·10	73·21	.....	5·36	24·00	....	" yellowish brown, not clear.	
20	2·04	67·84	68·12	0·27	.....	0·02	Genuine	16871
22	1·00	77·38	....	0·84	21·00	.....	" white; crystals.	
20	2·19	71·98	74·12	2·03	.....	0·02	Genuine	16872
22	.....	74·47	.....	0·10	25·30	.....	" yellow; clear.	
20	4·61	47·40	53·06	5·38	.....	0·10	Adulterated with glucose, and perhaps cane sugar.	16873
22	3·03	51·72	.....	6·55	27·40	.....	Not clear; sediment observed; adulterated with starch glucose.	
20	3·70	66·99	68·41	1·35	.....	0·10	Genuine	16874
22	... .	74·28	.....	4·07	24·10	....	" opaque; dark coloured.	
21	3·56	50·97	53·85	2·74	.....	0·02	Adulterated with glucose, and perhaps cane sugar.	16875
22	. .. .	57·36	.....	0·55	27·50	... ..	Clear; yellow; adulterated with starch glucose.	
21	4·47	63·82	68·24	4·20	.....	0·05	Genuine	16876
22	7·58	70·58	....	2·40	27·20	.....	" crystals; brownish yellow.	
21	3·41	67·56	74·02	6·14	.....	0·20	Genuine.....	16877
22	5·30	71·85	.....	6·17	21·2	.. ..	Genuine; white; crystals.	
21	3·94	45·52	51·25	5·06	.....	0·03	Adulterated with glucose, and perhaps cane sugar.	15483
22	0·0	49·87	.....	6·37	23·7	.....	Clear; yellow, thick, grossly adulterated with starch glucose.	

by Dr. F. X. Valade, official analyst, Ottawa; those on the second line are by Mr. F. W. Babington, and

RESULTS of the Examination of

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Toronto.*			
Nov. 27	16878	2 jars.	50	Robt. Peters & Co., 154 King St., E.	C. E. Sanders, Agerton, Ont	+ 1·2	— 21·5
						— 10·0	— 16·2
" 27	16879	3 "	36	" "	Not known.....	— 16·4	— 21·5
" 27	16880	2 "	20	" "	"	— 10·2	— 16·2
" 27	16881	3 "	30	H. Lindsay, 60 King St., W.	J. Hawley, Church St., Toronto.	— 24·5	— 20·0
" 27	16882	3 "	45	Rossin House Grocery, 139 King St., W.	West Virginia Preserving Co., Wheeling, West Va.	+147·0	+135·2
						+144·6	+143·8
" 27	16883	3 "	30	M. McAuliff, cor. York and Adelaide.	Rutherford & Harrison, Toronto.	— 13·2	— 18·3
" 27	16884	2 "	30	Caldwell & Hodgins, 250 Queen St., W.	W. B. Button, Ringwood, Ont.	— 5·3	— 19·2
" 27	16885	3 "	30	H. Hope, 292 Queen St., W.	H. Ross, Queen St., W.....	— 8·7	— 18·9
" 27	16886	3 "	45	S. Hazlett, 434 Queen St., W.	Moyer, grocer, Spadina Ave.	— 10·4	— 16·5
" 27	16887	2 "	30	J. F. Morrish, 267 Yonge St.	J. Hawley, Church St.....	+ 4 5	—19·8
						+ 6·0	—14·4
" 27	16888	3 "	50	F. S. Roberts, 290 Yonge St.	....	— 8·0	—18·0
" 27	16889	2 "	40	A. F. Barker, 302 Yonge St.	C. E. Sanders, Agerton, Ont.	— 3·5	—19·1
" 28	16890	3 "	45	Mrs. J. K. Oliver, 93 Church St.	....	—17·0	—19·1
" 28	16891	3 "	30	P. Macdonald, 120 Church St.	Graham & McLean, Colborn St.	— 6·4	—19·0
" 28	16892	3 "	45	Kelly Bros., 90 Queen E....	J. F. Switzer, Streetsville, Ont.	—10·0	—17·2
" 28	16893	3 "	30	G. Noble, 185 Wilton Ave..	Moyer, Spadina Ave.....	—14·3	—16·2
" 28	16894	2 "	40	A. Nettleton, 137½ Church St.	S. Jewell, near Toronto...	—15·5	—20·0
28	16895	3 "	30	G. F. Smedley, Wilton Ave.	.....	—13·3	—18·1
" 28	16896	3 "	45	F. Hall, 146 Queen St. E...	....	— 9·7	—27·7
" 28	16897	2 "	40	J. & W. McFarren, cor. Queen & Sherborne.	E. Cliff & Sons, Altona, Ont.	— 9·7	—17·7
" 28	16898	3 "	30	A. E. Varcoe, 182 Queen E.	J. F. Young, Toronto.....	—13·5	—19·8
" 28	16899	2 "	50	W. Forster, Queen & Jarvis	Mr. Hall, farmer, near Toronto.	—12·5	—17·9
" 28	16900	3 "	45	J. Verner, 283 Parliament St.	Moyer, Toronto	—11·9	—20·2

The results which are given opposite the sample numbers were obtained by Dr. W. H. Ellis, Official by Mr. F. W. Babington, Ottawa.

183 Samples of Honey—*Continued.*

Results of Analysis.								
Saccharimeter.		By Fehling Solution.			Water.	Ash.	Analyst's Remarks.	No. of Sample.
Temperature. — Centigrade.	Sucrose by Clerget's formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
19·5	17·07	67·20	82·37	14·41	15·56	0·06	Pollen grains ; honey mixed with cane sugar.	16878
23	4·70	.....	.....	.....	.....	.....	Genuine.	
19·0	3·83	77·05	78·73	1·59	15·68	0·04	"	16879
19·0	4 50	75·60	76·60	0·95	15·18	0·25	"	16880
19·0	18·47	63·45	79·81	15·54	17·08	0·14	Pollen grains ; honey mixed with cane sugar.	16881
18·0	8·83	46 18	48·57	2·27	15·19	0·03	No pollen grains : adulterated by admixture with starch syrup or glucose.	16882
23·	0·0	.....	.....	.....	.....	.....	" "	
18·0	3·81	75·60	75·74	0·13	16·93	0·02	Genuine.....	16883
18·7	10·43	75 10	76·81	1·62	16·15	0.26	Pollen grains ; genuine....	16884
18·5	7·64	72·90	77·67	4·53	14·73	0·06	" " ..	16885
19·5	4·58	76·20	76·81	0·58	15·21	0·14	" " ..	16886
19·7	18·31	64·15	78·95	14·06	16·43	0·11	Pollen grains ; honey mixed with cane sugar.	16887
23	15·45	.....	.....	.....	.....	.....	Probably adulterated with cane sugar.	
20·0	7·54	76·55	77·24	0·65	15·10	0·16	Pollen grains ; genuine.....	16888
20·0	11·76	71·70	77·88	5·87	16·10	0·15	" "	16889
21·0	1·58	75·80	77·03	1·17	17·39	0·02	" "	16890
20·	9·49	68·55	76 81	7·84	16·99	0·03	" "	16891
21·5	13·03	73·90	77·55	3·46	16·28	0·08	" "	16892
21·5	0·69	73·15	75·28	2·02	17·97	0·15	" "	16893
19·5	3·38	75·60	77·88	2·16	16·94	0·03	" "	16894
20·2	3·61	74·15	77·02	2·73	17·55	0·18	" "	16895
20·2	13·58	67·35	77·24	9·39	17·15	0·05	"	16896
20·0	6·01	75·35	76·81	1·38	14 86	0·20	" "	16897
19·0	4·73	73·90	77·24	3·17	15·20	0·03	" "	16898
19·0	4·05	74·15	74·46	0·29	13·70	0·12	" "	16899
19·0	6·23	75·60	78·10	2·37	15·20	0·06	" "	16900

Analyst, Toronto ; unless where a second and lower line of figures is given, in which cases the results are

RESULT of the Examination

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	NAME AND ADDRESS OF Vendor.	Manufacturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Seaforth, Ont.*			
Nov. 21	15699	3 lbs.	60	T. Daley, grocer	S. Stitt, Leadbury P.O.	— 7·2	— 8·1
" 21	15700	3 "	30	Robb Bros., grocers	J. Hinchly, Constance P.O.	— 7·0	— 9·0
				Woodstock, Ont.			
" 23	15701	3 "	30	J. B. Hall, bee-keeper	Vendor (clover honey)	— 7·2	— 8·9
" 23	15702	2 "	20	"	Buckwheat honey	—10·5	—11·5
" 23	15703	3 "	60	"	Pure clover honey.	— 7·0	—10·5
				Cainsville, Ont.			
" 23	15704	3 "	30	J. H. Shaver	Vendor, bee-keeper	— 5·6	— 9·6
" 23	15705	3 "	25	F. J. Davis	"	— 4·0	—10·0
				Brantford.			
. 23	15706	3 "	25	A. L. Vanstone	Mr. Petril near Brantford	— 5·0	— 9·1
				Ingersoll.			
" 24	15707	3 "	30	Dundas & Menhenic	E. G. Bodwell, Salford P.O.	— 4·8	— 9·1
Nov. 24	15708	3 lbs.	30	E. E. Dnndas	O. E. Robinson, Ingersoll	—10·5	—12·5
" 24	15709	"	30	Robinson Bros	E. G. Hollingshead, Cullo-den.	—7·5	—11·0
" 25	15710	"	30	J. Newton, Thamesford	Vendor, bee-keeper	—4·0	—6·9
				London, Ont.			
" 25	15711	"	45	Turville Bros., Dundas St.	W. Fulton, Brewster P.O.	—5·0	—15·9
						—17·2	—23·1
" 25	15712	"	50	Somerville & Co., "	P. Brennan, Wildwood P.O	—5·5	—10·7
				Stratford, Ont.			
" 25	15713	"	25	A. Beattie & Co	J. Worden, St. Paul P.O.	+0·5	—10·7
						—3·3	—17·3
" 25	15714	"	30	E. O. Flaherty	J. Young, near Embro	—5·8	—9·3
				Tilsonburg.			
Dec. 1	15716	2¼ "	20	W. B. Hogart	Mr. Brunson, Glenmore, O.	—8·0	—9·9
" 1	15717	2½ "	25	W. J. Wilkins	R. J. Young, Tilsonburg	—6·8	—9·1
" 1	15718	2¼ "	23	H. C. Buchner	D. McFarlane, Tilsonburg	—7·0	—9·9
				St. Thomas, Ont.			
" 1	15719	3 "	30	H. H. Waddell	Waddell Bros., bee-keepers	—6·0	—9·9
" 1	15720	.....	....	S. Pettit	Vendor, bee-keeper, Belmont P.O.	—5·0	—9·0

The results which are given opp site the sample numbers were obtained by Mr. F. T. Harrison; results are by Mr. F. W. Babington, Ottawa.

183 Samples of Honey—*Continued.*

Results of Analysis.								
Saccharimeter.	By Fehling Solution.						Analyst's Remarks.	No. of Sample.
Temperature. — Centigrade.	Sucrose by Clergets formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.	Water.	Ash.		
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
18·	0·9	68·30	68·77	·44	32·7	·17	Not adulterated ; no foreign substance detected.	15699
18·	2·3	73·19	75·08	2·00	28·2	·10	" " ..	15700
18·	1·9	69·9	71·8	1·8	27·6	·16	" " ..	15701
18·	1·2	72·3	74·0	1·6	30·4	·23	" " ..	15702
18·	3·9	70·38	73·09	2·6	26·8	·26	" " .	15703
18·	4·5	70·8	70·8	None.	27·2	·20	" " ..	15704
18·	6·7	70·74	74·58	3·7	26·2	·15	" " ..	15705
18·	4·6	69·20	70·94	1·52	28·7	·15	" " ..	15706
18·	4·8	69·06	71·74	2·55	23·8	·10	" " ..	15707
18	2·3	72·55	73·98	1·36	30·8	0·39	" " .	15708
18	3·9	70·07	74·78	4·2	27·5	0·03	" " .	15709
18	3·3	71·3	75·58	4·0	25·4	0·10	" " ..	15710
18	13·0	64·9	75·73	10·0	28·2	0·06	Apparently contains a little added sucrose.	15711
20	4·44	.....	.....	.....	.....	....	Genuine.	
18	5·8	71·11	72·24	1·08	24·2	0·08	Not adulterated ; no foreign substance detected.	15712
18	13·0	63·49	73·71	9·71	27·5	0·25	Apparently contains a little added sucrose.	15713
20	10·50	.....	.....	.....	.....	....	Genuine.	
18	3·9	73·24	73·84	0·56	25·06	0·06	Not adulterated ; no foreign substance detected.	15714
18	2·2	70·97	74·50	3·35	29·1	0·20	" " ..	15716
18	3·1	72·10	73·83	1·64	29·7	0·06	" " ..	15717
18	3·2	72·31	72 34	None.	26·5	0·05	" " ..	15718
18	4·4	71·74	72·42	0·64	28·1	0·15	" " ..	15719
18	4·6	69·83	74·93	4·8	24·8	0·15	" " ..	15720

Official Analyst, London, unless where a second and lower line of figures is given in which cases the latter

RESULT of the Examination

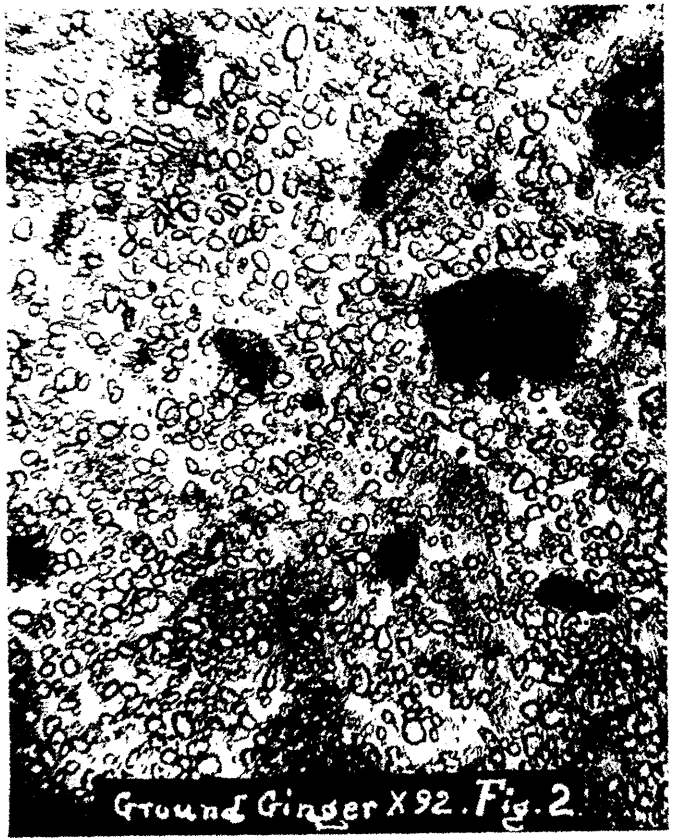
Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufrcturer or Furnisher as given by Vendor.	Observations by Direct reading.	Observations by Invert reading.
1896.			Cts.	*Winnipeg, Man.*			
Dec. 29	14779	3 jars.	45	W. F. Calder	A. Maynard, Winnipeg	-10·9	-19·6
" 29	14780	"	75	J. L. Wells & Co.	"	-11·0	-22·0
						-10·5	-18·2
1897.							
Jan. 4	14781	"	60	W. H. McLean	Bright & Johnson, Winnipeg	-15·5	-20·5
" 4	14782	"	75	E. Hunter & Co.	S. A. Deadman, Brussels, Ont.	-19·7	-23·1
" 5	14783	"	75	Mrs. Cranston		-13·5	-21·3
" 5	14784	"	45	R. Crawford	A. Maynard, Winnipeg	-11·4 -9·0	-22·6 -17·6
" 6	14785	3 lbs.	35	Irish & Cleveland		-8·2 -10·5	-19·8 -16·5
" 6	14786	3 tins.	1 05	E. Galbraith	W. M. Artley, Walter's Falls.	-19·1	-21·7
" 7	14787	"	60	Sutherland & Campbell.		+34·7 +36·6	-24·0 -17·8
" 7	14788	"	30	Thompson, Codville & Co.	W. C. Wells, Phillipston, Ont.	-16·1	-19·5
" 7	14789	"	90	Turner, McKeand & Co.	E. C. Williams, Omemee, Ont.	-13·4	-17·8
" 8	14790	"	75	Bright & Johnson	Vendors	-11·2	-17·2
" 8	14791	3 tins.	75	The A. Macdonald Co.	J. Stewart, Meaford, Ont.	-16·5	-19·6
" 8	14792	3 lbs.	75	M. Cornier	Vendor, "Bee-keeper," La Salle, Man.	-17·9	-19·1
" 11	14793	3 tins.	80	J. Jesselwick	The Macdonald Co., Winnipeg.	-17·0	-20·6
" 11	14794	3 "	75	C. D. Anderson	A. Maynard, Winnipeg.	- 4·9 -10·3	-19·7 -14·5
" 11	14795	3 "	40	K. Mackenzie & Co	W. C. Wells, Phillipston, Ont.	-13·9	-19·6
" 11	14796	3 "	75	J. C. Sproule	A. Maynard, Winnipeg.	-17·9	-19·9
				R. F. Holtermann, Brantford, Ont.	From thistle and basswood.	- 5·0	-15·2
				" "	From clover	-12·3	-14·6
				S. J. Major, Ottawa.		+101·1	+96·8

The results which are given opposite the sample numbers were obtained by Professor E. B. Kenrick latter results are by Mr. F. W. Babington, Ottawa.

183 Samples of Honey—*Concluded.*

Results of Analysis.								
Saccharimeter.		By Fehling Solution.			Water.	Ash.	Analyst's Remarks.	No. of Sample.
Temperature. — Centigrade.	Sucrose by Clergets formula.	Reducing sugars direct.	Reducing sugars after inversion.	Sucrose.				
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
14	6·40	71·62	.....	.....	18·36	.....	Free from added cane or starch sugar.	14779
14	8·09	71·74	.....	.....	16·83	.....	Doubtful, contains an abnormal proportion of cane sugar.	14780
20	5·79	.....	.....	.....	.....	..	" " ..	
14	3·68	74·03	.....	.....	17·33	.....	Free from added cane or starch sugar.	14781
14	2·50	77·51	.....	2·55	16·33	.....	" " ..	14782
14	5·74	71·82	.....	.....	16·70	.....	" " ..	14783
14	8.24	69·65	.....	8·77	16·65	.....	Doubtful, contains an abnormal proportion of cane sugar.	14784
20	6·46	.....	.....	.....	.....	.....		
14	8.53	72·44	.....	8·47	16·51	.....	" " ..	14785
22	4·54	.....	.....	.....	.....	.....		
14	1·91	74·74	.....	2·32	19·74	.....	Free from added cane or starch sugars.	14786
14	43·16	42·48	.....	42·42	14·62	...	Adulterated with cane sugar	14787
22	.....	.....	.....	.....	.....	.....	" " ..	
14	2·51	73·01	.....	.....	16·11	.....	Free from added cane or starch sugars.	14788
14	3·24	74·38	.....	2·98	16·11	.....	" "	14789
14	4·41	71·38	.....	.....	17·23	....	" "	14790
14	2·28	74·60	.....	.....	18 26	.....	" "	14791
14	0·88	71·32	.....	.....	22·42	.....	" "	14792
14	2·65	73·25	.....	.....	18·40	.....	" "	14793
14	10·88	69·23	.....	.....	16·83	.....	Doubtful; contains an abnormal portion of cane sugar.	14794
22	3·18							
14	4·19	78·08	.....	.....	15·52	.....	Free from added cane or starch ugar.	14795
14	1.47	76·36	.....	1·35	16·51	.....	" "	14796
22	7·61	64·75	.....	4·0	20·28	.....	Crystalized.	
22	1·37	69.21	.....	4·43	27·10	.....	"	
22	3·26	52·11	.....	None.	25·80	.....	Clear white.	

Official Analyst, Winnipeg, unless where a second and lower line of figures is given, in which cases the



Ground Ginger X 92. Fig. 2.

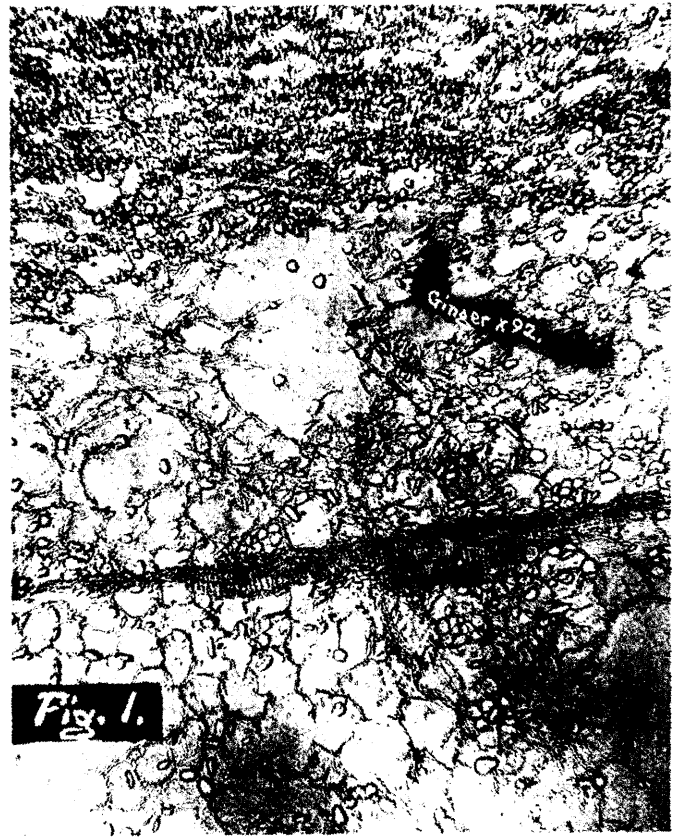


Fig. 1.


Exhausted Ginger
x 225
Fig. 4

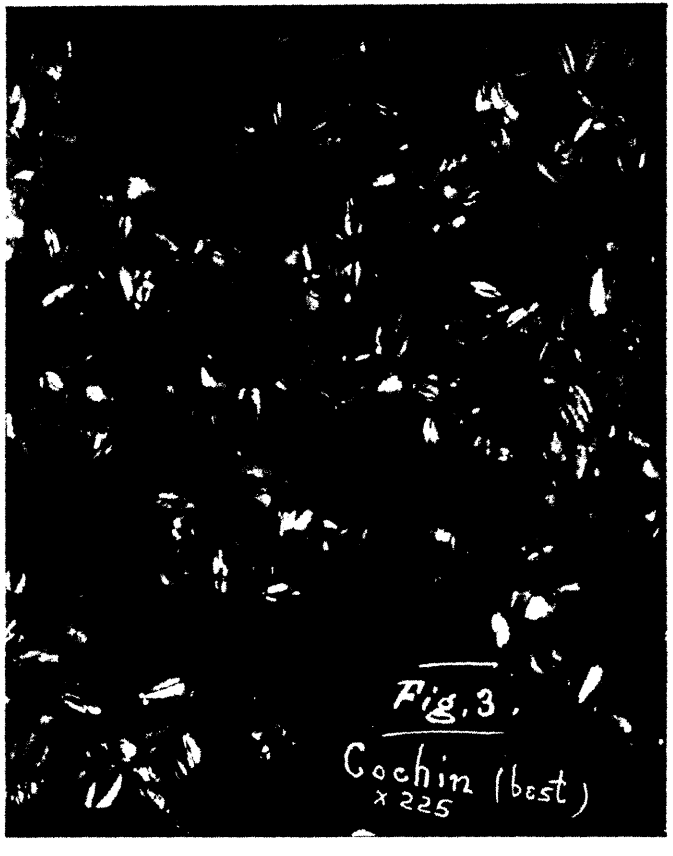


Fig. 3.
Cochin (best)
x 225

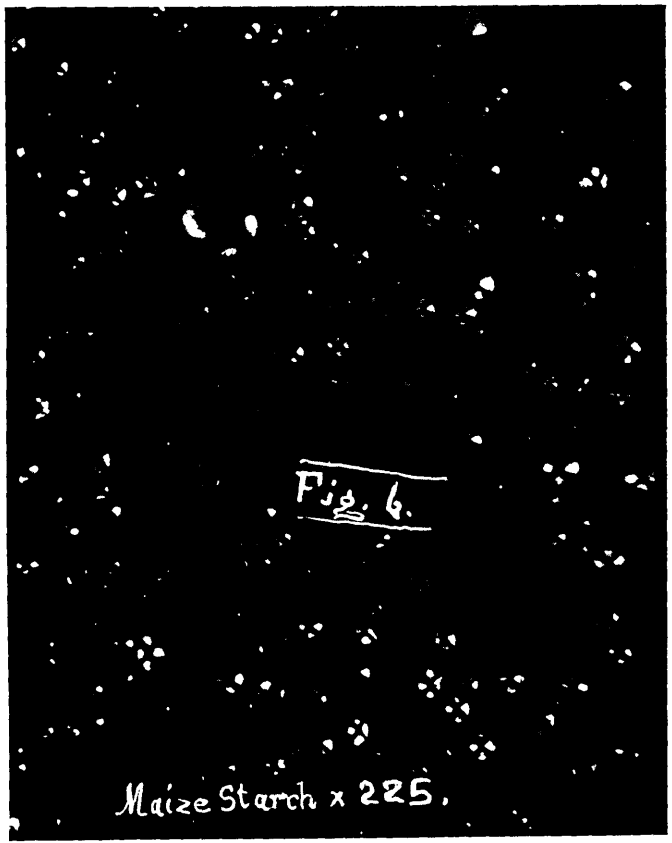


Fig. 6.
Maize Starch x 225.

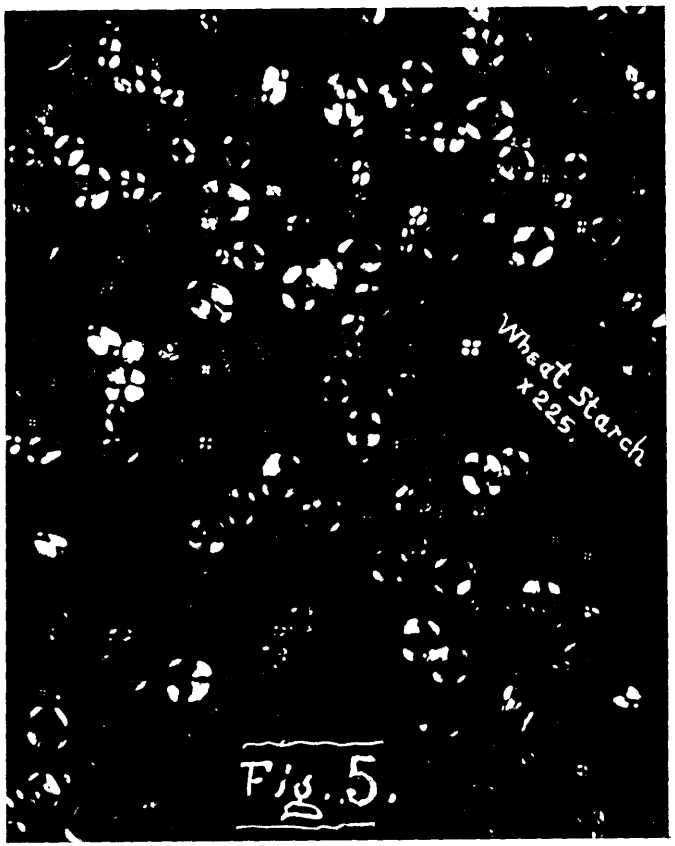

Wheat Starch
x 225.
Fig. 5.

Fig 7.
Potato Starch
x225.

Ginger & Wheat
50¢ each -
(Damar).
Fig 8.

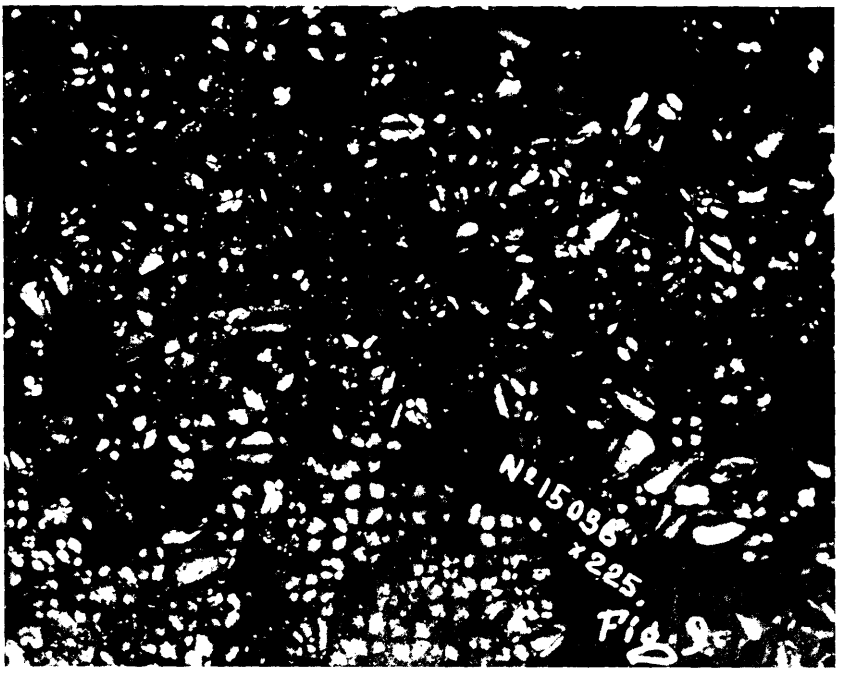


Fig. 9.

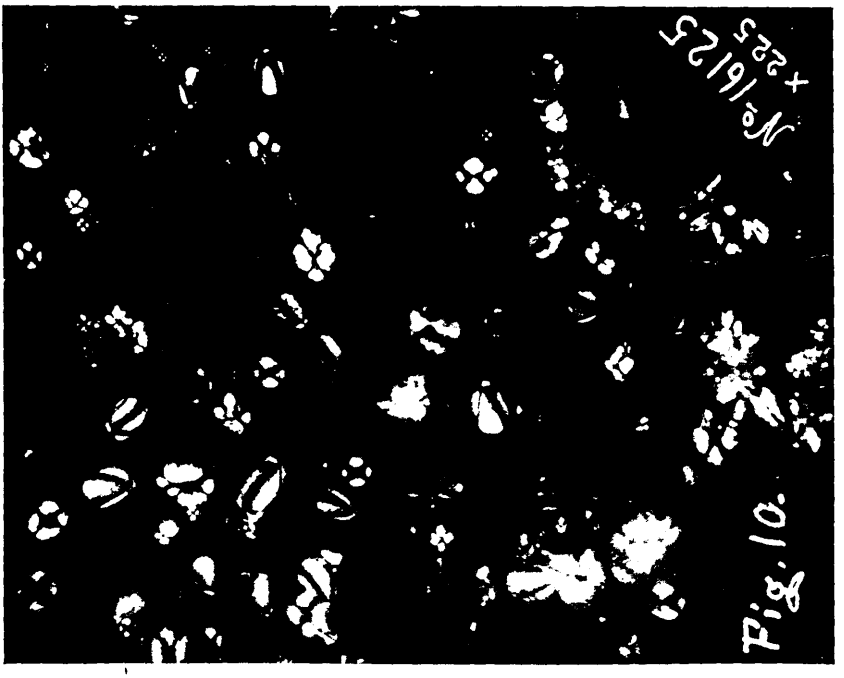


Fig. 10.

No 16126
x225
Fig. 11.

16818.
x225.

APPENDIX L.

BULLETIN, No. 48—GROUND GINGER—1897.

E. MIALL, Esq.,

Commissioner of Inland Revenue.

SIR,—In the months of August and September, 1896, samples of ground ginger to the number of 98 were collected, submitted for analysis to the district analysts, and many of them were also examined in this laboratory. The cases of adulteration among these, 26 in all, were reported to you on the 7th November, 1896, and, of these, 22 flagrant instances were recommended for prosecution. Since then a large amount of microscopic work has been done on these and other samples of ginger by my assistant, Mr. McGill, the results of which appear to me to be well worthy of publication, for the information of the public, the trade and the public analysts. I therefore submit to you the following tables which give full information as regards the origin of the samples and the results of their examination. Subjoined to the tables will be found Mr. McGill's memorandum on the subject, which is illustrated by twelve photographs taken direct from the objects as shown by the microscope and therefore more trustworthy than the usual drawings given in the text books. I beg respectfully to recommend the publication of the whole.

I have the honour to be, sir,

Your obedient servant,

THOMAS MACFARLANE,

Chief Analyst.

RESULTS of the Examination of

Date of Collection.	No. of Sample.	Quantity Purchased.	Cost.	Name and Address of		Moisture or loss on drying at 100° C.	Petroleum Ether.
				Vendor.	Manufacturer or Furnisher, as given by Vendor.		
1896.			$ cts.	*St. John, N.B.*		p. c.	p. c.
Sept. 16..	15032	¾ lb..	0 25	P. A. Scoville, 237 Carmarthin St.	Dearborn & Co., St. John, N.B.	10·20	.....
do 16..	15033	do ..	0 25	A. Foster, 175 St. James St.	Lordly & Co., St. John, N.B ..	10.10	.....
do 17..	15034	do ..	0 27	Alston & McBeath, 239 Charlotte St.	C. & E. McMichael, St. John, N.B.	10·20	....
do 17..	15035	do ..	0 25	W. A. McGee, cor. Charlotte and Princess Sts.	J. Finlay, St. John, N.B	9·15	.....
do 17..	15036	do ..	0 25	W. L. Bonnell, 200 Union St.	F. F. Dalley & Co., Hamilton, Ont.	10·20	.....
do 17..	15037	do ..	0 27	J. S. Armstrong Bros	Pure Gold Co., Toronto.....	10·08	.....
do 18..	15038	do ..	0 24	King & Nobles, 14 Maine St.	Dearborn & Co., St. John, N.B.	11·30	.....
do 18..	15039	do ..	0 20	Lordly & Co., Paradise Row.	Vendors...	10·00	.....
				Sussex, N.B.			
do 21..	15040	do ..	0 15	Huestis & Mills..... ..	Canada Drug Co., St. John, N.B.	10·10	.....
do 21..	15041	do ..	0 21	Mitchell & Dryden.....	Merritt Bros. & Co., St. John, N.B.	9·61	.....
				Moncton, N.B.			
do 22..	15042	do ..	0 24	Gross & Co	Barker & Sons.....	9·60	.....
do 22..	15043	do ..	0 21	E. L. Ayer & Co.....	S. H. & A. S. Ewing, Montreal	9·50	.....
do 22..	15044	do ..	0 30	S. Melanson	Baird & Peters, St. John, N.B.	9·55	.....
				Lévis, Que.			
Aug. 20..	16118	½ lb..	0 15	Geo. Lambert.....	.....	.....	.....
do 20..	16119	do ..	0 15	John Sutcliffe.....	....	.....	.....
				Quebec.			
do 20..	16120	do ..	0 15	G. B. Prevost & Co., 41 St. Peter St.	....	.....	.....
do 20.	16121	do ..	0 25	J. Savard, 35 St. John St.	Pure Gold Co., Toronto	.....	.....
do 20..	16122	do ..	0 15	G. Boivin & Co., 122 St. John St.	.....	.....	.... .
do 20..	16123	do ..	0 15	Dion & Frére, 168 St. John St.	....	.....	.....
do 20..	16124	do ..	0 20	E. H. Pelletier, 171 St. John St.	....	.....	.....
do 20 .	16125	do ..	0 10	Josh. Picard, 32 Anderson St.	.....	.... .	.....
do 20..	16126	do ..	0 15	L. Mercier, 117 St. Paul St.	....	.....	....

98 Samples of Ground Ginger.

Results of Analysis.						Official Analyst's Remarks.	Results of Examination in Inland Revenue Laboratory
Extract by		Ash.					
Alcohol.	Cold Water.	Total.	Soluble.	Insoluble.	Alkalinity of Soluble Ash as K 2 O.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
.....	3·25	6·10	.....	.....	.....	Shows only flour of ginger; pure.	Wheat flour, turmeric and husks, 15 p. c.
.....	4·15	6·05	.....	.....	.....	do do ..	Doubtful; wheat flour, husks and cayenne, 5 p. c. to 10 p. c.
.....	3·65	6·09	.....	.....	.....	No foreign starch; not adulterated.	Doubtful; wheat flour, husks and turmeric, 5 p. c.
.....	3·95	6·10	.....	.....	.....	do do ..	Practically pure.
.....	5·25	3·15	.....	.....	.....	Adulterated with a small amount of turmeric.	Turmeric (abundance) and wheat flour, 20 p. c. to 30 p. c.; challenged.
.....	4·20	4·00	.....	.....	.....	Adulterated with a small amount of wheat flour.	Wheat flour and turmeric, 10 p. c. to 15 p. c.; challenged.
.....	4·40	7·00	.....	.....	.....	No foreign starch; not adulterated.	Pure.
.....	3·95	4·15	.....	.....	.....	Adulterated with a small amount of flour.	Wheat flour, turmeric and husks, 10 p. c.; challenged.
.....	4·05	4·15	.....	.....	.....	do do ..	Practically pure.
.....	5·00	5·65	.....	.....	.....	Shows only ground ginger; not adulterated.	do
.....	3·75	6.14	.....	.....	.....	do do ..	Pure.
.....	4·30	5·75	.....	.....	.....	do do .	Practically pure.
.....	3·75	5.50	.....	.....	.....	do do ..	Pure.
.....	.....	4·42	.....	.....	.....	Shows no admixture with foreign starch, &c.; pure.	Pure.
.....	.....	6·90	.....	.....	.....	do do ..	do
.....	.....	4·16	.....	.....	.....	do do ..	Pure; a little turmeric.
.....	.....	4.38	.....	.....	.....	do do ..	Pure.
.....	.....	5·60	.....	.....	.....	do do ..	Practically pure; a little whea flour.
.....	.....	5·86	.....	.....	.....	Shows an admixture of about 20 p. c. wheat flour; adulterated.	20 p. c. wheat flour, turmeric (buckwheat and cayenne) challenged.
.....	.....	4·44	.....	.....	.....	Shows no admixture with foreign starchs, &c.; unadulterated.	Pure, but fibre in excess.
.....	.....	5·60	.....	.....	.....	Shows an admixture with about 20 p. c. to 25 p. c. wheat flour; adulterated.	Wheat flour, turmeric (buckwheat), 20 p. c. to 30 p. c.; challenged.
.....	.....	2·41	.....	.....	.....	Shows admixture with wheat flour and turmeric, about 50 p. c. to 60 p. c.; adulterated.	Adulterated; 20 p. c. to 30 p. c. wheat flour and turmeric challenged.

RESULTS of the Examination of 98

Date of Collection.	No. of Sample.	Quantity Purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Moisture or loss on drying at 100° C.	Petroleum Ether.
1896.			$ cts.	*Quebec*—Con.		p.c.	p.c.
Aug. 21..	16127	½ lb..	0 20	Fortier & Corriveau			
do 21..	16128	do ..	0 20	E. Turcotte, 74 Defosses St.			
do 21..	16129	do ..	0 20	M. W. Coleman, Bridge St.			
				Lévis, Que.			
do 21..	16130	do ..	0 15	P. E. Begin	Pure Gold Co., Toronto		
do 21..	16131	do ..	0 24	J. Buchanan			
do 21 .	16132	do ..	0 15	G. & E. Couture			
				Montreal.			
do 17..	16101	do ..	0 15	Gouin Frères, St. Catherine St.		10 92	3·36
do 17..	16102	do ..	0 15	J. G. Stafford, 246 St. Antoine St.		10·77	3·58
do 17..	16103	do ..	0 15	M. Dwyer, 114 Fulford St.	Ewing, Heron & Co., Montreal.	9·49	3·92
do 17..	16104	do ..	0 17	O. Renaud, 1231 St. James St.		10·21	2·73
do 17..	16105	do ..	0 15	E. W. Farrell, 1000 St. James St.	Marcotte & Leblanc, Montreal.	9·94	2·21
do 17..	16106	do ..	0 15	J. H. Howard, 319 Roy St.	J. G. Duffy & Co., Montreal	10·58	4·54
do 17..	16107	do ..	0 20	S. Brenner, 318 Roy St.		10·17	2·46
do 17..	16108	do ..	0 20	A. Renaud, 133 Roy St.		10·50	3·46
				Aylmer, P.Q.			
do 26..	16109	do ..	0 15	C. J. Wright		10·75	3·13
do 26..	16110	do ..	0 8	C. Devlin	Dominion Spice Co., Toronto	10·99	3·89
do 26..	16111	do ..	0 20	Mrs. Chabot		9·05	4·53
				Hull, P.Q.			
do 2[illegible]..	16112	do ..	0 18	O. Lebrum		10·78	2·84
do 26..	16113	do ..	0 20	B. Carrière		10·68	2·38

Samples of Ground Ginger—*Continued.*

Results of Analysis.						Official Analyst's Remarks.	Results of Examination in Inland Revenue Laboratory.
Extract by		Ash.					
Alcohol.	Cold Water.	Total.	Soluble.	Insoluble.	Alkalinity of Soluble Ash as K_2O.		
p.c.	p.c.	p.c.	p.c.	p.c.	p.c.		
.....	.....	5·44	.....	.. ..	.....	Shows an admixture with 30 p. c. to 35 p. c. wheat flour, a little turmeric and a dark brown substance like fragments of shells and cayenne; adulterated.	Adulterated; 30 p. c. wheat flour, turmeric and cocoa nut shells (cayenne); challenged.
.....	.....	6·92	.....	.....	.....	Shows no admixture with foreign starches; pure.	Pure.
.....	.. ..	5·34	.....		.....	do do ..	do
..	.....	6·08	.....	.....	.....	Shows an admixture with 10 p. c. to 15 p. c. wheat flour; adulterated.	10 p. c. wheat flour and turmeric; challenged.
.....	.....	4·48	.....	.....	.. ...	Shows an admixture with about 10 p. c. to 15 p. c. rice flour; adulterated.	Practically pure; a little buckwheat.
.....	.....	4·28	.....	.....	.....	Shows no admixture with foreign starches, &c.; pure.	Pure.
.....	.....	6·75	.....	.....	.....	No foreign starch; genuine.....	Wheat flour, 15 p. c. to 20 p. c.
.....	.....	6·85	.....	.....	.	do do	Wheat flour and turmeric, cayenne, 20 p. c.
.....	....	4·20	... .	.....	.....	do do	Wheat flour, turmeric, cayenne, 15 p. c. to 20 p. c.
.. ...	... ..	2·90	.....	...	...	Contains wheat flour and maize; adulterated to the extent of from 15 p. c. to 20 p. c.	Wheat flour, turmeric, cayenne, 10 p. c. to 15 p. c.; challenged.
. ....	....	3·10	.....	. . .	....	Contains maize and wheat flour; adulterated to the extent of from 15 p. c. to 20 p. c.	Wheat flour, turmeric, maize, 10 p. c. to 15 p. c.; challenged.
.... .	... .	5·10	.....	..	...	Genuine.	Genuine.
..	.....	3·20	.....	.....	.. .	Contains maize starch; adulterated to the extent of 10 p. c. to 15 p. c.	Wheat flour and turmeric, 10 p. c. to 15 p. c.; challenged.
.....	... .	4·90	.....	.....	.....	Genuine.	Genuine.
....	.....	4·25	....	.. ...	....	Genuine.....	Practically pure, a little wheat flour, less 5 p. c.
.. . .	. ..	5·35	...	..	.....	do	Genuine.
. ...	....	12·55	.....	.....	... .	Contains wheat starch, mustard husks and maize; adulterated to the extent of 10 p. c. to 15 p. c. of millings and sweepings.	Wheat flour, turmeric and cayenne, 10 p. c. to 15 p. c., Talc or Gypsum, 20 p. c. to 30 p. c.; challenged.
.....	.....	4·50	.....	... .	...	Genuine.....	Genuine.
.....	.....	3·85	. .. .	.....	.....	Probably adulterated with exhausted ginger.	Practically pure.

RESULTS of the Examination of 98

Date of Collection.	No. of Sample.	Quantity Purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher as given by Vendor.	Moisture or loss on drying at 100° C.	Petroleum Ether.
1896.			$ cts.	*Hull, P.Q.*—Con.		p. c.	p. c.
Aug. 26..	16114	½ lb..	0 20	E. Carrière, Maisonneuve.	.....	11·08	3·09
do 28..	16115	do ..	0 20	T. Dudevoir.....	.....	10·72	3·06
do 28..	16116	do ..	0 20	Bois & Pigeon.....	.....	10·93	2·37
do 28..	16117	do ..	0 20	C. Belleron & Bros.....	C. Lacaille & Co., Montreal ...	10·75	2·78
				Ottawa.			
do 19..	16801	do ..	0 18	J. Tweedy, 130 Rochester St.	Bate & Sons, Ottawa.....	11·2	.....
do 19..	16802	do ..	0 15	S. Stitt, 141 Rochester St.	....	10·2	.....
do 19..	16803	do ..	0 15	L. Ellard, 261 Rochester St	S. J. Major, Ottawa.....	10·4	... ..
do 19..	16804	do ..	0 25	W. H. Scripture, Druggist, cor. Theodore & Nicholas	.....	10·6	.... .
do 19..	16805	do ..	0 15	E. Waterston, 141 Nicholas St.	Bate & Sons, Ottawa	11·7	.....
do 19..	16806	do ..	0 25	M. A. Belanger, Druggist, 138 Rideau St.	.....	10·9	.....
do 21..	16807	do ..	0 30	A. E. Brethour, Druggist, Bank St.	Evans & Sons, Montreal. ...	10·9	.....
do 21..	16808	do ..	0 20	John Edgar, Bank St . .	....	11·65	... .
do 21..	16809	do ..	0 25	R. B. W. Robinson, Druggist, Bank St.	Lyman & Sons, Montreal... .	10·7	.....
do 22..	16810	do ..	0 15	J. Templeman, 2 Emily St	Bate & Sons, Ottawa..... ..	11·65	.....
do 22..	16811	do ..	0 20	A. P. Johnston, 370 Concession St.	do do	11·7	.....
do 22..	16812	do ..	0 20	C. G. Culbert, Druggist, Rideau St.	.....	10·2	.....
do 22..	16813	do ..	0 18	H. C. Ellis, cor. Somerset and Concession Sts.	Bate & Sons, Ottawa..... .	11·7	.....
				Toronto.			
Sept. 2..	16814	do ..	0 20	T. W. Dutton, 1498 Queen St. W.	....	11·60	5·62
do 2..	16815	do ..	0 18	T. Bletsoe, 1484 Queen St. W.	....	11·60	5·53
do 2..	16816	do ..	0 20	R. Hickman & Co., 1424 Queen St. W.	A. Piper & Co., Hamilton.....	11·80	5·95
do 2..	16817	do ..	0 25	Murchison & Co., druggists, 1418 Queen St. W.	Lyman, Knox & Co., Toronto..	11·50	6·13
do 2..	16818	do ..	0 18	W. H. Smith, 118 Dundas St.	....	5·80	2·39
do 2..	16819	do ..	0 20	H. G. Horton, 138 Dundas St.	....	11·40	5·92
do 2..	16820	do ..	0 20	D. Barnett, Dundas St...	.....	11·20	5·72

Samples of Ground Ginger—*Continued.*

Results of Analysis.						Official Analyst's Remarks.	Results of Examination in Inland Revenue Laboratory.
Extract by		Ash.					
Alcohol.	Cold Water.	Total.	Soluble.	Insoluble.	Alkalinity of Soluble Ash as K_2O.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
....	.....	4·75	.....	....	.....	Genuine.....	Genuine.
.....	.....	3·60	.....	.....	.....	do	Practically pure, but small amount of wheat flour and turmeric, less 5 p.c.
.....	.....	4 00	.....	.....	....	Adulterated to the extent of 10 p. c. to 15 p. c., foreign ingredients and probably exhausted ginger.	Small amount of wheat flour, turmeric and talc, less 5 p. c.
.....	.. ...	4·90	...	...	.....	Genuine.....	Genuine.
8·1	.....	3·88	.....	.. .	.... .	Genuine but coloured with a little turmeric.	Pure.
7·3	.....	4·10	.....	.....	.....	Very little wheat or turmeric; genuine.	do
8·75	....	5·05	.....	.....	.....	Adulterated with about 10 p. c. of wheat flour and turmeric.	Wheat flour and turmeric, 10 p. c. ; adulterated, challenged
8·7	.....	4·0	.....	....	.....	Wheat flour and turmeric in small quantities ; genuine.	Wheat flour and turmeric 1 p.c. to 5 p. c.
6·1	.....	3 95	.....	.....	....	Very little wheat and turmeric ; genuine.	do do ....
7·75	.....	6·75	.... .	.....	.....	Adulterated with about 10 p. c. of wheat flour and turmeric.	Wheat flour, turmeric cayenne, 10 p. c. to 15 p. c. ; challenged.
6·8	. ..	4·0	.. .	.....	.... ..	Very little wheat and turmeric ; genuine.	Pure.
10·1	....	4·05	. ...	....	...	Very little wheat and turmeric ; genuine.	Practically pure, a little wheat flour and turmeric.
10·85	.....	5·05	.. .	.....	....	Adulterated with about 5 p. c. of wheat and turmeric ginger, not sifted.	Wheat flour, fibre and a foreign fibre ; adulterated.
7·1	.....	4·05	.....	.....	.....	A little wheat and turmeric ; genuine.	Wheat flour and turmeric, 1 p.c. to 5 p. c.
10·3	.....	4·11	.....	.....	... .	do do	Wheat flour and turmeric, 10 p.c.
6·0	.....	3·60	.... .	. . .	.....	do do ...	Wheat flour fibre and a foreign fibre.
10·3	.....	4·0	.. ...	.....	.....	do do	Wheat flour and turmeric, 1 p.c. to 5 p. c.
.....	.....	4·80	.....	....	.....	No foreign starch ; genuine.....	Pure.
.....	.....	5·00	.....	.....	.... .	do do	A little wheat flour.
...	.....	4·80	.....	.....	.....	do do	Pure.
. ....	.....	5·10	.....	.....	.....	do do	do
.....	.. .	2·05	.. ...	.....	.....	Adulterated by admixture with farinaceous matter.	Maize (abundance) ; turmeric and cayenne, 40 p. c. to 50 p. c. ; challenged.
... .	.....	4·95	.....	.. .	....	No foreign starch ; genuine.....	Pure.
.....	....	4·65	.....	.....	.....	do do ...	

RESULTS of the Examination of 98

Date of Collection.	No. of Sample.	Quantity Purchased.	Cost.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher, as given by Vendor.	Moisture or loss on drying at 100° C.	Petroleum Ether.
1896.			$ cts.	*Toronto*—Con.		p. c.	p. c.
Sept. 2..	16821	½ lb..	0 20	A. Hudgson, 154 Dundas St.	Pure Gold Co., Toronto.....	11·60	5·60
do 2..	16822	do ..	0 20	J. McHambly, 192 Dundas St.	Todhunter, Mitchell & Co., Toronto.	11·70	5·56
				Hamilton.			
do 2..	16823	do ..	0 15	A. L. Reeves, jun., King St. W.	W. G. Dunn, Hamilton.....	11·70	5·39
do 2..	16824	do ..	0 20	Mrs. Dixon, King St. W.	J. Turner, Hamilton.....	11·65	5·93
do 2..	16825	do ..	0 25	A. Mitchell, druggist, 82 York St.	W. G. Dunn, Hamilton.	12·00	4·81
do 2..	16826	do ..	0 20	C. Philips, 39 McNab St..	Lumsden Bros., Hamilton.....	11·30	6·04
do 2..	16827	do ..	0 20	E. Hudson, 8 Market Square.	Snow Drift Co., Brantford.....	11·40	3·91
do 2..	16828	do ..	0 18	A. Waddell & Co., James St.	F. F. Dalley & Co., Hamilton..	11 20	4·32
				Clinton, Ont.			
Aug. 18..	15670	do ..	0 20	O. Cooper.....	Snow Drift Co., Brantford.....	11·45	. ....
do 18..	15671	do ..	0 18	J. W. Irwin.....	Phœnix Coffee and Spice Co., Toronto.	12·12	....
				Goderich, Ont.			
do 19.	15672	do ..	0 18	C. H. Nairn.....	G. F. Mather & Son, Toronto..	12·02	.....
do 19..	15673	do ..	0 15	Geo. Price.....	McKee, Smith & Co., Toronto.	12·10	.....
do 19..	15674	do ..	0 15	G. M. Elliott.....	Snow Drift Co., Brantford.....	11·39	. ....
				Exeter, Ont.			
do 20..	15675	do ..	0 20	J. A. Steward....	Gorman & Eckhart, London, Ont.	11·90	.....
do 20..	15676	do ..	0 20	G. G. Johnston.....	A. M. Smith, London, Ont....	11·97	.....
				Ingersoll, Ont.			
do 21..	15677	do ..	0 18	A. J. Dyer.....	Coffee and Spice Co., Hamilton	11·95	.....
do 21..	15678	do ..	0 15	C. A. O'Neill.....	Pure Gold Spice Co., Toronto..	11·66	.....
do 21..	15679	do ..	0 20	J. Gibson & Son.....	Gorman & Eckhart, London, Ont.	12·15	.. ...
				St. Thomas, Ont.			
do 21..	15680	do ..	0 20	Waddell Bros.....	do do ..	11·47	.....
do 21..	15681	do ..	0 20	E. B. Benson.....	Orient Mills Co., Toronto.....	11·70	. .
do 21..	15682	do ..	0 20	Black & McCance.....	Gorman & Eckhart, London, Ont.	11·75	.....

Samples of Ground Ginger—*Continued.*

Results of Analysis.						Official Analyst's Remarks.	Results of Examination in Inland Revenue Laboratory.
Extract by		Ash.					
Alcohol.	Cold Water.	Total.	Soluble.	Insoluble.	Alkalinity of Soluble Ash as K_2O.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
		4·40				No foreign starch; genuine	Pure.
		4·90				do do	do
		4·00				do do	do
		6·10				do do	A little wheat flour; turmeric?
		3·85				do do	Pure.
		4·30				do do	do
		3·02				Adulterated with farinaceous matter.	Maize or rice; turmeric and cayenne, 30 p. c. to 40 p. c.; challenged.
		5·15				No foreign starch; genuine	Maize or rice; turmeric, 20 p. c. to 30 p. c.
		2·28				Adulterated with corn starch	Adulterated; 10 p. c. to 20 p. c. of wheat flour; (maize?); challenged.
		4·10				Pure, though chemical tests give indication of presence of turmeric.	Practically pure; (turmeric?)
		4·44				No foreign substance detected; pure.	Pure.
		3·90				do do	do
		3·09				Adulterated with corn starch	Adulterated; 10 p. c. to 20 p. c. wheat flour; challenged.
		3·65				Shows corn starch and wheat flour; adulterated.	Adulterated; 20 p. c. to 30 p. c. wheat flour; challenged.
		5·59				No foreign substance detected; pure.	Pure.
		3·67				do do	do
		3·85				do do	Pure, but with excess of fibre.
		4·33				Wheat flour and probably a little turmeric; adulterated.	Adulterated; 10 p. c. to 15 p. c. wheat flour and turmeric; challenged.
		4·42				No foreign substance detected; pure.	Pure.
		3·93				do do	do
		4·77				Slightly adulterated with wheat flour.	Doubtful; small amount of wheat flour.

RESULTS of the Examination of 98

Date of Collection.	No. of Sample.	Quantity Purchased.	Cost.	NAME AND ADDRESS OF		Moisture or loss on drying at 100° C.	Petroleum Ether.
				Vendor.	Manufacturer or Furnisher, as given by Vendor.		
1896.			$ cts.	*Winnipeg, Man.*		p. c.	p. c.
Sept. 21..	14755	½ lb..	0 20	A. Elliott & Co.....	Sutherland & Campbell, Winnipeg.	10·67	3·78
do 21..	14756	do ..	0 23	D. A. Ritchie.....	Dyson, Gibson & Co., Winnipeg.	11·22	3·98
do 21..	14757	do ..	0 20	E. Turnbull.....	.....	10·98	4·02
do 23..	14758	1 lb..	0 40	Ferguson Bros.....	Todhunter, Mitchell & Co., Toronto.	10·36	3·52
do 23..	14759	do ..	0 30	J. W. Cockburn.....	.....	12·20	3·81
do 23..	14760	do ..	0 35	F. Keane.....	.....	11·07	3·67
				St. Boniface, Man.			
do 23..	14761	do ..	0 35	W. German.....	Williams & Hinton, Winnipeg.	12·31	3·62
do 23..	14762	do ..	0 50	E. Guilbeault.....	Dyson, Gibson & Co., Winnipeg.	11·61	3·57
do 23..	14763	do ..	0 35	T. Pelletier.....	Williams & Hinton, Winnipeg.	12·45	3·23
				Winnipeg, Man.			
do 24..	14764	do ..	0 40	A. Macdonald & Co.....	Dyson, Gibson & Co., Winnipeg.	12·20	3·50
do 24..	14765	do ..	0 40	G. Augusttad.....	Williams & Hinton, Winnipeg.	11·75	3·03
do 24..	14766	do ..	0 30	A. Hollanguist.....	Dyson, Gibson & Co., Winnipeg.	12·32	3·54

Samples of Ground Ginger—*Concluded.*

Results of Analysis.						Official Analysts Remarks.	Results of Examination in Inland Revenue Laboratory.
Extract by		Ash.					
Alcohol.	Cold Water.	Total.	Soluble.	Insoluble.	Alkalinity of Soluble Ash as K 2 O.		
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
...	14·53	6·87	3·06	3·81	0·124	Genuine	Pure.
.....	14·04	6·99	3·01	3·98	0·133	do	do
.....	15·48	7·14	3·15	3·99	0·133	do	do
.....	10·56	4·24	2·28	1·96	0·103	Doubtful	do
...	13·00	4·82	2·01	2·81	0·207	do	Wheat flour, 10 p. c. to 15 p. c.
.. ...	14·30	6·57	3·02	3·55	0·120	Genuine	Genuine.
.....	12·45	4·43	2·43	2·00	0·051	Doubtful	Turmeric and wheat flour?
.....	14·80	7·08	3·17	3·91	0·150	Genuine	Pure.
.....	9·82	3·35	1·73	1·62	0·041	Apparently contains wheat or other foreign starch; adulterated.	Wheat flour, 20 p. c. to 30 p. c.; challenged.
.....	14·52	6·73	3·07	3·66	0·124	Genuine	Practically pure; a little wheat flour.
.....	13·32	4·83	2·03	2·80	0·197	Doubtful	Wheat flour (turmeric?) 10 p. c. to 15 p. c.
.....	12·03	5·16	1·74	3·42	0·904	Apparently contains wheat or other foreign starch; adulterated.	Wheat flour and turmeric, 20 p. c. to 30 p. c.; challenged.

MEMORANDUM ON PURE AND COMMERCIAL SAMPLES OF GROUND GINGER.

By A. McGILL.

Ginger is the underground stem (rhizome) of *Zinziber officinale*, a plant which is native to various parts of Asia, and which is extensively cultivated in the tropical regions of Asia, Africa and America. The best known and highest priced ginger comes from Jamaica.

The rhizomes are dug when about a year old and are prepared for the market either by simply washing and drying (black ginger) or by scraping (white ginger).

The coarser grades of ginger are often "limed," *i.e.*, coated with carbonate or sulphate of lime, to improve the appearance. Sometimes bleaching by chloride of lime is resorted to.

The histological components of ginger are those of rhizomes in general. The principal are as follows :—

1. An epidermis of large, angular, flattened cells, firmly cohering into a membrane, having a brownish or yellowish colour. The epidermis is, of course, absent in scraped ginger.

2. Ordinary cellular tissue (parenchyma) forming the main portion of the rhizome.

3. Cell contents, which consist of :

(*a.*) Starch granules. The starch makes up more than half the weight of the rhizome and is the chief portion of ground ginger. The granules have a resemblance to certain species of arrowroot starch. They are irregularly oval and average about 25 mkm. in greater diameter, varying from 10 to 30 mkm. The hilum is very obscure and often impossible to make out ; the same is true of the concentric rings of growth. With polarized light very distinct markings are seen, resembling those obtained with potato starch, and with a plate of selenite, a play of colours.

(*b.*) Yellow, pigment granules. These are indistinguishable from the similar pigment masses of turmeric.

(*c.*) Oil globules.

(*d.*) Small crystals (raphides) probably lime salts.

4. Woody bundles, containing dotted ducts.

The only one of the above elements which is sufficiently distinctive to be of importance to the analyst is the starch, and this is best seen with a power of about 200 diameters and the use of polarized light. The unsymmetrical character of the cross serves to distinguish ginger starch from wheat, which is the commonest adulterant. Wheat starch varies in size through much greater limits than ginger, but the average size is not so different from that of ginger as to make an examination with plain light of very great value. From potato and arrowroot starches, which give a cross very like that given by ginger, the size of the granules is a sufficient distinction. The hilum and concentric rings are also much less distinct in ginger than in potato or arrowroot.

The chemical composition of ginger has been worked out very fully. In the subjoined table I have collated the results published to date. An examination of these results shows that no single component of ginger is sufficiently constant in amount to make the identification of a sample as genuine possibl by its means.

A SUMMARY of recorded Analytical Work on Genuine Ginger.

		Water.	Total ash.	Water soluble ash.	Water insoluble ash.	Acid insoluble ash. (sand.)	Volatile oil.	Fixed oil and resin.	Total oils, cal. on the dry.	Nitrogen.	Albuminoids.	Albuminoids, calculat'd on dry substance.	Crude fibre.	Starch.	Carbohydrates	Water extractive.	Alcohol extractive.	Mucilage.	Resin.	Alkalinity of sol. ash, as K_2O	Cold water extractive.	Potash, determined as chloroplatinate.
		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.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.
Seven samples—W. C. Young, "The Analyst," 1884, p. 214	Max.	20·50	8·00	4·18	5·82	....	....	....	....	....	....	....	9·00	....	....	55·7	15·7	41·1	4·50	....	....	....
	Min.	10·20	3·40	1·80	1·22	....	....	....	....	....	....	....	1·70	....	....	24·8	4·1	19·4	0·25	....	....	....
	Mean	15·20	5·01	2·55	2·46	....	....	....	....	....	....	....	4·71	....	....	40·5	8·6	25·8	2·05	....	....	....
Six samples, whole root—C. Richardson, 1887	Max.	11·00	7·02	....	....	....	2·54	4·58	7·58	1·74	10·85	12·12	7·65	53·33	74·09	....	....	....	....	....	....	....
	Min.	9·10	3·39	....	....	....	0·96	2·29	4·46	0·84	5·25	5·78	1·70	46·16	62·33	....	....	....	....	....	....	....
	Mean	9·95	4·56	....	....	....	1·92	3·30	6·30	1·27	7·96	8·86	4·46	49·90	67·85	....	....	....	....	....	....	....
Eighteen samples—König, Bd. I., 743	Mean	12·08	4·81	....	....	....	1·70	3·44	5·84	....	7·12	8·11	4·36	....	66·49	....	....	....	....	....	....	....
Four samples—F. W. Babington, 1896	Max.	9·60	4·40	2·85	1·60	0·30	....	....	....	....	....	....	....	....	....	....	....	....	....	1·43	15·2	....
	Min.	8·75	3·40	1·95	0·80	0·10	....	....	....	....	....	....	....	....	....	....	....	....	....	0·57	11·2	....
	Mean	9·23	3·74	2·45	1·29	0·21	....	....	....	....	....	....	....	....	....	....	....	....	....	0·85	13·3	....
Eight samples—C. G. Moor, Analyst, xix, 219	Max.	....	7·00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Min.	....	2·98	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mean	....	4·55	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
One hundred and four samples—Collated by A. H. Allan	Max.	....	10·65	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Min.	....	2·48	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	Mean	....	4·46	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Fifty-eight samples—W. F. K. Stock	Max.	....	10·86	3·60	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1·80
	Min.	....	2·90	1·70	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0·80

The characteristic pungency of ginger is capable of being extracted by prolonged treatment with cold water, by very dilute spirit, or by boiling water. Ginger which has been treated by one or other of the methods named is dried and sold to the spice men as exhausted ginger, and there is reason to believe that most of it is used as an adulterant of ground ginger. The extract obtained has a value to the manufacturers of ginger beer, ginger essence, etc., while the exhausted residue is little better than woody fibre and starch. Unless, however, the extraction has been made by prolonged boiling, the microscopic appearance of the starch is not appreciably altered, and the discrimination between genuine ginger and exhausted ginger must be made by chemical methods. The determinations which have greatest value for this purpose are undoubtedly the total and soluble ash, and the cold water extract. It will be seen, however, from the foregoing table, that the total ash in genuine ginger may vary between 10·86 and 2·48 per cent, while the soluble ash varies from 4·18 to 1·70 per cent. The cold water extractive seems a more constant number, but a great deal more work is needed in relation to this determination before its value as an aid to the analyst can certainly be known.

The adulterations of ginger, other than exhausted ginger, are best detected and estimated with the aid of the microscope. The chief of these are starches (wheat flour, etc.) and turmeric and cayenne, the former to restore the yellow colour which is reduced in intensity by starch admixture, the latter to give necessary pungency. The natural pungency is necessarily lessened by addition of starch, and may be further reduced by addition of exhausted ginger. To assist in the employment of the microscope, and to demonstrate the unequivocal nature of its testimony, the following plates are appended. They are all made by photography direct from the objects themselves. I have found that a magnification of about 200 diameters is the best for bringing out the characteristic features of ginger and wheat starches, either with plain or with polarized light.

Fig. 1. A section of ginger root (rhizome) magnified 92 diameters; seen by plain light. The cell walls with cell contents (starch), and a large dotted duct and woody bundle, are the chief features.

Fig. 2. Ground ginger, magnified same as above. Shreds of cellular tissue and fibro-vascular tissue are seen, but the main feature is starch granules. These appear somewhat larger than in Fig. 1, through being less sharply focussed.

Fig. 3. A sample of ground Cochin ginger, magnified 225 diameters, and seen by polarized light. The unsymmetrical markings on the starch granules are characteristic for a group of starches, to which group the starches commonly used in adulterating ginger do not belong.

Fig. 4. A sample of Jamaica ginger seen as in Fig. 3. This sample has been treated by alcohol, and the increased brilliancy of the markings is partly due to the removal of resin.

Fig. 5. Wheat starch, magnified 225. Seen by polarized light. The symmetrical cross and the extreme variation in size of the granules are noteworthy features.

Fig. 6. Maize starch, magnified 225; polarized light. The polygonal outline (best seen by plain light) and the greater uniformity of size, with other features, distinguish this starch from wheat. The symmetrical cross distinguishes from ginger. One foreign granule is in the field.

Fig. 7. Potato starch, magnified 225; polarized light. The cross is very like that of ginger starch, but the greater size of the granules is distinctive. Also the concentric rings and evident hilum, as seen by plain light.

Fig. 8. A mixture of ginger and wheat starches in equal proportions, seen by polarized light and magnified 225 diameters. Although not focussed very sharply, it is not difficult to identify the species of most of the granules.

The appearance of this field suggests the correct proportion of admixture; but it is not usual to decide this matter by the examination of a single field. The mean of at least five fields is taken.

Figs. 9, 10 and 11. Commercial ginger, adulterated with wheat flour.

Fig. 12. Commercial ginger, containing about 40 to 50 per cent maize starch.

APPENDIX M.

BULLETIN NO. 49—FERTILIZERS AS SOLD, 1897.

E. MIALL, Esq.,
Commissioner of Inland Revenue.

SIR,—My last report to you regarding Fertilizers is dated 11th March, 1897, and contains the analysis of the standard samples which were sent in to the department by manufacturers and vendors as representing the goods which they proposed to offer for sale in the Dominion. This report has since been published as Bulletin No. 46, and is titled "Fertilizers—1897." The Act respecting Agricultural Fertilizers requires that at least once in every year samples of the fertilizers offered for sale shall be collected and analysed, and the results of such examination published. Accordingly, and in compliance with your instructions to that effect, the collection was made in the month of April last, the number collected being as follows:—

In the district of Nova Scotia	10	samples.
" New Brunswick	8	"
" Quebec	10	"
" Montreal	11	"
" Kingston	10	"
" Toronto	11	"
" Windsor	9	"
Total	69	"

These samples were submitted to the official analysts, and the results of their analysis are stated in the subjoined tables in such a manner as to enable them to be compared with the manufacturers' guarantee and with the figures obtained in analysing the standard samples above referred to. Following the name and description of each fertilizer there will be found in three separate lines: (1) the contents guaranteed by the manufacturer, (2) the percentage of fertilizing ingredients contained in the samples collected, and (3) the same percentages as contained in the standard sample submitted to the department by the manufacturer or vendor. In cases where no such sample has been submitted, and nevertheless, in contravention of the provisions of the Fertilizers Act, the fertilizer has been offered for sale, the first and third lines will of course show no figures. Of the 69 samples described in this bulletin 14 are to be regarded as unregistered, no standard sample of the various brands which they represent having been sent in to the department previous to the 31st January, 1897. On the 7th June last I took occasion to call your attention to this illegal sale of fertilizers, and to recommend the institution of legal proceedings against the offenders. Particulars are also given in the tables as regards the samples which have been challenged by the district analysts, the analysis of which show deficiencies in their fertilizing constituents. In two such cases prosecutions have also been recommended.

I have appended to the tables certain "Notes on Fertilizers" which I think have been found useful in former bulletins, and to which it is desired to give as wide a circulation as possible. I respectfully recommend them as well as this report for publication.

I have the honour to be, sir,

Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

6th July, 1897.

RESULTS of the Examination of 69 Samples

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.	Results: Nitrogen. Total including that of Nitric Acid or Ammonia, if present	Results: Nitrogen. Total calculated as Ammonia.
1897.		*Halifax, N.S.*			p. c.	p. c.
April 14	16517	E. H. Oland	Provincial Chemical Fertilizer Co., St. John, N.B.	Victor Guano		
				Guaranteed	2·51	3·05
				Found	1·71	2·08
				Standard		
do 14	16518	Saunders & McLean	Vendors would give	no information		
				Guaranteed		
				Found		
				Standard		
do 14	16519	E. M. Walker, Dartmouth.	Pacific Guano Co., Boston, Mass.	Soluble Pacific Guano		
				Guaranteed		
				Found		
				Standard		
do 14	16520	Jack & Bell, Halifax	Vendors	Potato Phosphate		
				Guaranteed		3·72 to 4·24
				Found	3·58	4·35
				Standard	2·75	3·34
do 16	16521	S. Archibald, Truro, N.S.	Vendor	Ground Bone		
				Guaranteed		4·50 to 5
				Found	4·13	5·02
				Standard	4·08	4·95
do 16	16522	J. W. Frazer	do	Ground Bone		
				Guaranteed		
				Found	4·13	5·02
				Standard		
do 21	16523	The Farmers' and Citizens' Co-operative Co., Yarmouth, N.S.	W. P. Churchill, Yarmouth, N.S.	Ground Bone		
				Guaranteed		
				Found	4·03	4·90
				Standard	3·62	4·39
do 21	16524	De Wolfe & Lamont, Kentville, N.S.	Nova Scotia Fertilizer Co., Halifax, N.S.	Bone Meal		
				Guaranteed		4·53
				Found	3·87	4·70
				Standard	3·95	4·80
do 21	16525	Pidgeon Fertilizer Co., Windsor, N.S.	Vendors	Intense Brand		
				Guaranteed		
				Found		
				Standard		
do 21	15126	Pidgeon Fertilizer Co., Windsor, N.S.	Vendors	Eureka Phosphate		
				Guaranteed		
				Found		
				Standard		
		St. John, N.B.				
do 5	15127	Wallace & Frazer, 90 Germain St.	Chemical Works late H. & E. Albert, London, Eng.	Thomas' Phosphate		
				Guaranteed		
				Found		
				Standard		Trace
do 5	15128	D. J. Seeley & Son, Walker's Wharf.	Bowker Fertilizer Co., Boston, Mass.	Bowker's Square Brand		
				Guaranteed		2 to 3
				Found	1·76	2·13
				Standard	2·27	2·76
do 5	15129	P. Nase & Son, 1 Main St., North End.	Provincial Chemical Fertilizer Co., St. John, N.B.	Special Potato Phosphate.		
				Guaranteed	4·00	4·86
				Found	0·83	1·01
				Standard		

of Fertilizers as sold in 1897.

OF ANALYSIS.									
Phosphoric Acid.									
Soluble in Water	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.	Relative value per ton of 2,000 lbs.	No. of Sample.	Official Analyst's Remarks.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	.....	.....	.....	.....	.....	16517	
7·13	.....	8·25	15·38	.....	1·52	.....	24 41		
0·51	4·48	4·29	9·28	4·99	1·82	15·32	15 84	.....	Deficient in phosphoric acid.
.....	.....	.....	.....	.....	.....	.....	.....	16518	Not guaranteed in Bulletin 46.
.....	.....	.....	.....	.....	.....	.....	.....		
Trace.	.....	.....	1·48	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	16519	do do
.....	.....	.....	.....	.....	.....	.....	.....		
5·76	.....	.....	12·06	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	16520	
.....	.....	.....	7·85 to 9·25	.....	4·70 to 5·21	.....	.....		
3·07	1·28	4·16	8·51	4·35	5·66	5·64	23 78		
2·23	2·18	4·38	8·79	4·41	4·00	10·50	20 26		
.....	.....	.....	.....	.....	.....	.....	.....	16521	
.....	.....	.....	22 to 23	.....	Traces.	.....	.....		
0·32	2·43	19·96	22·71	22·71	.....	8·38	32 92		
0·80	11·99	8·64	21·43	21·43	.....	8·30	33 40		
.....	.....	.....	.....	.....	.....	.....	.....	16522	do do
.....	.....	.....	.....	.....	.....	.....	.....		
0·64	4·16	15·99	20·79	20·79	Traces.	7·52	31 25		
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	16523	
.....	.....	.....	.....	.....	.....	.....	.....		
0·64	2·63	20·15	23·42	23·42	Traces.	15·14	33 48		
0·60	3·56	16·63	20·79	20·79	Trace.	8·54	29 96		
.....	.....	.....	.....	.....	.....	.....	.....	16524	
.....	.....	.....	22·66	.....	.....	.....	.....		
0·51	3·33	20·79	24·63	24·63	Traces.	8·78	34 35		
....	6·11	17·11	23·34	23·34	.....	5·8	33 31		
.....	.....	.....	.....	.....	.....	.....	.....	16525	do do
.....	.....	.....	.....	.....	.....	.....	.....		
Trace.	.....	.....	7·35	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	15126	do do
.....	.....	.....	.....	.....	.....	.....	.....		
Trace.	.....	.....	8·83	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	15127	Genuine.
.....	.....	.....	18·57	.....	.....	.....	.....		
Trace.	6·59	11·12	17·71	5·59	.....	0·38	18 37		
Trace.	6·46	9·47	15·93	6·46	.....	0·10	16 58		
.....	.....	.....	.....	.....	.....	.....	.....	15128	do
.....	.....	.....	12 to 14	6 to 8	2 to 3	.....	.....		
1·48	2·39	7·41	11·28	3·87	2·35	6·45	18 57		
3·84	4·96	2·72	11·52	8·80	2·80	9·55	21 18		
.....	.....	.....	.....	.....	.....	.....	.....	15129	Adulterated.
8·05	.....	8·49	16·54	8·05	4·20	.....	32 16		
3·20	1·11	3·45	7·76	4·31	8·31	10·85	18 89		
.....	.....	.....	.....	.....	.....	.....	.....		

RESULTS of the Examination of 69 Samples

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.	RESULTS Nitrogen. Total including that of Nitric Acid or Ammonia, if present	RESULTS Nitrogen. Total calculated as Ammonia.
1897.		*St. John, N.B.*—Con.			p. c.	p. c.
April 5	15130	J. Horncastle & Co., 20 Main St.	Cumberland Bone Phosphate Co., Boston, Mass.	Cumberland's Seeding Down.		
				Guaranteed		
				Found	1·03	1·25
				Standard		
do 6	15131	J. McMulkin, Robertson's Wharf.	E. Frank Coe, New York.	Coe's Grass and Grain		
				Guaranteed	80to1·60	1 to 2
				Found	1·23	1·50
		Sussex, N.B.		Standard	1·04	1·26
do 6	15132	Humphrey & Teakles	Nova Scotia Fertilizer Co., Halifax, N.S.	Ceres Superphosphate		
				Guaranteed		2 to 2·68
				Found	2·07	2·51
				Standard	2·55	3·1
do 6	15133	Huestis & Mills	Soluble Pacific Guano Co., Boston, Mass.	Soluble Pacific Guano		
				Guaranteed		
				Found	2·16	2·62
				Standard		
do 6	15134	W. B. McKay & Co	Archibald & Sons, Truro, N.S.	Archibald's General Fertilizer.		
				Guaranteed		3 to 3·50
				Found	1·43	1·74
		Sherbrooke, P.Q.		Standard	1·86	2·26
April 7	16290	A. H. Foss	Williams & Clark, Boston, Mass.	Royal Bone Phosphate		
				Guaranteed		
				Found	1·18	1·44
				Standard		
do 7	16291	do	do	Americus Corn Fertilizer.		
				Guaranteed		
				Found	2·21	2·68
				Standard		
do 7	16292	do	do	Americus Potato Fertilizer.		
				Guaranteed		
				Found	1·96	2·38
				Standard		
do 7	16293	W. N. Irwin	Bowker Fertilizer Co.	Bone and Potash		
				Guaranteed		2 to 3
				Found	1·90	2·31
				Standard	2·27	2·76
do 7	16294	do	do	Stockbridge Manure		
				Guaranteed	3 to 4	4 to 5
				Found	2·72	3·31
		Quebec.		Standard	3·06	3·71
do 13	16295	P. T. Lezare, 273 St. Paul Street.	Nichols Chemical Co., Capelton, Que.	Bone Phosphate		
				Guaranteed		
				Found	·50	0·61
				Standard	0·51	0·62
do 13	16296	do	do	Capelton Superphosphate.		
				Guaranteed		
				Found	·45	0 4
				Standard	0·21	0·92

of Fertilizers as sold in 1897—*Continued.*

OF ANALYSIS.									
Phosphoric Acid.							Relative value per ton of 2,000 lbs.	No. of Sample.	Official Analyst's Remarks.
Soluble in Water a	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ c.		
.....	.....	.....	.....	.....	.....	.....	.....	15130	Not guaranteed in Bulletin 46: deficient in phosphoric acid.
3·15	3·45	2·18	8·73	6·55	2·00	14·64	14 47		
.....	.....	.....	.....	.....	.....	.....	.....		
7 to 8	2 to 3	1 to 2	10 to 12	9 to 11	1·35 to 2	.....	17 88	15131	Genuine.
4·04	3·07	4·99	12·10	7·11	2·32	6·35	18 78		
8·00	2·87	2·43	13·30	10 87	1·22	13·18	18 97		
.....	.....	.....	.....	.....	.....	.....	.....	15132	do
.....	.....	.....	9·25to10·70	.....	2·14 to 2·44	.....	.....		
3·31	2·08	2·69	8·08	5·39	2·79	8·90	17 01		
2·72	1·89	6·10	10·71	4·61	2·14	7·3	19 81		
.....	.....	.....	.....	.....	.....	.....	.....	15133	Not guaranteed in Bulletin 46; genuine.
4·33	3·10	.....	7·43	7·43	3·49	13·40	17 72		
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	15134	Adulterated.
.....	.....	.....	6 to 7	.....	3 to 3·50	.....	.....		
2·51	1.09	0·52	4·12	3·60	2·32	15 63	10 81		
1·28	0·80	2·24	4·32	2·08	3·19	9·18	12 85		
.....	.....	.....	.....	.....	.....	.....	.....	16290	
.....	.....	.....	.....	.....	.....	.....	.....		
7·04	1·39	2·87	11·30	8·43	10·38	14·60	26 56	.....	Not mentioned in Bulletin 46.
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	..	16291	
.....	.....	.....	.....	.....	.....	.....	.....		
7·83	0·83	3·83	12·49	8·66	9·27	14·45	29 17	.....	do do
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	16292	
.....	.....	.....	.....	.....	.....	.....	.....		
7·98	0·66	4·47	13·11	8·64	5·35	11·83	25 11	.....	do do
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	....	16293	
.....	.....	.....	12 to 14	6 to 8	2 to 3	.....	.....		
2·08	2·40	9·91	14·39	4·48	3·57	.....	23 35	.....	Rather below claim in available phosphoric acid, but above claim in other constituents.
3·84	4·96	2·72	11·52	8·80	2·80	9·55	21 18		
.....	.....	..	.....	.....	.....	.....	.....	16294	
.....	.....	.....	10 to 12	8 to 10	6 to 7	.....	.....		
6·50	0·86	5·27	12·63	7·36	6·70	7·55	27 58		
4·64	2·25	5·59	12·48	6·89	6·12	10·07	27 50		
.....	.....	.....	.....	.....	.....	.....	.....	16295	
.....	.....	.....	.....	15 to 17	.....	.....	.....		
14·04	0·35	0·96	15·35	14·39	0·39	18·48	19 81	.....	Good
1·41	13·78	0·32	15·51	15·19	0·81	22·54	19 54		
.....	.....	.....	.....	.....	.....	.....	..	16296	
.....	.....	.....	.....	8 to 10	.....	.....	.....		
7·19	0·81	3·51	11·51	8·00	0·55	15·90	14 69	.....	do
4·92	3·01	3·07	11·00	7·93	0·13	14·95	12 97		

RESULTS of the Examination of 69 Samples

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.	RESULTS Nitrogen. Total, including that of Nitric Acid or Ammonia, if present	RESULTS Nitrogen. Total calculated as Ammonia.
1897.		*Quebec*—Con.			p. c.	p. c.
April 13	16297	P. T. Lezare, 273 St. Paul Street.	Nichols Chemical Co., Capelton, Que	Reliance		
				Guaranteed		2 to 3
				Found	1·79	2 17
				Standard	2·96	3·59
do 13	16298	do	do	Royal Canadian		
				Guaranteed		4 to 5
				Found	3·28	3·98
				Standard	4·13	5·02
do 13	16299	do	do	Victor		
				Guaranteed		2 to 3
				Found	1·84	2·24
		Montreal.		Standard	4·07	4·94
do 5	16279	Montreal Union Abbatoir Co.	Vendors	Tankage Fertilizer		
				Guaranteed		
				Found	6·51	7·90
				Standard	7·09	8·61
do 5	16280	do	do	"Blood Fertilizer"		
				Guaranteed		
				Found	10·72	13·02
				Standard		
do 5	16281	Laing Packing and Provision Co., Farnham, P.Q.	do	Dry Tankage		
				Guaranteed	4·12	5·00
				Found	5·60	6·80
		Granby, P.Q.		Standard	6·89	8·37
do 6	16282	J. W. Seal	Pacific Guano Co., Boston Mass.	Pacific Guano		
				Guaranteed		
				Found	2·24	2·72
				Standard		
do 6	16283	Bradford Bros	do	Soluble Pacific Guano		
				Guaranteed		
				Found	2·56	3·11
				Standard		
do 6	16284	do	do	Special		
				Guaranteed		
				Found	2·59	3·15
		Waterloo, P.Q.		Standard		
do 7	16285	Robinson & Tenny	Standard Fertr. Co., Smith's Falls.	Standard Fertilizer		
				Guaranteed	2·47	2½ to 3½
				Found	2·29	2·79
				Standard	2·49	3·03
do 7	16286	do	do	Special Fertilizer		
				Guaranteed	3·29	½
				Found	4·14	5·03
				Standard	4·53	5·50
do 7	16287	Allen, Taylor & Co.	Pacific Guano Co., Boston.	Special Pacific Guano		
				Guaranteed		
				Found	2·38	2·89
				Standard		
do 7	16288	do	do	Soluble Pacific Guano		
				Guaranteed		
				Found	2·54	3·08
				Standard		

of Fertilizers as Sold in 1897—*Continued.*

OF ANALYSIS.									
Phosphoric Acid.							Relative value per ton of 2,000 lbs.	No. of Sample.	Official Analyst's Remarks.
Soluble in Water.	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ c.		
.. ...	..	.....	.....	.....	.....	...	...	16297	
.....	.....	.....	.....	6 to 7	2 to 3	...	.....		
4·95	2·57	3·19	10·71	7·52	2·47	13·08	18 85	....	Good.
3·84	2·11	1·41	7·36	5·95	4·71	12·06	20 99		
....	.....	... ...	.....	.....	.....	.....	..	16298	
.....	.....	.....	.....	9 to 11	5 to 6	....	....		
9·27	0·65	3·35	13·27	9·92	5·81	8·85	27 16	.. ..	do
8·13	0·83	0·96	9·92	8·96	5·06	9·48	26 81		
. ...	.....	.....	.....	.....	.....	.....	....	16299	
.....	.....	.....	.....	7 to 9	3 to 4	.....	...		
5·59	0·97	3·03	9·59	6·56	2·86	12·45	18 27	.....	do
4·80	1·76	1·60	8·16	6·56	5·33	11·18	24 67		
.....	... ...	.....	.....	.....	.....	.....	...	16279	
...	.....	.....	.....	.....	.....	.....	.....		
.....	1·16	·79	1·95	1·95	....	5·60	17 69		
.....	1·28	·77	2·05	2·05	0·21	7·26	19 42		
....	.....	.....	.....	.....	.....	.....	... .	16280	Not guaranteed in Bulletin 46.
.....	.....	.....	.....	.....	.....	.....	.....		
....	1·01	·36	1·37	1·37	....	10·05	27 21	.....	Without guarantee.
....	.....	.....	.....	.....	.....	.....	.....		
....	.....	.....	.....	.....	.....	.....	.....	16281	
.....	.....	.....	14·71	.....	.....	5·52	..		
.....	5·77	11·03	16·80	16·80	.....	3·40	30 82	.. ..	Up to standard guaranteed.
0·64	4·36	7·16	12·16	5·00	0·37	7·50	29 66		
.....	...	.....	.....	.....	.....	.....	.. ...	16282	
.....	.....	.....	.....	.....	.....	.....	.....		
4·79	4·57	2·47	11·83	9·36	1·93	11·55	20·66	.....	Not guaranteed in Bulletin 46.
.....	.....	.....	.....	.....	.....	.....	.....		
.....	.....	.....	.....	.....	.....	.....	.....	16283	
.....	.....	.....	.....	.....	.....	.....	.....		
4·95	2·55	2·37	9·87	7·50	2·18	11·55	19 55		do do
.....	.....	.....	.....	.....	.....	.....	.....		
...	.....	.....	.....	.....	.....	.....	..	16284	
.....	.....	.....	.....	.....	.....	.....	.....		
2·38	2·62	3·49	8 49	5·00	2·76	13·15	18 35	.....	do do
...	...	.....	.....	.....	.....	.....	...		
.....	.....	.....	.....	.....	.....	.....	.....	16285	
9 to 11		2·00	11 to 13	.....	2 to 2½	.....	21 08		
5·91	3·45	3·91	13·27	9·36	2·18	17·40	21 66	.....	Up to standard guaranteed.
7·72	3·02	3·20	13·94	10·74	2·74	8·56	24 01		
.....	.....	.....	.....	.....	.....	... ...	.....	16286	
8 to 10		2·00	10 to 12	.....	6 to 9	.....	27 62		
6·88	1·54	1·97	10·39	8·42	6·89	16·15	29 21	.....	do do
5·72	2·34	2·94	11.50	8·06	7·63	7·30	31 13		
....	.....	.....	.....	.....	.....	.....	.....	16287	
.....	.....	.....	.....	.....	.....	.....	.....		
7·35	2·55	2·73	12·63	9·90	3·63	10·40	23 88	.	Not guaranteed in Bulletin 46.
.....	.....	.....	... ...	.....	.....	.....	..		
.. ..	.....	.....	.....	.....	.....	.....	. .	16288	
.....	.....	.....	.....	.....	.....	.....	.....		
4·47	5·05	2·79	12·31	9·52	2·22	16·60	22 25	.....	do do
.....	....	....	....	.....	.....	.....	.....		

RESULTS of the Examination of 69 Samples

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.	Results: Nitrogen. Total, including that of Nitric Acid or Ammonia if present	Results: Nitrogen. Total calculated as Ammonia.
1896.		*Waterloo, P.Q.*—Con.			p. c.	p. c.
April 7	16289	P. Hubert	Bradley Fertilizer Co.	Eclipse Phosphate		
				Guaranteed	1 to 2	1¼ to 2¼
				Found	2·12	2·57
				Standard	2·18	2·65
		Smith's Falls.				
do 7	16956	Standard Fertilizer Co.	Vendors	No. 1 Fertilizer		
				Guaranteed	1·55	1½ to 2¼
				Found	2·22	2·7
				Standard	1·33	1·61
do 7	16957	do	do	Corn and Grass		
				Guaranteed	2·06	2 to 3
				Found	2·78	3·38
				Standard	2·21	2·68
do 7	16958	do	do	Special Fertilizer		
				Guaranteed	3·29	3½ to 4½
				Found	4·17	5·06
				Standard	4·53	5·50
do 7	16959	do	do	Standard Fertilizer		
				Guaranteed	2·47	2½ to 3½
				Found	2·96	3·59
				Standard	2·49	3·03
do 7	16960	W. Flint	do	Pure Ground Bone		
				Guaranteed		
				Found	3·94	4·79
				Standard	3·75	4·55
		Millbrook, Ont.				
do 7	16961	Gardiner & Mulligan	Bradley Fertilizer Co.	"Bradley Dissolved Bone."		
				Guaranteed	0·82 to 1·65	1 to 2
				Found	1·33	1·61
				Standard	1·12	1·37
do 7	16962	do	do	Bradley's Potato Fertilizer.		
				Guaranteed	2·06 to 2·88	2·50 to 3·50
				Found	2·13	2·59
				Standard	2·47	3·00
do 7	16963	do	do	Bradley's B. D. Sea Fowl Guano.		
				Guaranteed	2·06 to 2·88	2·50 to 3·50
				Found	2·39	2·91
				Standard	2.40	2·92
do 7	16964	do	do	Bradley's Niagara Phosphate.		
				Guaranteed	·82to1·65	1 to 2
				Found	1·04	1·26
				Standard	1·06	
do 7	16965	W. J. Graham, Smith's Falls.	do	B.D. Sea Fowl Guano.		
				Guaranteed	2·06 to 2·88	2·50 to 3·50
				Found	2·18	2·65
				Standard	2·40	2·92

of Fertilizers as sold in 1897—*Continued.*

OF ANALYSIS.									
Phosphoric Acid.							Relative value per ton of 2,000 lbs.	No. of Sample.	Official Analyst's Remarks.
Soluble in Water	Reverted or Citrate soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	.....	.....	.....	.....	....	16289	
8 to 9	2 to 3	2 to 3	12 to 15	10 to 12	1·50 to 2·50	.....	19 95		
7·51	2·10	1·90	11·51	9·61	2·20	13·75	20 62	.....	A little below standard guarantee.
4·80	6·21	3·00	14·01	11·05	1·95	12·82	22 87		
.....	.....	.....	.....	.....	.....	.....	....	16956	
9 to 11		3·00	12 to 14	.....	1 to 1½	.....	18 29		
8·16	4·39	2·80	15·35	12·55	1·21	7·22	23 48	.....	Genuine.
6·82	3·68	3·96	14·46	10·50	1·29	8·55	19 61		
.....	.....	.....	.....	.....	.....	.....	.....	16957	
7 to 9		2 00	9 to 11	7 to 9	4 to 5	.....	20 18		
8·24	2·39	3·36	13·99	10·63	4 46	7·50	26 61	.....	do
7·45	2·40	3·20	13·05	9·85	4·67	8·60	24 31		
.....	.....	.....	.....	.....	.....	.....	.....	16958	
8 to 10		2·00	10 to 12	.....	6 to 9	.....	27 62		
7·20	0·96	3·36	11·51	8·15	6·05	6·14	29 07	....	do
5·72	2·34	2·94	11·50	8·06	7·63	7·30	31 13		
.....	.....	.....	.....	.....	.....	.....	.....	16959	
9 to 11		2·00	11 to 13	.....	2 to 2½	.....	21 08		
8·56	2·28	3 79	14·63	10·84	1·80	7·42	24 83	....	Potash slightly below guarantee
7·72	3·02	3·20	13·94	10·74	2·74	8·56	24 01		
.....	.....	.....	.....	.....	.....	.....	.....	16960	
.....	.....	.....	.....	.....	.....	.....	.....		
trace.	6·05	17·67	23·72	6·05	None.	5·19	33 78	.....	Genuine.
0·26	5·88	16·76	22·90	6·14	.....	4·70	32 54		
.....	.....	.....	.....	.....	.....	.....	.....	16961	
5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	2·15 to 3·25	..	17 63		
4·32	3·59	3·44	11·35	7·91	2·05	10·57	17 91	....	do
4·60	4·36	2·56	11 52	8·96	1·84	14·72	17 50		
.....	.....	.....	.....	.....	.....	.....	.....	16962	
6 to 7	3 to 4	2 to 3	11 to 14	9 to 11	3·25 to 4·35	....	23 07		
5·84	3·03	3·76	12·63	8·87	2·90	7·89	22 25	.....	Potash a little below the guarantee.
5·24	4·99	2·05	12·28	10·23	4·23	13·62	24 20		
.....	.....	.....	.....	.....	.....	.....	.....	16963	
5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	1·50 to 2·50	.....	20 28		
4·40	4·15	4·24	12·79	8·55	1·6	9·51	21 51	.....	Genuine.
5·44	4·79	2·24	12·47	10·23	1·95	14·88	21 85		
.....	.....	.....	.....	.....	.....	.....	.....	16964	
5 to 6	2 to 3	1 to 2	8 to 11	7 to 9	1·08 to 1·63	.....	15 22		
4·72	2·63	3·12	10·47	7·37	1·41	11·29	15 65	.....	do
5·12	3·36	3·20	11·68	8·48	1·62	12·60	17 28		
.....	.....	.....	.....	.....	.....	.....	.....	16965	
5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	1·50 to 2·50	.....	20 28		
4·88	3·91	5·12	13·91	8·79	1·68	11·44	22 27	....	do
5·44	4·79	2·24	12·47	10·23	1·95	14·88	21 85		

RESULTS of the Examination of 69 Samples

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.	Results — Nitrogen. Total including that of Nitric Acid or Ammonia if present	Results — Nitrogen. Total calculated as Ammonia.
1897.					p. c.	p. c.
April 19	16966	W. J. Graham, Smith's Falls. *Toronto.*	Bradley Fertilizer Co	Potato Fertilizer	2·06 to	2·50 to 3·50
				Guaranteed	2·88	....
				Found	2·03	2·46
				Standard	2·47	3·00
do 20	16967	Toronto Salt Works, Adelaide St.	Harris & Co., Toronto.	Pure Animal Fertilizer, Brand "H."	.....	....
				Guaranteed	.....	.....
				Found	7·60	9·23
				Standard	7·71	9·36
do 20	16968	do ..	do ..	Pure Animal Fertilizer, Brand "C."	.....	.....
				Guaranteed	.....	....
				Found	6·27	7·61
				Standard	4·00	4·96
do 20	16969	W. Rennie, Adelaide St.	W. Faint, Peterboro'	Bone Meal	.... ..	.....
				Guaranteed	.....	.....
				Found	3·57	4·33
				Standard	3·75	4·55
do 20	16970	do ..	Bradley Fertilizer Co	Bradley's Vegetable and Potato.	.....	.....
				Guaranteed	3·73 to 4·52	4·50 to 5·50
				Found	2·91	3·53
				Standard	4·25	5·16
do 20	16971	do ..	Mapes Guano Co., New York.	Peruvian Guano	.....	.....
				Guaranteed	.....	.....
				Found	6·64	8·06
				Standard	.....	.....
do 20	16972	Steele Briggs Seed Company.	H. & E. Albert, London, Eng.	Thomas' Phosphate	.....	.....
				Guaranteed	.....	.....
				Found	0·18	0·22
				Standard	.....	Trace.
do 20	16973	do do ..	do ..	Albert's Concentrated Manure	.....	....
				Guaranteed	12·10	15·00
				Found	10·03	12·18
				Standard	12·04	14·62
do 20	16974	do do ..	Maryland Fertilizer Co., Baltimore, U. S.A.	Pure Fine Ground Animal Bone	.....	....
				Guaranteed	.....	.....
				Found	4·01	4·87
				Standard	.....	.....
do 20	16975	J. A. Simmers, King St.	The W. A. Freeman Co., Hamilton.	Sure Growth	.....	.....
				Guaranteed	.....	3½ to 5
				Found	2·68	3·26
				Standard	4·27	5·19
do 20	16976	do ..	W. Faint, Peterboro'	Bone Meal	.....	.....
				Guaranteed	.....	.....
				Found	3·28	3·98
		London, Ont.		Standard	3·75	4·55
do 6	15745	A. McInnis	Vendor	Crown Jewel Fertilizer	.....	.....
				Guaranteed	.....	.. ..
				Found	7·52	9·
				Standard	.....	.....

of Fertilizers as sold in 1897—*Continued.*

Analysis.									
Phosphoric Acid.									
Soluble in water.	Reverted or Citrate soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.	Relative value per ton of 2000 lbs.	No. of Sample.	Official Analyst's Remarks.
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
								16966	
6 to 7	3 to 4	2 to 3	11 to 14	9 to 11	3·25 to 4·35		23 07		
6·13	3·60	2·17	11·90	9·73	2·94	10·48	21 45		Genuine.
5·24	4·99	2·05	12·28	10·23	4·23	13·62	24 20		
								16967	
	3·58	4·22	7·80	3 58	0·27	7·53	26 68		do
0·26	2·30	4·86	7·42	2·56	Trace.	3·80	26 20		
								16968	
0·93	6·24	7·29	14·46	7·17	Trace.	6·17	30 32		do
0·26	6·52	6·01	12·79	6·78	Trace.	6·35	23 09		
								16969	
	8 57	17 02	25·59	8·57	0·27	8·41	35 30		do
0·26	5·88	16·76	22·90	6·14	Trace.	4·70	32 54		
								16970	
6 to 8	2 to 3	1 to 2	9 to 12	8 to 10	6 to 7		29 36		
5·06	2·62	3·84	11·52	7·68	6·02	11·26	26 09		do
6·40	3·52	1 28	11·20	9·92	5·79	8·92	29 11		
								16971	
0·80	4·96	4·35	10·11	5·76	1·56	7·80	28 36		Unadulterated, but not registered according to the Act.
								16972	
			18·57						
	5·68	8·87	14·55	5·68		0·18	12 89		
Trace.	6 46	9·47	15·93	7·46		0·10	13 74		
								16973	
			14·09		20·12				
12·13	2·07	0·64	14·84	14 20	21·15	4·70	63 76		A very rich fertilizer, both in nitrogen and phosphoric acid, as well as potash; but the nitrogen is a little in deficiency as compared with the guarantee.
12·47	2 90	0·30	15·67	15·37	20·88	3·04	71 67		
								16974	
	8·96	18·04	27·00	8·96		7·80	37 62		Unadulterated, but not registered according to the Act.
								16975	
			8 to 10		3 to 4				
6·23	2·85	1·92	11·00	9·08	3·61	9·41	22 75		Unadulterated.
5·85	3·83	1·10	10·78	9·68	6·55	5·48	29 46		
								16976	
0·40	6·36	14·58	20·98	6·76		7·92	29 93		do
0·26	5·88	16·76	22·90	6·14	Trace.	4·70	32 54		
								15745	
None.	2·36	7·30	9·66	2·36	·33	5·60	28 30		Not reported in Bulletin 46.

RESULTS of the Examination of 69 Samples

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.
1897.		*London*—Con.			p. c.	p. c.
April 6	15746	J. S. Pearce.....	Michigan Carbon Works, Detroit.	Bone Meal	.....	.....
				Guaranteed..... ..	.....	.....
				Found.....	1·34	1·62
		Strathroy, Ont.		Standard.....	.....	.....
do 6	15747	R. Nicholson.....	Bradley Fertilizer Co.	Dissolved Bone and Potash	.....	.....
				Guaranteed.....	0·82 to 1·65	1 to 2
		Sarnia, Ont.		Found.....	1·05	1·28
				Standard.....	1·12	1·37
do 6	15748	Govenlock & Gammon..	do ..	Sea Fowl Guano . . .	.....	.....
				Guaranteed.....	2·06 to 2·88	2·50 to 3.50
				Found.....	3·56	4·32
				Standard.....	2·40	2·92
do 6	15749	do ..	do ..	Potato Fertilizer. . .	.....	.....
				Guaranteed.....	2·06 to 2·88	2·50 to 3·50
				Found.....	2·17	2·64
				Standard.....	2·47	3·00
do 6	15750	do ..	do ..	Lawn Fertilizer.....	.....	.....
				Guaranteed.....	.....	.....
				Found.....	5·10	6·19
		London, Ont.		Standard.....	.....	.....
do 7	15751	Canada Chemical Co....	Vendors.....	Acid Phosphate.....	.....	.....
				Guaranteed.....	.....	.....
				Found.....	.....	.....
		Woodstock, Ont.		Standard.....	.....	.....
do 8	15752	J. Pike.....	E. & H. Albert, London, Eng.	Thomas' Phosphate ...	.....	.....
				Guaranteed.....	.....	.....
				Found.....	.....	.....
				Standard.....	.....	Trace.
do 8	15753	W. Fripp	Bradley Fertilizer Co.	Complete Manure.....	.....	.....
				Guaranteed.....	3·73 to 4·52	4·50 to 5·50
				Found.....	3·11	3·78
				Standard.....	4·25	5·16

of Fertilizers as sold in 1897—*Concluded.*

Results of Analysis.							Relative value per ton of 2,000 lbs.	No. of Sample.	Official Analyst's Remarks.
Phosphoric Acid.									
Soluble in Water	Reverted or Citrate Soluble.	Insoluble.	Total.	Total available.	Potash.	Moisture.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	$ cts.		
.....	.....	.....	.....	.....	.....	.....	.....	15746	
Trace.	6·46	23 22	29·68	29·68	.....	2·58	33 55	.....	Not reported in Bulletin 46.
.....	.....	.....	.....	.....	.....	.....	.....		
								15747	
5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	2·15 to 3·25	.....	17 63		
4·86	4·10	2·62	11·58	.....	2·16	11·85	17 75	.....	Unadulterated.
4·60	4·36	2·56	11·52	8·96	1·84	14·72	17 50		
.....	.....	.....	.....	.....	.....	.....	.....	15748	
5 to 6	3 to 4	2 to 3	10 to 13	8 to 10	1·50 to 2·50	.....	20 28		
3·51	4·31	3·13	10·95	7·82	5·12	5 55	26 00	.....	do
5·44	4·79	2·24	12·47	10·23	1·95	14·88	21 85		
.....	.....	.....	.....	.....	.....	.....	.....	15749	
6 to 7	3 to 4	2 to 3	11 to 14	9 to 11	3·25 to 4·35	.....	23 07		
5 44	4·60	2·81	12·85	10·04	3·27	6·10	23 03	.....	do
5·24	4·99	2·05	12·28	10·23	4·23	13·62	24 20		
.....	.....	.....	.....	.....	.....	.....	.....	15750	
Trace.	4·86	1·92	6·78	4·86	3·15	3·70	22 82	.....	Not reported in Bulletin 46.
.....	.....	.....	.....	.....	.....	.....	.....		
								15751	
				11 to 13					
4·80	2·73	8·97	16·50	7·53	.....	6·50	17 73	....	Does not contain the guaranteed quantity of available phosphoric acid, and is therefore adulterated.
6·52	3·46	6·14	16·12	9·98	.....	10·91	17 77		
.....	.....	.....	.....	.....	.....	.....	.....	15752	
.....	.....	.....	18·57	.....	.....	.....	.....		
.....	8·18	7·04	15·22	8 18	.....	0·15	13 92	...	Does not contain guaranteed quantity of total phosphoric acid, and is therefore adulterated.
Trace.	6·46	9·47	15·93	7·46	.....	0·10	13 74		
.....	.....	.....	.....	.....	.....	.....	.....	15753	
6 to 8	2 to 3	1 to 2	9 to 12	8 to 10	6 to 7	.....	29 36		
3·68	5·28	2·68	11·64	8·96	5·40	8·25	26 04	.....	Not adulterated.
6·40	3 52	1·28	11·20	9·92	5·79	8·92	29 11		

NOTES ON FERTILIZERS.

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.

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, the 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 oxen 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 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. This means a quantity of 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 be to a great extent relieved from the necessity of purchasing the nitrogen of artificial fertilizers.

IMPROVED STABLE YARD MANURE.

The above plan for saving nitrogen has of course the effect of improving the quality of barn-yard manure, but means of doing this to a still greater extent have been suggested. The following quotation is taken from Bulletin No. 45 (for March 1897) of the Massachusetts Agricultural College, written by Dr. C. A. Goessmann, Chemist of that institution :—

"*The practice of adding to the manurial refuse materials of the farm as stable manure,* "*vegetable compost, etc., 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, etc., will in many "instances not only improve their general fitness as complete manure, but quite fre-

"quently 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 "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 manufactures 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 farmers 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 have 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, peas, 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 the 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 if it had not been for his investigations the controversy above referred to might have continued without result up to the present hour.

Professor König, 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 or oats, no return was obtained from them. The application of artificial 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 lbs. 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 lbs. kainite. Schultz obtained similar good results on the ground which had received the marl, by the application of potash salts. This ground has 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, the 300 lbs. kainite were applied here and ploughed in in the fall, 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 as 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 had consumed the stock of nitrogen. Grain crops always reduced 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, peas, beans, vetches, clover, lucerne, serradella &c.,) or, as they have been called, renovating crops, and give them 300 lbs. kainite per morgen, with perhaps an addition of 20 lbs. phosphoric acid. After harvesting the nitrogen collectors, sow a nitrogen consumer, raising a grain or exhausting crop, giving it also 300 lbs. kainite and 20 lbs. 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. Bnt 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 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 up to the present:—

1. "Peas, 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 vigorous 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, and largest where they had the most nitrogen at their disposal in the form of nitrates. As the gain of nitrogen by the legumes help to 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 exhaustive crop.

"Practical inferences:—The ability of legumes to gather nitrogen from the air helps to explain the usefulness of clover, alfalfa, peas, beans, vetches and cow peas as renovating crops and enforces the importance of these crops to restore fertility to exhausted soils. The judicious use of mineral fertilizers (containing 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, Griefswald, &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.

Canada possesses 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.
Sphagnum moss from Shippegan, N.B.	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
Light coloured moss litter from Caledonia Springs	10·00	1·60	2·95
Dark coloured moss litter from same locality	11·60	2·70	2·23
Peat from the same locality	10·95	3·90	2·94
Surface moss from Mer Bleu at Eastman's	10·85	2·80	0·71
Moss litter from bog in Welland County, Ont	3·85	4·70	1 51
Peat lying underneath the foregoing	5·30	4·85	1·41
Peat from the same locality, lying 4½ feet below surface	3·25	41·25	1·52
Moss litter from Musquash, N.B., upper layer	11·50	0·95	0·82
Moss litter from ame locality, lower layer	12·50	0·90	0·72
Peat from St. Bridget, Prov. Quebec	13·30	2·50	1·48

The first public mention of the usefulness of moss litter as a deodorizer and absorbant 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.* It, of course, at once recalls the dry earth system regarding which great expe tations 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

* In Canada this method of deodorizing human refuse has been in use for several years at Caledonia Springs.

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 valuelesss from an agricultural point of view, but this is not the case with moss litter, which as the above analyses show, often contains as much nitrogen as ordinary barn-yard manure. Numerous analyses have been made of the 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.

The manufacture of moss litter has been attempted at Musquash, in New Brunswick, and it is now being produced 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 absorbing qualities. He reports that 100 lbs. of moss litter was sufficient for drying 800 lbs. 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 analyses gave the following results:

	p.c.	lbs. pr. ton.		Value per ton.
Nitrogen	1·31	26·2	at 13c.	$3 41
Phosphoric acid	0·90	18·0	" 5	0 90
Potash	0·14	2·8	" 5¼	0 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. Gossmann, the value is nearly $2.25. Therefore, much better results might be expected agriculturally from a "moss manure" of the composition just described.

Moss litter might also be applied with great advantage in public urinals. When a sample of it was supersaturated with urine and dried, and this process repeated several times, no offensive odours were developed and the product was found on analysis to contain 12·41 per cent of nitrogen, which is equal to a valuation of $32.26 per ton.

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.

APPENDIX N.

BULLETIN NO. 50—COMMERCIAL MUSTARD.

OTTAWA, 4th August, 1897.

E. MIALL, Esq.,
Commissioner of Inland Revenue.

SIR,—I beg to submit herewith a tabulated statement showing the results of analysing 66 samples of commercial mustard, which were collected during the month of July last, in accordance with your instructions. According to the results stated iu the tables these samples may be classified as follows :—

Name of District.	Genuine.	Sold as Compound or Mixtures.	Adulterated.	Doubtful.	Total.
St. John	1	5	3	0	9
Quebec	0	1	9	0	10
Montreal	0	0	11	0	11
Ottawa	1	4	4	0	9
Toronto	1	3	4	2	10
London	0	1	7	1	9
Winnipeg	0	5	3	0	8
	3	19	41	3	66

The particulars regarding the adulterated samples are given in a special report dated 27th July last, in which the opinion is expressed that prosecutions should be instituted. With reference to those which were sold as "compounds" or "mixtures," the degree of adulteration varies from 80 per cent admixture of foreign substances to an article almost pure, from which fact it is to be inferred that the manufacturers are not yet sufficiently careful regarding the strength of their various grades, nor the vendors fully aware of the character of the goods they sell. I here repeat the recommendation made in Bulletin No. 19, that section No. 19 of the Adulteration Act be utilized, which empowers the Governor in Council "from time to time to establish a standard of quality for and fix the limits of variability permissible in any article of food, or drug or compound," the standard of which is not otherwise fixed. In the case of mustard I would recommend that the limits in question be fixed by Order in Council so that what are sold as pure mustards should not contain less than 30 per cent of fixed oil, and "compounds" or "mixtures" not less than 22 per cent. In conclusion I have to recommend the publication of the present report, and

I have the honour to be, sir,

Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

TABLE showing the Origin and Composition of

Date of Collection.	No. of Sample.	Description of Mustard.	NAME AND ADDRESS OF		Quantity.	Price.
			Vendor.	Manufacturer or Furnisher, as given by Vendor.		
1897.			*St. John, N.B.*			Cts.
June 17	15144	Pure	Dearborn & Co., 95 Prince William St.	G. N. Dean & Son, New York.	3 tins.	30
do 17	15145	Compound	do do	A. Colborn Co., Philadelphia, U.S.	do	30
do 17	15146	do	Jardine & Co., 28 Water St.	Pure Gold Co., Toronto	do	30
do 17	15147	do	Thos. Rippy, Union and Rodney Sts.	Jardine & Co., St. John	do	30
do 17	15148	Pure	J. J. Smith, 184 King St	do do	1 lb.	30
do 17	15149	Compound	W. D. Baskin, 267 King St.	J. & J. Colman, London, Eng.	3 tins.	45
do 17	15150	Pure	C. W. Smith, Cor. Ludlow and Guilford Sts.	Dearborn & Co., St. John	1 lb.	30
do 17	15151	Admixture	F. E. Williams, Cor. Princess and Charlotte Sts.	Keen, London, Eng	3 tins.	45
do 17	15152	Pure	W. A. Porter, 215 Union St.	J. & J. Colman, London, Eng.	do	45

The foregoing analyses are by Mr. W. F. Best, official analyst, St. John, N.B. The figures given on

			Quebec.			
June 9	16343	Pure	A. Chouinard, Finlay Market Square.	Colman, England	1 lb.	35
do 9	16344	do	L. Poulin, Finlay Market Square.		do	25
do 9	16345	do	J. Turcotte, Champlain Market.		do	30
do 9	16346	do	L. T. Demers	L. P. Boisseau, Quebec	do	25
do 9	16347	do	do	Colman, England	do	30
do 9	16348	do	A. Grant		do	30
			Lauzon, P.Q.			
do 10	16349	Compound	J. E. Paquet	Colman, England	do	30
do 10	16350	Pure	Mde. Pelletier	A. Carrier, Lévis	do	35
			Bienville, P.Q.			
do 10	16351	do	E. Ruell		do	24
			Lévis, P.Q.			
do 10	16352	do	L. H. Begin		do	40

The foregoing analyses are by Dr. M. Fiset, official analyst, Quebec. The figures given on the second

66 Samples of Commercial Mustard.

Results of Analysis.									Analysts' Remarks.
Ash.				Loss	Extracts.				
Total.	Soluble in Water.	Insoluble in Water.	Insoluble in Hydrochloric Acid.	Moisture and at 100° C.	By Petroleum Ether, Fixed Oil.	By Alcohol of 84 p. c.	Sulphur.	Nitrogen.	
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	
5·74	0·16	.....	.....	6·40	16·30	.....	...	...	Adulterated with flour and turmeric.
				7·23	19·60				
6·25	0·48	...	....	6·45	17·50	.....	.....	.....	Mixed with flour and turmeric.
				8·46	19·66				
8·10	1·30	.....	.....	8·60	9·25	.....	... ...	....	do do
				9 40	7·36				
3·36	1·06	.....	... ..	6·82	24·10	.....	.....	.....	do do
				7·30	29·03				
3·76	0·17	... ..	....	8·50	10·08	.....	.....	.....	Adulterated with flour and turmeric.
				9·43	9 33				
4·65	0·86	.....	.....	5·13	29·05	.....	....	.. ..	Mixed with flour and turmeric.
				5·53	33·63				
2·80	0·05	.....	.....	7·21	8·35	.....	.....	.....	Adulterated with flour and turmeric.
				10·16	6·33				
4·15	1·10	.....	.....	7 40	28·30	.....	.....	.....	Mixed with flour and turmeric.
				5·23	34·33				
4·08	1·05	.....	.. ...	5·13	33·40	.....	.....	.....	Mustard ; nothing else detected ; not adulterated.
				5·00	37·10				

the second line are by Mr. F. W. Babington, Ottawa.

3·36	0·36	3·00	.....	6·55	24·14	.....	.....	...	Adulterated ; probably contains 70 to 75 per cent pure mustard.
				7·30	23·50				
2·45	0·43	2·02	.....	7·24	8·50	.....	....	.....	Grossly adulterated ; probably contains 20 to 30 per cent pure mustard.
				8·40	9·43				
3·43	1·68	1·75	....	7·67	7·97	.....	.....	.....	do do
				8·90	7·73				
2·74	0·31	2·43	.....	6·74	8·76	.....	.....	.....	do do
				8·30	8·36				
3·63	1·32	2·31	...	6·94	24·08	.....	.....	.....	Adulterated ; probably contains 70 to 75 per cent pure mustard.
				7·20	24·33				
3·65	0·77	2·88	.....	6·56	22·68	.....	..	... .	Adulterated ; probably contains 65 to 75 per cent pure mustard.
				7·20	23·00				
3·43	0·58	2·85	.....	6·80	25·80	.....	.....	.. ..	Probably contains 75 to 80 per cent pure mustard.
				7·30	25·40				
2·53	0·88	1·65	.....	8·46	7·32	.....	.....	.....	Grossly adulterated ; probably contains 25 per cent pure mustard.
				9·26	7·60				
3·50	0·37	3·13	.....	6·44	25·92	.....	.....	.....	Adulterated ; probably contains 75 to 80 cent pure mustard.
				7·46	25·46				
3·75	0·10	3·65	.....	6·62	25·32	.....	.....	.....	do do
				6·96	25·56				

line are by Mr. F. W. Babington, Ottawa.

TABLE showing the Origin and Composition of

Date of Collection.	No. of Sample.	Description of Mustard.	NAME AND ADDRESS OF		Quantity.	Price.
			Vendor.	Manufacturer or Furnisher, as given by Vendor.		
1897.			*Montreal.*			Cents.
June 1	16332	Pure	L. C. Fortier, 1270 Demontigny.		1 lb.	50
do 1	16333	do	J. N. Gagnon, 458 Dorchester.		do	40
do 2	16334	do	N. Prezeau, 659 St. James.	G. J. Duffy & Co., Montreal.	do	20
do 2	16335	do	F. X. St. Amour, 2271 Notre Dame.	Ewing, Heron & Co., Montreal.	do	30
do 3	16336	do	N. Desnoyers, 1239 Demontigny.	Laporte, Martin & Co., Montreal.	do	35
do 3	16337	do	J. Chartier, 359 Dorchester.	J. J. Duffy & Co., Montreal.	do	25
			Lachine.			
do 4	16338	do	N. Cousineau	Laporte, Martin & Co., Montreal.	do	30
do 4	16339	do	H. L. P. Robert	J. J. Duffy & Co., Montreal.	do	25
			Sault au Recollect.			
do 4	16340	do	L. Pepin	Hadon, Hebert & Co., Montreal.	do	30
do 4	16341	do	T. Paquet	do do	do	30
do 4	16342	do	Michaud Bros. & Co	L. Chaput fi & Co.	do	40

The foregoing analyses are by Dr. J. B. Edwards, official analyst, Montreal. The figures given on

			Joneville, Ont.			
May 31	12890	Pure	C. C. Cummings	Hamilton Spice and Coffee Company.	¾ lb.	30
do 31	12891	Superfine	J. Durocher	Keen, England	3 tins.	45
do 31	12892	Compound	A. Gauthier	do	1 lb.	30
			New Edinburgh.			
do 31	12893	Pure	W. Moore	Wall, Market Sq., Ottawa.	1 lb.	30
do 31	12894	Compound	J. Johnston	Keen, England	do	25
do 31	12895	Compound	T. Hoare	do	¾ lb.	19
			Ottawa.			
June 2	12896	Pure	F. C. Daniels, 270 Bank St.	Keen, England	¾ lb.	27
do 2	12897	Pure	The Gilmour Grocery, 352 Bank St.	Toronto Coffee and Spice Company.	do	23
do 2	12898	Compound	Gates & Hodgson, corner Florence and Kent.		do	20

The foregoing analyses are by Dr. F. X. Valade, official analyst, Ottawa. The figures given on the

66 Samples of Commercial Mustard—*Continued.*

Results of Analysis.									Analysts' Remarks.
Ash.				Moisture and Loss at 100° C.	Extracts.		Sulphur.	Nitrogen.	
Total.	Soluble in Water.	Insoluble in Water.	Insoluble in Hydro-chloric Acid.		By Petroleum Ether, Fixed Oil.	By Alcohol of 84 p.c.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	
3·60	1·95	1·65	.....	9·16	8·01	.....	...	.....	Adulterated to the extent of at least 50 per cent with wheat flour, maize and turmeric.
				9·16	8·40				
4·15	1·85	2·30	.....	9·16	9·02	.....	.....	....	Adulterated to the extent of 40 per cent with wheat flour, maize, turmeric and cayenne
				8·83	10·56				
2·85	0·35	2·50	.....	7·43	6·55	.....	.....	...	Adulterated to the extent of 40 per cent and upwards with wheat and pea flour, maize and a little turmeric.
				7·66	8·03				
2·95	0·85	2·10	.....	8·74	8·03	.....	.....	.....	Adulterated to the extent of 50 per cent and upwards with wheat flour, maize and turmeric.
				8·70	8·00				
2·85	1·25	1·60	...	10·70	1·93	.....	.....	.....	Largely adulterated to the extent of 70 to 75 per cent with wheat flour, maize, turmeric and cayenne.
				10·16	2·80				
3·00	0·70	2·30	.....	7·26	6·64	.....	.....	.....	Adulterated to the extent of from 25 to 30 per cent with wheat flour, maize, turmeric and cayenne.
				7·56	7·96				
3·15	·65	2·50	.....	8·20	15·02	.....	....	....	Adulterated to the extent of 25 to 30 per cent with cereal flour and millings, pea flour, turmeric and cayenne.
				9·06	14·07				
4·00	·55	3·45	....	8·42	6·22	.....	.. ...	.....	Adulterated to the extent of from 50 to 60 per cent with mixed cereals and millings, coloured by turmeric.
				8·70	7·20				
3·90	·80	3·10	.....	7·04	21·66	.....	.....	.....	Adulterated to the extent of from 25 to 30 per cent with maize and pea starch.
				6·83	24·93				
3·15	·60	2·55	.....	7·57	19·55	.....	.....	.....	Adulterated to the extent of 25 to 30 per cent with cereals and millings, turmeric and cayenne.
				7·36	20·00				
2·55	·90	1·65	....	9·98	4·24	.....	.....	.....	Adulterated to the extent of from 50 to 60 per cent with wheat flour, millings, turmeric and cayenne.
				9·60	5·76				
the second line are by Mr. F. W. Babington, Ottawa.									
3 05	.....	3·00	0·38	7·78	11·98	.....	.....	.....	Adulterated by admixture with about 50 per cent flour and turmeric.
				9·56	12·23				
4 05	...	3·93	0·05	5·40	33·55	.....	.....	....	Genuine.
				6·90	33·33				
4 15	....	3·85	0·38	6·78	17·45	....	.....	....	Contains about 10 per cent flour.
				9·40	18·00				
3 13	...	2·75	0·10	7·03	18·75	...	.. ..	.....	Adulterated by admixture with about 30 per cent flour and turmeric.
3 00	. .	2·73	0·05	7·10	19·75	...	....	...	Contains turmeric, wheat starch in large quantity, some ginger.
				8·83	19·16				
3 10	.....	2·78	0·13	7·00	18·15	.....	.....	.....	Contains about 10 per cent foreign matter.
				8·60	18·83				
3 00	. . .	2·83	0·10	7·15	20·85	.....	.....	.....	Adulterated by admixture with about 20 per cent flour.
				8·80	20·60				
3 25	.....	3·15	0·30	6·90	11·30	.....	.. ..	....	Adulterated by admixture with about 5 per cent flour.
				8·86	11·56				
3 95	.....	3·85	0·25	8·43	9·20	.....	.....	.....	Contains flour and turmeric about 30 per cent.
				9·46	8·46				

second line are by Mr. F. W. Babington, Ottawa.

TABLE showing the Origin and Composition of

Date of Collection.	No. of Sample.	Description of Mustard.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher, as given by Vendor.	Quantity.	Price.
1897.			*Peterboro'.*			Cts.
June 4	15496	Pure	T. J. Michiel	Toronto Coffee and Spice Co.	½ lb.	20
do 4	15497	do	J. H. Savigny	Not known	"	20
do 4	15498	do	W. G. Fowler	do	"	20
do 4	15499	Mixture	W. H. Wrighton	Myell, England	"	30
			Toronto.			
do 4	15500	Superfine	A. Reddock, 443 Parliament St.	Keen, England	3 tins.	39
do 4	16996	Compound	Mrs. Spies, 405 Parliament St.	Not known	½ lb.	20
do 4	16997	do	A. G. Marmion, 403 Parliament St.	Pure Gold Manufacturing Co., Toronto.	3 tins.	30
do 4	16998	Pure	O. Taylor, 237 Gerrard St.	W. G. Dunn & Co., Hamilton.	½ lb.	20
do 4	16999	do	D. H. Bee, 240 Gerrard St.	do	"	30
do 4	17000	English	C. H. Wisker, Gerrard St.	Not known	"	30

The foregoing analyses are by Dr. W. H. Ellis, official analyst, Toronto. The figures given on the

			Goderich, Ont.			
June 1	15763	Compound	H. J. Horton	Gillard & Co., Hamilton	1 lb.	25
do 1	15764	Pure	T. G. Tipling	A. M. Smith & Co., London, Ont.	do	30
do 1	15765	do	O. C. Whitely	Keen, England	do	40
			London, Ont.			
do 2	15766	do	W. T. Stenberg, 515 Richmond Street.	Snowdrift Baking Powder Co., Brantford.	do	30
do 2	15767	do	Cleghorn & Russell		do	30
do 2	15768	do	G. Shaw, Craig and Wortley Road.	Gorman & Earckart, London, Ont.	do	30
			Windsor, Ont.			
do 3	15769	do	A. Dougall	Snowdrift Baking Powder Co., Brantford.	do	35
do 3	15770	do	Smith & Duck	J. P. Mayell, London, Ont	do	35
do 3	15771	do	C. R. Dougall	Not known	do	35

The foregoing analyses are by Mr. F. T. Harrison, official analyst, London, Ont. The figures given

66 Samples of Commercial Mustard—*Continued.*

Results of Analysis.									
Ash.				Loss	Extracts.				Analyst's Remarks.
Total.	Soluble in Water.	Insoluble in Water.	Insoluble in Hydrochloric Acid.	Moisture and at 100°C.	By Petroleum Ether, Fixed Oil.	By Alcohol of 84 p. c.	Sulphur.	Nitrogen.	
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	
2·92	....	2·76	.....	8·02	6·02	....	.....	2·99	Adulterated by admixture with about 50 per cent of farinaceous matter.
				8·60	6·46				
4·44		3·63		8·11	10·60	.. ..	...	3·64	Mixed with about 20 per cent of farinaceous matter and has some of the fixed oil expressed.
				7·86	9·07				
2·45	....	2·33	.....	8·84	7·05	....	..	3·28	Adulterated by admixture with about 60 per cent of farinaceous matter.
				9·43	4·57				
4·27	....	4·17	....	6·47	16·95	....	.....	4·57	Has some of the fixed oil expressed.
				6·93	14·27				
3·94	.....	3·69	.. ..	4·86	36·16	....	.....	4·70	Genuine, except that a little wheat flour is mixed with it.
				6·00	32·80				
2·68	...	2·61	.....	7·79	9·45	.....	.....	3·57	Contains an admixture with about 50 per cent of farinaceous matter.
				8·13	8·93				
2·91	.. .	2·64	....	7·14	10·46	.....	.....	4·15	do do
				8·36	9·26				
5·24	... ..	4·25	.....	6·13	26·40	.....	.....	5·80	Some of the oil is expressed.
				5·96	25·07				
5·15	.. ..	4·38	....	5·59	25·66	.. ..	....	5·67	do
				6·60	25·27				
3·72	....	2·81	.....	8·22	.....	....	....	2·61	Adulterated by admixture with about 30 per cent farinaceous matter.
				9·16	7·93				

second line are by Mr. F. W. Babington, Ottawa.

2·75	·87	1·88	·18	8·05	7·55	6·04	·34	3·49	Mixed with wheat flour; containing only about 30 to 40 per cent of mustard.
				9·50	5·86				
6·10	·65	5·45	.80	6·08	19·67	17·00	1·29	6·32	Mustard cake.
				9·83	19·56				
3·38	·70	2·68	·10	5·90	19·90	12·00	1·01	4·18	Adulterated with wheat flour; containing about 65 to 70 per cent pure mustard.
				8·26	18·56				
3·33	·38	2·95	·30	8·50	8·15	8·40	·48	3·54	Adulterated with wheat flour; containing 30 to 40 per cent mustard.
				10·60	6·63				
3·36	·41	3·15	·85	7·50	10·80	12·25	·46	3·17	Adulterated with wheat flour; containing 40 to 50 per cent mustard.
				8·86	11·53				
4·35	·45	3·90	·80	6·18	15·40	10·20	·67	4·37	Adulterated with wheat flour; containing about 50 to 60 per cent pure mustard.
				8·26	14·26				
3·85	·55	3·30	·57	8·15	11·30	8·75	·38	3·74	Adulterated with wheat flour; containing about 40 to 50 per cent mustard.
				9·33	9·86				
3·15	·35	2·80	·30	8·60	12·10	10·00	·45	3·50	Adulterated with wheat flour; containing about 40 to 50 per cent mustard.
				10·03	10·70				
2·00	·35	1·65	·20	7·95	9·55	8·50	·38	3·43	Adulterated with wheat flour; containing about 30 to 40 per cent of mustard.
				9·60	7·16				

on the second line are by F. W. Babington, Ottawa.

TABLE showing the Origin and Composition of

Date of Collection.	No. of Sample.	Description of Mustard.	Name and Address of Vendor.	Name and Address of Manufacturer or Furnisher, as given by Vendor.	Quantity.	Price.
1897.			*Winnipeg.*			cts.
June 18	17027	Compound	W. H. McLean	The Dyson Gibson Co., Winnipeg.	3 tins.	30
do 18	17028	do	C. Calland	J. J. Colman, London, Eng.	do	40
do 18	17029	Pure	R. Burns	Williams & Hilton, Winnipeg.	½ lb.	15
do 18	17030	Compound	Hardy & Buchanan	Keen, London, Eng.	do	20
do 18	17031	Pure	Mrs. A. E. O'Neil	Mackenzie, Mills & Co.	do	10
do 18	17032	Compound	Mrs. Cranston	Keen, London, Eng.	do	20
do 18	17033	do	A. Macdonald	do	do	20
do 18	17034	Pure	T. E. Williams	Not known.	do	15

The foregoing Analyses are by Professor E. B. Kenrick, official analyst, Winnipeg, Man. The

66 Samples of Commercial Mustard—*Concluded.*

Result of Analysis.									Analyst's Remarks.
Ash.				Loss	Extracts.				
Total.	Soluble in Water.	Insoluble in Water.	Insoluble in Hydrochloric Acid.	Moisture and at 100° C.	By Petroleum Ether, Fixed Oil.	By Alcohol of 84 p.c.	Sulphur.	Nitrogen.	
p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	
3·54	.....	.....	.....	8·10	8·90	.....	.....	....	Wheat flour and turmeric.
				6·30	12·43				
4·60	.....	....	.....	4·90	34·20	.....	.....	.....	Small proportion of wheat flour and turmeric.
				4·06	34·73				
3·66	.....	.....	.....	6·60	10·60	.....	.....	.....	Adulterated with wheat flour, turmeric and mustard husks.
				4·56	13·96				
3·06	.....	.....	....	7·10	18·60	.....	.....	....	Wheat flour, turmeric and mustard husks.
				5·46	20·66				
3·78	.....	.....	.. ..	9·10	8·60	.....	.....	.....	Turmeric, mustard husks and much flour. adulterated.
				7·37	11·36				
3·26	.....	.. ..	.....	7·00	17·90	.....	.....	.....	Flour, turmeric and mustard husks.
				5·53	19·90				
3·24	.....	...	.....	7·30	19·80	.....	.....	.....	do do
				6·00	21·96				
3·40	.....	.....	.....	7·10	7·20	.....	.....	.....	Wheat flour, turmeric and mustard husks, adulterated.
				5·20	11·20				

figures given on the second line are by Mr. F. W. Babington, Ottawa.

APPENDIX O.

BULLETIN NO. 51—WELL WATERS.

OTTAWA, 20th September, 1897.

E. MIALL, Esq.,
Commissioner of Inland Revenue.

SIR,—I submit herewith a report by Mr. A. McGill, B.A., on the samples of well water which were collected in various parts of the Dominion by your authority in the month of June last. These samples were 61 in number, and the results of the examination by the official analysts are given in the tabulated statement accompanying Mr. McGill's report. These results are stated in the upper line opposite the description of the sample, and on the second line will be found some additional or duplicate determinations by Mr. McGill, as well as the results of bacteriological examinations by Dr. A. Lehmann, who recently returned from his studies in Leipzig and was employed for a few months in this laboratory.

In order that the significance of the figures given in the table as the result of the chemical examinations may be understood, it will be necessary to make some reference to the analyses which have been made in other countries of uncontaminated natural waters. It is also necessary to notice the standards and limits which have been proposed for forming a judgment as to the fitness of a water for domestic use, and as to the character of those waters which are suspected of being too impure for drinking purposes. The impossibility of erecting reliable general standards for the waters devoted to such uses has been very justly insisted upon. They cannot be framed in such a way as to be applicable in districts situated widely apart, unless indeed the limits are made so wide as to lead to false conclusions in cases of contamination. Nevertheless, such attempts are not unworthy of notice, as giving some idea of what qualities a natural water should have for potable purposes.

The first attempt to formulate a general standard was made by Reichardt in 1872, but its applicability in some cases was challenged by F. Fischer in 1873, who gave other figures for the city of Hanover, which were however not put forward as a general standard. They coincide quite closely with the limits proposed by Tiemann & Gaertner in their work on water analysis (1889) and by the association of Swiss analytical chemists. These standards have been tabulated in a paper by F. Fischer (Zeitschrift für angewandte Chemie, 1889, p. 505) and his table is reproduced here, with such alterations as are necessary to admit of its figures being compared with those given in the table accompanying Mr. McGill's report.

NATURAL waters, free from any unusual contamination, should, as a rule, contain in 1 Litre no higher number of millegrammes (parts per million) of the undermentioned substances than are shown in the following table :—

	ACCORDING TO						
	Reichardt, 1872.	F. Fischer, 1873; for Hanover.	Tiemann, 1874.	English Commission, 1874.	Brussels Congress, 1885.	Swiss Chemists, 1888.	Tiemann & Gaertner, 1889.
Total dissolved solids	100 to 500		500·		500·	500·	500·
Nitrogen, as albumenoid ammonia					0·082	0·041	0·164
do as free and saline do		0·	0·		0·410	0·016	0·
do as nitrates	1·04	7·0	1·3 to 3·9		0·520	5·200	1·3 to 3·9
do nitrites		0·	0·			0·	0·
Chlorine	2 to 8	36·	20 to 30		8·	20·	20 to 30
Sulphuric anhydride	2 to 63	80·	80 to 100		60·		80 to 100
Organic substances, expressed in the quantity of oxygen they consume	0·505 to 2·525	2·02 to 4·04	1·515 to 2·525		2·525	2·525	1·515 to 2·525
Organic carbon in these				2·			5·
do nitrogen in these				·3			
Hardness (Clark's scale)	180·	170 to 200	180 to 200		200·		180 to 200

Even more deserving of consideration than the foregoing table are the averages given of the composition of unpolluted well water (mean of 589 analyses) in the Sixth Report of the Rivers Pollution Commission of 1868, because of the manner in which the various samples are classified. The following statement shows the contents in parts per million of certain constituents in such unpolluted well waters divided into four classes :—

	Class I. Rain Water.	Class II. Upland Water.	Class V. Deep Well Water.	Class VI. Spring Water.
Dissolved solids	29·5	96·7	437·8	282·0
Nitrogen, as albumenoid ammonia	0·15	0·32	0·18	0·13
Nitrogen, as ammonia	0·29	0·02	0·12	0·01
Nitrogen, as nitrates and nitrites	0·03	0·09	4·95	3·83
Chlorine	2·20	11·30	51·10	24·90
Organic carbon	0·70	3·22	0·61	0·56

A close inspection of this statement may help to explain why there are such differences in the limits proposed by the different authorities mentioned in Fischer's table. It will be observed that the deep well waters of Great Britain contain on the average fifty times more nitrogen in the form of nitric acid than do the "upland waters," which are waters collected upon uncultivated land and allowed to subside in lakes or reservoirs, or filtered through sand.

Besides the authorities above mentioned a few of the limits which have been indicated by other investigators ought to be put on record. Wanklyn condemns a water, under all circumstances, which contains 0·123 parts per million of nitrogen as albumenoid ammonia. Hehner states that the presence of more than 0·6 parts per million of phosphoric acid (H_3PO_4) should be regarded with suspicion. Frankland and Tidy would consider a water impure which absorbs more than 2·1 parts per million of oxygen. The Rivers Pollution Commission lays down the rule that surface water or river water containing more than 2 parts per million of organic carbon, or 0·3 parts of organic nitrogen, ought to be rejected, and that, in the case of spring and deep well waters, they ought not to contain more than 1 part organic carbon and 0·3 of organic nitrogen. Leffmann and Beam give the following, in parts per million, as the usual analytical results from uncontaminated waters :—

	Rain.	Surface.	Subsoil.	Deep.
Total solids	5 to 20	15 & upwards.	30 & upwards.	45 & upwards.
Chlorine	Traces to 1	1 to 10	2 to 12	Traces to large quantity.
Nitrogen, by permanganate Ammonia	0·08 to 0·20	0·05 to 0·15	0·05 to 0·10	0·03 to 0·10
Nitrogen, as NH_3	0·20 to 0·50	0·00 to 0·03	0·00 to 0·03	Generally high
Nitrogen, as nitrites	None or traces	None.	None.	None or traces.
Nitrogen, as nitrates	Traces.	0·75 to 1·25	1·50 to 5·00	0·00 to 3·00

Absolute agreement regarding standards is not to be fonnd among the authorities, except, perhaps, as regards the statement that water of the highest purity should be clear, colourless, odourless and tasteless. Very many of the limits given for one constituent are conditional upon the presence or quantity of others, and many investigators maintain that in judging of the quality of a water, the average of the constituents of those of the district should be considered. After all, the important matter seems to be to make sure that the water has not undergone contamination from animal sources. In this connection the following remarks by F. Fischer are of importance :—"The thoughtless application of these figures" (such as are given in his table) "as limits must, as a matter of course, lead to the greatest inconveniences, but they have and will retain their value as figures of comparison, waters exceeding which may be suspected of contamina tion. No one should, on the basis of the examination of a water sample, which has been sent in for analysis, pass judgment on it as 'injurious to health,' or maintain

"that the well yielding it should be closed up, because such a conclusion cannot always "be justified by the chemical analysis, and still less by microscopical examination, nor "even by both together. . . . . If from the examination a pollution of the "water has been shown or made probable, it is advisable that an inspection of the well "and its surroundings should be made."

Recent writers on water analysis and hygiene adopt the view that while general standards are unnecessary and possibly misleading, local standards might be very useful. Professor Nichols (Water Supply, 1886) says: "Moreover, it cannot be insisted upon "too strongly that different classes of water cannot be judged by the same standard, "and the results of the analysis of waters belonging to different classes ought not to be "put into the same table or otherwise arranged so as to invite comparison. If within "the same geological area it is possible to analyse the water from a considerable number "of unpolluted wells, a standard may be fixed for the well water of that region, and a "surface water may be compared with other surface waters of the same or of a similarly "situated region; or a stream in one part of its course may be compared with its own "unpolluted head waters." Professor Mallet (National Board of Health Bulletin, 1882) says: "There seems to be no objection to the establishment of *local* 'standards of "purity' for drinking water, based on sufficiently thorough examination of the water "supply in its usual condition." Dr. Dupré (The Analyst, Volume V., page 215) says: "In the first place, I would caution analysts most strongly against the adoption of any "general standards of purity, such as are laid down by some chemists. We may, of "course find waters of such absolute purity that we can at once safely pronounce them "fit for all domestic uses, but, short of this highest purity, it is dangerous to rely on "any general standards. The only safe standard to go by, in any individual case, is "the standard of purity furnished by unpolluted waters of the district from which the "sample under examination has come."

The suggestions here quoted are exceedingly valuable, and should, in any further work that may be done in this laboratory on waters, have every consideration. Meanwhile I have to recommend the publication of the present report, as well as that of Mr. McGill with the accompanying table.

I have the honour to be, sir,

Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst

RESULTS of the Examination of 61 Samples of Water

Serial Number.	Locality.	Collector's Number.	Source.	Physical Characters.	Total dissolved Solids		
					Dry at 100° C.	After Igniting.	Loss.
			Official Analyst—M. Bowman, Halifax.		p. c.	p. c.	p. c.
1	Halifax, N.S.	1	Taken from tap at weights and measures office.		30·4	14·8	15·6
2	Rockingham, N.S.	2	Taken from premises of J. Strachan, Esq.		64·0	37·6	26·4
3	Bedford, N.S.	3	Taken from a spring on farm of Dr. Ternan; principally used by H. M. military forces.		80·8	58·4	22·4
4	Brookfield, N.S.	4	Taken from premises of T. Andrew, Albion Hotel.		90·0	53·2	36·8
5	Onslow, N.S.	5	Taken from premises of Dr. H. Crowe.		172 0	138·4	33·6
6	Dartmouth, N.S.	6	Taken from the store of C. McNab, grocer.		28·4	10·4	18·0
7	Newport, N.S.	7	Taken from a spring on the premises of Mrs. Sweet.		2297·6	2083·6	214·0
8	Windsor	8	Taken from the premises of Thos. Gibson, Windsor Hotel.		68·8	47·2	21·6
			Official Analyst—W. F. Best, St. John, N.B.				
9	Sussex, N.B.	15153	From well on premises of P. Doherty, Queen's Hotel.		1020·0	680·0	340·0
10	do	15154	From well at caretaker's house, camp grounds.		250·0	170·0	80·0
11	Sackville, N.B.	15155	From tap in Hotel, Brunswick House.		1540·0	840·0	700·0
12	do	15156	From tap in Ladies' College, Dr. B. C. Borden, principal; well fed by spring.		70·0	50·0	20·0
13	do	15157	From tap at Male Academy, J. M. Palmer, principal; well fed by boiling spring.		245·0	170·0	75·0
14	Dochester, N.B.	15158	From Hotel Windsor pipes to hotel from reservoir, fed by spring in rock.		405·0	310·0	95·0
15	do	15159	From Dorchester Penitentiary; source, spring reservoir (Dr. Mitchell, surgeon of prison).		155·0	104·0	51·0

collected during the month of June, 1897.

Phenomena on Ignition.	Nitrogen (per million). As Albuminoid Ammonia.	Nitrogen (per million). As Free and Saline Ammonia.	Nitrogen (per million). As Nitrates and Nitrites.	Chlorine in Chlorides (per million).	Phosphates.	Oxygen (per mill'n) consumed by Organic Matter at 27° C. In 15 minutes.	Oxygen (per mill'n) consumed by Organic Matter at 27° C. In 4 hours.	Bacteriological Data. Number of Colonies per 1 cbc.	Bacteriological Data. Number of Varieties.	Remarks.	Serial Number.
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.				
Blackened	·102	·048	....	.....	None.	2·280	3·930	.....	....	Is not a well water; same water examined in 1888; see Bull. 5, p. 10—Is highly contaminated with vegetable matter, but may be harmless.	1
	·156	·025	0·569	Trace.			3·670				
Slight blackening	·060	·056	....	....	None	0·805	1·829	.....	....	Of questionable purity; nitrogen, chlorine and absorbed oxygen combine to suggest sewage infiltration; the history of this supply should be looked into.	2
	·040	·135	1·325	8·0			1·700				
do	·036	·044	....	....	None.	0·066	0·279	1350	5	Is apparently a good water.	3
	·027	·030	1·719	6·0			0·040				
do	·150	·058	....	6·89	...	0·977	1·955	.....	....	Free and albuminoid nitrogen too high, also the vegetable (?) organic matter; cannot be considered a pure water.	4
	·102	·105	3·793	6·0			1·640				
Blackened	·144	·032	....	20·69	.....	1·610	3·003	.....	....	Albuminoid, nitrogen and organic matter are too high; the excessive chlorine is probably in part of sewage origin; is an undesirable supply.	5
	·115	·020	1·750	18·00			3·060				
do	·096	·054	.....	....	None.	0·766	1·590	....	....	May be considered passable, but cannot rank first-class.	6
	·036	·012	0·277	Trace.			1·413				
Slight blackening	·174	·020	.....	349·11	None.	1·980	2·183	... ...	....	Is evidently impure.	7
	·127	·027	5·291	340·00			1·000				
Blackened	·126	·080	..	4·31	None.	1·571	2·776	.....	....	Impure.	8
	·149	·095		2·00			2·667				
....	.....	·034	.....	....	....	.....	.....	4845	....	Is probably a good water.	9
	·027	·020	2·253	22·0			0·200				
....	·136	·070	..	.....	.....	.....	.....	5968	....	Is decidedly suspicious and probably impure.	10
	·119	·020	5·611	10·0			0·840				
.....	.....	.....	.....	..	.....	.....	.....	6127	....	do do ..	11
	·140	·040	1·660	6·0			1·750				
.....	·030	....	....	....	.....	.....	.....	8830	....	Is apparently a good water.	12
	·042	·018	0·668	6·0			0·060				
....	·049	....	....	....	.....	.....	.....	2817600	...	Is probably a good water; the exceedingly high bacteria is the result of multiplication of colonies after collection.	13
	·035	·020	5·175	10·0			0·120				
.....	.....	.....	.....	...	.....	.....	.....	12969	6	Is probably a good water.	14
	·067	·015	1·918	10·0			0·760				
....	·029	....	....	....	.....	.....	.....	4930	4	A good water.	15
	·025	·050	0·335	0·0			0·130				

RESULTS of the Examination of 61 Samples of Water

Serial Number.	Locality.	Collector's Number.	Source.	Physical Characters.	Total dissolved Solids		
					Dry at 160° C.	After Igniting.	Loss.
			Official Analyst—Dr. M. Fiset, Quebec.		p. c.	p. c.	p. c.
16	Beauport, P.Q.	10	Taken from well at the school house, Cote des Pères.	Chalky white from suspended matter, but settles clear and colourless.	344·0	244·0	100·0
17	Sillery Cove, P.Q	11	Sample taken from public well, Bowen's Cove, Sillery, P.Q., opposite residence of Thos. Fumy.	Clear; no smell.....	88·0	52·0	36·0
18	do ..	12	Sample taken from public well, Spencer's Cove, Sillery, P.Q., nearly opposite house of L. Demers.	Brownish tint.....	172·0	132·0	40·0
19	Bienville, P.Q..	13	Sample from public well, main road.	Greenish tint; no smell	344·0	224·0	120·0
20	Lévis, P.Q.....	14	Sample from public well, St. Margaret Street, near Wolfe Street.	Clear; no smell.....	396·0	236·0	160·0
21	do	15	Sample from public well at No. 3 Police Station, Chabot Street.	do	268·0	168·0	100·0
22	St. David, Lévis Co.	16	Sample from public well.....	Clear on standing.....	160·0	100·0	60·0
23	Hadlow's Cove..	17	Sample from well in yard of L. Langlois.	Clear; no smell.	152·0	88·0	64·0
			Official Analyst--Dr. J. B. Edwards, Montreal.				
24	Sault au Recollect, P.Q.	1	Sample from tap in Pelogmin's Hotel, pumped from the River de Prairies to a tank on his premises.	Clear, with slight sediment; peaty orange colour.	58·0	28·0	30·0
25	Mount Royal Vale.	2	Taken from pump on premises of Thos. Overing.	Tinge of green.....	716·0	536·0	180·0
26	Cote des Neiges, P.Q.	3	Taken from public well, Mountain avenue; well supplied from spring on Mount Royal, ⅛ of a mile distant.	Clear white; no sediment.	350·0	244·0	106·0
27	Cartierville, P.Q.	4	Taken from well on premises of C. Lagasse.	Clear; greenish.	678·0	412·0	266·0
28	St. Laurent, P.Q.	5	Taken from well on premises of A. Gobier.	Greenish; sediment of brownish colour.	1398·0	1176·0	222·0
29	do ..	6	Taken from tap on premises of H. Beaubin, supplied from a spring at Côte des Neiges, 2½ miles distant, conveyed through wooden pipes.	Clear bluish white; slight sediment.	348·0	270·0	78·0

collected during the month of June, 1897—*Continued.*

Phenomena on Ignition.	Nitrogen (per million). As Albuminoid Ammonia.	Nitrogen (per million). As Free and Saline Ammonia.	Nitrogen (per million). As Nitrates and Nitrites.	Chlorine in Chlorides (per million).	Phosphates.	Oxygen (per mill'n) consumed by Organic Matter at 27° C. In 15 minutes.	Oxygen (per mill'n) consumed by Organic Matter at 27° C. In 4 hours.	Bacteriological Data. Number of Colonies per 1 cbc.	Bacteriological Data. Number of Varieties.	Remarks.	Serial Number.
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.				
.....	·029	·024	2·500	10·10	None.	.....	0·230	5400	7	Is apparently a good water.	16
	·025	·022	2·453	10·00			0·250				
.....	·056	·038	1·390	3·50	None.	.....	0·240	.....	....	do do	17
	·055	·040	1·245	3·30			0·250				
Slight blackening	·049	·022	2·400	6·30	None.	.....	0·590	.....	....	do do	18
	·042	·018	2·340	6·00			0·620				
do ..	·149	·041	2·500	33·0	None.	.....	2·500	1498	6	Albuminoid nitrogen, together with other data, points to sewage contamination.	19
	·160	·035	2·455	33·0			2·560				
do ..	·080	·044	1·900	40·0	None.	.....	1·200	3017	8	Is not above suspicion, but cannot be absolutely condemned on analytical data; history should be looked into.	20
	·073	·040	1·887	40·0			1·120				
....	·060	·025	3·100	16·9	None.	.....	0·900	.....	....	Is apparently a good water.	21
	·054	·020	3·126	17·0			0·880				
Blackened	·049	·059	1·399	11·1	None.	.....	0·600	6465	7	Is possibly a safe water, but cannot be ranked as first class; history should be looked into.	22
	·050	·064	1·486	11·0			0·620				
Slight blackening	·052	·019	1·100	22·2	None.	.....	0·900	.....	....	Is probably a good water...	23
	·052	·020	1·078	22·0			0·880				
Blackened	·142	·023	0·188	4·0	Trace.	2·420	4·590	7866	6	Vegetable matter too high, but may be a safe water.	24
	·124	·032	.....	Trace.			5·000				
Slight blackening	·124	·017	2·860	28·0	Trace.	0·041	0·965	1932	5	Is decidedly suspicious; albuminoid nitrogen, and other data, suggest sewage contamination.	25
	·124	·036	2·500	26·0			0·730				
Blackened	·062	Tra's	1·938	10·0	Faint	0·095	0·266	11582	5	Is probably a good water; large number of bacteria colonies, due to improper collection and storage of sample.	26
	·024	·046	2·830	6·0	trace.		0·210				
Blacken'd and remained brown.	·115	·040	. .	74·0	Hea'y	0·315	0·493	2653	....	Of doubtful and suspicious character, and almost certainly contaminated with sewage.	27
	·045	·020	7·895	72·0	traces		0·330				
Blackened	·110	006	2·984	251·0	Hea'y	1·233	2·775	7914	9	do do ..	28
	·157	·015	2·108	260·0	traces		2·120				
arkened	·156	·010	.....	.....	Trac's	0·205	0·260	5800	4	Of somewhat doubtful quality; the duplicate samples have not been well taken, or long keeping has produced change in the nitrogen compounds.	29
	·030	·073	2·557	4·0			0·111				

RESULTS of the Examination of 61 Samples of Water

Serial Number.	Locality.	Collector's Number.	Source.	Physical Characters.	Total dissolved Solids		
					Dry at 100° C.	After igniting.	Loss.
			Analyst—Dr. J. B. Edwards—Con.		p. c.	p. c.	p. c.
30	St. Lambert, P.Q.	7	Taken from pump at well on the premises of W. Darling, Victoria avenue.	Clear; slight tinge of green; slight reddish brown deposit.	584·0	490·0	94·0
31	St. Lambert, P.Q	8	Taken from well in yard of the premises of D. Dion, Victoria Avenue.	Clear, with greenish tinge.	478·0	362.0	116·0
32	Outremont, P.Q.	9	Taken from well on farm of Dr. McEachran, adjoining municipal hall. *Official Analyst—Dr. F. X. Valade, Ottawa.*	Clear, bluish tinge; slight deposit.	354·0	246·0	108·0
33	Aylmer, P.Q....	1	Taken from well in Ogilvie Hotel yard; source, spring.	Clear, pale straw colour	1420 0	570·0	850·0
34	Hintonburgh, Ont.	2	Taken from well in public school yard; source, spring.	Clear and colourless...	490·0	262·0	228·0
35	Janeville, Ont ..	3	Taken from well in Mr. McFadden's yard; source, spring.	Clear and colourless...	1636·0	970·0	666·0
36	Ottawa East, Ont	4	Taken from well No. 10 Centre street; source, spring.	Clear and colourless...	740·0	440·0	300·0
37	Billings' Bridge, Ont.	5	Taken from well in Mr. Linton's yard; source, Rideau River.	Clear and colourless...	370·0	200·0	170·0
38	Clarkston, Ont..	6	Taken from A. Rheaume's well; source, Rideau River.	Clear, pale straw colour. Taste slightly saline.	1660·0	1094·0	566·0
39	Britannia, Ont..	7	Taken from well on Mr. McGee's premises; source, Deschenes Lake.	Clear, straw colour; contains water fleas, chiefly Daphnia.	440·0	170·0	270·0
40	Billings' Bridge.	8	From well in Mr. Larochelle's premises; source, spring. *Official Analyst—Dr. W. H. Ellis, Toronto.*	.....	.....	.....	....
41	Elora, Ont... ..	1	From J. Jones' well, Pilkington Township.	Clear, faint green; hardness 13° to 6° on boiling	330·0	210·0	120·0
42	do	2	From T. L. Biggars' well..... ...	Fairly clear; peaty colour; hardness, 5°.	140·0	60·0	60·0
43	Fergus, Ont	3	From well on J. Morrow's premises.	Clear; slight sediment; greenish yellow; hardness, 42·5° to 16°.	1050·0	790·0	260·0
44	do	4	From public fountain on the main street; source, from a spring 100 yards from the fountain.	Clear; very faint green. Hardness, 26° to 10·5°	540·0	410·0	130·0

collected during the Month of June, 1897.—*Continued.*

(per million).	Nitrogen (per million.)			Chlorine in Chlorides (per million).	Phosphates.	Oxygen (per mill'n) consumed by Organic Matter at 27° C.		Bacteriological Data.		Remarks.	Serial Number.
Phenomena on Ignition.	As Albuminoid Ammonia.	As Free and Soluble Ammonia.	As Nitrates and Nitrites.			In 15 min.	In 4 hours.	Number of Colonies per 1 cbc.	Number of Varieties.		
	p. c.	p. c.	p. c.	p. c.		p. c.	p. c.				
Much blackening; odour of SO_2.	·174	·005	. . . .	101·0	Hea'y	2·432	3·670	.....	....	Is decidedly impure.....	30
	·125	·053	0·372	100·0	trace.		2·600				
Much blackening.	·146	·024	.....	17·0	Slight	0·357	0·714	.....	....	Of suspicious character. The low amount of nitrates may be due to reduction of these; must be considered as of doubtful quality.	31
	·065	·052	0·133	18·0	trace.		0 470				
Blackened....	·064	·005	....	10·0	Trace.	0·467	1·010	.....	...	Probably a good water, although the trace of phosphates found, with other data, points to past sewage contamination.	32
	·046	·025	1·793	8·0			0·840				
Darkened....	·310	·040	5·290	210·0	Trace.	3·064	5.872	30000	6	A very impure water..,....	33
	·325	·040		204·0			7 520	20370			
Darkened.....	·077	·027	4·260	9·0	None.	0.294	0·848	4360	7	Is of doubtful q'ality but may not be absolutely unsafe.	34
	·135	.095	2·430	8·0			0.750	455			
No charring....	·092	·053	5·655	237·0	None.	0·334	0·795	7392	8	Is of very doubtful quality but may not be unsafe. There is evidence of extensive past sewage contamination. History should be looked into.	35
	·030	·015	7.955	234·0			0·750	1800			
No charring	·110	·017	.....	68·0	Slight	0·789	2.020	5764	6	Must be considered as of very suspicious and doubtful quality.	36
	·111	·012	8·077	62·0	trace.		1·900				
No charring	·038	·027	2·667	8·0	Slight	0·107	0·309	144000	....	Is a good water. The high bacteria first found, due to long keeping of the sample, improperly collected.	37
	·042	·040	3·468	6·0	trace.			720			
Charred...	·505	·067	1·464	463·0	None.	2·533	5·250	4158	7	A very objectionable water.	38
	·442	·185	0·798	462·0			3·800	1920	5		
Charred.....	·463	·213	3·785	57·0	Trace.	5·213	8·792	62060	8	A very bad water..	39
	·493	·142	4·685	66·0			9·250	38900			
.....	.....	... .	. ..	.....	... ...	.....	.....	165000	5	The bacterial examination condemns this water. A chemical analysis was not made.	40
								43900			
.....	·040	·060	....	10·0	None.	.....	0·296	... .	.. .	A good water..... .	41
.....	·560	·850	.. ...	2·0	None	6·420	12·660	.....	....	Impure. Contains a large amount of organic matter, chiefly of vegetable origin, in all probability.	42
.....	0·350	2·640	3·960	170·0	None.	5·524	8·400	.....	.....	Very impure. Recent sewage pollution indicated.	43
....	Tr'ce	Tr'ce	...	34·0	None.	.. .	0·296	.....	... .	Very good...	44

RESULT of the Examination of 61 Samples of Water

Serial Number.	Locality.	Collector's Number.	Source.	Physical Character.	Total dissolved Solids		
					Dry at 100° C.	After Igniting.	Loss.
			Official Analyst—Dr. W. H. Ellis, Toronto—Con.		p. c.	p. c.	p. c.
45	Arthur, Ont....	5	From Royal Hotel pump; source spring.	Turbid; greyish green. Hardness, 16° to 8·5°.	780·0	600·0	180·0
46	Arthur, Ont....	6	Taken from well in Commercial Hotel yard. Source spring.	Clear, some sediment slight brown colour; hardness 48° to 14°.	1250·0	970·0	280·0
47	Orangeville, Ont.	7	From tap in store of M. Stephenson, druggist; Source, spring 2 miles distant, brought by iron pipes.	Clear, faint green. ...	270·0	160·0	110·0
48	do	8	From well at the Gordon House Hotel; source, spring.	Turbid, greenish, grey; hardness 22·5° to 14°.	920·0	690·0	230·0
			Official Analyst—F. T. Harrison, London, Ont.				
49	Seaforth, Ont...	1	From a well on Dr. Stones' premises.	Clear and almost colourless.	650·0	480·0	170·0
50	Mitchell, Ont...	2	From corporation well on the banks of the river.	Slightly turbid, with a yellowish tinge.	335·0	245·0	90·0
51	Clinton, Ont....	3	From well on O. Johnston's premises.	Fairly clear and only a faint tint of colour.	335·0	300·0	35·0
52	Exeter, Ont. ...	4	From well on T. W. Hawkshaw's premises.	Clear and practically colourless.	410·0	315·0	95·0
53	Port Stanley ...	5	From well at Fraizer Hotel, a summer resort; well on top of a hill 300 ft. above Lake Lavel.	Clear and colourless ...	1,500·0	1,140·0	360·0
54	St. Thomas, Ont.	6	From tap in Eagan Bros. (grocers) store; source "Kittle Creek."	Clear and colourless....	245·0	150·0	95·0
55	London, W.....	7	From a pump in Mrs. Tillman's yard; source, spring.	Clear and colourless....	640·0	460·0	180·0
			Official Analyst—Prof. E. B. Kenrick, Winnipeg, Man.				
56	Winnipeg, Man.	1	From pump corner of Arthur and Notre Dame Sts.	....	1123·0	1002·0	121·0
57	do	2	From pump corner of Hargrave and St. Mary streets.	....	1235·0	1131·0	104·0
58	St. Boniface....	3	From pump at St. Boniface Town Hall.	.....	804·0	670·0	134·0
59	West Selkirk...	4	From Town pump.....	....	625·0	461·0	164·0
60	Stonewall.	5	From public pump at Bruce and Rutherford's flour mill.	.....	617·0	430·0	187·0
61	La Salle.....	6	Taken from La Salle river.....	.....	732·0	585·0	147·0

collected during the month of June 1897.

(per million).	Nitrogen (per million).					Oxygen (per mill'n) consumed by Organic Matter at 27° C.		Bacteriological Data.			
Phenomena on Ignition.	As Albuminoid Ammonia.	As Free and Saline Ammonia.	As Nitrates and Nitrites.	Chlorine in Chlorides (per million.	Phosphates.	In 15 minutes.	In 4 hours.	Number of Colonies per 1 cc.	Number of Varieties.	Remarks.	Serial Number.
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.				
....	0·140	0·000	. .	130·0	None.	1·792	3·192	.....	....	Impure.....	45
.....	·120	·040	1·160	330·0	None.	1·104	1·956	.....	....	Of doubtful purity.	46
... .	None	None	1·000	4·0	None.	None	None	.....	....	A good water.	47
....	.120	·040	1·200	13·0	None.	0·576	0·888	.....	....	Of doubtful purity.	48
Slight darkening	·120	·065	6·220	61·0	Trace.	0·394	0·775	5,222	7	do	49
	·087	·030	5·983	60·0		....	0·700				
do	·060	·210	....	2·75	Slight	0·149	0·530	.....	....	Of doubtful purity; although contamination by sewage cannot be in large amount.	50
	·020	·160	1·153	Trace	Trace.	.....	0·400				
No darkening..	·016	·049	2·510	30·5	None.	0.095	0·313	4,011	6	Probably a good water.	51
	·033	·052	1·695	26·0		.....	0·250				
Slight darkening	049	·033	1·850	36·0	None.	0·190	0·639	.....	....	A good water.	52
	·055	·010	1·265	30·0		.....	0·560				
No blackening..	·049	·025	0·041	5·5	Slight	0·218	0·599	.....	....	Of suspicious character, although contamination by sewage cannot be in large amount.	53
	·045	·030	0·075	6·0	Trace.	.....	0·560				
Blackened	·107	·033	0·124	1·5	None.	0·980	2·190	.....	....	Of decidedly suspicious character.	54
	·107	·035	0·358	1·0		.....	2·190				
No blackening..	·033	·016	10·320	43·0	Slight	0·177	0·530	.....	. .	Of suspicious character and probably contaminated with sewage.	55
	·065	·133	6·282	40·0	Trace.	.....	0·600				
....	·020	·050	.... .	291·0	.....	0·120	0·140	2450	4	A good water.	56
....	trace	·020	... .	340·0	.....	0·100	0·120	2096	4	do	57
....	trace	·060	.....	244·0	.....	0·110	0·140	17180	4	A good water. High bacteria due to improper collection and long keeping of sample.	58
....	·030	trace	.....	23·0	.....	0·180	0·220	9415	4	A good water.	59
....	·060	trace	.....	51·0	... .	0·260	0·410	107800	6	A good water. High bacteria due to improper collection and long keeping of the sample.	60
... .	·250	·010	.....	128·0	. ...	.....	.....	4816	5	Of decidedly suspicious character.	61

THOMAS MACFARLANE, Esq.,
Chief Analyst.

SIR,—I have the honour to submit you herewith the results of analysis of 61 samples of Well Waters collected at various points throughout the Dominion.

The numerical results are given for the most part in two horizontal lines of figures after the name of each sample. The first of these lines contains the analytical results obtained by the District Analyst, the second line those obtained by myself upon a duplicate sample collected at the same time as that sent to the local analyst. An examination of the results of analysis shows that 24 samples are apparently good and safe waters; 13 samples are clearly bad and unsafe; while 24 samples may be considered doubtful, so far as these results are concerned.

It has not been possible for me to check the samples by a complete analysis in any case. The large number of them, and the demands of other work, made it necessary that I should content myself by making certain more important determinations only, viz.:—Nitrogen as ammonia, albuminoid ammonias and nitrates:—Chlorine, and Oxygen consumed by organic matter in 4 hours. In addition to these the District Analyst has generally given: Total dissolved solids; phenomena on igniting the dry solids and loss of weight on igniting the same; phosphates; oxygen absorbed by organic matter in 15 minutes; together with such physical characters as colour, smell, clearness, &c. I am personally responsible for the opinion expressed; although in most cases it agrees with that of the District Analyst.

The last work done by this department on well waters was in 1889, and the results of that work are published in Bulletin 13.

Water is undoubtedly the most important of all food substances, and the necessity of assuring ourselves of the safe and wholesome character of the water which we use for food purposes will readily be granted by everybody. Like many another matter whose importance is universally admitted, we are, however, too apt to assume, without proof, that all is satisfactory; or leave to others the responsibility of attending to it.

When we consider that every water supply originates with rain, and is nothing more than rain water variously collected and stored; that the gathering ground is the surface of the earth itself, and the storage either some natural or artificial excavation to which water finds access from higher levels; when further we consider how large a proportion of the earth's surface is made up of manured fields, town and village streets, country barn-yards, pasture fields, etc., it becomes really a source of wonder that our great water courses are so little tainted as they are. And even when the gathering ground is mainly the untilled land of the back settlements and of the virgin forest, it is still to be remembered that the decaying vegetable matter of these regions, the peat-bogs, marshes and swamps, must cause the water there originating to have an amount of organic matter in solution which differentiates it sharply from pure water.

In the case of cities and larger towns which are supplied from a single source—generally a lake or river—it is comparatively an easy matter to ascertain from time to time the character of the supply. Any conditions likely to alter its nature, as the inflow of sewage, the establishment of manufactures, the decay of conduits, etc., are matters of municipal importance, and are generally looked after by the citizens or their representatives.

It is quite otherwise in the case of village supplies, and the wells throughout the farming districts. Each particular supply has its own character; and while one may, in general, safely assume that a farm well is a wholesome food supply, this is by no means universally true.

The writer has known one case where typhoid fever broke out year after year in a farm house in central Ontario. The house was comparatively new; large, well-built and in every way unexceptionable. Examination showed that it was built on the site of an old log house, which it had replaced, just as the old log stables and other out-buildings had long given place to very fine and commodious buildings of modern plan. But the well which had supplied the original settlers, and which was situated between the barns and house, still continued to be the source of domestic supply. It had an iron force pump in place of the old-oaken-bucket, but was otherwise unchanged. Analysis

showed the water to be absolutely unfit for use. The ground around the well had been in cultivation, or in use as door-yard and stable-yard, for seventy years, and was fairly saturated with nitrogenous matter of animal origin. There can be no doubt that the debilitated condition of the inmates of this house was due entirely to the use of a poisonous water supply. And it is by no means to be believed that this is a solitary, or even a rare instance of its kind.

Of course it is impossible that anything like a systematic and comprehensive examination of all the wells in the country should be undertaken by the Department of Inland Revenue, or by any other department of the government. This is a duty which must devolve primarily upon the particular owners and users affected. But the danger of using a polluted water supply does not end with the immediate consumer. All the residents of any locality are affected by the outbreak of typhoid fever, diphtheria, cholera, or other contagious disease within its limits, and are, in consequence, secondarily interested in the condition of any contaminated water supply through which the disease may be spread.

It is with a view to awakening the attention of owners and users of wells to the importance of having them looked after, that this work has been done. People assume, too frequently, that water used as a domestic supply is all right, when in truth, the facts are quite otherwise. It cannot be too emphatically stated that, although clearness, coldness, colourlessness and palatability should be insisted upon, they are no guarantee of the purity of a water supply. It has again and again been found by our collectors that the utmost confidence in the purity and wholesomeness of a water supply has existed where the analysis of the sample has proved dangerous contamination.

As has already been remarked, the analyses now published, of the 61 wells from which samples have been taken by the departmental collectors, cannot be held to represent in any comprehensive sense, the average well water supply of the country. To do this would require the collection and analysis of at least a hundred times the stated number of samples, yet it is fair to note that the samples lately analysed have, in most cases, been taken from wells used by more than a single family. Thus, wells in hotel yards, which are used by the patrons of the hotel, wells belonging to public institutions, prisons, schools, etc., have furnished most of the samples.

Since the main object of this examination of well waters is to call the attention of those immediately concerned to the importance of ascertaining the purity and wholesomeness of the supply they use, it seems both justifiable and desirable to make the meaning of our analytical work as intelligible as possible. With this in view, I propose to interpret in as simple language as I can, the numerical data upon which the chemist and bacteriologist form their opinions, giving such collateral information as may be necessary.

While the performance of the actual analysis of a water sample demands the greatest skill and patience on the part of the analyst, it is not, by any means, beyond the comprehension of any thoughtful person to understand why he proceeds as he does, or on what grounds he reaches a certain conclusion, for, while, in matters of detail, it is quite true that experts themselves are not unanimous, it is altogether wrong to suppose that they disagree on the main issues.

A water supply may become actively and acutely poisonous by containing (1) mineral matter, salts, &c., of a toxic kind, (2) definite organic poisons, such as strychnine, (3) organic ferments or germs of a morbific kind, as the typhoid, cholera or other bacilli. The only mineral poisons which are likely to occur in drinking supplies are the salts of arsenic, zinc, copper or lead; and these, with the exception of the last named, are only likely to find access to wells or streams when manufactures, employing these substances, are established in the vicinity, and allowed to run their waste into the water courses. Lead may be present in a water supply in consequence of lead service pipes; but danger only exists from this source when the water is soft, *i.e.*, practically free from sulphate of lime and magnesia. This is a condition so very rare in the case of well waters that we need scarcely discuss the matter further. The second class of poisons never occur naturally in Canadian waters; although it may be possible that certain poisonous water supplies in tropical countries owe their toxic proper ties, at certain seasons of the year, to poison of this kind

The presence of morbific germs, or bacilli, has again and again been demonstrated in the case of well waters where users of the water have been afflicted with typhoid fever, Asiatic cholera, and other diseases; and the presence of such bacilli has, in numerous cases, been shown to be due to the dejecta of patients finding entrance to the water supply. There is, therefore, no question as to the actively poisonous character of a well water in which bacteriological work has demonstrated the presence of the specific bacterium of disease.

But it is to be remembered that, in the first place, many diseases are believed to have their origin in physiological disturbance caused by bacteria, which bacteria, have either not been identified as the source of the disease, or are so little differentiated from other bacteria by size, shape, and other characters, as to make it impossible to distinguish them from the numerous species of apparently harmless bacteria found in nearly all natural waters. So that, while nothing can be more satisfactory in establishing the positively dangerous nature of a given supply than the demonstration in it of specific disease germs, it is certain that the vast majority of really poisonous waters would never be detected if we relied only upon this direct evidence of contamination.

It is clear, however, that wherever these germs are present, sewage has had access. By sewage is meant water containing waste matter of any kind which has had an animal, and particularly a human origin. And in the interest of public health, it is universally conceded that any well water which can be proved to contain sewage must be considered unsafe. It is true that normal human sewage may be present, to a small amount, in water, and yet this water be used with apparent impunity. The experiment has been tried; but even its success has failed to convince the public mind that sewage contamination of drinking supplies should not be condemned. For apart from the æsthetic view of the subject,—a view which has well established scientific justification—we have no guarantee that sewage shall remain normal. Specific disease germs may at any time appear in it, and the only safety is in strictly prohibiting its entrance into drinking supplies. The question of examining a well water resolves itself therefore into the detection of sewage in it.

The chief characters of sewage are as follows: (1.) Chlorine, from the common salt so largely used with all human food, and also from the waste tissues of the body. Hydrochloric acid is a normal constituent of the gastric juice. (2.) Nitrogen, from the waste tissues of the body, all tissues containing nitrogen; as well as from the undigested portions of human food, which is very largely nitrogenous. (3.) Phosphoric acid, a constant constituent of bone and nervous tissue; and, of course, largely present in human food. (4.) Organic matters, generally of a more or less unstable kind, and undergoing changes which we call decomposition.

Before describing in detail the methods by which the analyst looks for these various components of sewage, it is necessary to point out that, consistently with the ever changeful processes of nature, such changes are constantly taking place as completely alter the character of sewage, once it has diffused itself through soil or through water. The nitrogen which is present in animal tissues in very complex (so-called proteid or albuminoid) compounds, comes to exist in much simpler combinations, known as organic ammonia, ammonia (*i.e.* spirit of hartshorn), nitrous acid, or as nitric acid; these acids combined, of course, with ammonia, or other alkali. Under certain circumstances (in presence of reducing agents) the nitric acid may be reconverted into ammonia; and when it is remembered how volatile ammonia is, either *per se*, or in certain of its salts (sal. volatile, or smelling salt is the carbonate of ammonia), it will be easy to understand how the nitrogen of sewage may altogether disappear from a water sample which originally contained sewage. Phosphoric acid, again, forms insoluble compounds with several substances (notably iron and alumina) which are present in the soil, and thus the phosphoric acid of sewage may be removed from a water by precipitation. Organic matters are changed by oxidation, the carbon forming carbonic acid, and escaping or becoming undistinguishable from the carbonic acid of mineral carbonates, while the hydrogen forms water. The only constituent of sewage, therefore, which persists in spite of changed conditions, is the chlorine. Unfortunately chlorine is too widely present in the soils to make its detection in water a certain evidence of its sewage origin. It follows from this that, while the presence of nitrogen, phosphoric

acid, chlorine and decomposing organic matter in water is, under certain conditions to be farther explained, very conclusive evidence of sewage pollution, the failure to detect some or all of these (chlorine excepted) is no proof that sewage contamination has not taken place.

When, however, we find that such changes have taken place in sewage as to practically destroy it, we may consider that the water supply is, to all intents and purposes, quite good and wholesome, and may be considered safe, provided it be shown that recent sewage is entirely excluded.

These natural purifying processes are essentially brought about through oxidation, *i.e.*, the combination of atmospheric oxygen with the elements of the objectionable organic matter contained in the sewage. This oxidation is, no doubt, in part a simple and direct combustion, at a low temperature, analogous to phosphorescence. But it is a well established fact that oxidation in the soil and in water is mainly brought about through the agency of bacteria, and other minute organisms found there. And this is particularly true of the oxidation of organic nitrogen to nitric acid. So that the mere detection of bacterial life in water (or in soil) is no proof that such water is pathogenic in the strict sense. At the same time it is certain that the purest waters naturally occurring show comparatively small numbers of colonies, and certain artesian well waters are absolutely sterile. Good well waters, *i.e.*, those known to be free from sewage, seldom or never give more than 1,000 colonies per cubic centimetre; and it is certain that any well water giving as many as 5,000 colonies per cubic centimetre should be looked upon as very suspicious. Such a sample will generally show evidence of sewage admixture on analysis, and although it may not be possible to demonstrate the actual presence of a specific disease germ, it is evident that favourable conditions for bacterial growth are present, and only inoculation is needed to make such a water acutely poisonous.

The bacteriological examination of the 61 samples now tabulated, has been made by Dr. A. Lehmann, late of Leipzig. In many cases the sample, as ordinarily collected, has been used for making the cultures. This greatly invalidates their accuracy since the sample is necessarily kept for some days before it becomes available in the laboratory, and this period may be extended into weeks in certain cases, *e.g.*, the Manitoba samples. Thus the results of culture may be entirely misleading. As a check upon these results, Dr. Lehmann has made special collections in a number of cases; taking the samples in sterilized bottles, and making the cultures without delay. The results of such work are given in the second line under each sample, and the possible magnitude of the error involved is well seen in No. 37, where the ordinary collection gave 144,000 colonies per 1 cbc, while a sample properly collected gave only 720.

The specific identification of the typhoid, diphtheritic, cholera or other morbific bacterium has not been made in any case.

The bacteriological results are, as a rule, corroborative of those obtained by chemical analysis.

When a sample of well water is taken and bottled and kept for some time at a higher temperature than that of the well, the bacteria multiply very rapidly. Under given conditions, this growth would reach a maximum limit, depending, together with other factors, upon the specific character of the bacteria present, the temperature and volume of the water, and the amount of nutriment contained in it. This matter needs further investigation, since, if the growth were demonstrated to be approximately relative to the number of bacteria originally present, it would enable a certain value to be placed upon results of culture, even where special care had not been exercised in taking the sample. Dr. Lehmann has made a study of some cases in this regard, and his results are given in the following table:—

COLONIES PER ONE CBC.

Description.	In samples as ordinarily collected and kept for 1-3 weeks at room temperature.	In sample properly collected and examined without delay.	In same sample after keeping at room temperature for one month.
1. Aylmer, No. 33	30,000	20,370	9,970
2. Campbell's Well	.....	513	5,250
3. Hintonburg, No. 34	4,360	455	4,760
4. Janeville, No. 35	7,392	1,800	3,760
5. Billings' Bridge	144,000	720	10,080
6. Larochelle's Well	.....	165,000	43,900
7. Clarkstown, No. 38	4,158	1,920	3,290
8. Morgan's tap	.....	1,736	2,865

In numbers 2, 3, 4, 5, 7 and 8 of the preceding table the expected multiplication of colonies occurs on keeping the sample, although the rate of increase for the period selected is by no means uniform. In samples 1 and 6 a very remarkable decrease in the number of colonies is noted on keeping for a month. This is quite consistent with what is known of these lower life forms, the products of their growth being found to be ultimately prohibitive of further development, and acting as poisons in their regard. It is to be inferred, not that an increase did not occur on keeping, but that this increase reached and passed its maximum before the termination of the period named.

The number of different species of bacteria present is an important element in the conclusions of the bacteriologist. Where the number of species is large the indications are more unfavourable than when the reverse is the case. The distinction between one species and another is made by noting the size, form and mode of growth of the colonies; whether or not they cause liquefaction of the nutrient medium, produce colour or fluorescense in it, evolve gas, etc.; and by the use of the microscope and staining media.

Dissolved Solids—This term includes the whole of the organic and inorganic matter held in solution by a well water and left as a residue when the water is carefully evaporated till the residue attains a constant weight at 100° C (=212° Fah.) The residue is chiefly made up of mineral matter, *e.g.* carbonates, sulphates and silicates of lime and magnesia, chloride of sodium, and occasionally other salts, but invariably contains traces of organic matter and possibly ammonia salts, nitrates, &c., which have had an organic origin. Traces of organic life, bacteria, &c., of course are present in this residue, but can scarcely be said to add to its amount, as the exceedingly minute increment due to their presence is much less than the unavoidable experimental error involved in measuring, drying and weighing.

Unless the amount of dissolved solid matter be excessive, say above 1,200 parts per million, its estimation cannot be held to be a factor of great importance in diagnosing the character of a water supply. The English Commission of 1868 gives the term *total solid impurity* to this figure because the solids in solution are "quite useless, and they act injuriously in many of the processes to which water is applied." There is no evidence to support the contention that calculi owe their origin to lime salts in drinking water. An excessive amount of solid matter, especially when magnesia is largely present, may tend to give aperient qualities, or otherwise to bring about disturbance of the digestive functions; but even this cannot be said to be unequivocally established.

Phenomena on Ignition.—When the dry solids are heated gradually to redness, the organic matter is charred, and blackened, water of crystallization is given off as steam, carbonic acid gas is evolved from earthy carbonates, ammonia salts are decomposed with loss of ammonia, and if nitrates are present, red acrid vapours are produced by the reaction of the acid upon the organic matter. If nitrates are present in notable quantity, slight explosions with scintillation may take place. Interaction of nitrates with chlorides may cause the evolution of chlorine; and if the temperature be raised to bright redness, alkaline chlorides may be volatilized. Many other phenomena may

occur in special cases; and all of these appearances have their value to the analyst, and often suggest to him a method for the further examination of the sample.

Loss of weight on igniting.—It will be evident from what has just been said that the loss of weight sustained by the solids on igniting is due to very complex changes, and cannot be attributed to the dis-appearance of any single component. On this account many analysts ignore the datum altogether; but I think this going too far. The operation must be performed if only for its qualitative significance; and the weighing is easily made. In this connection it is worth while to quote the well-known and very high authority A. H. Allen (See Analyst, II., 63) "I believe the actual loss of weight is not without its value. In a good water the loss on ignition is rarely more than one-fifth of the total weight of the residues."

Organic Nitrogen.—Organic matter having an animal origin is distinguished from that having a vegetable origin by its greater percentage content in Nitrogen. It is not to be understood that vegetable organic matter contains no nitrogen. The seeds of all plants contain this element; and water which has been collected on upland, marshy grounds, although practically uncontaminated by animal waste, yet containing large amounts of vegetable matter is found, to yield considerable and even high amounts of nitrogen to analysis. This is notably true of the water of the Ottawa river, which contains 0·20 to 0·30 of organic nitrogen per million parts, estimated as ammonia and compound ammonias, and about the same amount in the fully oxidized condition, as nitric acid.

Such river and lake waters are, however, sharply distinguished from deep well waters; and the example of the Ottawa river cannot be used to interpret any such results in organic nitrogen found in the case of a well.

For a well should not contain surface water, as a river or lake does. Well water should have undergone a natural filtration, by having passed through several or many feet of sand, gravel or other porous material; and in this filtration, by the action of atmospheric oxygen contained in the soil, aided by the pressure of nitrifying bacteria already mentioned, any nitrogenous impurities which it originally contained will have been either separated entirely (perhaps taken up by vegetation), or will have been completely oxidized to nitrates. The presence of comparatively small amounts of nitrogen either as free and saline ammonia, or as so called albuminoid ammonia, is therefore the worst possible indication that a well-water can give. Such nitrogen proves the infiltration of either fresh sewage, or sewage which has not yet been completely oxidized and so rendered harmless.

Of course, if the well receives surface water of a peaty kind—like that of the Ottawa river for instance—such a well will give ammoniacal nitrogen, although sewage pollution is absent. But such a well is not a well in the true sense, and certainly cannot be considered a safe domestic supply, since it is open to admission of surface pollution. It becomes (as a so-called *Surface well*), nothing better than a stagnant reservoir, and is the most dangerous of all sources of water supply. An amount of ammoniacal nitrogen which may be known to be quite harmless in a flowing river or in a large lake, may be altogether intolerable in the case of a well.

Past Sewage Pollution.—When organic nitrogen is fully oxidized to nitric acid, it may be held to be quite innocent. Still it indicates past sewage pollution, and if its amount go beyond a certain figure, say 4-5 parts per million in a deep well, it calls for at least a close examination of the antecedents of such water supply. We have examples of such waters in Nos. 27, 35, 36, 49 and 55, and, although it would not be safe to condemn such samples on the basis of this feature only, it will in general be found that other analytical numbers make them at least very suspicious. The conditions which ensure complete oxidation of nitrogenous organic matter may not be sufficient to ensure the destruction of organic life in the sewage. It is well known that many organisms (presumably some of those which cause enteric fevers) resist oxidation much more vigorously than dead organic matter.

Before leaving this subject, it may be well to point out that the particular combination in which sewage nitrogen occurs in any given sample, is undergoing constant change from the moment of collection. Hence it is not to be wondered at that duplicate analyses of the same supply, made at different lapses of time after collection, should

give somewhat differing numerical results. The difference, unless an unreasonably long time has occurred since collection, should never be so great as to cause any doubt regarding the character of the water. When it is remembered that so little as 0·2 per million, or 1 part of albuminoid nitrogen in five million parts of water, is enough to absolutely condemn a well water, while many high authorities would not allow 0·15 to pass, it will be seen that we are dealing with very minute quantities, and that absolute numerical identity in analytical results is not to be expected.

Oxygen absorbed from Permanganate.—Just as nitrogen is the most characteristic component of organic contamination from animal sources, so carbon, in various combinations, is most characteristic of vegetable organic matter. High organic carbon, without a correspondingly high number for nitrogen, is held to indicate vegetable organic matter. Permanganic acid is the substance chiefly employed by the chemist to supply oxygen in known amount for the oxidation of organic carbon. It is evident that a deep well water which has undergone efficient natural filtration, with concomitant oxidation of its contained organic matter, will absorb very little oxygen from permanganic acid. Examples of this are seen in Nos. 3, 9, 12, 13, 15, etc., of the accompanying table. Where this is not the case, and the absorption of oxygen from permanganic acid is high, as in Nos. 33, 38, 39, 42, 43, etc., there is grave reason to question the wholesomeness of the water; and certainly it is necessary to account for such abnormal oxygen absorption.

Chlorine in Chlorides, as already mentioned, is a constant accompaniment of sewage, and when other results certainly indicate sewage the chlorine number is pretty sure to be high, *i.e* above 10 per million. Still, chlorine may have a mineral origin, and may be largely present in a water sample which is pure organically. It is therefore necessary, in presence of a high chlorine content, to consider well the meaning of the other results, and especially the total dissolved solids. Where mineral chlorides are largely present the other mineral contents of the water are likely to be high. Thus, in Nos. 7, 28, 30, 35, 43, 46, 56, 57, 58 and others, the high chlorine is not, of itself, sufficient to condemn the sample, although some of these are judged to be bad from other considerations.

Phosphates in water can, in most cases, be only of sewage origin. Absence of phosphates is, however, no proof that sewage is absent; since substances like iron and alumina, which are present in all soils, precipitate phosphoric acid; and plants derive their phosphorus from it, and so remove it from the soil.

In the case of river and lake supplies, many American Analysts have contended that the standards adopted by European authorities cannot be held applicable to our waters; since an amount of organic nitrogen which could not be interpreted as of other than sewage origin in the case of an English stream, may occur in an American river flowing through a region where animal pollution cannot possibly occur. This is undoubtedly true; and the immense area of the gathering ground of many Canadian rivers is so unlike anything occurring in England that there is great force in the contention that we must establish standards of our own.

This does not hold, however, in the case of well waters; and the data which suffice to condemn a well water in any part of the world may reasonably be held as furnishing ground for suspicion in the case of our own wells.

In rare cases a well is fed by subterranean springs situated at a higher level than the mouth of the well. In such a well there is a constant (or intermittent, in the case of an intermittent spring) overflow, and the well is to all intents and purposes a reservoir interposed in the course of a stream. Such wells are nearly always good, the exceptions being those in which the volume of water flowing into the well is small; not more than enough to compensate for the daily demand upon the well. Even in this case, the supply may be satisfactory if surface water is prevented from mixing with it.

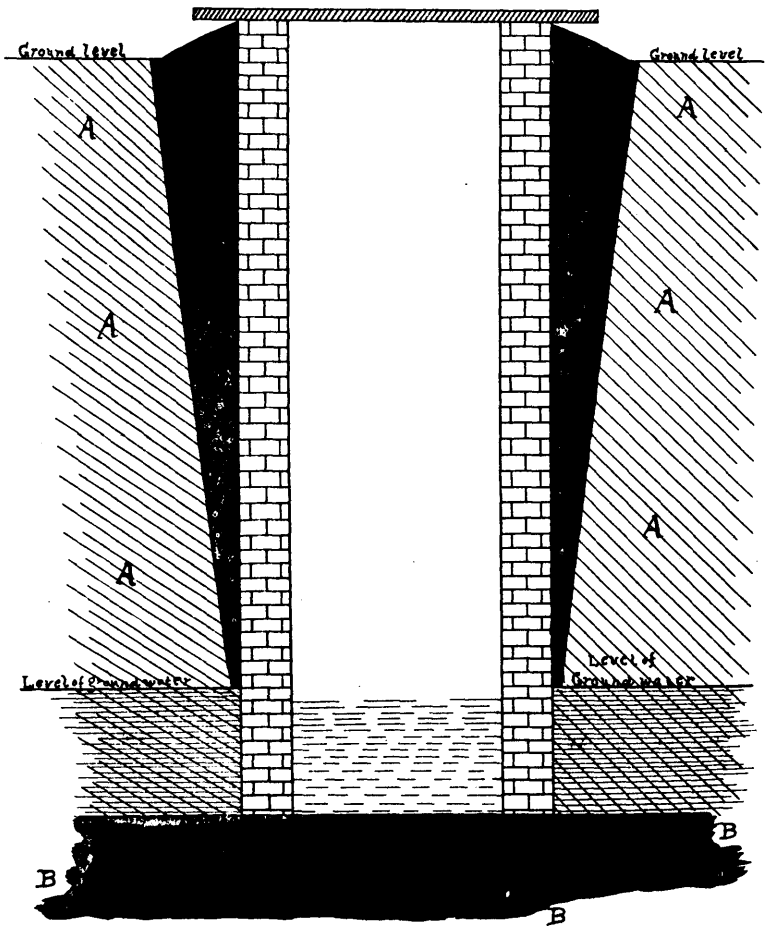
But the great majority of wells are not flowing wells. They are simply cisterns or reservoirs for the collection of "ground water," and in which the ground water rises to its normal level for the locality, only changing this level with the season of the year. In this case the water contained is practically stagnant (the natural movement of the ground water being very variable for different localities, and often quite insignificant) or only changed by pumping, the quantity so removed being replaced by an equivalent in flow from the surrounding ground water.

If such a well is freely pumped, so that the water in it is totally changed each day (for example) the character of the water will be identical with that of the ground water for that locality; and the wells of a given locality will, under these conditions, have a common character. This of course assumes that local surface inflow is prevented by a proper construction of the well.

When, however, the quantity pumped daily is much less than the capacity of the well, the character of the contained, and practically stagnant water, will differ more or less from that of the ground water. Nitrogen in nitrates will accumulate as oxidation of organic nitrogen progresses; salts of lime, etc., will go more largely into solution, and the water will become harder—and this in spite of the most careful exclusion of surface soakage. This last, however, can never be entirely prevented; and too frequently, no particular care is taken to do so; as a consequence organic nitrogen, chlorides and phosphates will cumulate, and the well will become an undesirable supply.

A well should be so constructed that no water could find entranceto it without filtration through a depth of soil at least equal to the vertical distance between the ground level, and the lowest level of ground water. To ensure this it is necessary to have the mouth of the well raised a foot or more above the surface of the surrounding soil, and to have the brick (or stone) lining of the well backed up by a layer of puddled clay, a foot or more in thickness, and extending continuously from the level of the ground water quite up the mouth of the well.

DIAGRAM of well; shewing a backing of puddled clay, or other impermeable material between the brickwork and the porous strata through which the well is dug.



A—porous strata, such as sand, gravel, loam, shale, etc. B—impervious stratum, such as clay, rock without flaws, etc.

The accompanying diagram will serve to explain what is meant. By this construction surface water is prevented, by the impermeable clay backing, from getting entrance to the well until it has percolated through the earth to the line of level of ground water. The efficiency of this filtration will, of course, vary with the nature of the filtering material and with its depth.

It may be well to add, in closing this brief summary of an important subject, that, when it is found necessary to use a polluted, or a suspected well water, danger may be very much lessened by artificial filtration, or by boiling the water. Boiling is not the absolute guaranty of safety which is generally supposed; since it is now known that some forms of bacteria are able, in the so-called *resting spore* condition, to resist a boiling temperature; but there can be no doubt that greater safety in use comes from boiling the water.

I have the honour to be, sir,

Your obedient servant,

A. McGILL.

REPORT

OF THE

MINISTER OF AGRICULTURE

FOR THE

DOMINION OF CANADA

FOR THE CALENDAR YEAR

1897

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
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1898

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ERRATA.

On page 2, line 17, read "February 1893" instead of "November 1892."

On page 71, 6th and 7th lines from bottom, read "February of the next year" instead of "November of the same year."

Department of Agriculture.

REPORT

OF THE

MINISTER OF AGRICULTURE

1897.

To His Excellency the Right Honourable Sir John Campbell Hamilton-Gordon, Earl of Aberdeen; Viscount Formartine, Baron Haddo, Methlic, Tarves and Kellie, in the Peerage of Scotland; Viscount Gordon of Aberdeen, County of Aberdeen, in the Peerage of the United Kingdom; Baronet of Nova Scotia, etc., etc., Governor General of Canada.

MAY IT PLEASE YOUR EXCELLENCY—

I have the honour to submit to you the annual report of the Department of Agriculture, for the year ended the 31st October, 1897.

I.—GENERAL REMARKS.

Under the respective headings of the branches and divisions of this department will be found a synopsis of proceedings during the past year. The work in each branch has been efficiently carried on.

The legislation affecting this department during the last session consisted of chap. 21, 60–61 Vic., entitled "An Act 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"; and also chap. 25, 60–61 Vic., entitled "An Act further to amend the Patent Act," the latter being the repeal of the Act chap. 18 of the Statutes of 1888.

It is not without regret that I have to report the death of the late Mr. Richard Pope, Deputy Commissioner of Patents.

The duties which he performed with so much zeal and ability have been added to those of the Deputy Minister of Agriculture. To enable this action to be taken the repealing of chapter 18 of the Statutes of 1888 and the revival of section five of the "Patent Act," being chapter 61 of the Revised Statutes of Canada was necessary.

In March last Mr. Nicholas Krukoff, Inspector of Agriculture of the Amoor District of Russia, and also a member of the Royal Agricultural Society of England,

visited the Dominion en route homewards from England, with a view to studying the Canadian system of agriculture.

Mr. Krukoff brought letters of introduction from the High Commissioner for Canada and from the Secretary of the Royal Agricultural Society of England.

Every effort was made to facilitate his endeavours to learn as much as possible about the productions and capabilities of the country. As a result of his visit a car load of seed grain was ordered by him and has been sent forward for use in the Amoor district.

The Pan American Medical Congress was held in the city of Mexico on the 16th, 17th, 18th and 19th days of November last. Dr. E. P. Lachapelle, chairman of the Board of Health of the province of Quebec, was appointed Canada's delegate. His report thereon, together with his essay on "Sanitary Laws, Bacteriology and Medicine," delivered at the congress is added as an appendix hereto. (See appendix No. 34).

On an invitation from the Hon. J. Sterling Martin, Secretary of Agriculture of the United States, to meet him and informally discuss the cattle trade question with a view to the removal of the embargo on cattle entering either country from the other, which had been in force since November, 1892, I visited Washington in December, 1896.

The meeting resulted in an agreement being drawn up, for ratification by both governments, by which the barrier of ninety days' quarantine was torn down and a system of inspection by official veterinarians inaugurated.

This agreement concerning changes in quarantine of animals between the United States and Canada, dated at Washington, D.C., December 18th, 1896, having been approved by Your Excellency in Council on the 12th January, 1897, it was deemed desirable and important that effect be given thereto from the 1st February, 1897.

To admit of this it was necessary that the cattle quarantine regulations then in force be amended.

Your Excellency, under the provisions of chapter 69 of the Revised Statutes of Canada, entitled "An Act respecting Infectious or Contagious Diseases affecting Animals," (as amended by chap. 13, 59 Vic.), and by and with the advice of the Queen's Privy Council for Canada, was pleased to order that all previous regulations relating to contagious diseases among animals and health of animals be rescinded excepting that portion of the Order in Council of the 12th May, 1888, being chapter seven of the Consolidated Orders in Council of Canada, referring to the disease of sheep scab, and contained in sections 35 to 52, inclusive, of the said Consolidated Orders and new regulations substituted therefor.

N.B.—The new regulations will be found as an appendix hereto. (See appendix No. 33).

MEMORANDUM *concerning changes in quarantine of animals between the United States and Canada.*

Each country to accept the veterinary certificates of the other, but only from inspectors who are regular graduates of recognized veterinary colleges.

The chief of the Bureau of Animal Industry, and the chief inspector of stock for Canada, will mutually inform one another of any outbreak of contagious diseases

in either country, so that necessary precautions may be adopted to prevent the introduction of disease from the infected district. They will also inform one another of the discovery of any disease in animals, imported from either country, so as to enable the source of infection to be traced.

A quarantine of ninety days shall be enforced by both countries upon all cattle imported from Europe or from any country in which contagious pleuro-pneumonia is known to exist; a quarantine of fifteen days shall be enforced upon all ruminants and swine imported from countries in which foot-and-mouth disease has existed during the six months preceding such importation; and a quarantine of fifteen days shall be enforced upon all swine imported from all countries other than the United States and Canada.

Animals shipped to either country for exportation or other purposes will be subject to all the local regulations applying to the animals of that country.

CATTLE.

BREEDING STOCK.

All cattle to be admitted for breeding purposes shall be accompanied by:—

(*a.*) A declaration made by the importer that they are actually for breeding and no other purposes.

(*b.*) A certificate signed by a government veterinarian that they have been subjected to the tuberculin test and found free from tuberculosis. Such certificate must show the date of testing and chart of reaction, with a description of the animal, giving age and markings. The importer may be required to swear that the certificate refers to the animal represented.

(*c.*) When not accompanied by such certificates the animal or animals must be detained in quarantine one week and subjected to the tuberculin test.

(*d.*) Should they be found tuberculous they must be returned to the country from which shipped or slaughtered without compensation.

FAT CATTLE AND CATTLE FOR FEEDING, INCLUDING RANGE CATTLE FOR STOCKING RANCHES.

This class of animals shall be accompanied by a certificate of inspection signed by an official veterinarian showing that the animals are free from contagious disease and that no contagious disease of cattle (excepting tuberculosis) exists in the district whence they came.

CATTLE IN TRANSIT.

Will be admitted to any part of the United States and Canada for transit to any part of the United States and Canada in bond and cattle will be admitted to Canada in bond for transit to any Canadian port for exportation by sea to Europe or elsewhere. Such cattle to be subject to inspection at the Canadian port of shipment. Cattle will be admitted to the United States in the same manner for export from Portland, Me., Boston and New York.

SETTLERS' CATTLE.

Settlers' cattle when accompanied by certificates of health to be admitted without detention, when not so accompanied they must be inspected. Inspectors may subject any cattle showing symptoms of tuberculosis to the tuberculin test before allowing them to enter.

Any cattle found tuberculous to be returned or killed without indemnity.

CLEANSING CARS.

No cattle or other species of animals covered by this memorandum are to be allowed to be placed on board cars till the litter from the previous load has been removed and the car whitewashed with lime and carbolic acid, 1 pound commercial carbolic acid to 5 gallons of lime wash. Shippers may object to place their animals on uncleaned cars, and may lodge a complaint with the nearest inspector, who will cause such cars to be cleaned as above at the expense of the railway company, or prohibit their use till this regulation is complied with.

SHEEP.

Sheep for breeding and feeding purposes may be admitted subject to inspection at port of entry and must be accompanied by a certificate signed by a government inspector, that sheep scab has not existed in the district in which they have been fed for six months preceding the date of importation. If disease is discovered to exist in them they may be returned, or slaughtered.

Sheep will be admitted for transit in bond from one port to another in each country.

Sheep for slaughter will be admitted without certification or inspection. Sheep will be admitted to Canada for transit to any shipping port in Canada for export by sea to Europe or elsewhere, but will be subject to inspection at the shipping port; they will be admitted on same conditions to the United States for export from Portland, Boston and New York.

SWINE.

Swine may be admitted for breeding purposes subject to a quarantine of fifteen days. Swine may be admitted to Canada for slaughter, in bonded cars to bonded slaughter houses, without inspection. Swine may be admitted to the United States for slaughter on inspection at port of entry. Swine may be admitted when forming part of settlers' effects when accompanied by a certificate that swine plague or hog cholera have not existed in the district whence they came for six months preceding the date of shipment, when not accompanied by such certificate they must be subject to inspection at port of entry. If found diseased, to be slaughtered without compensation.

HORSES.

Horses may be admitted for transit in bond from one United States port to another without inspection, and from one Canadian port to another in the same

manner. Horses may be admitted to the United States and Canada for transit in bond to any shipping port for export by sea to Europe or elsewhere, subject to inspection at the shipping port.

Horses may be admitted for racing, show, exhibition or breeding purposes on inspection at the port of entry.

Horses may be admitted for temporary stay, teaming or pleasure driving at points along the frontier for a period not exceeding one week, on permit by the customs officer at port of entry, such permit may be extended for one week, but no longer. Should he observe nasal discharges or other evidence of disease he may detain the animals and report the circumstances to the district inspector who will decide whether the animal will be admitted or not.

Horses may be admitted for general purposes, for sale, or for stocking ranches, and also cow ponies for cattle ranches, or horses which form part of settlers' effects, on inspection at port of entry only.

Horses used for riding or driving to or from points in Manitoba, North-west Territories or British Columbia, on business in connection with stock raising or mining, and horses belonging to Indian tribes may be admitted without inspection, but must report to customs officer both when going out and coming in.

Horses may be admitted for pasturing or winter feeding on inspection at the port of entry.

The foregoing regulations regarding the exportation of all cattle and live stock from the United States into Canada and from Canada into the United States have been thoroughly examined by the undersigned, and they hereby certify that they will officially recognize and enforce the same to the best of their ability.

(Sgd.) J. STERLING MORTON,
Secretary of the United States Department of Agriculture.

(Sgd.) SYDNEY FISHER,
Minister of Agriculture for the Dominion of Canada.

Dated at Washington, D.C., 18th December, 1896.

In order the better to carry out the new agreement entered into between the United States and Canada in reference to the importation, exportation and quarantine of animals which provides, among other things, that breeding stock exported to the United States from Canada must be accompanied by a certificate signed by a Government veterinarian that the animals exported have been subjected to the tuberculin test and found free from tuberculosis, the certificates to give the date of testing and chart of reaction, with a description of the animal, giving age and markings, Your Government, feeling the responsibility of the correctness of the test, deemed it wise and expedient to hold examinations, both written and oral, of all veterinarians desiring to qualify themselves and become eligible for such positions.

In view of the importance to the live stock trade of Canada of the appointments to be made, a circular letter was issued cordially inviting all veterinarians to present themselves for examination.

Examinations were conducted by Professor D. McEachran, D.V.S., F.R.C.V.S., Chief Veterinary Inspector for Canada, and the Secretary of the Department of

Agriculture. In the province of Ontario these gentlemen were assisted by Professor Andrew Smith, F.R.C.V.S., Principal of the Ontario Veterinary College, and in the province of Quebec by Professor V.T. Daubigny, V.S., of the School of Comparative Medicine of the Veterinary Science in connection with Laval University, and Dr. J. A. Couture, V.S., Director of the Quebec Veterinary College, each of whom rendered material assistance. Examinations were held in the following places and on the dates given below:—

London, Ont.	19th	February,	1897.
Toronto "	20th	"	"
Kingston "	22nd	"	"
Quebec, P. Que.	12th	March	"
Montreal "	13th	"	"
Winnipeg, Man.	7th	June	"
Regina, N.W.T.	9th	"	"
" "	14th	July	"
Calgary "	11th	June	"
Charlottetown, P.E.I.	11th	August	"
Moncton, N.B.	17th	"	"

In response to the invitation extended in the circular letter two hundred and twenty-four candidates presented themselves for examination.

Since the submission of my report for the year ended 31st October, 1896, I have attended the following Agricultural Exhibitions, Dairymen's Association, Fruit Growers and other like meetings, in Ontario, Quebec and the Maritime Provinces:—

The Provincial Dairy Association meeting at Joliette, in the Province of Quebec; the Eastern Dairymen's Association meeting at Brockville, Ontario; the Western Dairymen's Association meeting at Brantford, Ontario; the Creameries' Association meetings at St. Mary's, Ontario; the Fat Stock Show at Guelph, Ontario; the Experimental Union at the Ontario Agricultural College, Guelph, Ontario; the Exhibition in Montreal, Quebec; the Exhibition in Ottawa, Ontario; the Agricultural Exhibition in Halifax, Nova Scotia, and the Agricultural Exhibition in St. John, New Brunswick.

At St. John, N. B., I had the pleasure of meeting a large number of the leading farmers of the Maritime Provinces.

I also attended the annual meeting of the Ontario Fruit Growers' at Kingston, and the annual meeting of the Quebec Fruit Growers' Association at Howick, P Q.

By reason of these various meetings I have come closely in touch with many of the leading farmers in Eastern Canada and, consequently, have been able to much better understand their needs and the wants of the industry, and to present to them the work and scope of my department.

I may add that I also took occasion, in the course of the year, to visit the Nappan Experimental Farm at the time that the new manager was placed in charge, to thoroughly discuss with him the future operations of that farm.

Department of Agriculture.

II.—ARTS AND AGRICULTURE.

COMMISSIONER'S BRANCH.

The Department of Agriculture continues to help the farmers with information on economical methods of growing and making fine food products. Many of these, such as meats, butter, poultry, eggs, and to some extent fruits and cheese, are of a readily perishable character, and 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 and appearance lessen their value very greatly. 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, so that the consumer can obtain them in an undeteriorated state.

Cold storage is intended to preserve commodities and thus avoid direct loss; it is useful to extend 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 to be obtained from cold storage by its use for the preservation of commodities on their way to the consumers. The less time they are on the way, as a rule, the better will be the ultimate results.

In then planning and carrying out a system of cold storage for Canada, various interests have to be taken account of, viz., the producers, the collecting buyers, the carriers or transportation companies, the distributing merchants, and the consumers. In so far as a cold storage system helps to prevent losses and deterioration of quality, it gives every handler a chance for more profit and leaves more wealth in the country. The arrangements have been 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. It is expected that trial shipments of butter, fruits and other products may be successful in opening up new and profitable markets.

During the first months of summer the prices for butter ruled unusually low. By August there was a substantial advance, but the prices again receded. The prices for cheese were considered by dairymen as satisfactory until September. The fall in prices of both butter and cheese are said to be due to unusual and temporal causes, such as (1) uncommonly warm weather and good pastures in England during August and September; the direct and indirect effects of the engineers' strike; (3) the greatly increased quantities of butter received in Great Britain from Denmark, Russia, the United States and Canada; and (4) the large make of cheese in Canada. The course of events in recent years indicate that Canadian dairymen will find most profit by enlarging their business in the direction of making more fine creamery butter and not increasing the output of cheese.

During the year particular attention has been given to the extension of butter-making at co-operative creameries in districts in the North-west Territories which are adapted for mixed farming.

COLD STORAGE ON STEAMSHIPS.

Contracts were 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.

Messrs. Elder, Dempster & Co. agreed to provide cold storage on five steamships to give a weekly service between Montreal and Avonmouth for Bristol.

Messrs. H. & A. Allan agreed to provide cold storage on two steamships to ply between Montreal and Liverpool; three steamships to ply between Montreal and London; and on one steamship to ply between Montreal and Glasgow.

Messrs. R. Reford & Co., for the Thomson line, agreed to provide cold storage on three steamships to ply between Montreal and London; and, on behalf of the Donaldson line, on one steamship to ply between Montreal and Glasgow.

Messrs. David Torrance & Co., for the Dominion line, agreed to provide cold storage on two steamships to ply between Montreal and Liverpool.

Sailings of the steamships of the Allan and Dominion lines between Montreal and Liverpool were to be so arranged as to give as nearly as practicable a weekly service between these two ports; and the sailings of the steamships of the Allan and Thomson lines were to be so arranged as to give as nearly as practicable a weekly service between Montreal and London; and the sailings of the steamships of the Allan and Donaldson lines, were to be so arranged as to give as nearly as practicable a fortnightly service between Montreal and Glasgow.

The contracts provide that the steamship companies shall carry in cold storage, butter, cheese and other perishable products as demand for space may arise, at a charge not exceeding ten shillings per ton of 2,240 pounds of butter and cheese, and at the same charge for an equivalent space occupied by other products, in addition to the current charge for freight on butter and cheese not in cold storage.

Negotiations were begun for cold storage service from St. John, Halifax and Charlottetown to some port or ports in Great Britain, but agreements could not be concluded nor arrangements made in time for the summer of 1897.

Messrs: Pickford & Black agreed to provide cold storage on the steamship "Beta" to ply between Halifax, N.S., and the West Indies.

Provisional agreements have since been made with Messrs. Furness, Withy & Co., to provide a cold storage service from Halifax to London, and from St. John, N.B., to London, for three years, subject to ratification by Parliament.

COLD STORAGE ON RAILWAYS.

Arrangements were made for the running of refrigerator cars fully iced on the main routes on railways leading into the shipping ports of Montreal, Quebec, St. John and Halifax. 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 service.

COLD STORAGE WAREHOUSES.

Cold storage warehouses of sufficient capacity for the trade are provided in Montreal as private business concerns. For the protection of perishable products intended for export and for the extension of business, it was desirable to have cold storage buildings at Toronto, Quebec, St. John, Halifax and Charlottetown. 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 these points. 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 5 per cent on the cost of the buildings 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. Negotiations for providing cold storage buildings suitable for goods destined for export at other places, did not result in the making of any agreements in 1897.

It is expected that arrangements will be carried through for providing the required cold storage accommodation at St. John, Halifax and Charlottetown, to be ready for the season of 1898.

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 one 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 adopted for the insulation of old cold storage rooms and the methods of constructing new cold storage buildings and ice houses, were furnished on application. The bonus for 1897 has been paid to the owners of creameries, and a few others have made application for it.

When the bonus was made available for the year, a great many of the 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 have intimated that the Government will extend the provisions of the bonus offered in the circular published 26th October, 1896, for *one* year only.

To the owners or lessees of creameries who have not obtained the bonus of fifty dollars ($50) for 1897, the Government will grant a bonus of fifty dollars ($50) per creamery if and when they provide and keep in use a refrigerator room according

to the plans and regulations during the season of 1898, and the further bonuses of twenty-five dollars ($25) each for the seasons of 1899 and 1900, if and when the refrigerator room has been kept in use according to the regulations during those two seasons. All subject to ratification by Parliament.

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 1899 or 1900, as the case may be, may receive altogether a bonus of one hundred dollars per creamery.

COLD STORAGE INSPECTORS.

An inspector of cold storage was appointed to visit creameries which had provided cold storage rooms through Ontario and part of Quebec. He also visited places where cold storage buildings were being put up for the protection of general food products of a perishable character. Another cold storage inspector was appointed with headquarters in Montreal, to inspect the refrigerator cars on their arrival, to examine the cold storage chambers on steamships, and to look after any through shipments of butter or other perishable products intended for cold storage, when notified by the shippers to do so.

EXTENSION OF MARKETS.

By my direction the Commissioner of Agriculture and Dairying visited Great Britain during the summer to see the existing conditions of the markets for perishable farm products there, to learn the newest preferences for styles of packages and qualities of goods, to give information to Boards of Trade, Produce Exchanges and merchants concerning the arrangements made by the Government for providing a cold storage service for the carriage of those products, and to start two agents of the department in their work for the extension and improvement of trade in Canadian farm products.

The two agents have been occupied chiefly in gathering information on the condition in which Canadian fruits, butter and poultry are landed in Great Britain, and in seeking to discover methods whereby they can be landed in a still better condition there. Their reports will be duly published.

TRIAL SHIPMENTS OF FRUIT.

Special provision was made for trial shipments of fruit, particularly the tender fruits, such as peaches, pears, tomatoes and grapes. A small cold storage building cooled by ice was erected at Grimsby, Ontario. Nine growers of fruit there agreed to furnish a quantity of these fruits per week. Full reports on the shipments to Great Britain have not yet been received; but the general results of the trial shipments indicate that the first shipments consisting chiefly of Crawford peaches and Bartlett pears, were packed in cases too large and without sufficient provision for ventilation. When these were put in the cold storage building at Grimsby, the heat generated by the fruit in a large measure counterbalanced the cooling power of the ice. The tender fruit in these boxes was practically insulated by the extreme care in packing to protect it from being bruised, and thus the fruit in the middle of the packages remaining comparatively warm, and generating still more heat, ripened oo much before it was landed in Great Britain.

Later shipments of fruit, consisting of peaches, pears, tomatoes and grapes, were landed in Great Britain in good condition, but the British consumers as yet have not learned to like the flavour of Canadian grapes, or to pay a price for them which would permit them to be exported without loss. The prices at which grapes in good condition and of fine quality were sold, were not sufficient to meet the transportation charges, leaving the whole value of the fruit, the cost of the cases and the expense of packing to be borne by the department for the trial shipments.

The information which has been gained—and it is not evident that it could have been gained in any other way, except by making fairly large shipments—has been sufficient to show how such tender fruits may hereafter be shipped without deterioration in quality. It is more than probable that a large and profitable trade may be developed in the exportation of pears, peaches and tomatoes. It may be desirable to continue trial shipments of grapes for a few years, even at a loss, to test whether a demand will not arise for them when the consumers may have learned to appreciate their quality.

After the return from Japan of the commissioner for the Department of Trade and Commerce, arrangements were made for the sending of trial shipments of butter from the creameries in the North-west Territories to Japan. Arrangements have also been made for the sending of trial shipments of butter from Nappan, N.S., to the West Indies, in hermetically sealed tins, such as are used by those who export butter from France to warm climates. Reports containing full information on these trial shipments will be published as soon as they can be obtained.

A special bulletin of information on the dressing, packing and shipping of poultry for the British markets "has been published; and arrangements have been made for exhibiting at meetings of farmers, specimens of chickens and turkeys dressed in accordance with the instructions contained in the bulletin.

CREAMERIES IN THE NORTH-WEST TERRITORIES.

A sum was placed in the estimates and voted by Parliament to promote the establishment and maintenance of creameries in the North-west Territories. It was hoped that this help would promote the well-being of the population there by affording the farmers a chance of producing and marketing these food products which can be carried to distant markets with the smallest part of their value being absorbed in transportation charges. Agreements were made with the butter and cheese manufacturing associations at sixteen places whereby the department took charge of the manufacturing of butter at them according to the regulations published in the bulletin, "North-west Territories Creameries." The department also took the management of sixteen cream separating or cream collecting stations, tributuary to the creameries.

Of the creameries, nine had been in operation formerly, but had fallen into financial difficulties of one sort and another. These difficulties were chiefly those common to nearly all pioneer efforts, viz., the want of experience on the part of those who undertook the management; in some cases the lack of sufficient capital; also the absence of established and competent commercial agencies for the handling of the products. The result was inevitable losses. These losses, which fell on the joint stock companies or on the individuals owning the creameries, caused a fear among the patrons that the proceeds of the butter might somehow be diverted in

part to pay obligations of the owners of the creameries. This lack of confidence hindered the creameries from receiving sufficient support to make their operations profitable.

Seven were now creameries put up by butter and cheese manufacturing associations. These received loans from the department to fit up the creameries with the manufacturing plant. The loans to all the associations are to be repaid in full. It is expected that two of the creameries in Alberta will be continued in operation during the winter. The butter-makers at the various creameries report that there are good prospects of an increase of from fifty to one hundred per cent in the output of butter from them for next season. Full details of the business will be found in the report of the Commissioner of Agriculture and Dairying.

GENERAL DAIRYING SERVICE IN THE PROVINCES.

The following paragraphs indicate the other principal work which was carried on during the year in the different provinces.

In the province of Quebec, the Assistant Dairy Commissioner held meetings during the year; and during the winter he delivered a series of lectures to each class of students at the dairy school of St. Hyacinthe. During the winter of 1895-96, 344 students were in attendance.

During the summer the Dairy Superintendent of the St. Hyacinthe school, who is an expert in butter-making, was engaged to visit the creameries of the province, to inspect the cold storage buildings, and to give information as to how such cold storage rooms could be improved.

In the province of Nova Scotia a dairy station was conducted at Nappan. Cheese has been made there during the summer, and butter during the winter. It is proposed hereafter to undertake the making of butter only, and to use part of the product for trial shipments to outside markets.

In the province of Prince Edward Island two travelling inspectors were employed to visit the factories regularly during the summer. The department has withdrawn entirely from the management of the dairy stations in Prince Edward Island. I am informed that the cheese factories and creameries on the island which had been under the management of this department, are now conducted by the directors of the several dairying companies with economy, efficiency and success. The winter butter-making movement has been extended so rapidly that I am informed that at eighteen factories in Prince Edward Island winter butter-making will be carried on during the winter of 1897-98. This shows the development of co-operative dairying in that province from the beginning with one factory taken charge of by the department in 1892, until thirty-two co-operative cheese factories in the summer and eighteen co-operative butter factories in the winter are in operation, managed by the co-operative joint stock companies of farmers themselves, in 1897. The value of the product is estimated at over $400,000 a year, which is likely to grow.

In the province of British Columbia, an expert is to attend a series of meetings and give further help in the establishment of co-operative creameries and cheese factories and in the extension of dairying. The development of mining in British

Columbia and in the Klondike region will doubtless open new and profitable markets for butter and other dairy products from British Columbia and the North-west Territories.

In the provinces of Ontario, New Brunswick and Manitoba, superintendents of dairying are employed by the provincial governments and consequently no work of direct instruction, except the attendance at convention and the publication of bulletins and reports, from this department was undertaken in them.

To meet the request of many of the salesmen of cheese factories and creameries, an inspector was appointed at Montereal to report on the quality of cheese and butter sold, "quality guaranteed at Montreal" in cases where there was dispute. His services have been useful in protecting the interests of salesmen and shippers of cheese and butter.

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 over 350 cheese factories and creameries, and applications are being received regularly.

EXPORTS OF BUTTER AND CHEESE.

The magnitude and growth of the export trade of Canada in dairy products is shown by the following tables (year ended 30th June):—

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.	$	$	$	$	$	$	$	$
1869	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	2,847
1881	17,649,491	3,573,034	3,333,419	58,522	.....	.....	30,574	143,935	6,584
1882	15,161,839	2,936,150	2,195,127	529,169	.....	.....	32,052	169,270	10,538
1883	8,106,447	1,705,817	1,330,585	206,154	.....	.....	29,446	131,341	8,291
1884	8,075,537	1,612,481	1,395,652	46,618	.....	.....	16,455	151,224	2,532
1885	7,330,788	1,430,905	1,212,768	16,695	.....	15,172	21,473	161,862	2,835
1886	4,668,741	832,355	652,863	17,545	.....	.....	17,577	142,485	1,885
1887	5,485,509	979,126	757,261	17,207	.....	.....	23,789	180,238	631
1888	4,415,381	798,673	614,214	13,468	.....	.....	5,226	164,329	1,431
1889	1,780,765	331,958	174,027	7,879	.....	.....	22,921	124,349	2,782
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	24,021	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	.....	.....	.....	.....	.....	.....	.....

DOMINION OF CANADA—Exports of Dairy Products—Home Production—*Concluded*

CHEESE.

Year.	Quantity.	Value.	To Great Britain.	To United States.	To France.	To Germany.	Other Foreign Countries.	B.N.A. Provinces.	British Indies.
	Lbs.	$	$	$	$	$	$	$	$
1868	6,141,570	620,543	548,574	68,784	.....	.....	891	1,954	340
1880	40,368,678	3,893,366	3,772,769	114,507	.....	.....	170	5,710	210
1881	49,255,523	5,510,443	5,471,362	28,500	.....	.....	14	10,027	540
1882	50,807,049	5,500,868	5,571,076	18,436	.....	.....	242	8,196	2,318
1883	58,041,387	6,451,870	6,409,859	24,468	.....	.....	202	15,490	1,863
1884	69,755,423	7,251,989	7,207,428	24,866	.....	.....	188	19,248	262
1885	79,655,367	8,265,240	8,178,953	86,978	.....	.....	205	15,899	1,207
1886	78,112,927	6,754,626	6,729,134	15,478	80	90	156	9,139	546
1887	73,604,448	7,108,978	7,065,983	30,667	.....	.....	211	11,982	165
1888	84,173,267	8,928,242	8,834,997	83,153	5	.....	828	9,087	172
1889	88,534,887	8,915,684	8,871,205	31,473	.....	.....	1,582	11,208	216
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	4,096
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	.....	.....	.....	.....	.....	.....	.....

IMPORTS OF GREAT BRITAIN.

The following table, from the Board of Trade returns of Great Britain for eleven years (ended 31st December), 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.
1886	1,543,566	8,141,438	1886	1,734,890	3,871,359
1887	1,513,134	8,010,274	1887	1,836,789	4,514,382
1888	1,671,433	8,913,045	1888	1,917,616	4,546,408
1889	1,927,842	10,244,636	1889	1,907,999	4,490,970
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

Department of Agriculture.

CROPS.

The season of 1897 has, on the whole, been a favourable one for farmers in most parts of the provinces and territories of Canada. The crops have averaged well, while the higher prices which have prevailed for most farm products have been very encouraging to this important branch of industry.

In the province of Ontario the hay crop has been good, although in some localities, owing to unfavourable weather, it was not all saved in good condition. The area of land under winter wheat was increased, and the yield has been above the average. Early in the season, spring sown grain of all sorts was unusually promising, but the very wet weather which prevailed shortly before and during harvest, was very favourable to the growth of rust, which spread with much rapidity, and reduced the weight of the grain and lessened the yield. Nevertheless, the yields of oats, barley, and wheat have been fairly good. The acreage in oats and pease has been larger than heretofore, and there has also been a steady increase in the amount of fodder corn grown for ensilage. The yields of rye and beans have been above the average. Potatoes and roots have given fair crops, notwithstanding the very dry weather which prevailed during the autumn. The apple crop has fallen much short of that of last year, while peaches, pears, plums and grapes have produced abundantly.

The agricultural returns from Quebec have been good. In most sections of that province the hay crop has been well up to the average. Oats and other spring sown grain have given fair crops, but are believed to be a little below the average of previous years. The pastures have been good, and potatoes and roots have given encouraging results. Increased attention is now given to the growing of corn and fodder crops for the feeding of stock—a demand mainly brought about by the further extension of the stock industry for both dairy purposes and beef.

In the Maritime Provinces, the hay crop, so important in that part of the Dominion, has been an excellent one. The spring was unusually backward, and the weather cold and wet, on which account seeding was greatly delayed. Very wet weather prevailed throughout May and during the greater part of June, and the outlook was unpromising; but the fine weather which followed in July, brought the hay crop to a point above the average of recent years and promoted the growth of all other crops in a remarkable manner, the most varieties of spring grain have given fair returns. The pasturage has been excellent—much above the average, and live stock is said to be in good condition. Potatoes and roots are somewhat below the average, and the same may be said of ensilage corn. The crop of fruit is said to be the smallest for many years. Apples are less than half of the crop of last year, which, however, was a phenomenal season as regards the quantity produced. Pears have yielded well; but plums, cherries and peaches have given very poor returns. The crop of small fruits was abundant.

In Manitoba, the crops have given good results. The wheat has turned out very satisfactorily and of prime quality, and with the high prices prevailing, the farmers have been much encouraged. The yield of oats, barley and flax has also been good. The stock industry is growing rapidly in this province; large shipments of cattle have been made and the manufacturing of dairy products extended. Corn, potatoes and roots have, in most localities, given satisfactory returns.

The results of the year in the Territories are also very encouraging—the crops have been good and the prices high; the quality of the grain is excellent and there has been no injury from frosts. The stock industry is growing in importance and much attention is being given to the manufacture of butter and the production of beef. In this connection, the Brome Grass, introduced by the Experimental Farms, has already been found invaluable and the acreage under this valuable grass has been largely increased. The abundant and early fodder which it gives, together with its hardiness and endurance of dry weather, make it suitable for stock raising.

In British Columbia the crops of hay, grain and roots are generally good, while nearly all other agricultural products have given satisfactory returns. Prices are unusually high, and the demand large and increasing, especially from the mining districts—the evidences of prosperity are manifest on every hand. Fruits of most sorts have yielded well, and heavy shipments have been made to the mining regions and the prairie districts of the east, and with increased experience in the packing and marketing of the fruit, the returns to the growers have been satisfactory.

CATTLE TRADE.

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	764
Cattle	3,911
Sheep	27,062
Swine	781

They were brought in at various points as shown in detail in the report of the chief veterinary inspector. (See appendix No. 14).

EXPORTATION OF LIVE STOCK TO EUROPE.

The exportation of live stock from Canadian ports for the year ended 31st October, 1897, numbered:

Horses	10,651
Cattle	117,428
Sheep	62,046

(for details see appendix No. 14).

It is most gratifying to be able to report that in the inspection of this large number of cattle (117,428) not a single case of disease of the lungs was found. This alone speaks volumes for the health of the Canadian herds.

EXPORTATION OF CATTLE TO THE UNITED STATES.

There has been a rapid increase in the number of Canadian cattle exported to the United States since the removal of the regulations which required a quarantine

detention of 90 days on cattle entering from Canada. The numbers exported during the three previous years were as follows:—

1894	256
1895	882
1896	1,646

The numbers exported during the nine months, January to 30th September, 1897, were 57,857.

This has given a profitable outlet for a class of cattle not suitable in size for exportation to Great Britain. It has also created an active demand for young store cattle, for which many of the farmers have not as yet suitable stables and other facilities for feeding to a thoroughly fattened condition.

EXPERIMENTAL FARMS.

The continued interest taken by the farmers of Canada in the work carried on by the Experimental Farms is shown by the very large and constantly increasing correspondence not only at the Central Farm, but also at the branch farms. The requests for information on all agricultural and horticultural topics are multiplying on every hand, and the large and ever-increasing demand for the reports and bulletins issued from the farms gives further evidence of the appreciation in which the work of the experimental farms is held by the agricultural community.

AGRICULTURAL BRANCH.

Experiments have been continued during the year in testing all the more promising varieties of cereals and other important farm crops, in uniform plots, where the different sorts are sown under the same conditions and are subject to the same treatment, so that information may be gained as to the relative vigour, productiveness and earliness of each variety. The knowledge thus gained has proved of great practical importance to the farming interests of this country, and as this information is needed early,—in order to give to all who desire them, the facts available to guide them in the selection of suitable varieties for seed for sowing during the ensuing season,—it has been promptly presented in a special bulletin giving particulars of the crops obtained at each experimental farm of all the varieties thus tested together.

For ten years past a very important series of experiments have been conducted to gain information regarding the effects which follow the application of certain fertilizers and combinations of fertilizers on the more important agricultural crops. The particulars of information obtained during this long course of tests throw much light on the relative value of different fertilizers for particular crops, and a careful study of the facts presented will give the farmer much information which will be of great practical use to him, as indicating the relative value of barn-yard manure and artificial fertilizers.

Experiments to illustrate the great value of clover as a green crop for ploughing under have been continued with the most promising results. It has been shown that clover can be grown from year to year, with cereals without lessening the crop for the season, and by the subsequent growth of the clover there is stored up during

the autumn, a large quantity of nitrogen gathered directly from the air. The clover also acts as a catch crop, gathering the fertilizing constituents which are brought down with the rain, and thus there is added to the soil, at a comparatively small cost, a large quantity of those elements of fertility which growing crops require.

Further information has been gathered to establish the best time for sowing the more important cereals in the different climates of the Dominion. These experiments, which have now been repeated annually for eight years, furnish conclusions which will repay their careful study by farmers in every part of the Dominion.

DISTRIBUTION OF SAMPLES.

With the object of increasing the productiveness and improving the quality of the grain grown in Canada, a large number of samples of the most promising sorts grown on the experimental farms have been distributed among farmers in all parts of the country. These annual distributions of the most promising varieties placed in the hands of farmers, give them the means, if reasonable watchfulness and care is exercised, of soon replacing the less productive sorts sown in the past by those of the greatest vigour and highest quality. It is thus hoped that a material increase will shortly be made in the average annual yield of all the more important farm crops grown in Canada.

CROSS-FERTILIZATION.

Further work in the cross-fertilizing of cereals has been conducted, and a number of additional new varieties produced. The experimental work in the cross-fertilizing of different sorts of wild fruits—particularly as regards such apples, plums and cherries as have proven to be perfectly hardy at the experimental farms at Brandon and Indian Head—has been greatly extended. This work has been undertaken with the belief that these small sized fruits can be materially enlarged and improved in this way. Several hundred new sorts have thus been added to the list under test, and during the past season more than 4,000 cross-bred seeds have been produced, from which a very large number of distinctly new varieties may be expected. By the continuation of this promising line of work for a few years, it is hoped that many varieties of apples, plums, and cherries will be originated, possessing such hardiness and vigour as will fit them for growth in all the settled parts of the North-west country.

FATTENING OF STEERS AND SWINE.

Experiments have been conducted during the past year in the fattening of steers, with the object of ascertaining how far the quantity of grain fed to steers during the earlier parts of the feeding period, could be reduced without materially affecting the after result. The information gained has shown that it is economical to feed grain sparingly during the first half of the fattening period.

Experiments have also been conducted with swine, each group being fed with one sort of grain, either ground or unground, and the results compared with mixtures of different sorts of grain.

The particulars of information gained in connection with all these tests will be found in the Annual Report of the Experimental Farms, a copy of which may be had on application to the director.

FOWLS.

Further experience has also been had with poultry, showing which breeds are most profitable as egg layers and which sorts are best for the table. Additional experiments have also been conducted in the feeding of poultry with a view to economy in production; also for the purpose of obtaining more eggs during that period of the year when eggs command the highest price. Further work has also been done in the studying of the diseases of poultry and the best remedies therefor.

FOREST TREES, SHRUBS, ETC.

The growth of the economic timber trees in the forest belts which border the farm has been very satisfactory, and from the measurements taken important conclusions have been deduced regarding the annual growth of timber in this climate, which will prove of much value to those who engage in tree planting in future. During the course of these experiments much experience has been gained as to the most economical methods of planting and growing timber trees. The tests of many newly introduced shrubs and ornamental and economic trees obtained from the northern countries of Europe and Asia, have added quite a number of varieties to the list of those which are hardy at the several experimental farms in different parts of the Dominion.

The arboretum which has been established at the Central Experimental Farm, for the purpose of testing the hardiness and adaptability of useful trees and shrubs in this climate, has been enriched during the past year by the addition of a large number of new sorts. These have been obtained chiefly from different parts of Europe and from northern Japan. The growth of this collection of trees and shrubs has been very rapid and the arboretum already contains more than 2,500 species and varieties, and a large proportion of these have thus far shown themselves to be well adapted to the climatic conditions which obtain at Ottawa. The collection of hardy perennials has also been increased and now numbers more than 1,000 species and varieties. The information being gained in this connection, will, it is believed, prove of much interest to the general public and be valuable to those who are interested in the beautifying of city and country homes.

HORTICULTURAL BRANCH.

Further experience has been acquired during the past season, in reference to those varieties of fruit best adapted to the climate at Ottawa. Many new sorts of promising fruits have been added to the orchards and the collection has now become a large and interesting one. Many additions have also been made to the varieties of small fruits under trial. Additional experiments have been conducted with different sorts of clovers and mixtures of clovers, and the advantage of sowing these in orchards, as cover crops, has been demonstrated. This treatment seems to afford the necessary surface protection for the roots of the trees during the winter, at the least cost, and the turning under of this useful crop in the spring improves the condition of the soil and adds to its fertility.

Many new varieties of seedling fruits have been received during the year, for examination and report, some of which are quite promising. Full particulars regarding these will be found in that part of the farm report written by the horticulturist.

Further investigations have been made regarding diseases affecting fruits—especially with that disease which injures peach leaves, known as the "peach curl," and experiments have been conducted with the object of ascertaining the best remedies for the trouble.

Further tests have also been made with a large number of varieties of the most important vegetables, to ascertain which are the most productive and which give material of the best quality for the table.

ENTOMOLOGICAL AND BOTANICAL BRANCH.

The continued study of the many verieties of insects which are either beneficial or injurious to crops, is bringing to light from year to year many important facts bearing on their life history and distribution, and also regarding the best remedies to be used for the control and destruction of such species as are found injurious to the crops of the farmer or fruit grower.

Among the newly introduced insect pests, the San Jose scale has attracted a large amount of attention. This is probably one of the most injurious insects known on fruit trees. The scales are small and not easily detected, especially in their earlier stages, and it is a very difficult insect to destroy. Much timely information has been disseminated regarding this insect enemy, and fruit growers everywhere have been warned of the danger of the careless importation from infested districts, of trees by which this formidable foe may be brought into their orchards. Several visits have been made, and meetings of fruit growers attended, by the entomologist, in the districts where this insect has been discovered and advice has been given as to the best methods for the destruction of the invader.

Much attention has been given during the past year to the subject of pernicious weeds and a bulletin has been published which, it is believed, will prove very useful to Canadian farmers, by giving them the necessary descriptions to enable them to recognize these injurious intruders when met with, and particulars have also been given as to the best methods for the destruction of these pests. The botanist paid another visit to Manitoba, early in the summer, and held a series of meetings of farmers in different parts of that province, for the purpose of discussing the important subject of noxious weeds and disseminating information regarding the same.

Many new varieties of fodder grasses have been under test, obtained from different parts of Europe and America, some of which will probably prove useful. The distribution of small samples of such grass seeds grown on the experimental plots, as are promising, for test in different parts of the Dominion, has materially added to the general interest felt on this subject and useful results are hoped for from this line of work.

Information has also been sought and supplied regarding some poisonous plants—especially as regards the North-west country—on which valuable animals have fed and have died in consequence.

APIARY.

Much additional information has been gained regarding the habits of bees and as to the particular flowers, shrubs and trees from which they gather their chief supplies of honey during different parts of the season. Useful work has also been done by experimenting in different methods of wintering bees.

CHEMICAL BRANCH.

The work which the officers employed in the carrying on of this important branch have been engaged in has covered, as heretofore, a very wide range. Further data has been accumulated, adding to the information already gathered, on the composition and character of soils in different parts of Canada, and much practical information given to farmers as to how such soils may be improved and their fertility increased.

Experiments with barn-yard manure have been continued to obtain further information as to the losses which take place when manure is composted and rotted under different conditions, so that the most economic methods of preserving this valuable, and almost universal fertilizer, may be ascertained.

Experiments have also been conducted with finely ground mineral phosphate mixed with barn-yard manure in an active condition of fermentation, to find out whether any portion of the phosphoric acid in the mineral phosphate in an insoluble form, would thus be changed to soluble forms. The results have shown that no material change takes place in the fine ground mineral phosphate under such treatment.

Additional analyses have been made of clover, roots and hops, to ascertain the quantity of nitrogen which may be added per acre to land where such crops are ploughed under.

The analyses of well waters for farmers have been continued and many instances of contamination of water used for drinking purposes discovered. The importance of an ample and pure supply of water, both for man and beast, can scarcely be overestimated.

MEETINGS ATTENDED, CORRESPONDENCE, ETC.

All the members of the staff at the Central Farm have attended many important meetings of farmers and fruit growers during the year, and addresses have been given on topics of interest connected with the experimental farm work. A large correspondence is also conducted by each branch.

EXPERIMENTAL FARM, NAPPAN, N.S.

At the experimental farm for the Maritime Provinces many experiments have been conducted in the growing of cereals, roots, fodder crops, &c., to ascertain what varieties are most suitable to the climatic conditions prevailing there. Experiments have also been continued with useful fodder plants and grasses. Many different varieties of field roots have also been grown with much success, showing that the climate and soil in the neighbourhood of Nappan is well suited for such crops. Tests have also been continued with flax. Experiments have been made in the draining of land, both upland and marsh, with very good results.

In the horticultural branch at this farm much useful information has been gathered from the tests made with both large and small fruits; also with vegetables and with different varieties of ornamental trees and shrubs. Experiments in spraying have been conducted for the destruction of insect pests and fungi attacking fruits and fruit trees, with very satisfactory results.

A change has recently been made in the staff at the Nappan Farm. The superintendent, Mr. George W. Forrest, has resigned, and Mr. Robert Robertson has been appointed in his place.

EXPERIMENTAL FARM, BRANDON, MAN.

Among the useful lines of work carried on at the Experimental Farm at Brandon, may be mentioned the testing, under uniform conditions, of a large number of varieties of cereals and other important farm crops, to ascertain which sorts are the best adapted to the climate of Manitoba. Experiments with *early, medium* and *late sowing*—with field plots of wheat on newly broken land as compared with those on land some years under cultivation—results of sowing with drills and broadcast machines; experiments with flax—in sowing clover with grain; also testing the value of crops of mixed grain when cut green and cured for hay.

The Awnless Brome grass (*Bromus inermis*) has been tested here also and the area sown has of late been much extended with the view of obtaining more ample supplies of hay and areas of pasture for the future.

Experiments have also been carried on in the fattening of steers and the feeding and fattening of swine.

Further tests have been made with fruits; also with forest and ornamental trees and shrubs, and with perennial plants, with many encouraging results. A large number of vegetables have been tried to find out those best adapted to the needs of the settlers.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

At this farm also, the general lines of experimental work with cereals, roots and fodder plants, followed at the other farms, have been carried on to determine which are the most serviceable in that climate.

In the successful growing of cereals, the summer fallowing of land has been extensively followed, with excellent results, and this practice is now general throughout many parts of the North-west country. Experiments have been continued to ascertain the best time for sowing, and the proper depth at which to sow, and also the best treatment for the eradication of smut from wheat.

The tests in growing Brome grass (*Bromus inermis*), which have been continued for some years, have now definitely established the great value of this grass in the North-west, for hay and pasture.

Further work has also been conducted at this farm, in the fattening of steers and swine.

The benefits arising from the planting of trees for shelter, on the North-west plains, have been clearly demonstrated during the past season, those varieties of cereals sown within the influence of shelter having given much better crops than those sown in the open plain beyond the influence of such shelter. In view of the benefits derived from such planting, the forest belts and inclosures for shelter have been further extended.

EXPERIMENTAL FARM, AGASSIZ, B.C.

At this experimental farm, located near the Pacific Ocean and within what is known as the coast climate, experiments with cereals have been conducted similar to those referred to as made on the other branch farms. Tests have also been conducted with different fodder plants and roots for the feeding of stock; also with potatoes and many sorts of garden vegetables.

The greatest attention has, however, been paid to the growing of fruits and the results obtained show that the climate is well fitted for the maturing of fruits of the best quality. About 2,500 varieties are now under test, mainly apples, plums, pears and cherries. These are being tried on land in the Fraser River valley and on the sides of the mountains, with very gratifying success. A large number of varieties have already borne fruit and the information gained by the careful comparison of these many sorts is made available to all in the annual reports prepared by the superintendent.

At all the branch farms a large and increasing correspondence is conducted with farmers and many meetings of farmers and fruit growers have been attended by the officers in charge.

AGRICULTURAL SOCIETIES.

The distribution to the Agricultural Societies in the North West Territories of the $7,000 voted at the last session of Parliament will be dealt with by my department as in former years.

The number of societies entitled to participate in the distribution of the grant this year it is estimated will be 37, a decrease as compared with 44 last year, which will have the effect of slightly increasing the amount each society will be entitled to receive as its apportionment of the $7,000.

ARCHIVES.

The work of collecting the archives continues steadily and without intermission, the value of the collection being largely increased during the last few years. The whole of the documents in process of being copied in London are not yet received, but the last report of progress shows that those relating to Upper and Lower Canada, deposited in the Record Office, have been almost completed and the papers relating to Nova Scotia have been begun. The documents in Paris are copied down to the year 1741, and progress is making in the copying those of a later date. The copies of these papers so far received cover the dates between 1575 and 1741. Advantage has been taken to a large extent by historical writers of the collection, and in return for the benefits received many reports and other publications have been sent which are carefully bound, catalogued and thus made accessible to investigators.

On the 11th of February last, a fire was discovered in the Western Block, where the Archives were stored. The Archivist being confined to his house at the time with an attack of influenza, I instructed Mr. Jarvis, the secretary of the Department, to have the papers removed to a place of safety, which was done and no paper of any kind was lost or destroyed, the sole damage done being the injury to the binding of a few volumes, which can be easily repaired. A place of deposit is now being fitted up for the books and documents in the public building on Wellington Street, which will, no doubt, be ready for their reception before the end of the year.

III.—PATENTS OF INVENTION.

It is shown by the following comparative tables that there has been a growing yearly increase in the transactions of this branch of the Department of Agriculture from the calendar year 1887, to the year ended the 31st of October, 1897. This increase appears under all headings; and the last year shows the gratifying result that the increase of revenue of the office amounts to the sum of $8,585.40 over the preceding year, and a surplus of $64,196.55 over the expenditure.

The Act 55-56 Vic., chapter 24, provides that the life of patents issued after the passing of that Act is extended from fifteen years to eighteen years, without an enlargement of the fees.

The Act also provides that if within three months after the date of the issue of a foreign patent the inventor gives notice to the Canadian Commissioner of Patents of his intention to apply for a patent in Canada for such invention, that then no other person having commenced to manufacture the same device in Canada, during such period of one year, shall be entitled to continue the manufacture of the same after the inventor has obtained a patent in Canada, without his consent. 1,079 foreign patentees availed themselves of this privilege.

The same Act also provides for dispensing with the furnishing of models, unless specially required by the Commissionner of Patents, and this facility has operated as an incentive to increase the number of applications for patents.

"The Patent Act" confers on the Commissioner the power of granting to patentees 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 past year was 985; and the number of extensions of time to manufacture was 1,892.

The total number of applications for patents which were examined and reported on as provided by "The Patent Act" by the examiners during the past year was 4,861, of these sixty-nine were refused for want of novelty.

It is desirable in the interest of both inventors and the service of the department that great care should be taken in the preparation of the necessary application papers for patent. The rules and forms which are furnished by the office to all applicants, should be closely observed.

The Canadian Patent Office Record containing a transcript of the claims and illustrations of inventions patented in Canada, and the names and residences of the patentees is continued to be published in monthly numbers by the department, the work being accurately and satisfactorily performed by the Queen's Printer. This publication has become an indispensable adjunct to the office and is largely used by solicitors of patents and others engaged in the manufacture of patented inventions, or otherwise interested in patents.

The subscriptions are now received by the office instead of by a contractor, as formerly; and a revenue is also derived from the sale of back numbers. This publication is supplied to foreign Patent Offices in exchange for their reports, and, is also sent, without charge, to a large number of free libraries in Canada and in foreign countries, with the object of diffusing the valuable information therein contained in the interest of patentees and manufacturers.

The Canadian Patent Office is indebted to the British and United States Patent Offices for their weekly official reports; also for copies of the full specifications and drawings, which are of material assistance to the examiners and other officers of the Patent Branch of the department, in the discharge of their respective duties.

The model museum still continues to be visited by large numbers. It has been removed to 191 Sparks street, and is open to the public from 9 a.m. to 4 p.m., except on Saturday, when it is open from 9 a.m. to 1 p.m.

The library of the Patent Office, comprising about 3,500 volumes, is a well lighted and convenient room, to which inventors and the public have free access.

A re-organization of the Patent Branch of the department, came into force during the early part of the year, and has been found to be efficient and to have led to considerable economy. The staff of the office consists under the Deputy Commissioner, of a chief clerk, three examiners and the necessary clerks for the required service.

The economy effected is shown by the following statement:—

Salaries of the Patent Branch—

Preceding year	$30,892 85
Present year	26,223 40
Saving	$4,669 45

COMPARATIVE STATEMENT of the transactions of the Patent Office, from the 1st January, 1887, to 31st October, 1897.

Years.	Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignments of Patents.	Fees Received, including Designs and Trade Marks.
		Patents.	Certificates.	Total.			
							$ cts.
1887	2,874	2,596	254	2,850	219	1,335	76,132 74
1888	2,747	2,257	282	2,539	240	1,159	74,508 37
1889	3,279	2,725	356	3,081	221	1,437	87,158 60
1890	3,560	2,428	369	2,797	248	1,307	94,027 16
1891	3,233	2,343	393	2,736	215	1,231	86,960 59
1892	3,176	3,417	415	3,832	242	1,500	86,713 05
*1893	2,614	3,153	292	3,445	229	1,345	71,863 52
1894	3,291	2,756	462	3,218	301	1,445	90,146 19
1895	3,387	3,074	422	3,496	343	1,550	98,031 74
1896	3,728	3,488	413	3,901	306	1,420	104,112 06
1897	4,300	4,013	284	4,297	377	1,551	116,219 85

*For ten months only.

Detailed Statement, Patent Office Fees.

Years.	Patents.	Assignments.	Caveats.	Copies.	Subscription to *Patent Record.*	Notices to Apply for Patent.	Sundries.	Totals.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1887	62,924 44	2,715 88	1,169 50	1,044 31	.....	.....	86 08	67,940 21
1888	60,436 78	2,562 22	1,257 40	971 98	.....	.....	18 13	65,246 51
1889	72,411 30	3,027 90	1,205 47	1,267 60	.....	.....	134 45	78,046 72
1890	78,192 61	3,202 00	1,320 15	931 83	.....	.....	504 19	84,150 78
1891	72,664 26	2,411 95	1,124 60	782 29	.....	.....	340 53	77,723 63
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	127 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

*For 10 months only.

The Patent Office fees received during the year ended the 31st of October show a surplus of $64,196.55 over the working expenses of the office, as per subjoined table:—

Receipts.		Expenditure.	
	$ cts.		$ cts.
Cash received	102,117 92	Salaries	26,223 40
Cash refunded	1,586 03	*Patent Record*	10,111 94
			36,335 34
		Receipts over expenditures	64,196 55
Net cash	100,531 89		100,531 89

The patentees resided in the following countries:—

Countries.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.
Canada	639	565	609	620	606	671	685	661	707	740	796
England	153	152	203	116	122	298	206	177	179	215	266
United States	1,740	1,425	1,788	1,623	1,519	2,227	2,061	1,731	1,980	2,270	2,666
France	11	21	18	10	10	26	24	24	21	24	26
Germany	29	33	51	23	36	106	88	108	102	117	126
Other countries	24	61	56	36	50	89	89	55	85	122	173
Totals	2,596	2,257	2,725	2,428	2,343	3,417	*3,153	2,756	3,074	3,488	4,013

*For 10 months only.

The Canadian patentees were distributed among the provinces of the Dominion as follows:—

Provinces.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.
Ontario	442	354	383	425	394	464	437	404	451	430	464
Quebec	141	128	129	125	140	131	151	162	177	201	178
New Brunswick	18	19	22	20	16	19	23	13	13	12	20
Nova Scotia	26	35	30	17	22	16	29	15	19	32	22
Prince Edward Island	4	2	2	3	1	1	3	2	6	2	2
Manitoba and North-west Territories	16	18	32	14	28	22	26	38	18	28	36
British Columbia	2	9	11	16	5	18	16	27	23	35	34
Totals	639	565	609	620	606	671	*685	661	707	740	756

* For 10 months only.

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 patentees, 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.

Year.	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.
1892 (Six months ended 31st December)	2,141	3	35	.....	3
1893 (Ten months ended 31st October)	3,098	9	46	.....	3
1894 (Twelve months ended 31st Oct.)	2,701	9	46	.....	4
1895 do do	3,049	5	20	.....	.....
1896 do do	3,443	11	34	2	.....
1897 do do	3,981	8	24	15	3

	Years.	10 Years.
1892 (Six months ended 30th June)	387	25
1893 (Ten months ended 31st October)	279	10
1894 (Twelve months ended 31st October)	433	25
1895 do do	416	6
1896 do do	401	10
1897 do do	262	4

IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

The following table shows a comparative statement of the businesss of this division from 1887 to 31st October, 1897, inclusive:—

Years.	Letters Received.	Letters Sent.	Copywrights 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.
1887.....	1,543	1,543	554	167	245	245	105	105	16	16	56	8,192 53
1888.....	1,655	1,889	566	167	288	288	71	71	29	29	71	9,262 86
1889.....	1,721	1,987	616	178	280	280	88	88	26	26	49	9,111 88
1890.....	1,766	2,169	688	222	293	293	68	68	21	21	104	9,876 38
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	8,013 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

The total number of registrations of copyrights, trade marks, industrial designs and timber marks was 1,290 during the year ended 31st October, 1897. This consisted of 702 registrations of copyrights, 446 registrations of trade marks, 75 of industrial designs and 13 of timber marks. There were also issued 251 certificates of copyrights, 31 registrations of interim copyrights, and 19 certificates, 23 registrations of temporary copyrights, and 3 certificates. The total number of assignments of these different rights recorded was 94.

The correspondence of this branch of the department amounted to 2,606 letters received and 3,548 sent.

The fees during the year amounted to $14,101.93, being an increase of 33 per cent over the previous twelve months; the trade marks increased 35 per cent and the copyrights 15 in the same time. These constitute very large and very active increases.

COPYRIGHT AND TRADE MARKS BRANCH.

DETAILED STATEMENT of all Moneys received from 31st October, 1896, to 31st October, 1897.

Month.	Trade Marks.	Copy-rights.	Designs.	Timber Marks.	Assign-ments.	Copies.	Total.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
November, 1896.....	1,070 00	51 00	30 00	2 00	10 00	24 55	1,187 55
December do	714 75	97 50	23 00	.....	22 00	8 85	866 10
January, 1897.....	784 50	46 00	1 00	3 75	5 50	16 00	856 75
February do	1,037 00	71 50	25 00	4 25	20 00	12 75	1,170 50
March do	1,869 75	89 00	45 00	4 00	20 00	50	2,028 25
April do	1,399 85	93 00	50 00	2 00	15 00	10 50	1,570 35
May do	830 65	94 40	75 00	4 00	4 00	15 50	1,023 55
June do	999 25	80 97	21 00	4 00	27 33	11 50	1,144 05
July do	726 00	74 00	15 00	2 00	5 00	6 00	828 00
August do	922 00	64 50	10 00	8 00	7 00	4 50	1,016 00
September do	1,115 85	77 00	55 00	6 00	36 00	23 00	1,312 85
October do	931 75	55 10	25 00	2 00	21 00	13 13	1,097 98
Grand total.....	12,451 35	893 97	375 00	42 00	192 83	176 78	14,101 93

V.—QUARANTINE.

The General Superintendent of Canadian Quarantines has reported that the year now drawing to its close has not presented, for us in Canada, any unusual incidence of epidemic disease.

His very full and interesting report will be found as an appendix hereto (see Appendix No. 1).

Reports from the respective medical officers of each quarantine station on both Atlantic and Pacific coasts, are also appended (see Appendices Nos. 2 to 13).

VI.—STATISTICS.

The statistical division of the Department of Agriculture is based upon the Union Act which specifically assigns census and statistics to the exclusive authority of the Parliament of Canada.

In accordance with this assignment of duties, the Parliament of Canada passed chap. 21, Acts of 42 Victoria.

In the Revised Statutes of Canada, 1886, this Act forms chapters 58 and 59. Chap. 60 is the authority for the collection of criminal statistics.

By chap. 15, Acts of 1890, the collection and publication of labour statistics are defined to be part of the duties of the Minister of Agriculture, acting under the general authority conferred upon him by chap. 59, R.S.C., and the sum of $10,000 is authorized to be spent annually in the work. This Act, however, has not been put in force.

As misapprehension seems to exist leading to indiscriminate and unofficial publication of statistics, sections of the Act, chap. 59, R.S.C., are here given:—

The first section provides 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 Lieutenant-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:

"Every one who wilfully gives false information or practises 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 in 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, 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 public appear to appreciate the efforts of this division of the Department of Agriculture, the preparation of general statistics in answer to inquirers having been greatly in excess of former years; the aim is to give all inquirers the best information obtainable. The statistician's office has become a general inquiry office for all parts of the world.

In the course of these inquiries the statistician has been forced to confess the fact that Canada lags behind other countries in many branches of statistics.

In no branch have there been so many inquiries as to that relating to agricultural statistics. These inquiries have necessarily been answered in a most unsatisfactory way, owing to the absence of any system of collecting agricultural statistics co-extensive with the Dominion. If a good plan, ensuring accuracy and early publi-

cation, could be adopted in Canada, the value to farmers and business men of this information can hardly be over-estimated.

HEALTH STATISTICS.

No steps have been taken as yet to provide a better system of collecting vital statistics than that which was abrogated 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 collecting of vital statistics. Section 4 of chap. 59, Revised Statutes, 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 this 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.

This plan could be carried out in respect to agricultural statistics; so that while each province could have its own statistics for publication, the world at large would have those of the Dominion. The very great attention given to crop statistics in the United Kingdom, the United States, France, Germany, and Australia, and the large monetary operations based upon them, make it almost imperative upon Canada to provide her farmers and business men with these aids to successful efforts.

CRIMINAL STATISTICS.

Chap. 60 of the Revised Statutes of Canada gives the special directions under which the criminal statistics are collected. During the past year 308 persons made returns to the statistical division of the Department of Agriculture. By provinces these returns are as under:—

Prince Edward Island	5
Nova Scotia	46
New Brunswick	36
Quebec	39
Ontario	158
Manitoba	6
British Columbia	11
North-west Territories	7
Making a total of	308

The compilation which is published as an appendix shows that the number of persons convicted of indictable offences was 5,204 in 1896 as against 5,474 in 1895 or 10·25 per 1,000 inhabitants in 1896 against 10·86 per 10,000 in 1895. If to the number of convictions for indictable offences is added the number of summary convictions the result is a total of 37,278 convictions in 1896 against 37,585 in 1895. The result is that there was one conviction for each group of 136 persons in 1896 and one for each group of 134 in 1895, showing a small decrease.

It will thus be seen that crime, tested by the number of convictions has slightly decreased compared with the population. By provinces crime has decreased in Quebec, British Columbia and Prince Edward Island, and increased in the other provinces.

The system of examining the returns has been thoroughly examined and several changes made which will have the effect of rendering the criminal statistics of the country more accurate than they have been. The returns of the Mounted Police have been carefully examined and tables prepared for each year from 1883 to 1896 (both years included). With these changes it is believed that the Criminal Statistics of Canada for 1893, 1894, 1895 and 1896 are the most complete yet published by this department.

In the earlier years of the compilation of the Criminal Statistics the arrangement differed from that under which the tabulation was carried on since 1884. Returns previous to 1884 having been in this way deprived of their value for purposes of comparison these are now being compiled over again so as to bring them into unison with the subsequent years.

The country has now nineteen years compilation of statistics dealing with the criminal class, forming a body of information of increasing value to the student of sociology.

THE STATISTICAL YEAR BOOK.

This work is published by the Department under authority of chap. 59, sec. 6, Revised Statutes of Canada.

The demand for the work increases every year. Requests for the 1896 edition from the governments, public libraries and Chambers of Commerce of France, Germany, the United States, Italy, Japan and other foreign countries have been received, while the number required for the United Kingdom and other portions of the British Empire has been larger than ever. The demand within Canada continues.

In accordance with my statement in parliament, the Year Book has been reduced in size, thus enabling me to provide a larger edition to meet the increasing demand, without addition to the expense.

Testimonials expressive of the value of the Year Book have been received by the score. The following are samples:

Loudon M. Douglas, Esq., London, Eng.: "It is the best Year Book of its kind that I have ever seen."

John Hyde, Esq., Statistican, United States Department of Agriculture: "This publication is of much value in the work of this office and will be duly catalogued and added to our library."

Mr. John Coles, London, Eng.: "The Year Book contains a mass of valuable information."

His Lordship, the Bishop of Qu'Appelle: "The Year Book of 1896 has arrived. From a very cursory glance I can see that it will be a very valuable book of reference, and I am very thankful to you for sending it."

Wm. Lazenby, Ohio State University: "I find this annual extremely useful for reference."

A. Blue, Esq., Director Bureau of Mines, Toronto, Ont.: "I find it to be very comprehensive and valuable."

Warren Upham, Esq., Minnesota Historical Society: "A most valuable book for reference."

A. H. MacKay, Esq., Superintendent of Education, Nova Scotia: "An extremely valuable work of reference."

David Day, Esq., U. S. Geological Survey: "This is certainly a very complete statistical statement of the various interests of the Dominion, and you have been very successful in your attempt to compress a great deal of information into a very small volume."

C. R. McCullough, Esq., Principal Hamilton Business College: "This work has been very useful in the college as students require to refer to it quite frequently."

"Canadian Gazette," London, Eng.: "This publication which is a credit to Canada and an example to the statisticians of other British colonies, and even in some of its features, to the statisticians of the mother land."

In collecting information, several thousands of circulars have been issued, and I am happy to bear testimony to the willingness with which the several provincial governments, business men, farmers and the public generally have answered the circulars.

In addition to the statistical work required for the Year Book tables and statements wanted by ministers and members of parliament, the business community and by specialists in various countries, many of them necessitating a large amount of research, have been supplied.

The British Government, for the first time, published in the Colonial Series, a digest of Statistics of Canada prepared in the statistical division of my department, and thus aided greatly in supplying the unceasing demand for information about Canada from the press, the public men and the public generally of the British Isles.

The appendices herewith annexed contain the reports of the Medical Quarantine Officers, the Veterinary Inspectors, the Cattle Quarantine Regulations and a Special Report on the Pan-American Medical Congress.

The whole respectfully submitted.

SYDNEY A. FISHER,
Minister of Agriculture.

APPENDICES

QUARANTAINE

No. 1.

REPORT OF THE GENERAL SUPERINTENDENT OF QUARANTINES.

(F. MONTIZAMBERT, M.D., Edin., F.R.C.S., D.C.L.)

31st October, 1897.

SIR,—I have the honour to submit this my annual report, to the 31st October, 1897, as General Superintendent of Quarantines.

The year now drawing to its close has not presented, for us in Canada, any unusual incidence of epidemic disease. On the Atlantic side the immigration from Europe has been small, and free from more than the average amount of sickness. The prevalence of smallpox and yellow fever in epidemic form in South America and in Cuba, called for special care in the inspection of arrivals from those countries. On the Pacific side Asiatic cholera, the bubonic plague and smallpox continued their threatenings from China, Formosa, and Japan. And an unusually large number of cases of the last named disease presented themselves at your British American quarantine.

Asiatic Cholera.—This disease revived in Hong Kong last winter. It made much headway in many Chinese cities, and in the Island of Formosa. It was present in various parts of Japan from December last until the close of this summer. Its presence has not been reported in Europe, except in the case of the troop-ship "Nubia," which arrived at Plymouth on the 9th of January. This vessel left Ceylon on the 17th of December, having on board the Royal North Lancashire Regiment. Between Ceylon and Suez two of the crew, Lascars, died of dysentery, one on the 22nd of December, and the other on the 27th. At Port Said crew and passengers purchased fruit freely. The first case of cholera amongst the troops on board was on the 1st of January, when the vessel arrived at Malta. Other cases occurred after the ship left that place next day. In all there were four cases of choleraic diarrhœa, and five cases of Asiatic cholera. One of the deaths from cholera occurred after the vessel reached Plymouth. The measures taken on the vessel, and at Plymouth, were successful in preventing any spread of the disease.

In reference to the micro-organism of cholera the "Anales del Departamento Nacional de Hyciene," Dirigidos por la Oficina Sanitaria Argentina, December, 1896, publishes the following curious observations from a letter of Hankin to the Institute Pasteur, Paris: "I hope to send you soon a summary of my discoveries regarding the property that the waters of some rivers of India, as the Jumma and the Ganges, have of destroying the micro-organism of cholera. This action as a bactericide seems to me to be produced by certain volatile acids. This discovery is of special interest as it explains why, in India, cholera is never propagated in the valley of the Ganges in the direction of the current of the river, but always comes to us from Bengal. Frequently the bodies of people who have died of cholera are thrown into the rivers, and, as hitherto, no case of contagion has been known to be spread in this way, not even among the people who drink the water of the rivers. The physicians of India are not willing to admit that cholera has its origin in the water. I have discovered, however, that the microbe of cholera multiplies with great activity in the waters of the wells in that district. There are only a few rivers that seem to have the wonderful power of purifying themselves. I will cite, as an example, the observations made regarding the water of the river Jumma,

which flows by and quite near to Agra, this is a city of 160,000 inhabitants, and all the sewers of the city are emptied into the Jumma. The contamination with bacteria which is thus produced disappears in less than twelve and a half miles below the city; the number of bacteria in the cubic centimetre, which is from 700 to 820 above the city, increases to 16,000 and to 21,000 as it passes before the inhabited parts, and is again reduced to 6,200, 5,600, 4,200 in the three or four miles below; 550 to 600 at a distance of five or six miles, and 120 miles further down there are only 125 to 130; a number equal to that found at Dhobus Ghat, five or six miles above Agra. In regard to the cholera bacillus, the water has the same influence as a bactericide, whether taken above or below the city; in the immediate surroundings of a cadaver that has been thrown into the stream, or around a cadaver that has remained a long time in the water, there is no contagion. The water of the Jumma, boiled, like the water of the wells, favours the multiplication of the microbes. Other experiments of a similar kind have given us the same results, and cultures in peptones have demonstrated that all the cholera microbes perish really in the water of Jumma."

The Bubonic Plague.—This disease has been present almost throughout the year in China and Japan. In Hong-Kong the cases were few. The last reported death was on July 17th. In Amoy, Macao, and Swato, it was reported as epidemic in May and June. In Japan this disease has been present in places from November last until August. In Formosa it reached its maximum intensity in the month from April 20th to May 20th, when there were 268 deaths.

In Bombay the outbreak of plague, noted in my last annual report, continued and increased. It reached its height in the months of February and March. The deaths actually reported as being from plague in Bombay during those two months were 5,597; the estimated deaths 10,840. The disease spread to Agra, Delhi, Bangalore, Karachi, Poona and other cities. As to India generally, not a single case has been reported in Madras or Bengal; only thirteen in Rajputana; three in the central provinces; eight in the Punjaub, and four in the north-west provinces. These were invariably persons travelling by train, who were intercepted at railway junctions.

At Kamaran, the quarantine station in the Red Sea, the SS. "Pekin" arrived January 8th from Bombay with 1,047 pilgrims. Two deaths from plague had occurred on this ship during its voyage from Bombay. No further cases occurred on board.

In England there were two cases of plague brought to the Seaman's Branch Hospital in London last autumn, both of which ended fatally. The Indian transport "Dilwara" which arrived at Southampton on April 6th, had had a fatal case of plague on board during her voyage.

At Hamburg the SS "Pirrie" from Bombay, arrived January 19th, with her mate dead, and seven of her crew ill, stated to be with plague.

At San Francisco the British ship "Maud," from Calcutta, arrived July 15th, reported one death, and two convalescents, supposed to be from plague.

Besides the risk by sea, there is danger, also, to Europe from the spread of this disease by land. The country to the west of the Indus is the home of the bubonic plague, and when once the infection in an epidemic form reaches out from Afghanistan, Persia, and Mesopotamia, there will be danger of its importation via the Caspian and the Black Sea shores to Europe. At an early period of this outbreak in India, special instructions were given to all Canadian quarantine officers to exercise the utmost vigilance with regard to vessels coming either directly or indirectly from Bombay. Directing them to carry out minute individual inspection of all the sailors, and of all the passengers, on such vessels, especially of natives of India, should such be present.

Some very important points in connection with the spread of plague, will no doubt be settled by the investigations of this outbreak of the disease in India. The Berlin correspondent of *The Sun* states that Koch reports that the plague bacillus possesses but little vitality outside of the bodies of men and animals. Hankin has made exhaustive experiments with grain, clothing, and the principal commodities shipped from the port of Bombay, and has reported that their export may be con-

tinued without danger. The plague bacillus can only live for a very short time in the staple exports, and if even any of them found a home in a ship's cargo they would be dead long before the vessel reached Aden. The establishment of the non infective character of ordinary merchandise has a very important bearing upon questions of quarantine. And these statements of the bacteriologists are so far borne out, as no direct importation of plague by merchandise has ever yet been proved.

Small-pox.—This disease prevailed in epidemic form during this year in Japan. It was severe in the principal sea-ports, notably in Kobe and Tokyo, and to a somewhat less extent in Yokohama. In China it was present, as it usually if not indeed always is. In Cuba it prevailed in epidemic form throughout the spring and summer.

Yellow Fever.—This disease prevailed during the year at Rio de Janeiro, at Santos, and to an unusual extent in Cuba. It invaded the United States in August and September, doubtless introduced from Cuba to Central American ports. Cases occurred early in September in the states of Mississippi, Louisiana, and Alabama. It spread considerably through those states, and imported cases occurred in other states, but the invasion fortunately occurred somewhat late in the season, and the ravages of the disease have been lessened with the setting of cooler weather. But, as the *Medical Record* remarks, with the coming of frost and the disappearance of the fever the danger will not be over, for the frosts of an entire winter do not always destroy all the concealed germs of the disease. It will be a matter of general concern, therefore, that the places which have been invaded by yellow fever this year be thoroughly cleaned and put to rights during the winter, for unless the warning of the present visit is heeded, some of the infected cities will very probably see a return of the disease with the first heats of next summer.

Preventive Inoculations Against Disease.—Researches in this fruitful field have continued throughout the year.

Against Cholera.—Haffkine and Kitasato have made further investigations in this direction, and there is good evidence that these vaccinations afford a very distinct measure of protection against cholera, although this may be only during a limited time.

Against the Bubonic Plague.—Yersin has pursued his experiments in India, and is very sanguine as to the results. Hitherto the serum has only been employed in developed cases of plague. He claims to have reduced the mortality from eighty-three to thirty-four per cent in the cases treated. He maintains, however, as the result of his experiments on animals, that it will be extremely valuable in affording protection to those who have been exposed to the infection of plague. He urged that when a case of plague has occurred in a household, preventive injections of serum should be administered to all who have been exposed. And that in this way the diffusion of the disease may be prevented, especially when careful isolation can be maintained.

Haffkine's anti-plague serum has, however, been used as a preventive, and very successfully. The Earl of Onslow, Parliamentary Secretary for the India office, stated in the House of Lords, on March 11th, that 2,321 persons had been inoculated with it, of whom only two had been attacked and both were alive. Other accounts are somewhat conflicting. A telegram from Vienna, dated May 21st, states that the commission sent to India has reported to the Academy of Sciences that neither Yersin's nor Haffkine's serum has been successful in the treatment of cases of bubonic plague. Whilst the opinion of the Russian Plague Commission upon Yersin's method of treatment is favourable, Wyssocowitz and Zabolotny, members of that mission, state: "On the whole, the results have not been so encouraging as we had hoped, but they have, however, reduced the mortality to forty per cent in treated cases." And they add that the serum remains so far the only remedy to be employed, and that they very warmly (*très chaleureusement*) recommend its use in the treatment of this disease. Lustig and Galeolti, of the Royal University of Florence, who have been working in India claim also to have obtained a plague serum which acts as a vaccine with special protective powers.

Against Yellow Fever.—Dr. Guiseppe Sanarelli, Director of the Uruguayan National Institute of Experimental Hygiene of the University of Montevideo, and a

disciple of Pasteur, officially announced before the Congress of South American physicians in June last, his discovery of the micro-organism of yellow fever. This he has named "bacillus icteroides." He states that he entertains a well-founded faith that it will soon be possible to apply to man a specific preventive and curative treatment of this disease. Sanarelli, it seems probable, has rediscovered and elaborated the bacillus "*x*" of Sternberg.

Dr. A. Simoes proclaims in the *Rev. Med. Chir.* of Brazil the success of inoculations with attenuated cultures of the yellow fever microbe, the "micrococcus xanthogenicus" discovered by Domingos Freire, of Rio de Janeiro, in 1880, and confirmed by Carlos Findlay of Havana, Gerard of Panama and others. Since he was authorized in 1883 by the Government to administer these inoculations, 11,881 persons have received them, and he states that the mortality among them has been only 0·5 per cent while among the rest of the population it has average 30 per cent. The yellow fever hospital had a mortality of 78 per cent until the inoculations were introduced, when it fell to 30 per cent. He adds that if all strangers recently arrived, and all persons exposed to contagion, would have themselves inoculated, epidemics would cease and there would only be a few spasmodic cases, while vigorous hygienic and disinfecting measures in addition would exterminate the pest altogether.

Against Leprosy.—Carrasquilla claims continued good results after a year's experience with his anti-leprous serum. Consignments of it have been sent to Dr. Ashmead, of New York, and by him to Dr. Hansen, of Norway, Dr. Petersen, Inspector General of Leprosy for Russia, and the President of the Hawaiian Board of Health, Honolulu. The results of their experiments with this serum will be awaited with interest.

Considerable progress seems to have been made in the application of the principles of the preventive inoculation of serum to the prophylaxis of typhoid, or *enteric fever.* In this direction investigation has been stimulated, and at the same time facilitated, by the discovery of the influence exerted by the blood of persons who are suffering or have recovered from one of the infectious diseases upon the specific micro-organisms of the respective disorders, as manifested by their agglutination and precipitation, their loss of motility, and by their final devitalization. One of the most recent contributions to the literature of this very important subject has been made by Wright and Semple (*British Med. Jour.*), professor and assistant professor respectively of pathology in the Army Medical School, at Netley, England. These investigators describe briefly the method of anti-typhoid vaccination that they have gradually elaborated in the course of the period of more than a year during which they have prosecuted their inquiry. Iwanow describes in the *Bolnitschnaja gaseta Botkina*, No. 20, successful immunizing of monkeys. And Pfeiffer and Kolle, —repeating Durham and Gruber's work—relate in the *Deutsche med. Woch.*, No. 46, their favourable experience with inoculation of healthy persons, and describe their methods, adding that preventive inoculation now promises to render great service in epidemics of enteric fever, and in military camps threatened with it.

Czajkowski claims to have discovered the bacillus which produces *measles.* Professor von Leyden has discovered a new diplococcus in the parotid gland secretions of persons who are suffering from *mumps*, which he takes to be the *mumps bacterium.* Kuurloff found the microbes described by Burger and by Afanasiew only in complicated cases of *whooping-cough*, and does not consider them to be specific. The specific micro-organism of this disease he believes to be an amoeba found quite early in the sputa, as nucleated corpuscles with flagella, moving freely in warmth. They are visible in the fresh sputum, but are rendered much more distinct by staining with Ziehl's solution. Deichler, (*Baumgartner's Jahrb.* 1886 and 1889) had observed the like spore-bearing amoebae, but his discovery seems to have been forgotten. And Livaschew has differentiated two distinctive micro-organisms in *typhus fever.*

A Therapeutic Micro-organism.—A young Parsee medical man, Dr. Chadialli, is stated by the Bombay Gazette to have in July last discovered a micro-organism to which he ascribes the peculiar power of destroying the enteric and other allied bacteria. Hankin has named it the "Micrococcus Ghadiallii". In pure cultures it is harmless to man when swallowed, and produces no ill effects when injected into

the peritoneal cavity of rabbits and guinea-pigs. When information of this kind comes from an authority like Hankin we are justified in anticipating, with some degree of confidence, that the young Parsee doctor has thus opened up a field full of brilliant therapeutic prospects in the handling of a deadly malady.

Inspection Service.—In November last, by your instruction, I accompanied you in your inspection of your quarantine stations at Halifax, Nova Scotia, and St. John, New Brunswick. I further inspected for you the station at Sydney, Cape Breton. As a result of my study of the local conditions of that harbour I had the honour to report to you in support of the recommendation made by the senior quarantine officer of that port, that the work of the whole harbour could be consolidated with advantage under one inspecting officer, resident at North Sydney. I also inspected for you, and reported upon, the quarantine service and station at Chatham, New Brunswick.

In February last I proceeded, by your instruction, to British Columbia, to inspect the quarantine stations there and to report upon the quarantine protection of Victoria, Vancouver, and the other Pacific ports of the Dominion. In visiting these ports, and studying their conditions I was accompanied, by your permission, by Dr. Watt, the local Superintendent of Quarantine. Full information was courteously given me by the collectors of customs at the various ports, the members of the Provincial Board of Health, and other medical men, and by numerous representatives of the shipping interests. I also visited Port Townsend on the United States side of the Straits of Fuca, and had the advantage of conferring with the medical officer in charge of the National Quarantine Station at that place, Dr. Brooks, of the U.S. Marine Hospital Service, and with the Medical Inspector of the State of Washington.

As a result of these investigations I was enabled to report to you that the quarantine protection was satisfactory as far as most of the ports were concerned, such as Victoria, Nanaimo, Comox, and Chemainus, on the island, and New Westminster on the mainland.

With regard to Vancouver, and its contiguous sub-ports of Hastings and Moodyville in Burrard Inlet, the conditions are somewhat different. Many vessels come to those ports direct, or after calling for orders at Port Townsend or Port Angeles in the State of Washington, or are towed in direct to Burrard Inlet by United States tugs from Cape Flattery. Such vessels do not pass near to, and so are not inspected at, the William Head quarantine station. I therefore had the honour to recommend that Vancouver should be made a regular quarantine station, with a regular inspecting medical officer, for the protection of itself and the other ports in Burrard Inlet.

The quarantine inspection at Victoria, of vessels from contiguous United States ports, had been deemed essential by British Columbia some years ago, when infectious disease prevailed at Seattle and other Puget Sound ports, and had been continued ever since. It did not seem to me to be any longer requisite, as those ports have been free from any special or epidemic disease for years past, and as there is no inspection on the parallel lines of railroad entry from the same parts of the United States. Under section 9 of the quarantine regulations, which empowers the Minister of Agriculture to except from the regulations, from time to time, coasting vessels from ports in the United States contiguous to Canada—and free from infectious disease—vessels from New York and ports north of it are, for the present, exempt from quarantine inspection at your Atlantic quarantines. For these reasons I recommended that vessels from San Francisco, and ports north of it should, in the present freedom of such ports from epidemic disease, be similarly exempt from routine inspection at your Pacific quarantine stations.

This recommendation, as well as that for the erection of the port of Vancouver into a regular quarantine station, met with your favourable consideration, and subsequent adoption for administrative action.

In addition to this official inspection duty, I took occasion whilst on leave of absence in January last, to visit the offices of the Surgeon General of the Marine Hospital Service at Washington, where in the laboratories, Dr. Kinyoun and Dr. Geddings of that service were experimenting with formaldehyde as a disinfectant; and also to visit the quarantine station of Baltimore, through the kindness of Dr. McShane, and that at New York, through the kindness of Dr. Doty. At the quaran-

tine in the harbour of New York, I found improvements being introduced on a very large scale into its several departments by Dr. Doty, the health officer of the port.

Disinfection, &c., at Ports of Departure.—At the end of May last, there was sent to me for my official report a copy of a reference from council, being a letter from the Lieutenant Governor of British Columbia transmitting a certified copy of a minute containing a resolution passed at the late session of the Legislative Assembly, relating to the detention of oriental immigrants, and the disinfection of their baggage before they embark, and instructing me to report whether I thought we could arrange in the manner thus set forth with the Canadian Pacific Railway Company, and the other lines running from the Orient to British Columbian ports. I may perhaps be permitted to say that the desirability of disinfection, and vaccination, at the port of departure has been strongly advocated by me for many years past. In my recent report on my inspection of the British Columbian quarantines, in March last, I said:—"I may perhaps be permitted to add that while I hold that the station of William Head should thus be fully equipped to deal with infected vessels, persons, &c., and those reasonably suspected of being infected, I am, as ever, strongly of opinion that the proper time and place for the routine disinfection of passengers and their effects, and for their vaccination are before they board the vessel, and at the port of departure in the Orient. This properly carried out would destroy any infection many days sooner; would lessen the chance of disease during the voyage; would lessen the risk to cabin passengers of contracting disease from the steerage; and, if properly certified to, might well replace any routine disinfection of healthy vessels —even during epidemics—at quarantine, and so greatly lessen interference with travel and traffic; limiting our quarantine to inspection, and the treatment of actual infection only."

Infectious diseases prevail almost if not quite continuously in China. In Japan they are of frequent occurrence. It seems inevitable, therefore, that it will be expedient for you to require at intervals, greater or smaller, and for periods longer or shorter, the disinfection somewhere of oriental immigrants before they are allowed to enter Canada.

The carrying out of such routine disinfection at the quarantine of the port of arrival involves so much interference with travel and traffic that it seems to me to be clearly worth the while of the shipping companies to arrange for its performance at the port of departure.

As far as I have been able to ascertain, the cost of the erection, maintenance and working of the necessary disinfecting plant at the ports of departure in the Orient could be met by the addition of somewhat less than fifty cents to the price of each emigrant's ticket. The supervisor of this disinfection in each port would, presumably, be paid by, and be responsible to, the Canadian Government. His certificates to the passengers, and tags on their luggage, could then be accepted at our quarantines, and—in the absence of actual disease during the voyage—would ensure the admission of the vessel to immediate *pratique*.

It would certainly seem to be to the interest of the transportation companies—the Canadian Pacific, the Northern Pacific, and Oregon-Asiatic Steamship Lines—to combine to arrange for the immediate establishment of such disinfecting appliances at each of the ports of departure in China and Japan from whence they embark passengers for this country.

In such a project they would, in all probability, be joined by the great lines of passenger steamships running from the Orient to San Francisco. For at that port there has been enforced throughout this summer, by the Government of the United States, a precautionary disinfection of Chinese and Japanese immigrants similar in all respects to that which we have been employing in Victoria. If this disinfection at ports of departure be found for any reason impracticable, I would recommend as the next best alternative the fitting up of disinfecting chambers on the steamships themselves, in which, by steam from the vessels' boilers, clothing, etc., may be sterilized promptly as it comes on board. This being somewhat on the same principle as that by which the International Sanitary Conventions allow vessels having

their own steam disinfection chambers, "étuves," and the proper medical officers on board, to pass through the Red Sea in quarantine.

International Sanitary Conference, Venice, 1897.—This conference was opened on February the 16th. The following summary of its proceedings is taken by the Venice *British Medical Journal* from the *Supplemento al Policlinico* of 11th April:—

Four questions were discussed: 1. The origin and nature of the bubonic plague. 2. Its transmissibility, and by what means. 3. The duration of the incubation. 4. The processes of disinfection. The discussion occupied four sittings, and the following is a summary of the conclusions: The plague is of microbic origin, and is due to the bacillus isolated at Hong Kong in 1894 by Kitasato and Yersin. But the discovery of the specific germ, although it has thrown much light on the etiology of plague, has raised numerous problems which still await solution; one must therefore only rely upon well demonstrated facts, and avoid compromising science with premature applications. The specific microbe exists in the diverse morbific secretions, especially in the pus of buboes, in the intestinal discharges, the sputa and blood. Dead bodies must be considered as the receptacle of innumerable germs.

Human beings affected with plague do not constitute the sole origin of contagion; certain species of animals are liable to contract plague, and therefore must contribute to its diffusion. It is generally recognized that mice, rats, etc., are receptive, and one understands how they maintain and spread the disease in the midst of agglomerations, and also carry it on board ships, and then to distant regions. Domestic animals also, such as dogs, pigs, oxen, sheep, goats, etc., may, according to some observers, contract plague; the doubt, however, remains as to the identity of origin of plague and certain epizootics which at times are simultaneously present.

The presence of the contagion in the soil is a most important fact; the microbe, however, seems attached to the contaminated soil of habitations deprived of paved floors, whilst it loses its virulence when it lives as a saphrophyte. It has not yet been demonstrated that badly protected waters have ever acted as the disseminators of the germ; nevertheless, certain experiments prove that the bacillus of plague can live for a long time in water; therefore, when an epidemic threatens, it is necessary to examine potable water rigorously.

The notion that the principal generator of plague rapidly loses its morbific activity in the air now predominates; but one must be cautious in regard to these first results of the laboratory, however comforting may be the epidemiological fact that the contagion seems to act only in a limited area.

The conference next considered the important question of the objects and goods which may become the vehicle of the plague microbe, and placed in the first position the objects which are in immediate contact with the sick—that is, personal effects (linen, clothes). It gives a list of the goods whose importation should be prohibited from the places stricken with plague, including domestic and personal effects, rags, animal residues, fresh and dried skins, sacks, carpets and used laces. Those goods which should not be prohibited, in the absence of any justification, have also been mentioned, such as green plants, fresh and dried fruits, grain, jute, cotton, woven silk, etc.

The incubation period of plague has been determined on the basis of ancient and modern epidemiological study, and has been fixed at ten days, not with the intention of indicating in an absolute scientific way the greatest number of days during which the disease may exist in a latent state, but the period during which measures of isolation should be prescribed.

Finally, the conference completed its programme, studying the modifications concerning the methods of disinfection adopted up to now. It has been concluded that with some slight alterations, that which was established for cholera in the first Venice Conference of 1892, may also be adopted for plague.

An appendix deals with serumtherapy as a curative and preventive method, but whilst recognizing good prospects for this method, the conference maintains that, in the present state of our knowledge it is not desirable to recommend in a formal manner recourse to preventive injections of the anti-plague serum.

International notification of outbreaks of plague was also agreed to.

The British Medical Journal further states that the most important immediate consequence of the conference would appear to be the resolution adopted calling upon all powers to prohibit and restrict pilgrimages by all material and moral means at their disposal. The Indian Government anticipated this resolution by authorizing the British diplomatic representatives to announce to the conference that it had decided to prohibit this year's pilgrimage to Mecca entirely. The Netherlands representative stated that pilgrims from Java were required to be provided with a personal certificate, stamped at departure and on return. Persia announced the prohibition of pilgrimages to Mesopotamia, and Egypt reported that steps were being taken to deter pilgrims from Egypt from going to Mecca this year. Russia reported that not only all all Mohammedan, but Christian pilgrimages had been prohibited. Turkey alone declared that as pilgrimage was one of the cardinal points of the Mohammedan religion, pilgrims could not be prevented from going to Mecca.

In July last I received from you for report the reference from council of the report of the British delegates on the proceedings of the Venice conference, the proceedings of the conference, and the letter from the Right Honourable Mr. Chamberlain asking whether this colony is willing to become a party to the convention. In reply I had the honour to submit a report in part to the following effect:—

Land Frontiers.—In the event of the bubonic plague prevailing in epidemic form in the United States, Canada could, under this convention, close any part of her frontier. Failing that action, those persons showing the symptoms of plague could alone be held at the frontier. All others would be free to enter at once; a "surveillance" over such persons, at their homes, for ten days from the date of their departure from the contaminated districts being recommended. The importation of certain specified articles of merchandise could be prohibited. Disinfection of soiled linen, clothing, etc., coming from contaminated districts would apparently be obligatory. No mail matter, except that by parcel post, could be submitted to any restriction, or disinfection. Special regulations might be framed and enforced against: 1st, gypsies and tramps (*les bohémiens et les vagabonds*), and, 2nd, against emigrants and persons travelling or passing in companies (*par troupes*).

Seacoast Ports of Entry.—Special measures are allowed with regard to crowded vessels (*les navires encombrés*), notably emigrant vessels or any other vessel offering bad sanitary conditions.

Infected Vessels.—"Observation" at quarantine stations being allowed as an alternative to "surveillance" inland, our regulations and the usages under them would not be affected for this class of vessel.

Suspected Vessels.—Those on which there have been cases of plague at the time of departure, or during the voyage, but no new case within twelve days. With such vessels "observation" could no longer be enforced. Disinfection of soiled linen, of clothing, &c., is required. Also that of the vessel in part or in whole. And "surveillance" of the crew at the port, and of the passengers at their homes inland, for ten days from the date of arrival, is recommended. Merchandise is not to be treated otherwise than is laid down for land frontiers. No special mention is made of mails arriving by sea, but as in the rules for land frontiers mail matter is dealt with under the general heading of merchandise, in accordance with the foregoing clause no mail matter arriving by sea, except that by parcel post, could apparently be disinfected. As a note to the convention it is laid down that plague seems to transmit itself by the excretions of the sick (expectorations, dejections), by their morbid products (suppuration of buboes, carbuncles, etc.), and as a consequence by body-linen, clothing, and soiled hands. The possibility of such infectious plague material being conveyed on, and transmitted by, mail matter, would therefore seem unquestionable. And it would accordingly appear that the exemption of the mails from disinfection must be for considerations other than sanitary, and deemed to be of more importance.

It will thus be evident that in such a case for instance as that of a steamship from Hong Kong for Victoria having several deaths from plague during the first few days, her passengers would have to be sent on inland at once upon arrival, if twelve days have elapsed since the last death. And with plague in China and Japan disinfection of the incoming mails from those countries could not be performed, as a

safeguard against that disease, before their distribution throughout the "China-towns" of Victoria, Vancouver, and other cities.

Healthy Vessels.—With regard to such vessels arriving from infected countries or ports, they are to be at one admitted to free *pratique.* Medical inspection, evacuation of the bilge water, and the substitution of good drinking water for that stored on board, are permitted. But no disinfection of the vessel. Surveillance of crew, and of passengers inland, for ten days to count from the departure from the contaminated port, is recommended.

Thus under this convention inland surveillance would, in part, take the place of the present possible "observation" at the frontier and at the coast quarantine stations. Such inland "surveillance" would presumably under the existing laws fall within the jurisdiction of the Provincial Governments. In the event, therefore, of the Provincial Governments not being prepared to accept the responsibility and enforcement of such inland "surveillance," and the reception of the mails from plague infected districts without disinfection, it might become expedient for the Dominion Government, in becoming a party to this convention, to do so with some reservations, as well as to avail itself of the clause which permits the adoption by any country of special regulations for immigrant vessels and for immigrants.

British Medical Association.—This year's meeting of this association was held at Montreal, 31st August—3rd September. It was the 65th annual meeting, and the first one held outside the United Kingdom. The attendance was large, over 1,100 members and guests having registered. The presidential address was delivered by Dr. T. G. Roddick. An address on "The work of Pasteur" was given by Professor Charles Richet, Professor of Physiology in the University of Paris, Delegate of the French Government, and of the Faculty of Medicine of Paris. That in Medicine by Dr. Osler, Professor in Medicine in John Hopkins University, Baltimore. That in Surgery by Mr. Mitchell Banks, Surgeon Liverpool Royal Infirmary. That in Public Medicine by Dr. Hermann Biggs, Director of the Bacteriological Laboratory of the Health Department, New York City. Dr. Biggs gave a graphic account of the work in sanitation and preventive medicine being carried out in New York. Having been requested to move a vote of thanks to Dr. Biggs for his address, I referred, in so doing, amongst the many forms of work of the board, more particularly to the advance made in the admirable opportunities offered by the New York Health Board to physicians in that city to secure accurate diagnosis of infectious diseases by bacteriological investigation, in the facilities for obtaining protective serums and anti-toxins, in the progress made in educating the people as to the contagiousness of consumption, and in the means being taken to limit the spread of that fell destroyer of mankind. In referring to Dr. Biggs's remarks on work in infectious disease, and also to what Surgeon General Wyman had said in a speech on a similar subject, I took advantage of the occasion to say that the value and expediency of co-ordinate work between Canada and the United States, in reference to epidemic desease, is fully appreciated by our Government. For thus making this statement I had your authority and approval.

In the section of Public Medicine an admirable address on "The Progress of Sanitation in Canada" was delivered by Dr. E. Persillion Lachapelle, president of the Board of Health of the Province of Quebec, and president of the section. During the metings of this section many valuable papers were presented and several discussions held. For the purposes of this report the most interesting event was the discussion on quarantine. "The Utility of Quarantines as now conducted (inspection, disinfection, and isolation stations,) in certain countries at least." I had been honoured by being requested to open the discussion. I took up the question of the reasons for the differences between our quarantine usages and those of Great Britain. As that question has been a good deal referred to in the secular press, both before and since, and as it is of somewhat general interest I now submit my address in full as reported by the local papers:

"Mr. President and Gentlemen,—

In opening the discussion on the "utility of quarantines as now conducted, (inspection, disinfection, and isolation stations), in certain countries at least," it would seem well that I should first briefly remind you of certain familiar consider-

ations affecting this matter in general, and then—as this is a meeting of the British Medical Association—refer more particularly to the points in which the quarantine regulations and usage of Canada differ from those of the mother country.

The general consideration of infectious disease in connection with the subject of this discussion, divides itself naturally under two heads: the prevention of disease from without getting into the country, and the dealing with it once it has entered in. A system of arresting disease at the coast and frontier entrances, and a system of preparedness in the interior communities. Neither of these is sufficient without the other. Coast quarantines and inland health organizations form the double line of sanitary defence, or to borrow an illustration from the game of cricket, the coast quarantine may be compared to the wicket-keeper and the inland health board to the long-stop.

The interior communities throughout the length and breadth of the land have an interest, and a very close and vital interest indeed, in the fittings and working of the quarantine service at the various ports of entry. But confidence in a quarantine system, however perfected, must never lull us into a false sense of security, to the neglect of striving ever more and more towards the sanitary improvement of the cities, villages, and districts in which we dwell.

From the long period of incubation of some of the forms of infectious disease, and the relative shortness of the voyage from many ports outside the country, occasional cases of infectious disease in the period of incubation, and the micro-organisms of disease lurking in unsuspected clothing and merchandise, may pass, from time to time, in an invisible and unrecognizable stage and condition, the most efficient quarantine that is practicably possible. This cannot be entirely avoided without such routine detention of all vessels and persons at the ports of arrival, such routine disinfection of all clothing and merchandise from abroad, and such consequent interference with travel and traffic as would be altogether unjustifiable and impracticable. Quarantines must not be expected to do the impossible, nor must they be leant upon as an excuse for lessened effort inland.

But, admitting this, they certainly may be depended upon for dealing with actual cases of infectious disease, with infected vessels and effects, and with those suspected of being infected. In this way they strain out and protect the country from a very large percentage indeed of the exotic disease which threatens it from time to time. And thus they do a great and invaluable work.

And it is a work that is, perhaps, less known to, and appreciated by, the public than it should be. This is of the nature of things for all preventive work, the very success of which leads to negative rather than to positive results. As long as the country is free from the presence of epidemic disease no one has occasion to stop and ask himself why this is so, or to think of the work being done at the quarantines. The one instance in, perhaps, 1,000 in which a future case of disease gets past the quarantine in the unrecognizable period of incubation, and subsequently develops inland, becomes, naturally, the subject of widespread comment by the newspapers and the general public. The other 999 instances, in which infectious disease is quietly arrested and stamped out at the quarantines, remain unnoticed, unheralded, and unsung.

The quarantine regulations of Canada are framed upon the same modern general principles as are those of the United Kingdom, as far as they can be made to meet the peculiar conditions of this country.

They are based upon immediate inspection, and, when required, prompt disinfection and isolation, with notification inland to precede the passengers.

In them there is no survival of that old routine time-detention of healthy vessels, from which the modern service has inherited nothing but its most unfortunate and misleading name.

In the application of these principles our differences from the practice in the United Kingdom—as laid down in the reports of the British delegates to the International Conference of Dresden, 1892, and Venice, 1897, and the regulations of the Local Government Board of 9th November, 1896,—are mainly in three respects, and these are due to the different conditions of this country.

In the first place, healthy persons arriving at our ports in infected vessels may be held under "observation" at our quarantines during the accepted period of incubation of the disease in question from the ascertained date of last possible exposure. In Great Britain, from her comparative smallness in area, the number of her seaports, the extent of her shipping, the almost continuous influx of passengers from the continent, the shortness and compactness of her railway systems, the completeness of her inland sanitary organizations, and the perfection to which the sanitary condition of the homes of her people has been brought, this precautionary "observation" at the port of arrival is replaced by "surveillance" at the place of destination.

In Great Britain the ports are so numerous that to equip and maintain quarantines at them all would probably cost more than the average annual expense, in money, of letting in disease and fighting it inland; in Canada there are practically but four sea-gates of passenger entry from abroad: St. John, Halifax and the St. Lawrence, on the Atlantic side, and the Straits of Fuca on the Pacific side. In Great Britain the rapid crossing in a few hours of passengers from the continent offers no parallel conditions for the spread of disease amongst such passengers to those which obtain in an infected vessel, possibly crowded with hundreds of immigrants, during a passage of nearly three weeks from Asia, or during one of more than a week from Europe, to Canada. In Great Britain the place of destination is presumably reached within the first day after landing; in Canada it may not be reached until after a week or more of continuous railway travelling. In Great Britain it may be possible to isolate suspects in the separate compartments of the divided railway carriages during the short journey from port to destination; in Canada during the possible many days travel in our large and undivided cars no such isolation would be practicable; but with the constant coming and going of passengers into and out of the car at every station and cross-line, any infection present would be liable to be spread broadcast throughout the country. In Great Britain the inland sanitary organizations and the sanitary condition of the homes of the people have been brought considerably nearer perfection than they have been, as yet, in this country.

For such reasons as these Canada cannot depend, to the same extent as Great Britain upon inland "surveillance." And "observation" of suspects at quarantine must form part of our system of protection. Accordingly in becoming a party to the Dresden Sanitary Convention this country accepted its conclusions fully, and without the reservation made to Great Britain in her own case that healthy persons landing from infected ships should not be detained.

In the second place, under the regulations of the Local Government Board for ports in the United Kingdom no mail matter, except that by parcel post, may be detained or disinfected; in Canada the disinfection of the mails is not forbidden, and is sometimes considered necessary. Notably is this the case, for instance, in regard to the local mail arriving at Victoria from China. But little is known of the sanitary condition of the interior of China, and that little is anything but reassuring; cholera, the bubonic plague and smallpox being usually if not indeed always present there. The disinfection of the mails from that country is therefore considered advisable, especially in epidemic seasons, before their distribution throughout the "Chinatowns" of Victoria, Vancouver and other cities.

In the third place the regulations of the Local Government Board for ports in the United Kingdom limit the term "infected" to infected with cholera, yellow fever, or plague; under the Canadian regulations actual cases of any of the infectious diseases are removable at quarantine, so as to prevent the importation of new cases, even of the minor diseases, to become fresh centres for the spread of infection throughout our country. And the arrival of all classes of infectious disease is notified inland from our coast quarantines.

Under this head perhaps the most noteworthy difference between the two countries is in regard to smallpox. In the Canadian regulations smallpox is included amongst the graver forms of infectious disease, and there are indeed special regulations concerning it. According to the English regulations, and the English usage, as reported to me, a vessel arriving at a port of the United Kingdom with smallpox

on board is not considered an infected vessel at all. Possibly this is attributable to the theoretical protection of the English people under the Compulsory Vaccination Act. Yet the somewhat extensive outbreaks of smallpox which occur from time to time, such, for instance, as that recently in Gloucester, would seem to indicate that the importation of fresh centres of this disease is not without its danger even to Great Britain. However that may be, certainly in Canada the protection of the people by vaccination is not sufficiently complete and general to justify us in excluding smallpox from our meaning of the term "infected" as applicable to vessels and persons arriving at our sea-ports.

These are the chief, if not indeed the only, points in which the quarantine regulations and usage of Canada differ from those of the United Kingdom. And they are necessitated, as I trust I have established, by the different conditions of this new and extensive country.

For the rest, as I have said, our regulations are based upon prompt inspection, disinfection, isolation, and notification inland. They are designed to secure the maximum protection of the public health, with the minimum interference with travel and traffic.

With regards to our minor ports, and our land frontiers, we have regulations which can be fully amplified when emergency so requires. But with respect to the importation of disease from Europe, Asia, Central America, South America, etc., via the United States and across our frontier, we place our main dependence in their protection of themselves by the well-worked quarantines of our southern neighbours, such as those of Portland, Boston, New York, and New Orleans, and their admirable national quarantine service, under the able administration of Surgeon-General Wyman, who is to join with me in the opening of this discussion.

In conclusion I beg leave to submit and to maintain that the Canadian quarantine service, as at present conducted is certainly of most unquestionable utility to this country.

Surgeon-General Wyman who directs the national quarantine and the marine hospital service of the United States, described the system of national quarantine as it has existed since 1893. He showed how, during epidemic years, disease had been kept out of the United States by the system of quarantine which was rigorously applied at the several ports.

Dr. Duncan, Secretary of the Provincial Board of Health of British Columbia, was not present to read his paper, but the conclusions were given by the secretary. He submitted recommendations as to the disinfection and quarantining of Chinese immigrants landing at the Pacific coast. He thought that the boundary line between Canada and the United States should be obliterated for quarantine purposes, and that a central and united body should regulate and supervise all that was necessary to ensure both countries against the introduction of infectious disease.

A discussion followed, in which several English experts took part. The general agreement in opinion was well expressed by Dr. Harvey Littlejohn, Surgeons' Hall, Edinburgh, in the conclusion that the system employed in Canada and the United States was the one best adapted for the conditions of those countries; while that of England, which relied chiefly upon inspection, notification and interior sanitation, was the best for a compact population, which could be easily kept under surveillance.

The So-called Abolition of Quarantine.—In Great Britain much stress has been laid upon their abolition of quarantine, and the substitution for it of the regulations of last November. Thus in the Milroy Lectures on Quarantine, delivered before the Royal College of Physicians in London in March last, Dr. Collingridge, Medical Health Officer for the port of London, says: "Thus, for England, quarantine has been formally abolished, and our protection henceforth against the importation of infectious disease will be medical inspection, without any vexatious detention of a healthy vessel merely because she has arrived from an infected port."

If the literal meaning of the word be dwelt upon, or even if this English modified definition of it be accepted, we also have long since *abolished quarantine* in this country.

In England, instead of quarantine regulations, they have now substituted "Regulations of the Local Government Board for Ports in the United Kingdom." Neither this somewhat cumbrous title, nor that of "Maritime Sanitation,"—which has been adopted at some of the ports of the United States,—satisfactorily meets the want of a concise and comprehensive term for the modern system. The word quarantine, as now understood amongst modern sanitarians, remains a convenient term to stand for the modern methods. And in retaining it in Canada we may fairly hope and expect that gradually it will come to be fully understood in its modern meaning by our general public also, as indicating a system of medical inspection, with, when required, prompt disinfection, notification inland, and—for suspects from infected vessels—either "observation" at the port of arrival as in Canada, or "surveillance" at the place of destination, as in Great Britain.

American Public Health Association.—The annual meeting of this association was held at Philadelphia, October 26th-30th. It was the twenty-fifth—the silver—anniversary. It was well attended, over two hundred members being certified as present. Many southern men, however, were prevented from attending by the presence of threatening of yellow fever.

Reports were submitted by the different committees, including those on "Steamship and Steamboat Sanitation," on "Disinfectants," and on "Health Legislation."

Amongst the resolutions submitted and adopted were: One from the Committee on Health Legislation, containing a proposed bill to establish in the United States a national Department of Public Health, to be under the control and management of a Commissioner of Public Health, who shall be a regularly educated physician, and learned in sanitary science. Also one requesting Congress that a commission of expert bacteriologists be sent to Havana and Rio, and be kept there until all questions of the nature and causation of yellow fever are worked out and decided.

Papers on many important subjects were read and discussed, amongst which, as specially interesting from the quarantine standpoint, may be mentioned those on yellow fever by Dr. Licéaga, President of the Supreme Board of Health of Mexico, and by Brigadier-General George M. Sternberg, Surgeon-General, United States Army. Surgeon-General Sternberg related how he had discovered the micro-organism, named by him "bacillus x," in Cuba in 1889, but had not been satisfied that it was the actual yellow-fever bacillus. Recently, however, when Sanarelli startled the medical world by the assertion that he had discovered the real bacillus. Sternberg made a comparison of this bacillus with his own and found them identical.

Also papers on disinfection with formaldehyde, by Professor Robinson, Professor of Chemistry in Bowdoin College, Maine; Professor Burrage, Purdue University, Lafayette, Indiana; E. A. de Schweinitz, Chief of the Bio-chemic division of the U. S. Department of Agriculture, Washington D. C.; and Dr. James McShane, health officer of Baltimore, Md.

With regard to the conclusions to be drawn from these papers on formaldehyde, it was evident that the high expectations entertained as to this disinfectant have not as yet been completely realized. It is admittedly an excellent surface disinfectant under proper conditions of its strength and the time of exposure. But the hoped for penetration has not yet been satisfactorily obtained. Nor do any of the lamps or other appliances for the production or liberation of the gas from wood alcohol, formalin, or paraform, seem to have proved reliable for constant and uniform action and results.

In the belief that we have not, as yet, any entirely trustworthy method of disinfecting with formaldehyde in quarantine work, I do not as yet feel justified in recommending its adoption at our quarantines. But from the success already obtained with it, and the many bright minds now working at it, I doubt not that the near future will see disinfection by means of formaldehyde so developed and improved that in addition to room disinfection, it may also be available for the usual requirements of quarantine.

On Saturday 30th October, the members of the association were most hospitably given a visit to the quarantine defences of Philadelphia, and Pennsylvania. At 9 a.m. the start was made on the U. S. Revenue Cutter "Hamilton," the U.S. Light-house tender "Zizania," and the Sanitarium Association's boat the "John F. Smith."

By invitation of the State Quarantine Board of Pennsylvania, the State Quarantine station at Marcus Hook, was visited, and luncheon was served at that place. It is about seventeen miles below the city, and is an inspecting station only. The State there checks by re-inspection the work done by the National Quarantine below. Inspections are made between sunrise and sunset. There are two resident medical assistants in addition to a Chief Quarantine Officer.

The vessels then proceeded down the river and bay to Reedy Island, forty-five miles from the city, where the disinfecting plant of the United States Marine Hospital Service was inspected by invitation of Surgeon General Walter Wyman. Returning to Newcastle, a special train, furnished by the courtesy of the Pennsylvania Railroad Company, conveyed the members back to the city before 8 p.m.

The association accepted the invitation for next year of the Mayor and citizens of Ottawa, Canada. The next annual meeting will be held there in September, 1898, under the presidency of Professor Charles A. Lindsley, of New Haven, Connecticut, Dean of the Medical Faculty of the University of Yale.

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

F. MONTIZAMBERT, M.D.,
General Superintendent of Canadian Quarantines.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 2.

REPORT ON ST. LAWRENCE QUARANTINE SERVICE.

(F. MONTIZAMBERT, M.D., Edin., F.R.C.S., D.C.L.)

SIR,—I have the honour to submit this my annual report on the St. Lawrence Quarantine Service to the 31st October, 1897.

The number of vessels inspected at the Grosse Isle station shows an increase of sixty-two over the number inspected last year.

Infectious disease was reported by, or found on board of, the following vessels arriving in the St. Lawrence, named in the order of their arrival: SS. "Lake Superior," "Hazelmore," "Lake Superior," "Strathclyde," "Armenia," "Numidian," "Buenos Ayrean," "State of California," barque "Ora," SS. "Rossmore," "Ottoman," "State of California," and "Inishowen Head."

The diseases so reported or discovered were scarlet fever, chicken-pox, measles, enteric fever and diphtheria. The admissions to the quarantine hospital numbered sixty-four.

Of these four died, one from enteric fever and three from scarlet fever. There is one patient still in hospital.

The SS. "Queensmore" landed for burial at quarantine the body of a stowaway who had died of consumption.

The SS. "Armenia" landed for burial the body of a child who had died of scarlet fever.

The SS. "State of California" landed for burial the body of a child who had died of diphtheria.

In the case of a family landed from the SS. "State of California" for diphtheria, the anti-toxin treatment of this disease was employed with marked success. One child of the family had died of diphtheria on shipboard on the morning of the day

on which the vessel reached the station. The mother, who had nursed the child, presented a marked case of commencing diphtheria, with well-developed membrane on the throat. On admission to the quarantine hospital she was injected with 20 c.c. of anti-toxin from the Institute Pasteur, Paris. Within twenty-four hours the membrane had cleared off the throat, and convalescence was established. Her only surviving child, a little girl aged five, was injected with 7 c.c. of the same anti-toxin, as a preventive, and did not develop any indication of the disease.

Difficulty was experienced last autumn in boarding some vessels off this station during north-easterly gales. There is a good shelter during such weather under Pointe-aux-Pins, at Crane Island, about six miles below the station. I therefore had the honour to recommend that the inspecting steamer be allowed to shelter and work there during gales from the north-east. After correspondence this was agreed upon between yourself and the Quebec Harbour Board. The quarantine inspecting steamer was authorized to shelter there when necessary, displaying the yellow flag by day and the red light by night. And the pilots were instructed to expect to find her there under such conditions, and to show their quarantine signals and slow their vessels accordingly. Under this arrangement vessels have been, on several occasions this year, inspected without delay in weather which would have made it very difficult and dangerous—if not impossible—for two vessels to come together in the open and exposed roadstead opposite the station.

In June last Prof. Simard, professor of hygiene in the Laval University, Quebec, brought down, with your permission, his class to the station, that they might have the benefit of a day's lesson in practical hygiene.

On Sunday, August 29th, the congregation of St. Patrick's Church, Quebec, with your permission, made a pilgrimage under their clergy, to visit, with prayer and sermon, the typhus fever cemetery at this station. In this cemetery fifty years ago were interred the mortal remains of 5,424 persons, who, flying from pestilence and famine in Ireland in the year 1847, found in America but a grave.

At the sub-station at Rimouski, the mail steamers have been met and inspected as usual, and I have from time to time gone to that sub-station, and, coming up from thence on the said mail steamship, have made a detailed inspection between Rimouski and the main station at Grouse Isle.

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

F. MONTIZAMBERT, M. D.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 3.

REPORT OF HALIFAX QUARANTINE STATION.

(W. N. WICKWIRE, M.D.)

QUARANTINE OFFICE, HALIFAX, N.S., 10th November, 1897.

SIR,—I have the honour to submit my report for the year ended 31st October, 1897.

I may state that we have been fortunate enough to have had but few cases of sickness of any kind and only two cases of the severer forms of contagious disease brought into the port during the year. On March the 22nd, the steamer "Delaware," from London, bound to Philadelphia, called at this port for coal. I found two of the crew suffering from small-pox. These were removed to the quarantine station, where they recovered and were discharged after having been in hospital about four weeks. This steamer left for Philadelphia after having been in port only a few hours, giving us no time to have the ship properly cleaned, fumigated, etc. I learned that further cases of small-pox occurred on board before the steamer arrived at Philadelphia.

The usual inspection has been carried out and care exercised particularly as regards immigrants.

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

W. N. WICKWIRE, M.D.
Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 4.

REPORT ON NORTH SYDNEY, N.S., QUARANTINE STATION.

(HORACE RINDRESS, M.D.)

NORTH SYDNEY, C.B., 1st November, 1897.

SIR,—I have the honour to present my report for the year ended 31st October, 1897.

The inspections in this port were made up to September 1st by my predecessor, Dr. William McK McLeod, whose data, &c., I have in my possession. Since September the 1st I have done the work. The port has been free from contagious and infectious disease during the year.

The total number of inspections for the year up to date number 126.

Steamboats	88	Cis-Atlantic	57
Sailing vessels	38	Trans-Atlantic	69

The boat service has been excellent. The hospital buildings and wharf are much in need of repair. I will report more fully on this matter again.

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

HORACE RINDRESS, *M.D.*

The Honourable
The Minister of Agriculture,
Ottawa.

No. 5.

REPORT ON PORT HAWKESBURY QUARANTINE STATION.

(P. A. MACDONALD, M.D.)

QUARANTINE STATION, PORT HAWKESBURY, 31st October, 1897.

SIR,—In submitting my annual report on this quarantine station and on matters pertaining thereto, I may say that it is a matter for congratulation that during the year we have been singularly and exceptionally free from infectious and contagious diseases. The only case was one of meta-tatic parotitis landed from the schooner "Julia E. Whalan" of Gloucester, United States. The patient was placed in an isolated house where he recovered completely, and was sent to his home; and all expenses paid by the American consular agent. The vessel proceeded on her fishing voyage to the Grand Banks of Newfoundland.

Several other vessels came into port with members of their crews ill with diseases of a non-contagious character.

My detailed monthly reports have been regularly transmitted to your department.

The number of vessels that arrived at this port during the season from foreign ports, and officially inspected by me, was seventy-nine. During the same period four hundred and eighteen coastwise vessels reported.

All instructions and regulations from your department were strictly and faithfully attended to.

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

P. A. MACDONALD,
Quarantine Officer.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 6.

REPORT ON PICTOU, N.S., QUARANTINE STATION.

(JOHN MCMILLAN, M.D.)

QUARANTINE, PICTOU, 15th November, 1897.

SIR,—I beg leave to report that there has not been any infectious or contagious disease at Pictou Quarantine Station during the season. Twenty vessels have arrived from foreign ports, thirteen from Great Britain, four from Cuba, three from United States. The buildings at the quarantine station are in good order.

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

JOHN McMILLAN, M.D.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 7.

REPORT ON ST. JOHN, N.B., QUARANTINE STATION.

(J. E. MARCH, M.D.)

QUARANTINE, ST. JOHN, N.B., 31st October, 1897.

SIR,—I have the honour to submit my report for the year ending 31st October, 1897.

The arrivals from foreign ports during the period were 1,728 vessels, of 667,146 tons register, carrying as crews 17,820 persons, and as passengers 60,239.

Infectious diseases scheduled by regulation were reported by or found upon four vessels, and comprised measles, scarlatina, diphtheria, enteric fever and erysipelas.

Unscheduled infectious diseases were found on 49 vessels, and included 31 cases of advanced tuberculosis, 34 cases of venereal diseases and 2 cases of mumps.

Sixteen vessels arrived from ports whose consular officers were issuing foul bills of health.

It is, I think, a matter for congratulation that small-pox has not come into the country through this station during the year, for we have had many arrivals from small-pox ports.

Masters of steamers to arrive from Cuban ports have been notified in advance by me of our quarantine requirements, and in every instance where such notification has been given the ship on arrival has been found in excellent condition.

The regulations and special instructions which have been received from your department, and from the General Superintendent of Canadian Quarantines, from time to time, during the year, have been carefully made effective, and always with as little inconvenience to the shipping as was possible.

Since, and as a result of your visit in November last, many needed improvements have been made here. A new building for the steam disinfector, and containing needle and shower baths, tanks for hot and cold water and a room for bacteriological diagnostic work, has been erected upon a substantial cribwork foundation, which was built for the purpose, at the landing. The building has not been taken over by the Department of Public Works, but will be made ready in time for the winter's work. A boat-slip has been put down from the west wharf to low water-mark neap tides and is a great convenience. To be of the greatest benefit it should be extended to low water spring tide mark as originally intended.

Last winter it was found necessary in order to meet the requirements of the rapidly growing winter business, to employ a tug-boat here, not only that your officer might promptly be put aboard arriving steamers, but also, that as we have no wharf at which a ship could lie to be disinfected, a suitable disinfecting plant might be put alongside ships of any size requiring its services, A dioxide blast was therefore fitted up on board the tug "Neptune." This was needed almost as soon as it had been completed, and in the work of disinfecting the SS. "Lake Ontario" and other vessels it has given satisfaction.

It was my good fortune to be present at the meeting of the British Medical Association in Montreal early in September, and to bring back with me a Rickert microscope which, by authority, was purchased for diagnostic purposes, from Messrs. Paterson and Foster. The instrument is an excellent one and, apart from the utility, it is a suggestive and fitting memento of an enthusiastic and inspiring occasion that will always be memorable in Canada's medical history.

During this meeting I examined the several forms of apparatus for disinfection with formaldehyde which were on exhibition there. Large claims are being made

for this disinfectant, and it has been adopted as the disinfectant *par excellence* by several of the larger municipal, provincial and state boards of health. The cheap and simple apparatus for generating the gas seemed to me equally efficient with the most elaborate and expensive forms, and so far as quarantine work is concerned the simple form is preferable because of its ready portability, and the fact that the same apparatus may be utilized for the disinfection of hospitals, rooms, &c., on shipboard, or elsewhere, and for the sterilization of clothing, bedding, &c., and so be made to do a double duty. One of the exhibitors, the Kny-Sprague Company, create a partial vacuum in their disinfecting chambers before applying the gas, and they accomplish this by a very simple but apparently satisfactory device. Whether partial exhaustion of the air from the disinfecting chamber is of any advantage in the process of sterilization by formaldehyde has not yet been fully determined, but in steam sterilization such as we practice at this station it is of decided advantage, and it is for this reason that I refer to the Kny-Sprague device. A jet nozzle of a peculiar pattern is placed inside of an exhaust pipe which is connected with the interior of the disinfecting chamber, and steam, under a pressure of from fifty to sixty pounds is allowed to escape through the nozzle in the direction of the open distal end of the exhaust pipe, against the inner surface of which it impinges in such a way as to draw after it the air from the chamber. I saw a vacuum of eighteen inches produced in this way in a few minutes. The advantages of steam sterilization in vacuo are, the absence of air pockets the contents of which, if present, may not be heated to the disinfecting point, the almost instantaneous attainment of the desired temperature on the application of the steam, the absence of condensation on the clothing undergoing disinfection and the consequent saving of time.

In my report for 1895 I had the honour to direct the attention of the then acting Minister of Agriculture to the fact that 26 cases of tuberculosis had come under my observation among the passengers and crews of vessels arriving here during the year, and I ventured to express the hope that a regulation for the guidance of quarantine officers in the presence of this infectious and communicable disease on ship-board would be formulated by the department.

In my last annual report I stated that I had observed 22 cases during the year. In the year just closed 31 well marked cases have occurred, making a total in three years of 79 cases.

Medical science has reached a point where it may hopefully grapple with this disease. It's cause is known, its methods of propagation are clearly understood. By applying the knowledge we possess, a great reduction can undoubtedly be made in the present death rate from it.

During the past year not only one but several ship-masters have stated to me on inquiry that for years past there has almost always been at least one case of consumption in their forecastles. This can only mean that the forecastles of these ships are infected with bacillus of tuberculosis. The seed is there. The soil, in the shape of an anæmic or underfed sailor is taken to it. The crop grows and the harvest is sure. On many ships this unfortunate and entirely preventable sequence recurs again and again until some friendly rock or iceberg sinks them and puts an end to it. Sailors do not yet know what to insist upon in the way of sanitation in order to protect themselves from tuberculous infection from foul quarters, matrasses, bedding, etc. It seems to me that at our quarantine stations we are able, and should do something to improve this condition of affairs; and, when we consider the enormous cost of the disease, directly and indirectly, to the country, and the efforts that are being made to lessen its baneful effects, we find strong, economic reasons—sometimes more potent than humanitarian ones—why, while dealing with that which is within the country, we should exclude, so far as we may be able, every case that seeks an entrance from without. Therefore I respectfully submit that tuberculosis should be scheduled as a quarantinable disease; that the regulations shall contemplate the return of tuberculous steerage passengers to their homes by the transportation companies bringing them; the removal of consumptive sailors and firemen from the forecastles in which they may be found; the renovation of the quarters which have been occupied by them; and the disinfection by steam at

the high temperature of all clothing, bedding, etc., that have been exposed to the infection.

A large percentage of Canada's carrying trade is done by regular lines of steamships. A notification to the managers of these lines of the intention on the part of the Government to deal with cases of tuberculosis, coming to Canadian ports on their ships, as I have indicated, would in itself, I think, result in decreasing to a great extent its importation. At all events the far advanced cases, such as I have noted in my reports, would no longer be brought.

In support of these recommendations, which I have respectfully submitted, from time to time, during the past three years, let me quote but one paragraph from the address on Public Medicine, delivered before the British Medical Association at Montreal by Dr. Herman M. Biggs, the Director of the Bacteriological Laboratory of the Health Department of the City of New York. Speaking of inland Boards of Health, he said: "No more striking example of inherited beliefs and prejudices can be found than is afforded by the exhibition of hesitation and reluctance on the part of the proper authorities to assume the sanitary supervision of the tubercular diseases. It is now universally admitted that tuberculosis is infectious and communicable, and the most fatal disease to which the human race is subjected; yet, as a rule, no effective measures, or no measures at all, have been adopted by sanitary authorities with relation to it. Nevertheless, we believe it may be more easily controlled than any other of the principal infectious diseases with which we have to deal, and that it is of as great importance—judged by the deaths it causes—*as all the others together.*"

Let me earnestly submit the proposition that the work of the marine sanitary officer should not be limited to a search for those epidemic diseases which have been largely brought under control, and that now only occasionally appear. Let me urge that all matters connected in any way with the scientific investigation, diagnosis, care and sanitary supervision of every disease that is known to be infectious and a menace to the public health and well-being, should be regarded as coming properly within the bounds of his duty.

In the quarantine of to-day, detention has given place to disinfection, the lazaretto to the isolation hut, the microscope and the culture tube replace doubt in diagnosis with certainty, and the former system, which was essentially passive, has been driven out by sanitation, which is essentially active. The passive method of dealing with tuberculosis has failed utterly. Active methods are now being put into force against it.

I plead for uniformity of attack; aggression all along the line..

So shall we "do a great good, a little harm, and rob this cruel tyrant of his will."

With respect, and a high appreciation of the many needed improvements which, through you have been made at this station during the year that is just closed,

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. 8.

REPORT ON CHATHAM QUARANTINE STATION.

(J. MACDONALD, M.D.)

CHATHAM, N. B., 31st October, 1897.

SIR,—I have the honour to submit my report for the year ending 31st October, 1897.

There were ninety-one vessels inspected at this station since the opening of navigation, thirty-three of these were steamers, several others are now overdue.

The falling off compared with the number last year (136) may be accounted for by the large increase in the number of steamboats, and also that coasting vessels from Newfoundland, New York and ports north thereof, were exempted from the usual regulations until further notice, by instructions in a circular letter dated June 14th, 1897.

No contagous or infectious disease was found on any of the vessels, although several came from South American ports where both yellow fever and small-pox prevailed.

A coat of paint would help to preserve the hospital buildings and would also greatly improve their appearance.

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

J. MACDONALD,
Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 9.

REPORT ON CHARLOTTETOWN QUARANTINE STATION.

(P. CONROY, M.D.)

CHARLOTTETOWN, P.E.I., 31st October, 1897.

SIR,—I have the honour to herewith submit for your consideration my report for the year ending the 31st October, 1897.

The total number of arrivals of vessels, direct from foreign ports, was thirty-nine.

All vessels from foreign ports, north of New York, were allowed to pratique without inspection. Those from all other ports were carefully inspected. No case of sickness of a dangerous epidemic character was found to exist on board any vessel.

During the past summer a suitable wire fence was erected inclosing the hospital premises.

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

P. CONROY, M.D.
Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 10.

REPORT ON WILLIAM HEAD QUARANTINE STATION.

(A. T. Watt, M.D.)

Victoria, B. C., 31st October, 1897.

Sir,—I have the honour to submit this my report, from the time I took charge of the William Head Quarantine Station, 15th January, 1897, to 31st October, 1897. The past winter and spring have been exceedingly busy seasons at this station in common with all the other quarantine stations on the Pacific coast. Great epidemics of small-pox have been raging in China and Japan, the disease being in several instances carried on to vessels bound for this coast. A detailed statement is given below of the infected vessels coming from there to this station. A sailing ship also arrived with small-pox from Antofagasta, South America. Epidemics of plague have occurred in several parts of China; fortunately, however, none of the vessels bound for this port became infected although the disease found its way on to two ships bound for Japan and on to at least one other vessel on the China coast. No severe outbreaks of cholera have been reported, but several cases seem to have occurred at different points both in China and Japan. I believe, however, it is claimed by the chief of the Sanitary Bureau of Japan that the cases developing there have not been true Asiastic cholera, the *comma bacillus* not having been isolated in any case. Last winter several thousand cases of relapsing fever were reported in Japan. The epidemic soon died out. Within the last few weeks epidemic dysentery has become very prevalent. The Japanese authorities are taking precautions against this disease similar to those they would take against cholera, a quarantine of eight days being enforced. The Central America yellow fever has been exceedingly prevalent. Fortunately no infected vessels have reached this station from there. Two such vessels had to be dealt with at Port Townsend and several at San Francisco. The prevalence of these various diseases in countries in direct communication with Canada has necessitated the most careful surveillance of all vessels from those countries.

Acting under instructions addressed to my predecessors, given under clause 29 of the Quarantine Regulations, 1896, the disinfection of all immigrants and their effects, from China and Japan, has been carried out at this station. The precaution I believe to be a wise one. The sanitary conditions in Japan, and particularly in China are of the worst possible description, and very little or nothing is done to stamp out grave forms of contagious disease. The consequence is that a few cases of such diseases—cholera, plague or small-pox—always exist, which become the seeds of a more or less widespread epidemic whenever seasonal variations favour or a sufficient number of susceptible persons offer fresh material for the disease to feed upon. This year these conditions have been pronounced and consequently the best of reasons have existed for carrying out disinfection. This procedure has involved a great deal of extra work on the part of the staff at this station. When the disinfection began the facilities for doing it were inadequate. Outside of a steam sterilizing apparatus which was placed in an unfinished building and a sulphur blast not in working order, no facilities existed for disinfecting either ships or passengers. When, therefore, the steamship "Victoria" with a case of small-pox on board arrived about a week after I had taken charge, the lack of these appliances made at once a serious problem.

Immediately on taking charge of this station I set to work to find out what improvements were necessary, and I was fortunate in having at the outset the personal advice of Dr. Montizambert, General Superintendent of Dominion Quaran-

tines, who visited this station in February last. The facilities for disinfection were at once looked to. The steam sterilizer had been set up in a large barn-like shed, in which there was no partition to separate the end of the building into which infected clothing and people were brought, from that into which the disinfected clothing was brought out and the people dressed. No means had been provided for giving baths, except two wooden washtubs, so that I at once had a temporary arrangement to give a shower bath made, with a spray nozzle and hose leading from a small tank containing a disinfectant in solution. The lack of a partition was a serious defect. Re-infection could easily take place before people could leave the building. And there is a reason to believe that this actually did happen during the steamship "Victoria's" quarantine. The building had not been lined or ceiled; daylight could be seen in many places through cracks and holes in the walls and roof, so that it was impossible to confine sulphur fumes in the rough interior. This state of affairs being made known to you, authority was soon received to erect suitable shower baths, and to partition one end of the building from the other, to make an extension at both ends and to have it properly lined. Authority was also received to build a shelter shed on the wharf, 150 feet in length, and to construct a sulphur room capable of holding the baggage of several hundred people. A four thousand gallon redwood tank to hold a bichloride of mercury solution was erected thirty feet above the wharf. With hose leading from this tank, the decks and steerages and other parts of the ship can be thoroughly sprayed with the disinfectant solution.

New fender piles were placed along the face of the wharf, and two dozen or more of the coppered piles, which had not been covered far enough down and consequently had been eaten away, were replaced. Fences and gates have been put up on the wharf where required. Two extra baggage cars were purchased which can be being loaded while the other two cars are in the retort, so that the work can go on continuously.

The buildings for disinfecting are now so complete that the work can be done almost as expeditiously as at any other quarantine station on the continent. When a ship arrives at the wharf, the baggage is immediately sorted. A bundle is made of all bedding, clothing, etc., which can be put into the steam chamber. The other articles which steam would injure are treated either by dipping in bichloride solution or by exposure to sulphur fumes for at least six hours. When quick despatch of the steamer is necessary the fumigation is done in one of the steerages on the ship. At other times the articles are placed in the sulphur room on the wharf, and there treated. Passengers then walk to the end of the wharf to the disinfecting building, where they are given a check to attach to their personal clothing, which they place in a car at the door of the steam sterilizer. They then step into the bath-rooms under the same roof. These are of the needle and shower bath description, twelve in number. Warm bichloride solution is used. On passing from the baths the people enter the waiting and dressing-rooms and are given towels and warm blanket kimonos while they wait for their clothing to come through the retort. Each batch of from two to three hundred Chinese requires from three to four hours for the disinfecting process. The second batch takes less time, as the other cars are being loaded while the first are in the retort. Separate baths and waiting-rooms are provided for female passengers or for officers and cabin passengers should there be actual disease on board. An improvement was effected in connection with the retort which has been a means of preventing a waste of steam. Only about one-third of the quantity of the coal formerly required is used, and steam under pressure can now be had in the retort. This was managed by placing a three-way cock between it and the air-pump. An electric contact thermometer and a telethermometer and dial are required in connection with the steam sterilizer. If the disinfecting building were wired for the electric light, connection could be made with the wires on the steamers and would better enable the work to go on at night. If the retorts were lengthened by one-half, a much larger amount of baggage could be handled at one time and the work of disinfecting more quickly done. I am inquiring into the cost of doing this. I am also finding out about a quicker way of getting a vacuum by means of a steam jet. If this can be applied several minutes should be saved each time the retort is used.

A formic-aldehyde generator should be procured in order that this valuable disinfectant may be available. If this gas were used instead of sulphur dioxide, disinfection could be accomplished more quickly and more safely.

Considerable work has recently been done at the lake from which the water supply is drawn. Stumps and fallen timber have been carefully cleared and burned all around the edge, and several tons of weeds taken out of the water. Some work of the same nature should be done every year. I believe a filter is to be ordered; it is certainly necessary as the water ought to be further purified to make it entirely fit for drinking purposes. Other improvements contemplated are extension of the four-inch main to the different buildings to afford proper protection against fire. Plans for a small wharf for the "Earl" have been prepared and it is hoped its construction will shortly be begun. In winter time while lying at the big wharf the steamer is knocked about and strained a good deal. It is also in the way of steamers coming to the wharf.

There are also to be built cottages for the staff; these will add greatly to the comfort and convenience of the employees.

The saloon detention building has not yet been furnished, but will be, I understand, within a short time. Increased accommodation for saloon passengers and officers is needed, the present building being adequate only for the accommodation of about half the number which might be brought here on the largest steamers coming to this port, and also suitable quarters for servants in connection with the same. The present accommodation for steerage passengers is sufficient for about 600. It might be necessary to accommodate more than twice that number. This could be done in the present building if berths were put up. At present the people sleep on the floor. If the shed on the wharf were closed in and extended, accommodation for about three hundred or more would be afforded.

A number of small buildings are needed, an outside kitchen and storehouse in connection with the suspect buildings for steerage passengers, a boathouse and ice-house. Some fences are wanted.

Roads and better trails ought to be made to the different buildings. This can be done in time by members of the staff. An improvement in the telephone is necessary. A return wire should be strung thus giving a metallic circuit. This will, I understand, be shortly effected. The steamer "Earl" has seen a good deal of service this year. In addition to her usual work she has been engaged in towing lumber needed for the new buildings and bringing supplies, etc., for the workmen. The condition of her boiler has been getting worse and worse since it was first found to require patching. At different times this year minor repairs have had to be made and for a period of about six weeks recently the boiler has been undergoing repair. No permanent repair can however be made so that a new boiler will have to be put in shortly. Captain J. A. Thompson, the steamboat inspector writes October 19: "They (the repairs) seem to be efficient as far as they go and with care may last considerable time. But still they are of a more or less temporary nature, as no really permanent repair can be made to a boiler with a bolted patch, or to the bottom of the chamber without renewing the plate entirely, which would be an expensive job. In my opinion, as those small repairs are constantly requiring attention and laying the boat up may happen just when the boat is most wanted. It ought to be taken seriously into consideration by your department, whether it would not be advisable to get the price of a new boiler put into next year's estimates. Advantage was taken of the boats being out of commission to make as thorough repairs of the boilers as possible. The placing of the "Earl" out of commission was necessitated by the discussions which had been going on for some time among the members of the crew. I thought it best to lay all hands off until the root of the trouble could be found and while I endeavoured to have an arrangement made for the boarding of the crew. The existing plan whereby each man found his own food and did his own cooking was most unsatisfactory. Pending your decision of the matters referred to, a temporary crew has, by your direction, just been placed on the "Earl."

Before deciding to put a new boiler in the "Earl" which would cost about a third of what the boat is worth, the question of building a new and larger boat should be considered. Such a boat is greatly needed as there are many days in the

winter when the "Earl" dare not venture out, and there are many more on which she runs great risks in going out. The "Earl" is not the right class of steamer for boarding vessels out in the open with a high sea running. Since Dr. Montizambert's visit, all vessels have been inspected at or off William Head, instead of at Victoria as formerly, since, as it was pointed out, it is no place to discover disease after a vessel is tied up at a crowded wharf. A better steamer is consequently required to do the work in the way desired.

The month before I took charge of this station, the tramp steamer "Florida" and a sailing vessel underwent quarantine on account of small-pox, and the hospital had just been vacated by the patients from these vessels when I commenced my duties. These two vessels, together with the appended list make quite a number of small-pox infected vessels to arrive here in one year. The following vessels underwent special quarantine treatment since I took charge: The steamship "Victoria," of the Northern Pacific Steamship Company; steamship "Empress of India," of the Canadian Pacific Steamship Company; ship "Alice E. Leigh," steamship "Victoria," of the Northern Pacific Steamship Company; "Empress of China," of the Canadian Pacific Steamship Company; the barque "Sam Mendal" and steamship "Braemar," of the Northern Pacific Steamship Company.

On January 23, steamship "Victoria" arrived with one case of small-pox on board, the patient being the No. 1 fireman. He had evidently contracted the disease in Shanghai, the symptoms developing three days out from Yokohama. He was isolated in the hospital by the ship's surgeon who happened to be a member of the United States Marine Hospital Service, making the round voyage. The patient died the next day after landing here. On the ship's arrival here, as much of the baggage of the crew and passengers as could be disinfected by steam was so treated, and the vessel herself disinfected as thoroughly as possible with the means at command. The vessel then continued on her voyage to Tacoma, carrying the European officers and seven cabin passengers, who were allowed to proceed, as they all seemed to show satisfactory evidences of protection by vaccination. The vaccination was well done. All the steerage passengers had been vaccinated on leaving Hong Kong. Those whose arms had not taken well were again vaccinated on the outbreak of the disease, and also all the crew and the cabin passengers. The steerage passengers were detained here the full period of incubation of the disease, from what was thought to be in their case their last exposure, viz., the time when the patient was isolated in the ship's hospital. The apparent success of the vaccination decided their release at the end of this period. The crew who were not so well vaccinated and who had been more exposed to the disease, the case developing in one of their number, were detained here two weeks from the time of their arrival.

The theory of allowing persons to proceed who show satisfactory evidence of recent successful vaccination is a reasonable one and prevents a long delay to many persons who are most unlikely to come down with the disease. Vaccination, however, is not an absolute safeguard, as cases which occurred amongst those so released show in this instance. A certain amount of risk must be taken, however, but it is only the risk of an isolated case developing very occasionally, and such a case can always be promptly dealt with by local health authorities as was done at that time.

On March the 9th, the "Empress of India" arrived and it was found that seven cases of small-pox had occurred amongst the crew a month previously whilst lying in Hong Kong harbour. The men had visited some musical entertainments and were evidently while there all exposed to infection at the same time. The ship's surgeon had taken all precautions possible and the ship was thoroughly cleansed before any passengers were allowed on board. No further case had occurred or could be discovered on arrival here. But all the steerage passengers were given careful inspection.

On April the 11th inst. I received a telephone message that the ship "Alice E. Leigh" was at anchor in Royal Roads and that there was some sickness on board. The "Earl" was in town the men being allowed that Sunday home. So that it was afternoon before the crew could be gathered together and the ship reached. On hailing her I found that she had been towed in the night before by tug "Tacoma"

which had immediately left for Puget Sound. There were five cases of small-pox on board, all convalescent. Two men had died of it a few days previous and were buried at sea. The patients not being in need of medical attention and knowing that nothing could be done to the vessel until it was towed to the quarantine wharf, I did not board the vessel but went on to Victoria to see about having it towed to quarantine and to secure nurses, guards, provisions and fresh vaccine. The nurses were taken down to the station and I visited and removed the patients in one of the ship's boats the next day, but owing to various difficulties the tug could not be secured to bring the ship herself to quarantine until the following morning. This delay to the vessel was really owing to the system in vogue of tugs taking ships to the Roads without calling at William Head. The order making it necessary for tugs to bring vessels here was approved by the department because of this case. The captain of the "Alice E. Leigh" was also to blame since he did not tell the captain of the tug that he had sickness on board, thus being able to get a cheaper tow. I telegraphed the quarantine officials at Port Townsend regarding the tug. The vessel had come from Shanghai. While there, both the captain and mate seemed to have had small-pox. The captain's case was mild, and he was confined to his room only a week. The mate was left behind in a hospital. The captain refused to believe that he had had small-pox. The captain and the port authorities took no precautions to disinfect, or put the vessel in a proper sanitary state. The only thing they seem to have done was to vaccinate the six apprentice boys, not touching the other members of the crew of thirty. The subsequent sickness and death amongst this part of the crew, may with good reason be ascribed to this neglect. The ship was thoroughly disinfected and put at anchor in the bay with the officers and apprentice boys living on board. The sailors occupied one of the suspect buildings. The arrangement proved a fortunate one, since a case developed afterwards among the sailors and they had to be detained for a further period of two weeks. The others, however, were allowed to proceed with the ship on April the 29th.

On April the 18th, steamship "Victoria" arrived and reported that two of her Chinese passengers had been landed in Yokohama, suffering from small-pox. The disease had evidently been contracted before leaving Hong Kong. The cases were discovered in their incipient stages and at once removed from the ship so that very little chance of infection for the other passengers seemed to be possible. Means had been at once taken by the Japanese authorities to disinfect the ship and her crew. As the ship had been fifteen days on her way from Yokohama, and all had been vaccinated there, this period was thought to exclude any probability of further cases developing; so that after another thorough disinfection of all the steerage passengers and crew, they were allowed to go. The Port Townsend officials detained all the steerage passengers for another two weeks, as no confidence was felt in the Japanese disinfection. No further cases developed, however. In connection with the Japanese disinfection, Dr. Brooks of the United States Marine Hospital Service, who has just been in Japan, has informed me that the disinfection as practised in the Japanese ports is not thorough and should not be accepted here. This is contrary to what I had believed to be the case: but in the opinion of one who has been in the country, the Japanese are not so far advanced in sanitary methods and their application as is generally thought.

On April the 27th "The Empress of China" arrived with two cases of small-pox on board, which had developed a week previously. There had also been a suspicious death at the same time. There were nine hundred and seventy-one persons on board, and the facilities of the station were taxed to their utmost. There were one hundred and forty-six cabin passengers, and these it was of course desired to deal with first in order that their detention period might be as short as possible. They resolved at a meeting, however, that they would not submit to any of my requirements and sought to exert influence in order to enable them to escape without interference. The disinfection of the steerage passengers had, therefore, to be gone on with first. This occupied most of the 28th. The evening before the mails had been disinfected and forwarded. On the 29th the crew and the greater part of the vessel had been disinfected. The cabin passengers might have been dealt

with the same day. It was late on this evening, however, before they would allow any of their baggage to come on shore; so that the entire work of disinfection was not finished until the next morning. The ship might have then proceeded to Vancouver but the company would not compel the passengers to vacate their staterooms for other quarters, so that the steamer was altogether one week at the wharf. Two weeks after vaccination had been performed on board ship, the cabin passengers were allowed to proceed from here with the vessel. The members of the crew whose vaccination was not satisfactory and all the steerage passengers were left behind. On Wednesday and Thursday five cases of small-pox developed amongst these passengers. They were all again disinfected and detained another two weeks. The passengers were all allowed to go on May 21; the crew remained another day to place the buildings in order. Before leaving a final disinfection was given both to the crew and passengers.

Just as the crew of the "Empress of China" had been got ready to leave, the barque "Sam Mendal" on which small-pox had occurred on the way from Antofagasta, South America, was towed to the quarantine wharf. The only passenger had died of small-pox after a week's illness nine days after leaving port. Within a few days the captain of the barque developed the disease. On his arrival here his skin was hardly more than clear of scalings. No other members of the crew contracted small-pox. The ship was disinfected and placed at anchor in the bay, the crew being detained on shore for the full period of incubation of the disease from the time of disinfection here. The ship was towed away on the 31st of May, the captain being allowed to proceed with her.

On June 15th the steamship "Braemar" arrived, having landed a case of small-pox at Yokohama. The patient was the engineer's Chinese mess boy. The infection in this case seems to have been received in Hong Kong. After landing the case no disinfection of the ship beyond that of the room in which the boy had been sleeping was done. No disinfection of the clothing of the passengers or crew was attempted. All on board were vaccinated at the time. But on arrival here hardly more than one-third of them seemed to have taken. This number were allowed to go after a thorough disinfection of their persons and effects. The others were re-vaccinated and detained here two weeks. After the vessel had been disinfected she proceeded to Port Townsend with those members of her crew who seemed protected by vaccination. These, however, were, with the exception of the captain, all detained at Port Townsend quarantine station for two weeks from the time of their disinfection at this station, the rule there lately, apparently, being to hold all alike, whether successfuly vaccinated or not.

In February I found a case of leprosy amongst the Chinese firemen on steamship "Pelican." He was detained at the hospital and returned on first vessel of the same line leaving. A few weeks afterwards I discovered the same man on inspecting the crew of the steamship "Tacoma," and detained him again until he could be sent back. On August the 28th a Japanese patient, suffering from beri-beri, was landed from the steamship "Columbia" in a moribund condition. He died the next day.

It will be observed that the small-pox infection in all these cases was got in China, although the epidemics heard most of were in Japan. No infection was carried thence, however, as all intending emigrants were carefully examined and vaccinated and sometimes detained several days under observation before going on board. With the Canadian Pacific steamers the Japanese were refused passage altogether.

In the case of one ship quarantined here, and perhaps of another, the disease seems to have broken through our line of defence, owing either to the partial lack of or incompleteness of the appliances for disinfection at this station at that time, or to failure of protection by vaccination. But unquestionably quarantine here now goes as far as that of any other station in affording as full a defence as reasonable quarantine methods can be expected to afford. Some cases may elude the utmost vigilance, but infection can always be prevented entering the country in a wholesale manner. It may be fairly assumed that the prevention of this last summer was due to the work at this station.

The report submitted is somewhat extensive, but the year has been an unusually eventful one, both in regard to the number of improvements effected and of the infected vessels dealt with.

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

A. T. WATT, M.D.,
Superintendent B. C. Quarantine.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 11.

REPORT ON VICTORIA QUARANTINE STATION.

(R. L. Fraser, M.D.)

Victoria, B. C., 31st October, 1897.

Sir,—I have the honour to submit my quarantine report for Victoria, B. C.

I was appointed medical quarantine officer of this port on January 15th of this year. My duties were to inspect local steamers from Puget Sound and the neighbouring ports of the United States.

On March 26th, I was notified from Ottawa that coasting steamers from United States ports were, for the present, exempt from quarantine regulations. My duties from the latter date were to assist Dr. Watt when called upon and to attend to any quarantine matters referred to me by the collector of customs for Victoria.

During my term of office no case of infectious disease has arrived here. I have examined seven foreign vessels for Dr. Watt, at times when he was unable to attend to them. I have been called on by the collector of customs four times to decide on the admission of persons on coasting steamers.

I returned to Puget Sound two destitute blind men and two destitute cripples. Fourteen Chinese for Victoria via Portland were returned for vaccination and for the disinfection of their persons and baggage.

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

R. L. FRASER, M.D.,
Quarantine Officer.

To the Honourable
The Minister of Agriculture,
Ottawa.

No. 12.

REPORT ON VANCOUVER QUARANTINE STATION.

(L. N. MacKechnie, M. B., Tor.)

Vancouver, B. C., 1st November, 1897.

Sir,—In compliance with your request I have the honour to submit my report respecting quarantine at this station from July 1st to October 31st, 1897.

During this period three vessels were boarded and inspected by me. No case of infectious or contagious diseases was found on board.

Owing to large demands on our mills for lumber and timber for the Crow's Nest Pass Railroad our export trade has been unusually small this fall; but there is every indication of great activity this coming year.

The regulations of your department as applied to this station have been faithfully observed.

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

L. N. MacKECHNIE, M. B.

To the Honourable
The Minister of Agriculture,
Ottawa.

No. 13.

REPORT ON THE LAZARETTO, TRACADIE, N.B.

(A. C. Smith, M.D.)

Tracadie, N.B., 31st October, 1897.

Sir,—I beg leave to submit, for the information of the department, the general statement respecting the work done in connection with the leper hospital at Tracadie for the twelve months ending on this date.

There are registered to-day twenty inmates of the lazaretto—sixteen males and four females. The youngest patient in the wards is eleven, and the eldest sixty-one years of age. Four of the patients are in the early stage of the disease; ten are somewhat more advanced, and six are far on in their sad journey towards the end of life. There were nine deaths,—an unusually large number, due to so many having reached the final stage and succumbing one after another to a disease relief from which can only be found through the portals of death. I may add that all who died had been attacked by *la grippe* last winter, and were in consequence enfeebled. At present we have very little suffering among the inmates. All, including the Icelandic patients, seem surprisingly contented. The bright, sunny influence of the kind sisters in charge accounts for the patient resignation which our poor lepers exhibit.

Eight new cases were admitted. Of this number four came from Manitoba. The finding of four lepers among our Icelandic population caused some unnecessary

alarm. These cases were not permitted by the Government to remain long enough to become foci of the disease. Besides, leprosy is not a disease of modern civilization, and is seldom contracted by persons whose systems are well nourished. It is well known that members of leprous families living in poverty on the coast of Norway never develop leprosy after emigrating to the Western States of America. Leprosy is most prevalent in poverty-stricken areas. Poor and unsanitary conditions are factors of importance in the etiology of the disease; they favour the fecundation and development of the leprous poison. So far as I have noticed, our Icelandic people are cleanly, healthy and prosperous. Leprosy can never make headway among such in our country. Of course lepers are not desirable citizens, and such as reach our shores should be sent back to the place from whence they came. Whenever a leper is found in an advanced stage of the malady he should be isolated. The disease is insidious, and the consequences of a contact with a leper in the dangerous stage, by a person in anyway predisposed to the disease, may appear only after many years. In the absence of a law enforcing segregation, I had much difficulty in effecting the removal of one leprous individual living in squalid poverty at Pt. Marcel, N.B. The man was brought to the lazaretto, but not until after the dangerous stage had developed; and, probably as a consequence, his wife is now showing symptoms of leprosy. I seldom have difficulty in removing those affected. When after careful examination I declare a man to be leprous, his neighbours, *and those giving employment*, shun him, and he is glad to avail himself of the comforts of the leper's home.

During the year I gave certificates to several persons unjustly reported to be leprous, and in this way enabled them to return to employment.

I have again to report that the institution is fulfilling its object—that of segregating those who might, through a careless indifference on the part of some with whom they would come in contact, become foci of the most horrible disease known to mankind.

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

A. C. SMITH,
Inspector of Leprosy, and Physician to the Tracadie Lazaretto.

To the Honourable
The Minister of Agriculture,
Ottawa.

No. 14.

REPORT ON CATTLE QUARANTINE IN CANADA FROM 1st NOVEMBER, 1896, TO 31st OCTOBER, 1897.

(Professor D. McEachran, F.R.C.V.S., V.S. Edin., D.V.S. McGill, Chief Inspector of Live Stock for Canada.)

Sir,—I beg herewith to transmit this my annual report from 1st November, 1896, to 31st October, 1897, covering live stock quarantines for the Dominion.

It is my pleasant duty to report that during the period covered, the health of animals in the Dominion has been excellent, as will be seen from the appended reports of inspectors from every province; there have been no new occurrences of disease calling for special action since my last report.

During the period covered sheep scab has been eradicated from Ontario and New Brunswick, and while hog cholera still continues to appear here and there in Essex and Kent, it has been confined to a few centres which are under control and from which it is rapidly disappearing with lessened probability of its again (from ignorance of its nature) being reintroduced there.

Pictou cattle disease being a disease of local origin is more difficult to deal with, but reference to my report will show that it is steadily decreasing and hopes are entertained that the method of ensuring thorough disinfection under the supervision of a special overseer adopted under your instructions will prove effective in diminishing the losses still more.

I beg to call your attention to the necessity for encouraging the importation of thoroughbred bulls necessary to improve the quality of cattle of the country, which, for want of the infusion of fresh blood into the herds, are not holding their own in the standard of quality

I beg to point out the fact of horses throughout the Dominion rapidly becoming scarce owing to lessened breeding and increasing exportation; it is necessary to encourage farmers to recommence breeding horses and if judiciously followed it can be made a profitable branch of agriculture.

I beg specially to call your attention to the subject of tuberculosis in cattle, which, from the reports, will be seen to exist somewhat extensively in Canada, but I am happy to be able to say much less so than in any other cattle growing or dairying country known. Much good has been done by the efforts of the department to inform cattle owners on the subject, and by the testing of herds, and voluntary destruction of cattle.

I have much pleasure in informing you that another year's experience goes to prove the complete non-existence in Canada, from ocean to ocean, of contagious pleuro-pneumonia or any lung disease of a contagious nature; this affording further proof, if such were necessary, of the error in diagnosis made by the officers of the Imperial Government, on the authority of which Canadian cattle were scheduled.

EXPORTATION OF LIVE STOCK FROM MARITIME PORTS.

The following table shows the numbers of cattle, sheep and horses inspected for export to Europe during the past four years, at Montreal and St. John, N.B.

	Cattle.	Sheep.	Horses.
1894	82,217	121,304	
1895	99,606	187,338	
1896	101,502	117,428	11,531
1897	117,428	62,406	10,651

Of the shipments for the twelve months ended 31st October last, 11,768 cattle and 4,554 sheep were in transit from the United States.

The increased number of animals exported, in addition to the large exportation to the United States, is very satisfactory and evidences the opening up of markets for our supremely healthy Canadian cattle.

During the same period the following were rejected:—

Port.	Animals.	Actinomycosis.	Lame.	Skin Eruption.
Montreal	Cattle	112	30	
do	Sheep	.....	30	
St. John, N.B.	Cattle	2	1	
do	Sheep	.....	.....	4
		114	61	4

It is satisfactory to note that no disease of the lungs has been discovered in a single instance by the inspectors, in the 117,428 cattle inspected, and, considering that they were gathered from all parts of Canada east of the Rocky Mountains, it affords strong evidence that no lung disease exists in Canadian herds.

The following directions for the guidance of shippers of live stock at the ports were distributed and the regulations carried out as far as possible, although some difficulty was experienced in getting the order for detention for rest and inspection enforced:—

DIRECTIONS FOR SHIPPERS OF LIVE STOCK FROM CANADIAN PORTS.

"The animals must reach the port of embarkation 18 hours before shipment.

The shipper must notify the inspector in writing 24 hours before embarkation, giving the number of cattle, the ship on board which they are to be placed, and the owner's name and address. A book is kept in the stock yard office in which shippers must enter this information on arrival, so as to prevent delay in inspection.

The shipper should inquire for the Cattle Quarantine foreman, at the stock yard, who will give him all necessary directions and will see that the stock are inspected in time for removal to the ship.

No animal will be allowed to be put on board any steamship without the mark of inspection (V.R.) and the inspector's certificate.

Shippers must arrange to have their animals arrive in time to give them a rest and have them inspected in daylight. Inspectors have positive instructions not to inspect under any circumstances by artificial light. Shippers must have their men on hand while the stock are being inspected to move the animals as required by the inspector.

Shippers of cattle should note that no diseased animals will be allowed to be shipped. If affected by *Tuberculosis* or *Actinomycosis* (lump jaw) in any stage, or by any contagious disease whatever, they will be confiscated, and slaughtered as condemned animals.

Shippers of sheep are cautioned against bringing sheep affected with sheep scab to a shipping port, as, on the discovery of scab, they will be condemned and slaughtered

Shippers of horses are warned not to bring horses suffering from glanders or other nasal discharges to shipping ports. Inspectors are instructed not to allow such to be exported, but to quarantine them in the stable where found to be dealt with as subsequent developments render necessary and the Minister of Agriculture may direct.

United States animals must be bonded to the port of embarkation. They will be dealt with at the shipping port (under present arrangements) the same as Canadian live stock, subject to such regulations as the Minister of Agriculture may from time to time prescribe."

W. B. SCARTH,
Deputy Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, May 8th, 1897.

INSPECTION OF ANIMALS FOR EXPORT TO GREAT BRITAIN.

During the year there were exported 7,862 head of cattle, 3,321 sheep and 1,410 horses from the port of St. John. N.B.

Of the cattle 599 were from the United States, the balance 7,263 were Canadian.

There were rejected 3 head of cattle, 2 for actinomycosis and 1 for injury in transit, 4 sheep were held back on suspicion of sheep scab.

QUARANTINE OF FOREIGN ANIMALS.

Two head of swine were quarantined for 15 days, being exported from Bangor, Maine, U.S.

INSPECTION FOR TUBERCULOSIS IN CATTLE.

Eight herds were inspected, consisting of 48 cattle in which 15 head were found to be diseased showing a reaction to the tuberculin test. The diagnosis was confirmed on post-mortem examination.

INSPECTION OF HORSES.

The demand for Canadian horses in Britain still continues and horses of the right kind can be sold in British markets at paying prices.

The inspection of horses was satisfactorily conducted by Inspector Dr. Charles McEachran who reports having given certificates for the year ended 31st October, for 9,241 head of horses exported to British ports, which were found free from disease, of these 1,016 were United States horses in transit.

Of the entire number 17 were detained for strangles and 43 for influenza, most of them were shipped later, after recovery.

His report will be found as an appendix. (See appendix No. 16).

It will be observed that the inspector remarks that the horses shipped were an improvement on the previous year's shipment.

By report of Inspector J. H. Frink (see appendix No. 19), it will be seen that 1,410 horses were shipped from St. John, New Brunswick, and no contagious disease was discovered in them.

I would again urge the Canadian farmer to recommence horse-breeding, as the result of so many having relinquished it, and large numbers having been exported good horses are even now scarce, and, before they can be replenished by breeding, their scarcity will make them valuable.

Too much care cannot be exercised in the selection of the breeding stock; breeding to pedigree ought as far as practicable to be followed, soundness, action, heavy bone, good feet are all important in all breeds and in both sexes.

The most salable are high class carriage and saddle horses, extra heavy draught, van and omnibus horses, and these are the classes it will pay best to breed.

INSPECTION OF LIVE STOCK CARS AND YARDS.

In consequence of the arrangement made with the Secretary of Agriculture at Washington, it became necessary to appoint an inspector of cars and yards used in the transit of cattle between the two countries.

Mr. M. Auger was accordingly appointed and has performed his duties satisfactorily, the Railroad Companies cheerfully complying with the regulations.

Mr. Auger's report will be found as an appendix. (See appendix No. 32).

LIVE STOCK FROM MANITOBA AND THE TERRITORIES.

I may here state that the Canadian Pacific Railway has carried during the year ended 31st October, 1897, from Manitoba and the Northwest Territories :

Cattle	Sheep	Hogs	Horses
38,342	2,393	6,409	120

In all 47,264 heads of live stock.

IMPORTATIONS AT QUARANTINE PORTS.

—	Horses.	Mules.	Cattle.	Sheep.	Swine.
FROM GREAT BRITAIN.					
Halifax, N.S.			7		
Quebec	1		19	323	6
Total	1		26	323	6
FROM UNITED STATES.					
Halifax, N.S.	5				
St. John, N.B.					2
Quebec	22				
Point Edward			2		47
Emerson, Man.	24		32		1
Deloraine			1,617		
Maple Creek	64				
Lethbridge	95				
Ainsworth, B.C.	36	30	4		12
Rossland do	259	86	63		
Nelson do	24		130		16
Victoria do	36	2	10	26,739	63
Total	541	116	3,885	26,739	169

The above figures are taken from the reports of the Inspectors at the ports mentioned.

The small numbers of animals imported for the improvement of stock is disappointing in the extreme. Of those from Great Britain, six cattle were slaughtered for Tuberculosis at Quebec and Halifax quarantines.

It is evident to all interested observers that year by year Canadian cattle are failing to hold their own in quality and the time has come when they must be improved by the importation of fresh blood from abroad. Circumstances have come about from a variety of causes, notably the re-opening of the United States market for our live stock and the demand for supplying the mining districts with beef in addition to the British market, which renders this not only necessary, but opens up a field for profitable enterprise. Canadian breeders now find no difficulty in disposing of their cattle, but it is evident that there will be a considerable shortage to meet the demand for them. No enterprise will remunerate the farmer as well for his skill and labour as the production of well-bred cattle. By raising cattle he cre-

ates a market on his own farm for all his feed stuffs produced on it; he not only realizes the profit on his stock when sold, but he also enriches his land by the production of manure and thus returns to the land what rightly belongs to it, by so doing enhancing the value of his property, and giving employment to his family.

When it is considered that it costs just as much to feed and care for an inferior and low priced animal as it does a high class and more valuable one, the common sense of breeding and feeding well-bred cattle must appeal to every one.

IMPORTATION FROM BRITAIN.

The importation of pure bred cattle was stopped within the past ten years very largely on account of the dread of contagious pleuro-pneumonia and protective regulations which were considered to be necessary. Now as that disease is almost unknown in Britain, and when discovered is dealt with in a prompt and energetic manner by the staff of the Board of Agriculture, the danger is reduced to a minimum.

Further investigation of this disease has shown that it is not communicated by any means other than contact of living diseased animals with healthy ones, and most authorities believe that there is no danger from buildings or ships, provided ordinary care in cleaning and disinfecting after occupation is practised, consequently acting on your instructions, steamship agents have been notified by the department that they need not fear being quarantined if they should carry stock affected by this disease, thus, it is hoped, removing a serious difficulty, which would-be-importers experienced in getting cattle carried on steamships to Canada.

To encourage importers it has been decided to accept tuberculin tests made in Britain by a number of veterinarians in various districts there, owing to some having raised objections to their cattle being again subjected to this test in Canada before being allowed to leave the quarantine. While this has been done to meet the wishes of importers, the propriety of it is not apparent. The cattle must remain in quarantine three months, ample time therefore elapses to admit of retesting, it cannot injure them in any way, it costs the importer nothing, and is a double safe-guard against the possibility of bringing into the home herd a most contagious though extremely subtle disease, worse even than pleuro-pneumonia itself. An importer therefore is studying his own interest when he not only willingly submits his importations to a retest but insists on it being done before they leave quarantine. No man who has had the misfortune to lose his herd by this disease would dream of doing otherwise. The necessity for pure bred bulls throughout Canada is so urgent that every facility and encouragement should be made to importers of such, even to the extent of offering a premium for such as are imported to remain in Canada.

REMOVAL OF THE QUARANTINE FOR LIVE STOCK BETWEEN CANADA AND THE UNITED STATES.

In 1879, owing to the discovery of the widespread existence of contagious pleuro-pneumonia in some of the Eastern States and the consequent scheduling of the United States of America by the British Government, Canada, having secured exemption from such embargo by proving her freedom from this or any of the live stock contagious diseases found elsewhere, deemed it necessary for self preservation and to meet the requirements of the Imperial Government, to establish a quarantine of 90 days on all cattle entering from the United States.

In March, 1892, owing to a blunder on the part of the official veterinary advisor of the British Government, Canadian cattle were scheduled. In November of the same year, the United States Secretary of Agriculture, Mr. Rusk, placed a quarantine of 90 days on Canadian cattle entering that country.

The effect of this latter embargo was the immediate loss of a large and valuable market for Canadian breeding and feeding stock. It likewise had the effect of stopping almost entirely the importation of breeding stock from Britain.

The efficiency of the work done by the Bureau of Animal Industries of the United States which was established almost exclusively for the purpose of dealing with the extirpation of pleuro-pneumonia, was such that five years ago the work of extermination of this plague was happily completed, and in doing this the official veterinarians of the United States accomplished the greatest achievement in veterinary sanitary science ever dreamed of in any country, carrying to a successful issue in a few years what European countries have failed to do in half a century.

Pleuro-pneumonia no longer in existence in the United States, all reasonable grounds for the continuance of the quarantine were removed, and as the embargo of the British Government on Canadian cattle had been made permanent by the passing of an Act in 1896, excluding all foreign cattle. In response to numerous urgent appeals by those interested in live stock exportation, breeders of stock and others you decided to take steps to accomplish the removal of the quarantine between the United States and Canada, providing it could be done by arrangements mutually satisfactory.

After due consideration on the matter, and some preliminary correspondence a meeting was arranged at Washington between Hon. J. Sterling Morton, Secretary of Agriculture of the United States, and yourself as Minister of Agriculture, Canada, Doctor D. E. Salmon, D.V.S., Chief of the Bureau of Industry, Washington and myself as Chief Veterinary Inspector for Canada, were present for consultation.

This agreement has worked very satisfactorily for Canada. An extensive demand for Canadian cattle for feeding and breeding developed immediately on the new regulations coming into effect on the first of February, 1897.

While the quarantine has been removed, protective provisions have been fully provided for, not the least important being the requirement of a tuberculin test in the case of all cattle being imported for breeding (including milking) purposes, a regulation which not only prevents the importation of animals affected by tuberculosis, but which also aids materially in detecting that disease by inducing owners to establish the health condition of their herds by the test, thus leading to the voluntary elimination of tuberculous cattle of pure bred herds and dairy stock.

The rapid development of the cattle trade between Canada and the United States, especially in the class for feeding purposes has been much beyond expectations. The new regulations came into force on the 1st February, 1897, and it took some time for their publication to reach United States buyers. The following returns of cattle exported for the six months, January and June (inclusive) of 1897, compared with the return for the six months, January to June (inclusive) 1896, show an increase of 34,369 head, and there is every reason to believe that the succeeding six months will show a much greater increase.

NUMBER OF CATTLE EXPORTED TO THE UNITED STATES FROM CANADA.

6 months, January to June, 1897	35,421
do do 1896	1,034
Increase	34,387

APPOINTMENT OF VETERINARY INSPECTORS.

To meet the requirements of the new regulations for giving effect to the international agreement it was necessary to appoint veterinary inspectors accessible at the various shipping points to give the certificates of health and freedom from disease of the districts whence animals were being shipped.

For this purpose inspectors had to be named, who could be recommended to make tests for tuberculosis on cattle bought for export to the United States, and their names forward to the Bureau of Animal Industry at Washington.

To enable this to be done confidently it was ordered that both a written and oral examination of veterinary graduates be held at various points in the Dominion on contagious diseases of animals and the tuberculin test as a guide in selecting qualified men.

Such examinations were held at London, Toronto and Kingston in the province of Ontario, Montreal and Quebec in the province of Quebec, Moncton, St. John, Pictou and Charlottetown in the Maritime Provinces, Winnipeg in Manitoba, and in Regina and Calgary in the North-west Territories. 224 candidates presented themselves and were classified as follows in four divisions:—

A, 75; B, 70; C, 60; D, 19.

Appointments have been made in each province of inspectors specially instructed in tuberculin testing who are employed to apply the test whenever an owner suspecting the existence of disease, makes application to have his herd tested. The applicant agrees to have all his cattle tested, to completely isolate all showing a reaction, and to thoroughly disinfect his premises. This does not apply to what may be called commercial testing—testing done to comply with the United States regulations—which is done by veterinarians nominated by you, but paid by those employing them according to the following scale of fees:—

$5.00 for the first animal; $1.00 per head for the next nine; 50 cents per head for any number over ten.

TUBERCULOSIS.

As a result of the various tests made of cattle for export to the United States, it was discovered that this disease existed to some extent even among pure bred herds in the country, and the dissemination of information by a bulletin addressed to the farmers throughout the Dominion has done a great deal towards the eradication of this disease, as many owners of cattle hitherto uninformed on the subject now see the necessity for getting rid of it and have tested their herds. With a view to influencing farmers to have their herds tested, your department has undertaken to test, free of cost, all herds whose owners make application to the department.

When tuberculosis is discovered the diseased animals are isolated, and quarantined so as to prevent them being disposed of for milking or breeding purposes. As a rule owners will voluntarily slaughter them. Thorough disinfection of infected premises is always ordered to be carried out to the satisfaction of the inspector.

I have pleasure in reporting that the past year's experience in the use of tuberculin proves that it is almost absolutely reliable.

Since my last report on this disease much excellent research work and experimentation have been made by M. Nocard in France, Professor Bang in Denmark, the Bureau of Animal Industry and others in the United States. The British Royal Commission have reported their investigations and the attention of the whole world has been forcibly called to this disease, especially in relation to its intercommunicability with the human family and the danger from ingestion, especially of milk from tuberculous cows. Its contagious nature has been fully established, and the many insidious ways in which it is spread, explained.

I herewith append copy to Farmers' Bulletin No. 1, on this subject.

FARMERS' BULLETIN.

TUBERCULOSIS.

In issuing this bulletin on a subject affecting very intimately not only the extensive and rapidly growing cattle industries of Canada, but also having a close and direct bearing on the health and lives of the people, an effort is being made to convey to everyone interested, more especially the farmers, dairymen and stock-raisers, in a condensed form and in non-technical language, a simple statement of facts as to the nature, causes, symptoms and prevention of this disease.

In the preparation of the bulletin free use has been made of the publications and reports of the best authorities up to date, especially those of Prof. Ed. Nocard, of Alford Veterinary College, France, Chief Consulting Veterinarian in France; Prof. Bang, of Denmark, who was specially employed by the Danish Government to inves-

tigate this disease; the report of the Royal Commission appointed by the British Government; the report of the Bureau of Animal Industries at Washington, U.S.A.; Prof. Theobold Smith, Harvard University; Profs. Law and V. A. Moore, Cornell University; the late Prof. Walley, Edinburgh Veterinary College, &c., as well as of the extensive experience of the veterinary staff of the department.

The statements contained herein are accepted generally by scientific men as facts, and our farmers may accept them as such, care having been taken to avoid making statements on debatable points. The Minister trusts that interested parties will carefully read the bulletin, preserve it for future reference, and apply the suggestions contained therein to their own individual cases.

Full directions for applying the tuberculin test are given, by following which any intelligent person accustomed to handle cattle may diagnose obscure or latent cases, which seldom present symptoms recognizable by mere clinical examination.

Accuracy in conducting the test being all-important, any owner desiring to have his cattle tested by a Government Inspector may have it done free of cost by making application to the Department of Agriculture at Ottawa by a letter addressed to the Deputy Minister of Agriculture. This does not apply, however, to the testing of cattle for exportation to the United States.

In the event of an Inspector discovering the disease in one or more of the herd, it will be his duty to at once remove them out of the byre to an isolated place, in which they must remain quarantined until otherwise disposed of. The premises must also be disinfected to the satisfaction of the Inspector.

INDEMNITY.

As no provision has so far been made by Parliament for the payment of indemnity for animals slaughtered on account of this disease, under ordinary circumstances no indemnity will be paid by the Minister of Agriculture.

OBLIGATIONS OF OWNERS OF DISEASED CATTLE.

The following extract from the Animals Contagious Diseases Act will explain to owners of diseased cattle their responsibility under this Act:—

Notice of disease to be given to the Minister of Agriculture by breeders or dealers.

3. Every cattle or farm stock owner, and breeder of or dealer in cattle or other animals, and every one bringing foreign animals into Canada, shall, on perceiving the appearance of infectious or contagious disease among the cattle or other animals owned by him or under his special care, give immediate notice to the Minister of Agriculture, at Ottawa, of the facts discovered by him as aforesaid.

Penalty for neglect.

4. Every owner of such diseased cattle or other animals who neglects to comply with the provisions of the next preceding section shall forfeit his claim to compensation for any cattle or other animals slaughtered in accordance with the provisions of this Act; and no such compensation shall be granted him; and every person who maliciously or fraudulently conceals the existence of infectious or contagious disease among cattle or other animals, shall incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 4.

Or fraudulent concealment of disease.

Penalty for keeping diseased animals in places not inclosed.

5. Every person who turns out, keeps or grazes any animal knowing such animal to be infected with or labouring under any infectious or contagious disease, or to have been exposed to infection or contagion in or upon any forest, wood, plain, moor, beach, marsh, common, waste land, open field, roadside, or other undivided or uninclosed land, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 5.

Penalty for bringing such animals to market, &c.

6. Every person who brings or attemps to bring into any market, fair or other place, any animal known by him to be infected with or labouring under any infectious or contagious disease, shall, for every

such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 6.

Penalty for selling or putting off such animals, &c.

7. Every person who sells or disposes of, or puts off, or offers or exposes for sale, or attempts to dispose of or puts off any animal known by him to be infected with or labouring under any infectious or contagious disease, or the meat, skin, hide, horns, hoofs or other parts of an animal known by him to be infected with or labouring under any infectious or contagious disease at the time of its death, whether such person is the owner of such animal, or of such meat, skin, hide, horns, hoofs or other parts of such an animal, or not, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 7.

For throwing carcass into rivers, &c.

8. Every person who throws or places, or causes or suffer to be thrown or placed, into or in any river, stream, canal, navigable or other water, or into or in the sea, within ten miles of the shore, the carcass of an animal which had died of disease, or which has been slaughtered as diseased or suspected of disease shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 V., c. 70, s. 8.

For digging up any such carcass when buried.

9. Every person who, without lawful authority or excuse, digs up or causes or allows to be dug up the buried carcass of an animal which has died or is suspected of having died from infectious or contagious disease, or which has been slaughtered as diseased or as suspected of disease, shall, for every such offence, incur a penalty not exeeding one hundred dollars. 48-49 V., c. 70, s. 9.

Such animals if offered for sale to be seized and reported to the mayor, &c.

10. If any animal infected with or labouring under any infectious or contagious disease, is sold, disposed of, or put off, or is exposed or offered for sale in any place whatsoever, or is brought or attempted to be brought for the purpose of being exposed or offered for sale in any market, fair or other open or public place where other animals are commonly exposed for sale, any clerk or inspector, or other officer of such fair or market, or any constable or policeman, or any other person authorized by the mayor or reeve, or by any justice of the peace having jurisdiction in the place, or any person authorized or appointed by the Governor in Council, may seize the same, and report the seizure to the mayor or reeve, or to any justice of the peace, or person authorized or appointed by the Governor in Council, may cause the same, together with any pens, hurdles, troughs, litter, hay, straw, or other articles which he judges likely to have been infected thereby, to be forthwith destroyed, or otherwise disposed of, in such manner as he deems proper, or as is directed, as provided by this Act. 48-49 V., c. 70, s. 10.

Who may cause them with things supposed infectious to be destroyed.

TUBERCULOSIS.

This disease claims for its victims nearly, perhaps we might say, all the domestic animals, and few of the wild animals subjected to domestication resist the contagion, as is well known to keepers of menageries. Rats, mice and other vermin which inhabit houses and outbuildings not only contract the disease but are active agents in spreading it.

Some species are more susceptible than others and contract it readily by eating food containing the germ of the disease, or inhaling the dried germs given off from the lungs and throats of animals affected in these organs.

The most susceptible of the domestic animals are cattle, swine, chickens, goats and rabbits. These contract it readily in the natural way, but it can be produced in sheep, dogs, cats and horses by inoculation with tuberculous material.

Tuberculosis in the lower animals is identical with consumption in the human family. It is due to the same germ, (Bacillus Tuberculosis).

It is communicable from other animals to man, and just as readily from man to the lower animals, by natural infection and by inoculation.

TUBERCLE.

The germs (bacilli), which are living organisms of minute microscopic size, when they reach and become located in a tissue, produce local irritation and the formation of small reddened areas infiltrated with fluid and cells. These are tubercules. As they become a little older they enlarge, and their colour is grayish or yellow from changes that take place within causing the death of the central tissues. Their appearance and consistence in this way resemble that of cheese.

These nodules may vary in size from a pin head to a cocoanut, often they are of stony hardness from the presence of lime salts. The tubercules may be confined to one organ or tissue of the body, such as the lymphatic gland, for example, of the mesentery or thorax, or the throat, or udder, or ovaries, etc., or they may be generalized throughout the body, the germs travelling in the blood circulation. In this way the abdominal organs (liver, spleen, kidneys, etc.) may all be involved as well as those of the thorax, lungs, pleura, heart, lymph glands, etc. Often the pleura and peritoneum are covered with grape-like excrescences whose appearances are characteristic of this disease. Whenever tubercles are lodged for any length of time, much destruction occurs in the affected tissue.

THE TUBERCLE BACILLUS

Is described as a rod-shaped organism with rounded ends and a slight curve, requiring complex laboratory methods of cultivation and staining to prepare it for microscopic study.

It is a parasitic organism, which is only found in the bodies and excretions of animals affected by this disease. It thrives badly in the sunlight, which is said to kill it in from a few minutes to several hours. This fact should be remembered in dealing with it with a view to preventing it.

The invasion of the animal's body by the entrance into it of living bacilli is effected either through the digestive organs (ingestion), or by the respiratory organs (inhalation), by transmission to the sexual organs when the testicle is invaded, and by inoculation, or by a cut or abraded surface.

Without the entrance of the living bacillus into the body, tuberculosis cannot affect it. It is the seed from which it grows and is as essential to the development of the disease as oats, pease or potatoes are to reproduce these plants.

WHAT RENDERS CATTLE SUSCEPTIBLE TO THIS DISEASE.

Impaired health from whatever cause it arises renders cattle susceptible to tuberculosis. Heredity has been proved not to be an active cause of its propagation, it is, however, a predisposing one, and while it is well established by the experiments of Prof. Bang and others that calves may be bred from tuberculous mothers, and if removed before the cow licks them, or they have sucked their mother's milk, are placed in absolutely healthy surroundings and fed on milk from healthy cows, they can be reared and remain so as far as any inherited disease is concerned perfectly free; but common sense will teach us that in such animals we are likely to find a predisposition, that is a condition favourable to the growth and development of the tubercular bacillus, animals likely to contract the disease when exposed to contagion which their neighbours not so predisposed would resist successfully.

In-and-inbreeding is another predisposing cause, by producing animals with reduced vitality. Over-milking, under-feeding, want of sunlight and pure air, insufficient exercise, breeding too young, are all what may be termed predisposing causes to tuberculosis, and should be avoided.

One breed of cattle is just as subject to this disease as another when subjected to the predisposing and exciting causes. Dairy cattle are most subject to it because they are most exposed, they are more congregated, more closely and continuously housed, their vitality more drained by heavy milking and they are kept longer.

Their calves are more liable to milk infection, as they are fed on mixed milk, whereas the beef breeds usually suckle their calves. The majority of beef cattle are killed off at three or four years old, hence they are exposed to the contagion for a shorter term of life which is spent more in the open air and in sunlight.

HOW THE DISEASE IS USUALLY INTRODUCED INTO A HERD AND HOW IT EXTENDS IN IT.

A tuberculous bull is probably the most active agent in spreading this disease, both by cohabitation and sexual connection.

Farmers cannot be over-cautious in buying a bull or in having cows served by one till he has been subjected to the tuberculin test and found free from the disease.

Nothing should induce a breeder to allow contact with his healthy cattle by a bull till he has every assurance that he is free from tuberculosis.

Tuberculous animals of any kind should be prevented from coming in contact with the cattle.

TUBERCULOUS ATTENDANTS.

Tuberculous attendants, men or women suffering from pulmonary consumption, should on no account be allowed to feed, milk or have anything to do with cattle or pigs.

The intercommunicability of the disease from animals to man, and from man to animals is an established fact no longer open to discussion.

The bacilli from the throats and lungs of diseased people or animals, being coughed up adhere to and dry on the woodwork, walls, floors and feed boxes in buildings, cattle trucks or stock yards, and the dust being moved about by air currents, or mixing with the food in they hay rack or feed-trough, find access to the stomach and intestines, thence through the blood or lymph channels to the abdominal glands and other organs.

DANGER FROM MILK.

The virulence of milk from tuberculous cattle especially when the udder is diseased has been clearly demonstrated. Milk is dangerous even when the udder is not specially diseased. It will communicate the disease even when diluted by mixing with large quantities of other milk in the creamery or cheese factory; whey is equally dangerous.

The germs remain active in the skim milk and whey, and may produce the disease in calves fed on it. Milk obtained from creameries in districts where tuberculosis prevails should be raised in temperature for 10 minutes to 160° before being given to calves, otherwise living bacilli may be taken into the stomach, and entering the lymph channels produce the disease. As a precautionary measure, milk from tuberculous cows should not be received at creameries or cheese factories. All skim milk and whey should be heated to 160° for 10 minutes before being given out to farmers from the factories for feeding calves or swine. Unless this is done creameries and cheese factories may become distributing agents of this disease to healthy herds. Milk from tuberculous cows is a frequent source of communicating the disease from cattle to people, especially children and old feeble persons; meat from diseased cattle is also dangerous, although it may be sterilized by heat.

HOW TO PREVENT ITS INTRODUCTION TO A HERD.

See that your animals to begin with are free from disease.

Never bring any animal into the byre till you have ascertained beyond a doubt that it is healthy.

Keep your own bull. Your neighbour may be obliging, but if careless about the health of his stock, you may suffer irreparable injury by accepting even the free use of his bull should the animal happen to be tuberculous.

Conversely, if you have a bull, be exceedingly careful to see that no tuberculous cows are brought to him for service.

Never allow a consumptive person to have anything to do with your cattle, make no mistake about this.

Your byres must be well lighted, almost as light as outdoors; disease germs are killed by sunlight.

Pure air and plenty of it is essential to health. This can only be provided by sufficient space. Let your cow stable be roomy.

Drainage is essential to purity of the air. Without proper and efficient drainage the air must become contaminated by emanations from the droppings and urine of the cattle as well as by the decomposing vegetable matters with which they are mixed.

Drain your buildings, and do it thoroughly.

The ventilation is all-important. By properly arranged ventilators the impure air is removed and replaced by pure, the oxygen of the air is constantly being consumed in the process of breathing, and unless it is replaced it becomes unfit to sustain animal life. The constant change of the air in buildings inhabited by animals is absolutely necessary to preserve health.

During summer weather most buildings are sufficiently ventilated by the doors and windows being left open; it is during the winter when cattle are housed that they suffer from imperfect ventilation.

Proper ventilation provides for the admission of the pure and the escape of the foul air. As a rule farmer's architects do not make sufficient provision for either.

The air may be admitted by openings near the floor and by windows hinged at the bottom and dropping inward.

The ventilators or air shafts are usually to small. Most buildings require shafts three feet square placed about twenty feet apart, in the middle aisle of the byre. The shafts should be divided inside into two by a partition extending from the top to within three feet of the ceiling; the opening being controlled by trap doors opened or closed by cords running through pulleys.

CATTLE STANDING HEAD TO HEAD OBJECTIONABLE.

The common plan of arranging the byre, so as to save labour in feeding, by having an alleyway with the heads of the cattle opposite each other is objectionable from a health standpoint, as it exposes animals opposite tuberculous cattle much more to the contagion than when they are placed with their heads to the wall. They may be easier fed the former way, but they are easier cleaned the latter, and it has a decided sanitary advantage should contagious disease exist.

Running water in troughs placed in front of the cattle is objectionable if tuberculosis is present, as by this means the germs may be carried in front of the whole herd.

SYMPTOMS AND DIAGNOSIS OF TUBERCULOSIS.

In the majority of cases the symptoms are obscure, and till the discovery by Prof. Koch of the reaction produced by the injection of tuberculin (being a most reliable test for discovering this disease in obscure cases unrecognizable by symptoms) the majority of cases could not be detected even by experts.

When affecting the lungs, throat and respiratory organs generally, it is accompanied by a frequent cough but no fever. There is disturbance of respiration; the breathing is quickened by slight exertion or excitement; the cough is produced by changes of temperature. The expert can detect dull spots surrounded by areas of increased resonance on examination of the lungs by the usual methods.

Usually the superficial glands, in the throat, between the jaws, under the ear, or the udder, may be hard and swollen. The animals may continue for months or even years to maintain fair condition. They are sometimes fat while the lungs may be found studded by large tubercular masses.

When the disease is abdominal and the glands and organs in the belly are chiefly affected, the symptoms of defective nutrition are early apparent; emaciation, lessened secretion of milk, indigestion, breathlessness, and general failure more or less rapid. Many cases cannot be detected by symptoms, but can almost to a certainty (in 98 per cent at least) by the Tuberculin Test.

THE TUBERCULIN TEST.

Until the discovery by Professor Koch, in his experiments to discover a cure for consumption in human beings, that the injection of tuberculin invariably caused a rise in temperature when the person or animal was tuberculous, while it produced no effect whatever when free from it, the detection of the disease in early stages or when slightly affected was considered impossible in most cases. This test is most delicate and reliable (about 98 per cent) where it is properly applied.

Tuberculin is a soluble product of cultures of tubercle bacilli, of which a glycerine extract is made which is sterilized by heat and filtered through porcelain, so that it contains no living germs, and therefore cannot produce tuberculosis in animals injected with it. It has therefore no effect on healthy animals, in some cases the disease is aggravated by it when it exists, but it cannot be produced by it. The lymph must not be exposed to sunlight. It must not be frozen; must be kept well corked to exclude air.

Tuberculin injection has no bad effects on the secretion of milk.—The consensus of opinion of those most experienced is that it does not lessen the secretion of milk in dairy cattle, consequently they may be tested even when in full milk without disturbing its secretion.

Dose.—The dose varies with the size and age. As issued by this department it is ready for use, with doses marked on the bottle, viz., 20 drops for calves, 40 for small or medium sized animals, 60, larger, and 80 drops for very large ones.

When second tests are considered necessary at least thirty days should elapse and the doses be slightly increased.

PREPARATIONS FOR THE TEST.

It being decided to test a herd, the following suggestions should be considered. If the weather is extremely hot, or very cold, wait till it moderates. If the animal is suffering from any inflammatory disease when the temperature is over 102° from any cause, a cow being bulling—a bull being sexually excited, scarcity of water, impure air, irritation from flies, pregnancy in advanced stages, are all unfavourable for reliable testing.

Instruments necessary.—The following instruments are required. One or more Fahrenheit (clinical) thermometer, a hypodermic syringe with three strong hypodermic needles and a fine trocar and canula, a fine brad-awl, and a pair of clippers or curved scissors, and several glass droppers.

The Thermometers in use for this purpose cost about $1, are self-registering, and can be bought at any drug store.

Syringes.—Metallic syringes, strong and easily taken apart to be cleaned and disinfected, costing $3, can also be obtained at drug stores, or instrument makers.

The Scissors and Brad-awl are easily and cheaply procured at any hardware store,

Charts for recording tests which should be numbered, and the name or number of the animal, the colour and markings, sex, age, breed, hours at which the temperatures

were taken before and after injection, and a column for the decision should be arranged.

Disinfectants.—Professional men generally prefer a solution of corrosive sublimate, 1 part to 1,000 of water, but equal results will be obtained by using a 5 per cent solution of carbolic acid or creolin, and they have the advantage of being less poisonous. Such a solution is required to wash the hands and instruments in, and when used to disinfect the skin it has the advantage of being anesthetic locally.

The Cattle should be stabled.—If the cattle are at pasture, they should be stabled, tied up in their accustomed stalls, numbered as they stand, handled quietly by those accustomed to feed and milk them.

They should be allowed to remain undisturbed for some hours, being careful not to disturb the temperature by large draughts of cold water or overabundant feeding.

Taking the Temperature before Injection:—Two men to whom the cattle are accustomed should assist the person taking the temperature. One takes the nostril with finger and thumb with one hand, and the horn with the other. The second stands at the hip to prevent her from moving from side to side The thermometer with the mercury forced down by a few sudden jerks, as if shaking ink off a pen, till it marks below 100°, is inserted into the rectum, where it should remain for three minutes. Enter the temperature in a book or chart every three hours, commencing at 8 a.m., 11 a.m., 2 p.m., 5 p.m., and 8 p.m.

The hands and thermometer should be dipped in the disinfectant solution before inserting it into another animal. When there is a large number to be tested three thermometers may be in use simultaneously, so as to save time.

The best place to inject the test is in the loose skin on the side of the chest above and behind the elbow. The hair should be closely clipped off in a circle about three inches in diameter, and the skin well washed with a 5 per cent solution of carbolic acid.

Injecting the Test.—The dose of diluted tuberculin is now taken into the syringe, all air being forced out. The operator, if he is a fairly tall man, and the animal not very large, should stand on the opposite side, and reaching across the shoulder, he takes up the disinfected loose skin with the fingers, and if the needle is strong and sharp enough, he penetrates it and pushes the needle its full length into the loose cellular tissue beneath the skin; if not he should with the brad-awl pierce the skin and insert the needle into the puncture, then slowly inject the fluid, withdrawing the needle gradually. The advantage of this position is that the animal, when pricked with the needle, cringes from it, and needles are often broken, whereas in this position it cringes towards instead of from the operator.

The Best Time to Inject the Test.—The injection may be commenced after finishing taking the normal temperatures, say, nine o'clock in the evening.

Temperatures After Injection. Commence to take the temperatures at 6 o'clock next morning, take them every three hours till it falls to normal again. If tubercle is present there will be a rise of temperature, which attains its highest point usually about mid-way, sometimes later and generally it falls gradually till in about twenty-four hours from the hour of injection it is normal again.

The rise in temperature is no indication of the extent of the disease. Often the reaction is a high temperature, and post mortem examination shows but slight affection.

A rise in temperature of two or more degrees will indicate tuberculosis. In tuberculous herds, one and a-half degree would indicate the disease also; but that

temperature in a single animal in a herd would indicate suspicion only, and suggest re-testing after thirty days.

SAMPLE OF CHART.

CHART NO .....

Tuberculin Test at .... of Cattle owned by Mr ... .

No.	Age—Years.	Sex.	Breed.	Colour.	Date 189					Date 189						Normal.	Reaction.
					TEMPERATURE												
					BEFORE INJECTION.					AFTER INJECTION.							
					8 A.M.	11 A.M.	2 P.M.	5 P.M.	8 P.M.	6 A.M.	9 A.M.	12 A.M.	3 P.M.	6 P.M.	9 P.M.	MAXIMUM.	
*1	5	Cow.	Ayreshire...	Red and white	101	101 3/5	102	101 3/5	101 2/5	101 2/5	101 1/5	100	100 1/5	102	102	102	102
†2	8	"	Shorthorn ..	Roan.....	101 1/5	101 2/5	101 3/5	101 3/5	101 2/5	103 3/5	106	107	106 3/5	105 1/5	104 2/5	101 3/5	107

Decision—*Healthy. †Tuberculous.

OFTEN NO REACTION IN ADVANCED CASES.

It is usually found that in animals in advanced stages of the disease, owing to there being a superabundance of tuberculin in the system already, there is little or no reaction.

Fortunately in such cases the symptoms are so apparent, such as coughing, wasting, enlarged glands, etc, that the owner has little difficulty in recognizing the disease.

HOW TO DEAL WITH A DISEASED HERD.

When tuberculosis is discovered in a herd immediately remove the diseased ones from the healthy to another isolated stable, or a part of the byre may be partitioned off by close boards as far as possible from the rest of the herd.

In the case of low-priced cattle the owner will best serve his own interests by slaughtering them at once.

When they are specially valuable and in calf, the experiments of Prof. Bang and others show that the calf may be saved by removing it as soon as born, and before the cow has licked it, or it has been suckled by its diseased mother, and by placing it in an uninfected building, and feeding it on milk from tested cows, it will in all probability grow up free from tuberculosis, although, as previously explained, it may have a predisposition to contract the disease.

The herd should be tested every six months, and those which react likewise removed, till all trace of it disappears.

DISINFECTION OF PREMISES.

Most careful and complete disinfection of infected buildings and yards in which diseased cattle have been kept should be employed to rid them of disease germs.

In doing this before sweeping sprinkle the floors and walls well with water to prevent dust rising, remove drinking troughs, feed boxes and stall divisions. The floors must be specially scrubbed, the walls, ceilings and partitions should be carefully washed, and all freely sprayed with a disinfectant solution such as carbolic acid, one pint of crude acid to four gallons of water, or better still, lime wash. It may be applied by a whitewash brush or a spraying pump, care being taken to see that every corner, crack and joint is thoroughly penetrated by it.

The cleansing and disinfection should extend to drinking troughs and fences of the barn yard to make disinfection complete.

DISPOSAL OF TUBERCULOUS CARCASSES.

All animals slaughtered should be buried or burned. It is allowed in densely populated European centres by Government regulation that when the disease is limited and local the flesh may be sold for food, all others are confiscated and destroyed.

In Canada no provision is made in the Animal Contagious Diseases Act for such disposal, on the contrary it is strictly forbidden under section 7, 48–49 V., c. 70, which is as follows:

Penalty for selling or putting off such animals, &c.

7. Every person who sells or disposes of, or puts off, or offers or exposes for sale, or attempts to dispose of or put off any animal known by him to be infected with or labouring under any infectious or contagious disease, or the meat, skin, hide, horns, hoofs or other parts of an animal known by him to be infected with or labouring under any infectious or contagious disease at the time of its death, whether such person is the owner of such animal, or of such meat, skin, hide, horns, hoofs or other parts of such an animal, or not, shall for every such offence, incur a penalty not to exceed two hundred dollars. 48–49 V., c. 70, s. 7.

Every stock owner should have his stock tested, and voluntarily eradicate the disease from it, because diseased animals are a constant source of danger to the balance of the herd. It is unlawful to sell animals or their products known to be suffering from a contagious disease as tuberculosis is well known to be. Buyers of breeding stock will not purchase from a herd suspected of disease.

Tuberculous cattle cannot be exported. They are a menace to your neighbour's

cattle which may be infected by them, milk and other products of the dairy is dangerous to your own family as well as others using it when drawn from tuberculous cows. Once your herd and premises are free from the infection they can be kept so by following the suggestions above made. It is a duty you owe to yourself, your clients and country.

By co-operation of the breeders it is quite within the possibilities that this disease can in a few years be eradicated from Canadian herds. If the nature and manner of introduction and extension of tuberculosis is once thoroughly known, and preventive measures are enforced in both the human family and lower animals, this fell destroyer of human beings and the lower animals will disappear from the Dominion.

TUBERCULOSIS AT THE CENTRAL EXPERIMENTAL FARM.

This disease was introduced to this farm by a Durham bull over seven years ago, and from him the infection extended to the entire herd which was gradually killed out after testing with tuberculin, except four heifers kept for experimental treatment conducted under the supervision of the Director and Agriculturalist, these only being killed in the fall of 1896 and found very extensively diseased. Animals which had been sent from the Central Farm to the branch farms on being tested were also found diseased, and were slaughtered.

The buildings were disinfected by spraying with corrosive sublimate solution and sulphur fumes.

The slaughtered animals were replaced without the precaution having been taken to have them tested with tuberculin.

The recent accidental discovery of the disease in a Jersey bull which died from another cause led to the testing of the herd and the discovery that 26 out of 55 were tuberculous.

The origin of the infection in the present outbreak may be due to one of three causes. The diseased animals kept for experimentation for nearly three years; the disinfection having been imperfectly done; or the introduction of a diseased animal in the new purchases which were made without being tested.

Post mortem examinations made of 16 of the diseased animals showed that in all except one cow, the disease was slight, and the date of infection recent. In one cow the lesions were of several years standing, and this cow most probably was the source of infection.

This second unfortunate experience at the Central Experimental farm, costly as it has been, will not be without good results if every stock owner in Canada will rearn from it the folly of keeping a single infected animal on his farm, isolated or not; the necessity for unquestionable thoroughness of disinfection of infected premises; and the great risks they incur by allowing an animal to enter their byres without first being tested for tuberculosis.

EXPERIMENT STATION.

In accordance with your instructions I have had ten of the tuberculous cattle removed to a temporary building erected at Outremont for the purpose of having a series of experiments made on calves, pigs, guinea pigs, and rabbits, with a view to

confirm or otherwise the research work of others, more especially its relation to human consumption, its communicability from drinking milk from the tuberculous cattle; if the udder is diseased; and when it is not, the effect of repeated tuberculin injections, &c., &c.

As instructed by you I have arranged with Prof. Adami to conduct the bacteriological research and the microscopic and other laboratory work, he having been appointed by you Bacteriologist of the quarantine service. This he undertakes with the assistance of Dr. C. F. Martin. Every effort will be made to conduct the investigations in a thorough manner so as to make them valuable confirmatory or contradictory evidence of the various statements promulgated with reference to this disease resulting from the investigation by scientists in other countries.

Experiments will also be made with various preparations with a view to discover if possible a remedy, something that will kill the tubercle bacilli and thus cure the disease. The importance of research work cannot be over-estimated in connection with animal quarantine service. For many years I have pointed out to the Government the necessity for such work, and it is highly gratifying to me as chief inspector, and to those engaged in this work with me to have this want at least understood and supplied.

TUBERCULIN TESTING.

Testing in Canada is only now beginning to be appreciated, and since it has been announced that owners can have their herds tested free of cost, applications are coming in freely, and it has been found necessary to appoint two inspectors, Doctor Daubigny, senior, and Doctor A. E. Moore, specially to test cattle with tuberculin, and others must soon be appointed to meet the demand.

So far about one hundred official tests have been made of herds numbering from 1 to 55, amounting in all to about 500, of which number 180 were found diseased.

It must be borne in mind, however, that these herds were tested because the disease was evident by clinical symptoms, and by no means indicates in any way what proportion of cattle are affected in the country, yet it clearly points to the necessity for active measures still being further prosecuted in the efforts to rid our herds of this plague.

With a view to preventing unscrupulous persons from using the official tests to discover the disease in their herds to be followed by their dispersion, it is made conditional when an owner applies for free testing that he agrees to have the whole herd tested and to isolate all cattle showing a reaction from the injection of tuberculin.

A circular letter with a form for reply is sent to all applicants, together with a bulletin, giving them necessary information, (see page 79.) It is confidently expected that this voluntary destruction of the deceased animals will lessen materially the number of tuberculous animals in Canada.

It must not be overlooked, however, that many owners of cattle are not in a financial position to sacrifice their herds, which may be their only source of income and will not hesitate to dispose of them to the best advantage, heedless of the injury they cause to unsuspecting purchasers. Nor is it fair to expect men rich or poor, to make sacrifices for the public good without the public at least sharing in the loss.

Another year's experience has confirmed me in the belief that this disease is much less prevalent in Canada than in more populous and older countries, and that it is unquestionably as yet within our means to eradicate it from our herds at a cost trifling as compared with the benefits present and prospective to the live stock interests and public health of the Dominion.

It should be remembered that the longer this canker worm is allowed to undermine our dairy business and spread incurable and contagious disease among our people the more expensive and more difficult to deal with, does it become.

DOMINION OF CANADA.

DEPARTMENT OF AGRICULTURE,

OTTAWA,..... .....1897.

DEAR SIR,—

In response to your letter of the..... .....I beg to say that the following are the conditions upon which the Department applies the tuberculin test to cattle:—

When a person makes application to the Department to have his cattle tested, a Government Inspector is sent to test, and all expenses in connection with this are paid by the Department. The owner must accept all responsibility for the result of the test. The Government do not order the slaughter of diseased animals. No compensation will be given in cases where owners slaughter of their own free will. If any of the animals are found to be suffering from the disease, they will have to be isolated and the shed or corral in which they are kept will be quarantined. The premises in which diseased animals have been, must be cleansed and disinfected to the satisfaction of the Government Inspector, as recommended on page 11 of the Farmers' Bulletin on Tuberculosis, a copy of which I inclose you. The owner will then be prohibited from selling any of them or their products. Should he desire of his own free will to slaughter them and dispose of the carcasses for food he will have to consult the local authorities as to whether he will be allowed to sell them. The premises in which the diseased cattle have been quarantined will also have to be disinfected and cleansed, as mentioned above, after the animals have been disposed of. When the Minister of Agriculture receives a certificate from the Inspector that the disinfection has been done to his satisfaction the premises will be released from quarantine. No application will be considered unless the owner agrees to submit all his cattle to the test.

Upon your signing and returning to us the attached form of request a Government Inspector will be sent to test your cattle.

Yours truly,

....

Deputy Minister of Agriculture.

The Honourable
The Minister of Agriculture for Canada
Ottawa, Ontario.

DEAR SIR,—I hereby request that my entire herd of cattle consisting of—

.....Bulls,
.....Cows,
.....Steers,
.....Heifers,
.....Calves,

be tested for Tuberculosis with tuberculin, and I hereby agree to conform to the Government conditions as expressed in their letter dated ....which I acknowledge having received.

Signed..... ....

Date..... ....

Address .. ..

8—6

GLANDERS.

I am happy to be able to report that glanders in horses, one of the most virulent diseases affecting these animals, is almost unknown in the older provinces. Evidence of this will be found in the reports of Professor Charles McEachran (appendix No. 16) who failed to discover a single case of this disease in the 9,241 horses shipped from the port of Montreal, and of Inspector J. H. Frink, of St. John, N.B. (appendix No. 19), who inspected 1,410 horses and found no disease.

By a report received from the High Commissioner at London, dated October 11, 1897, it would appear that a Canadian horse was said to have developed glanders thirty days after landing, and being sold in London. The report made by William Hunting, F.R.C.V.S., who was employed by the High Commissioner to examine and report on the case, shows that it may possibly have been glanders, but the disease was of very recent origin and could easily have been contracted since the landing of the horse in London, Taking into consideration the rarity of this disease in the provinces of Canada from which horses are mainly exported and the early stage of the disease discovered by *post mortem* it is more than probable that either the animal became infected after landing, or that it was not affected with glanders. It is much to be regretted that no report of the Mallein test having been made has reached us, nor does it appear that any attempt was made to confirm the diagnosis by laboratory methods, cultures or inoculation, nothing but the "I say so" of the inspector.

Glanders has not been discovered in the stable whence the horse was shipped, and those best qualified to know believe that if it were glanders, it was contracted in England.

I regret to have to report, however, that this disease exists somewhat extensively in Manitoba and the North-west Territories. In Manitoba during the past twelve months some seventy horses were found affected with glanders. By the reports of the inspectors attached to the North-west Mounted Police it will be seen that 125 horses have been destroyed throughout the Territories in the large districts covered by eleven inspectors.

The facts connected with this deplorable condition of affairs are as follow:—

A ranchman from Montana moved into Alberta bringing with him a large band of horses, for the improvement of which he subsequently imported also from the South two thoroughbred stallions, one of which proved to have glanders. This horse infected the band, and as it then numbered over a thousand head of unbroken horses of all ages the difficulty of dealing with the disease became apparent. At this time horses did not come under the operations of the Animal Contagious Disease Act, consequently your inspectors had no responsibility, and the matter was left to the Territorial Government to deal with. Unfortunately considerable laxity was allowed in the quarantine by the veterinarian in charge, and horses were allowed to be sold from the herd without undergoing the Mallein test, and were distributed over a large area of the Territories and Manitoba, thus extensively spreading the disease.

In the report of the Commissioner of the North-west Mounted Police, L. W. Herchmer, will be found the following statement:—"As you will observe from the different reports submitted by our veterinarians the disease of glanders has been very common indeed, the Act was strictly enforced and all suspicious cases immediately investigated, and owners compelled to slaughter infected animals and to disinfect the premises and contact places."

In this connection I beg to state that owing to reports of glanders (since horses were again put under the operation of the Animal Contagious Diseases Act) and actinomycosis existing extensively in the Territories, it was considered necessary to appoint three veterinarians specially for quarantine duty, and R. G. Mathews, D.V.S., G. T. Stevens, D.V.S., and Angus Tracey, D.V.S., were appointed and attached to the Mounted Police. An Order in Council was also passed giving Commissioner Herchmer all the powers of an inspector under the "Animal Contagious Diseases Act," and appointing all Mounted Police veterinary surgeons inspectors for quarantine purposes. This arrangement has proved eminently satiisfactory, and

owing to the vigilance and skill brought to bear in the administration of the Act Commissioner Herchmer is able to report a very great decrease in the number of cases of both glanders and actinomycosis in consequence of the prompt measures taken.

The instructions given to inspectors of the Mounted Police on discovery of glanders are to at once quarantine all suspicious cases, test them with mallein, with which they are supplied by the department, kill all actually diseased horses, see to the thorough cleansing and disinfection of the premises and to the deep burial of the carcasses.

It is confidently expected that by the energetic operations of the Police in the Territories, and of the officers of the Government in Manitoba, this incurable malady will soon be eradicated.

I herewith append Mr. Hunting's report above referred to.

"16 TRAFALGAR SQUARE, S.W.
"October 11, 1897.

"*Re* GLANDERED HORSE.

"SIR,—I attended to-day at the horse slaughterers, Garratt Lane, Wandsworth, and examined the carcass of the bay gelding I saw alive on Saturday at Mill Hill.

"There were a number of farcy buds on the skin of the lips, neck and hind quarters. The nasal membrane was extensively ulcerated and the gland under the jaw was much enlarged.

"These conditions are, without doubt, due to the poison of glanders, but they may all have arisen from an infection dating back no further than ten days. The only lesion upon which it is possible to form a reliable opinion as to the duration of a case of glanders is that found in the lungs. In this case I certainly expected to find many nodules in the lungs and some indication of age. As a fact I could find only one nodule of glanders, and its form and colour indicated an infection of recent date. It is almost certain that the horse was not infected one month since, and I have a positive belief that the time of infection is well within three weeks.

"The fact that the horse had a discharge from the nose and an enlarged gland under the jaw on September the 20th is not evidence that he had the symptoms of glanders. The evidence of ill health at that time was due to some acute febrile disease, and this is corroborated by the condition of one of the anterior lobes of the lung which was solidified by inflammatory action and breaking down as the result of purulent infiltration.

"The opinion I form on the whole case is that the horse was not infected when he left Canada and perhaps not when he was sold in London. That he was suffering from an acute febrile disease when infected, and that this caused the rapid development of infection. That three weeks is the longest possible time which can have elapsed since glanderous infection was effected.

"The carcass will be further examined by one, if not two of the L. C. C. Veterinary Inspectors. If I hear their opinion I will report to you.

"WILLIAM HUNTING, *F.R.C.V.S.*

"To the High Commissioner for Canada,
"17 Victoria St., London, S.W.,
"England."

SHEEP SCAB.

By reference to the report of exportation of live stock (see appendix No. 14) it will be seen that out of 62,046 sheep inspected at the ports of Montreal and St. John for export to Europe, only a single case of sheep scab was discovered.

Reports, however, had been received from the Bureau of Animal Industry of the detection of scab in Canadian sheep being exported via United States.

Having received information which led to suspicion of the existence of sheep scab in Ontario, I paid a visit to Aurora, and there I discovered that it existed somewhat extensively in the townships of Vaughan and King especially.

H. Vanzant, V.S., Aurora, and Major T. Lloyd, V.S., of Newmarket, were appointed to search for the disease, and deal with it under directions from the department. Lloyd discovered 14 and Vanzant 11 flocks affected.

Orders were given to dip all the sheep in a disinfectant solution or sheep dip. Portable vats were provided, and the inspectors were directed to proceed to each farm and to dip all the diseased sheep themselves. The department also supplied the labour and the material used in dipping. To prevent any sheep from the quarantine district being shipped it was found necessary to quarantine the townships of Scarborough, Markham, Etobicoke, York, East and West, King, Vaughan, Gwillimbury East and West, Georgina, in the county of York, Tecumseh, in South Riding of Simcoe, Toronto, Toronto Gore, in the County of Peel, and Whitechurch, Pickering, Uxbridge, Scott, Brock, in the County of Ontario, in which 49 farms were quarantined, and to prevent movement till the diseased flocks had been dealt with and places disinfected.

An outbreak of scab was also reported from New Brunswick, which was similarly dealt with. In consequence of scab having been detected by the inspector at Montreal in a carload of sheep from Hartland, N.B., Mr. S. C. Richards, D.V.S., was ordered to make an investigation, which he did, and reported finding the disease, having placed 20 farms in quarantine and directed the necessary dipping to be done.

In the report of J. W. Farr, V.S., he mentions having inspected Mr. Walton's premises at Medicine Hat for sheep scab on May the 3rd, and released them from quarantine on the 16th of June.

I have no report of scab existing in Manitoba.

I am happy to be able to report that with the exception of three shipments sent by United States ports and one at Montreal, no scab was discovered at shipping ports by the inspectors. It was found necessary, however, as a precautionary measure to detain all sheep for export to United States at the ports of entry for inspection, till the disease was eradicated and quarantines raised.

For the information and guidance of owners and inspectors, the following printed directions for dealing with the disease were issued for distribution:—

DIRECTIONS TO OWNERS OF SHEEP.

This disease is caused by microscopic insects similar to cheese mites, which burrow into the skin, causing irritation and formation of crusts or scabs.

The insects are readily transferred to the posts and walls of pens, fence-rails, trees, bushes or even the ground, and very readily from infected to healthy sheep. One scabby sheep may thus infect a large flock.

The symptoms are so easily recognized that no owner can be excused on the plea of ignorance. The itching causes the animals to bite at the wool, scratch with the feet, and rub against posts or fence-rails. The wool falls out in patches, and the skin is found thickened and covered by scabs more or less thick according to the stage and degree of friction to which it has been exposed.

On discovering scab in the flock, even in only one animal, you must report it at once to the nearest veterinary inspector who must quarantine the flock, thus stopping all movement into or from it. Affected animals must not be grazed within 200 yards of healthy sheep. They must not be driven on public lanes or highways.

You must not sell or traffic in any way with a quarantined flock.

Should you desire to slaughter any or all of them you must obtain a permit from the inspector.

No skins or wool should be moved off the premises till they have been disinfected under direction of an inspector.

Badly diseased animals should be buried *or burned.*

The disease is curable, and when the sheep are valuable or the disease is in an early stage the flock may be successfully treated.

For this purpose, where a large number have to be dealt with, a vat 2 feet wide, 12 feet long and 4 feet deep must be provided, at which three men can wash them comfortably. The vat is filled with the dipping solution so that the whole body of the animal, except the head is immersed in it, the head being kept above the fluid. The washers should be provided with stiff brushes and the wash should be well scrubbed into the skin before the sheep is removed to the dripping rack.

The dripping rack is a large vat covered by a perforated lid and raised above the dipping vat but connected with it by means of a conductor by which the drippings are carried back into the dipping vat.

The sheep must be well dripped before being let loose in the drying yard.

Dipping should only be attempted during fine weather, and it is most successful when the fleeces have been clipped off. It should not be attempted during winter. The sheep must not be exposed to rain for at least two days after being dipped.

Most of the sheep dips advertised, such as McDougall's, Cooper's and others, prove efficacious.

The two following mixtures will be found both cheap and efficacious :—

	Lbs.
Impure carbolic acid (phenic)	4
Quick lime	3
Carbonate of soda	8
Soft soap	8

Zundel.

When mixed they form a thick paste or soap, which, when dissolved in the proportion of 1 pound to 8 gallons of water, will make a solution which should be put into the dipping vat tepid, allowing 2 gallons for each sheep.

The following is also recommended :—

	Lbs.
Flour of sulphur	10
Quick lime (newly slacked)	5

Boil in 10 gallons of water ; keep mixed by constantly stirring, till a clear dark orange solution is produced.

Make up the bath to the necessary quantity by mixing 1 gallon of this solution with 3 gallons of hot water.

A second and usually a third dipping is necessary in most cases.

The sheep after being dipped must on no account be allowed to go back into the infected pens till the pens have been thoroughly cleaned out and scrubbed with hot water and crude carbolic acid 1 lb. to 4 gallons and whitewashed to a height of 5 feet from the ground or floor with limewash, to which 1 lb. of chloride of lime to every gallon of limewash has been added. Every board, post, fence rail, trunk of tree or anything whatever that the sheep may have come in contact with must be carefully cleaned by the above solution. Negligence in these particulars may render all the dipping and other measures useless, whereas these suggestions thoroughly carried out will not only cure most of the sheep, but will prevent a recurrence of the disease.

When you have completed the dipping of sheep and cleansing of the premises, you will notify the inspector who will inspect them and if satisfied that everything necessary has been thoroughly done he will send a certificate to that effect to the Minister of Agriculture who will order the raising of the quarantine. On your promptness and thoroughness therefore depends the length of time your farm will be quarantined.

You are advised to adhere to the above instructions and not to adopt other methods of cure without reference to the department.

Your special attention is directed to the following extracts from the Animal Contagious Diseases Act, from which you can learn your responsibilities and the penalties you incur by neglecting to carry out the requirements of the Act.

EXTRACT FROM ANIMAL CONTAGIOUS DISEASES ACT.

3. "Every cattle or farm stock owner, and every breeder of or dealer in cattle or other animals, and every one bringing foreign animals into Canada, shall, on perceiving the appearance of infectious or contagious disease among the cattle or other animals owned by him or under his special care, give immediate notice to the Minister of Agriculture, at Ottawa, of the facts discovered by him as aforesaid. 48-49 Vic., chap. 70.

7. "Every person who sells or disposes of, or puts off, or offers or exposes for sale, or attempts to dispose of or put off any animal known by him to be infected with or labouring under any infectious or contagious disease, or the meat, skin, hide, horns, hoofs, or other parts of an animal known by him to be infected with or labouring under any infectious or contagious disease at the time of its death, whether such person is the owner of such animal, or of such meat, skin, hide, horns, hoofs or other parts of such animal, or not, shall, for every such offence, incur a penalty not exceeding two hundred dollars. 48-49 Vic., chap. 70, s. 7."

Your attention is also called to the following regulations, being extracts from Orders in Council relating to animals quarantine and health of animals.

THE DISEASE OF SHEEP SCAB.

It is the duty of every farmer, owner or breeder of, or dealer in sheep, on perceiving the appearance of the disease of "sheep scab" among any one of the animals owned by him or under his care, to give immediate notice to the Minister of Agriculture at Ottawa, of the fact discovered by him, as required by section 3 of the said Act.

Negligence to comply with this obligation shall entail upon the owner of the said diseased sheep the penalty of not being entitled to, nor granted any compensation for such animals as may be slaughtered in accordance with the provisions of the said Act, and further that concealment of such disease shall subject such person, on conviction thereof, to forfeit and pay a sum not exceeding two hundred dollars.

If any person turns out, keeps or grazes any sheep knowing such animal to be infected with the disease of "sheep scab," or to have been exposed to infection or contagion therefrom, in or upon any forest, wood, moor, beach, marsh, common, waste land, open field or other undivided or uninclosed land, such person shall, on conviction thereof, forfeit and pay a sum not exceeding two hundred dollars.

Any person bringing into any market, or other place, any animal known by him to be infected with the disease of "sheep scab" shall, upon conviction thereof, forfeit and pay for every such offence a sum not exceeding two hundred dollars.

Any person throwing or placing or causing to be thrown or placed in any river, stream, canal, navigable or other water, or in the sea within ten miles of the shore, the carcass of any sheep which has died of "sheep scab," or been slaughtered as having been so diseased shall, on conviction thereof, forfeit and pay a sum not exceeding two hundred dollars.

Any person who digs up or causes or allows to be dug up a carcass buried of a sheep having died or been suspected of having died, or been slaughtered, from the disease of "sheep scab," shall, on conviction thereof, forfeit and pay a sum not exceeding one hundred dollars.

In case any sheep affected with the disease of "sheep scab" be exposed or offered for sale, or be brought for such purpose into any market, fair or other open or public place where other animals are commonly exposed for sale, then any police or municipal officer or duly authorized inspector shall cause the same, together with any

pens, hurdles, troughs, litter, hay, straw or other articles, to be forfeited, destroyed or otherwise disposed of in such manner as he may deem proper or as may be directed.

It shall be unlawful for any person to have in his possession or under his charge a sheep affected with the disease of "sheep scab," without causing it to be treated with some dressing, dipping or remedy for "sheep scab."

No sheep being affected with "sheep scab," or sheep which have been in contact with other sheep suffering with "sheep scab," or have been in any field, stable, cowshed or other premises in which "sheep scab," is found to exist, shall be allowed to be removed therefrom without a written order from an inspector authorized by the Minister of Agriculture for that purpose.

All sheds, outhouses and places used by sheep affected by "sheep scab" must be thoroughly cleansed and disinfected by scrubbing with hot water and carbolic acid—one pound to four gallons—and afterwards whitewashed with hot lime to which chloride of lime—one pound to one gallon—has been added, to a height of at least five feet from the ground or floor.

When found necessary an inspector shall order the slaughtering and burial of all badly affected sheep, and any person having in possession any sheep affected with "sheep scab" without treating such sheep by some dressing or dipping fluid shall be liable to such penalties as may be enacted under the provisions of the aforesaid Act.

VETERINARY INSPECTOR IN CASE OF "SHEEP SCAB."

In order to provide for the segregation, or isolation or otherwise dealing with animals affected with the disease of "sheep scab," a veterinary inspector, or other person appointed by Order in Council acting under the direction of the Minister of Agriculture, may declare any farm or place, or common, or yard, or any building, where such diseased animals are found, to be an infected place within meaning of the Act aforesaid.

No person whatever, except a veterinary inspector or other person duly appointed as aforesaid, and acting under the direction of the Minister of Agriculture, shall remove any sheep from such infected district, and then only for the purpose of carrying into effect the provisions of said Act, under a penalty of two hundred dollars.

A veterinary inspector, or other person duly appointed as aforesaid, acting under the direction of the Minister of Agriculture, may make a selection of a particular place or places within or without the limits of an infected district for the purpose, in such cases in which it may be considered advisable, of isolating and segregating such animals as may have been exposed to the disease of "sheep scab." Such veterinary inspector, or other person duly authorized as aforesaid, shall alone have the power to order the removal of such animals as he may consider advisable to or from such selected places.

Such duly appointed veterinary inspector or other officer acting under the direction of the Minister of Agriculture, may, under the provisions of section 13 of the Act aforesaid, order any animal found to be affected with "sheep scab," or in contact with animals so affected, to be slaughtered, a compensation to an amount not exceeding two-thirds of the value of such animal before it became affected to be paid to the owner thereof, but such compensation never to exceed the sum of four dollars for any one animal.

The value of such animals is to be, in all cases, appraised by a veterinary inspector, or other person appointed for that purpose by the Minister of Agriculture; but no compensation whatever is to be allowed in any case in which it is found that fraudulent attempts at concealment of such disease shall have been made; or in any case in which such animals shall have been removed from any place declared to be infected under the provisions of the Act aforesaid.

Any market, or railway yard, or pen, or wharf, or part or parts of such, o other place where sheep are exposed for sale, or where, or in which they may be placed for the purpose of transit for removal to market, or from the province, for

the purpose of exportation, shall, in the event of any animal affected with the disease of "sheep scab" being found therein, by a veterinary inspector, or other person duly appointed by Order in Council, and acting under instructions from the Minister of Agriculture, on a declaration to that effect made by him, be held to be an infected place within the meaning of the Act aforesaid; no animal being allowed to be removed from such infected place, except on order of such duly appointed veterinary inspector, or other person aforesaid, under a penalty of two hundred dollars.

All sheds, out houses, or places used for sheep affected by "sheep scab" must be thoroughly cleansed and disinfected under the directions of a veterinary inspector or duly appointed person.

W. B. SCARTH,
Deputy of the Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
OTTAWA, 25th January, 1897.

HOG CHOLERA AND SWINE PLAGUE.

I regret to have to report that the disease known in Britain as swine fever and in America as hog cholera and swine plague, has continued during the past year to appear here and there in the counties of Essex and Kent, and that during the year 3,395 pigs, young and old, were slaughtered under quarantine regulations as diseased and in contact with. The sum of $10,119.83 was paid as indemnity.

As a matter of fact, when in October, 1896, instructions were issued by you to take energetic measures for the eradication of this disease, it was impossible for your inspectors to ascertain by any means the extent of the area of infection; and although it had been dealt with by two inspectors, acting under the direction of the Chief Inspector for Ontario, no active measures seem to have been taken to discover the extent of its invasion, nor does it appear that effective measures were adopted to stamp it out by disinfecting the premises properly, and by stopping movement from infected farms. When the extremely contagious and infectious nature of the disease is considered, it is surprising that it did not extend still further.

I am glad to be able to report that the number of infected farms in Essex County at the date of my last visit, as reported by the local inspector, Mr. Perdue, V.S., was only three or four.

Inspector Thorne of Wallaceburg, who met me at Chatham, reports having a few recent outbreaks, but all under control. Inspector Jos. Kime, V.S., Chatham, has about half a dozen farms quarantined, and together we visited an infected centre in Dover Township and quarantined three farms. A small outbreak occurred in October in West Middlesex County, which is now under control. During the early summer it was considered advisable to close-quarantine certain townships and stop all movement of all kinds of swine, within or out of the township. This, however, was found to be a serious hardship for those who had fat hogs ready for market, and it was considered that under proper precautions fat hogs could be shipped to slaughter houses for immediate slaughter with impunity, and permission was given to do so, much to the relief of those whose hogs, if detained in infected areas, were liable to become diseased and sacrificed, and the Government obliged to pay considerable sums in indemnity.

I am glad to be able to report that in no case where all the swine were killed off and the disinfection orders carried out thoroughly, did we have a recurrence of the disease. In every instance where the disease reappeared in new hogs brought on to the farm, it was clearly traceable to imperfect disinfection, or else one or more pigs having been kept as having either not had the disease or recovered from it.

Every pig in an infected herd should be killed. Our experience proves that correctness of the system followed by us from the beginning is, viz., that of slaughtering every hog in the affected herd. It is a well established fact that adult pigs, such as brood sows, generally have the disease in a mild form, and even if they do not abort, their pigs usually drop off by degrees.

The sow resists the disease, and apparently recovers, yet her intestines are diseased, and the infected germs are passed in her fœci. This continues for months, her dung may continue to be infectious for a year if it happens to be located where it remains at a moderate temperature, and becomes the undiscovered source of infection in the next outbreak.

I repeat, every hog on the place must be killed, and disinfection and cleansing must be most thorough.

I would suggest that every breeder or feeder of pigs ought to arrange his premises so that he can divide them into perfectly isolated piggeries, so that if by some misfortune disease is introduced to one lot, the others may be preserved through isolation.

I would further recommend that they would greatly serve their own interests by providing a far separated pen as a quarantine pen for probationary detention of all new purchases, and in which they would be kept for a few weeks to make sure that they are free from disease.

The attention of hog breeders and feeders should be called to the subject of feeding their swine. It is well known that most farmers keep a swill barrel in which sour milk and sour whey are collected. To this they add kitchen refuse and such cereals as barley, oats, pease, corn, etc., not unfrequently animal matter as well. It does not require a chemist to discover that fermentation products and toxines are generated in the mixture, which must prove indigestible and produce disorders of the stomach and intestines, the result being the development of symptoms which resemble very closely those of swine fever, lacking only its contagious character.

If swine feeders would but consider that the stomach and intestines of the pig resembled very closely their own, and imagine the household being forced to eat what they give to the pigs, from the delicate little sucking pig to the fat hog, would they not expect young and old to be attacked by severe gastric and intestinal derangement.

I would also suggest that the agricultural boiler be brought more into use by the swine raiser and feeder. Boiling food will at least ensure freedom from diseased germs.

The growing importance of hog raising, especially in the corn-growing district of Western Ontario, warrants the department in continuing the work of ridding the hog districts of disease. Large as is the sum spent in this work, it is but a trifle compared with the losses incurred by the United States by this disease alone, which it is officially stated amount to about $20,000,000.

It is gratifying to know that as compared with results in Britain and the United States our operations during the past year have been phenomenally successful.

At the present time all the quarantines have been raised, except in the townships of Dover, Gosfield South, Colchester South, Malden, west half of Camden, Sombra and Gore of Chatham, in all of which close quarantine is still maintained.

ACTINOMYCOSIS.

The disease Actinomycosis, commonly called "Lumpy Jaw" would appear to be on the increase, or else the quarantine operations are bringing it more prominently to notice.

By reference to the reports of the Port Inspectors it will be seen that 114 animals affected by this disease were rejected at Montreal and St. John, and by the reports of Veterinary Inspectors of the North-west Mounted Police for the Territories, 87 head of cattle were shot on account of this disease during the past year.

At the beginning of the shipping season orders were given to the inspectors to confiscate every animal affected by Big Jaw, and to send them to the abattoir to be dealt with by the City Health Department Veterinary Inspectors. The practice followed was this:—If the disease was local, the meat was allowed to be sold, but if general and affecting internal organs, it was condemned and thrown into the rendering vat. This of course had a decided effect, and shippers did not continue to send

cattle so affected, thus it will be seen that the returns do not show the extent of the disease in the country.

It is feared that unscrupulous dealers find some means of evading the law, and that traffic in flesh of Lump Jaw cattle is carried on to a considerable extent.

Breeders and feeders would find it very much to their advantage to remove at once from their herds any animal affected by this disease. While it is not, in the common meaning of the terms, either infectious or contagious, yet in actual facts it is communicable from one animal to another by means of the spores of the fungi dropping from the diseased jaw or tumerous growth outside of the jaw on to the grasses in fields or hay or straw in the yards, and being taken up by other cattle spread the disease.

ANTHRAX.

I am happy to report that only five important outbreaks of this disease were reported to the department, one in July on the farm of Pierre Lacasse, Farnham township, who lost ten cattle and one horse and a few weeks later his neighbour, whose cattle for a time occupied the same field, lost a few head.

Inspector Mathews, North-west Mounted Police, also reported an outbreak at Blackwood, N.W.T., in September, during which F. Carey lost six head, James Moxon twenty head, R. Ross twenty head, and at Gainsboro during October William Rogers lost three head.

The history of the outbreak on the farm of Mr. P. Lacasse is interesting, as showing how difficult it is to deal with such cases.

As reported to you at the time, I made a thorough investigation of the outbreak and sent diseased organs to Prof. Adami for confirmation of the diagnosis, which showed that the disease was anthrax.

It is well known that for over thirty years this farm has been an anthrax district. It has changed hands three or four times, and during the occupancy of each owner heavy losses have been incurred from anthrax, and owing to ignorance of the disease or carelessness, the carcasses have been buried in numerous places over the farm, thus rendering it next to impossible to remove the numerous sources of infection represented by each grave.

The following extract from my report of last year read in conjunction with this will render it more easily understood:—"It is due to a microscopic organism, the anthrax bacillus. These organisms seem to prevail in certain conditions of soil and climate. Certain localities, therefore, are recognized as anthrax districts, in countries such as France, where the disease has occurred extensively. It is apt to occur where indifference is allowed to lead to careless burial. The carcasses contaminate the soil by the spores of the baccillus which may reach the surface years after in many subtle ways, it may be by water springs a long distance off if the grave be near their source; earth worms are said to bring them to the surface, and even the roots of plants and grasses growing over anthrax infected graves are said to bring the spores up."

The effect of the entrance of three virulent spores into an animal body, by whatever channel they do enter, is soon to destroy the subject by their rapid and indefinite multiplication, and in many ways affect the life sustaining properties of the blood by the production of toxines by the absorption of oxygen, or by the obstruction of the minute capillary circulation,

In all cases stockmen should burn the carcasses of animals dying of anthrax and bury the ashes mixed with lime in some dry place where there is no probability of the spores being washed up by springs or surface water, and thus gain the surface. On infected farms all known graves should be fenced off and cattle prevented from feeding on the grasses growing over them.

BLACK QUARTER.

This disease has occurred during the past year in only a very few instances, and does not call for any special reference.

RABIES.

This disease has not been reported during the past year, and Canada may be said to be absolutely free from it.

MANGE IN HORSES.

Two reports of this disease only were received, one from Prince Albert, N.W.T., and of two horses near St. Hyacinthe, P. Q. In both instances the animals were quarantined and treated successfully.

PICTOU CATTLE DISEASE.

This disease continues to occur from time to time in the infected district, but in gradually lessening numbers. The total number slaughtered for this disease during the past 12 months was 95 head, for which $802.63 was paid as indemnity.

To ensure thorough cleaning and disinfection Mr. John S. Copeland was appointed to visit all the infected farms and see that the disinfection orders were carried out, the department ordering and paying for the necessary lime and carbolic acid; no certificat of slaughter or appraisement being given till he reported that disinfection was thoroughly done.

I herewith append the circular letter of directions for disinfection given to each owner of diseased animals, and the report of Mr Copeland for the year ended 31st October.

DIRECTIONS FOR DISINFECTING.

It is the duty of inspectors who discover contagious disease in any steamship or other vessel, railroad car, truck, stable, byre, cow shed, yard, field or in any place whatsoever, to cause such places to be thoroughly cleaned and disinfected immediately after the removal, whether by slaughter or otherwise, of the infected animals and before healthy animals are allowed to be placed therein.

It will be necessary to see that byres where Pictou Cattle Disease has existed are thoroughly cleaned out, the walls and flooring thoroughly scrubbed with hot water and carbolic acid, 1 pound to 5 gallons of boiling water. Every corner and crevice of the walls and flooring should be saturated with the solution; after it has dried, the walls and flooring should be thoroughly covered with a coating of freshly made lime wash to which 1 pound of carbolic acid to 4 gallons of lime wash has been added.

Feed boxes and hay racks when of little value should be taken out and burned and replaced by new ones. If of value they need not be destroyed but must be thoroughly scrubbed with boiling water and carbolic acid.

Should there be no ventilators in the building, inspectors should urge that they be provided. Where there are no windows, or the light is insufficient, they should urge that enough windows be provided, as sunlight and cleanliness are themselves excellent disinfectants.

In byres where drainage does not exist or is defective, the inspector should urge that proper drains be provided.

No farm placed in quarantine can have the quarantine removed until a report from the Inspector has been received by the Minister of Agriculture declaring that the disinfection directions have been thoroughly carried out.

REPORT OF INSPECTOR OF DISINFECTION IN PICTOU COUNTY.

Pictou Cattle Disease.

I began the work of disinfecting in March, 1897.

	No. of Farms Visited.	No. Revisited.	No. Passed.
March	58	20	3
April	27	33	15
May	18	27	18
June	15	35	16
July	15	45	14
August	15	17	10
September	7	28	26
October	9	9	9

I was obliged to visit some farms several times before the work was done satisfactorily. I also visited some farms in Antigonish County, but received orders from Dr. Townsend to stop visiting in that county, which consequently left my work there unfinished.

JOHN S. COPELAND.

NO CONTAGIOUS PLEURO-PNEUMONIA IN CANADA.

I have much pleasure in reporting that no contagious pleuro-pneumonia in cattle or lung disease of any kind, except tuberculosis, has been discovered in any portion of Canada.

In addition to the total absence of this disease in animals sent from all over the Dominion to the shipping ports, the non-discovery of it by any of the inspectors employed by the department, the absence of reports from owners, or in the newspapers,—I have personally visited Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and the Territories, during the past summer and failed to discover even a suspicion of such a disease.

Another year's experience is thus added to the proof of the correctness of our contention that contagious pleuro-pneumonia has never got beyond the quarantine at Quebec.

In conclusion I have much pleasure in reporting that the health of animals in the Dominion is almost phenomenally good. It can be confidently asserted that there is no country or climate on the face of the globe, in which live stock is as healthy as in Canada. Breeders and feeders in this country need have no anxiety whatever about losses from disease of a contagious or infectious nature other than tuberculosis, and it is confidently expected that the measures adopted by your department will exterminate the scourge.

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

DUNCAN McEACHRAN, F.R.C.V.S.,
V.S. Edin., D.V.S. McGill,
Chief Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

Department of Agriculture.

No. 15.

REPORT OF INSPECTOR OF STOCK.

(M. C. BAKER, D.V.S.)

MONTREAL, 1st November, 1897.

SIR,—I have the honour to report that during the year ended 31st October, my duties have been mostly confined to the inspection of cattle and sheep for export at the Canadian Pacific Stock Yards.

During the year there were inspected and passed for shipment at those yards 60,859 head of cattle and 26,652 sheep.

During the same time there were rejected as unfit for shipment, 79 head of cattle, 51 for actinomycosis and 28 lame or injured. 22 sheep were also rejected on account of injuries.

No contagious diseases were found among the cattle presented for inspection excepting actinomycosis, and no contagious diseases among the sheep. The cattle affected with actinomycosis were sent to the civic abattoirs and the inspectors of the City Board of Health notified. When slaughtered, if the disease was purely local, the affected parts were confiscated and the balance of the carcass was used for food. When there were signs of general disease the whole carcass was confiscated.

During the winter scab was discovered among three small lots of sheep brought in by local dealers. The sheep were all slaughtered, the yards in which they were found disinfected and the cases reported to the Chief Inspector.

In January, in accordance with instructions received from the department, I tested the herd of Mr. A. A. Mooney of Mansonville, with tuberculin and communicated the results of the test to the department. This was the only case I was called upon to investigate during the year.

There were inspected and passed for shipment from the Canadian Pacific Stock Yards the following number of cattle during the different months:—

	Cattle.	Sheep.
November, 1896	6,124	1,978
May, 1897	5,240	160
June, 1897	6,690	1,322
July, 1897	7,555	6,270
August, 1897	11,217	3,613
September, 1897	11,030	5,562
October, 1897	13,003	7,747
	60,859	26,652

Of this number there were from the United States 3,745 head of cattle and 320 sheep. The balance being all Canadian.

During the same time there were rejected as follows:—

	Cattle.		Sheep.
	Actinomycosis.	Lame.	Lame.
November, 1896	9	3	2
May, 1897	12	4	
June, 1897	6	2	
July, 1897	3	4	2
August, 1897	2	3	7
September, 1897	7	10	8
October, 1897	12	2	3
Totals	51	28	22

I have the honour to be, sir,

Your obedient servant,

M. C. BAKER,

Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 16.

REPORT ON ANIMALS REJECTED FROM SHIPMENT

(C. McEachran, D.V.S.)

Montreal, 1st November, 1897.

Sir,—I beg to report that since the 1st of November, 1896, there have been inspected, found free from infectious and contagious diseases and shipped from the port of Montreal, 9,241 horses. Of these 1,016 came from the United States. During that period there were held back and quarantined until fit to ship, 17 for strangles and 43 for influenza.

There were inspected and shipped during—

	Horses.
November, 1896	388
May, 1897	1,530
June, 1897	1,502
July, 1897	1,756
August, 1897	1,521
September, 1897	1,629
October, 1897	915
Total	9,241

It is my pleasing duty to report that, though a great many cheap and inferior horses have been shipped during the past season, the majority exported were of a very good class, particularly the heavy draught and coach horses, and a vast improvement on last year's shipment.

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

CHARLES McEACHRAN,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 17.

REPORT ON INSPECTION OF ANIMALS AT GRAND TRUNK RAILWAY STOCK YARDS, MONTREAL.

(B. A. SUGDEN, V.S.)

MONTREAL, 10th November, 1897.

Dr. D. McEACHRAN, F.R.C.V.S.,
Chief Inspector of Stock,
Montreal.

SIR,—I beg to report that from the 1st of November, 1896, to the 31st October, 1897, there were inspected and passed for shipment during the different months, the following number of cattle from the Grand Trunk stock yards:—

	Cattle.	Sheep.	Of this Number there were	
			U.S. Cattle.	U.S. Sheep.
1896.				
November	2,809	4,871	.....	.....
1897.				
May	12,900	2,577	1,099	2,062
June	12,136	2,526	1,691	.....
July	12,583	9,485	3,192	1,182
August	6,984	4,864	407	566
September	5,677	6,101	756	433
October	3,480	4,970	229	.....
Totals	56,569	35,394	7,424	4,243

During the same time there were rejected as follows:—

	Cattle.		Sheep.
	Actinomycosis.	Lame.	Lame or suspicious.
November, 1896	3	.....	.....
May, 1897	14	.....	.....
June, 1897	28	1	....
July, 1897	7	.....	1
August, 1897	6	1	1
September, 1897	1	.....	4
October, 1897	2	.....	2
Totals	61	2	8

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

B. A. SUGDEN,
Inspector.

No. 18.

REPORT ON POINT LEVIS CATTLE QUARANTINE STATION.

(J. A. COUTURE, D.V.S.)

QUEBEC, P.Q., 31st October, 1897.

DEAR SIR,—Please find inclosed statements of the imports and exports of live stock as recorded at this station for the year ending 31st October instant.

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

J. A. COUTURE, *D. V.S.*

To the Honourable
Minister of Agriculture,
Ottawa.

STATEMENT OF CANADIAN CATTLE EXPORTED FROM POINTE LEVIS TO THE UNITED STATES, OCTOBER 31ST, 1897.

October 7th, 1897, per Grand Trunk Ry. : 118 heads of cattle, consigned to Louis Turgeon, Kimball, South Dakota.

J. A. COUTURE, *D. V.S.*,
Assistant Inspector.

STATEMENT OF HORSES IMPORTED AT QUEBEC DURING THE YEAR ENDED 31ST OCTOBER, 1897.

Date of Arrival.	Per	From	Number of Horses.	Owner.	Address.
1897					
August 6..	Grand Trunk Ry.. . . .	Saratoga, N.Y....	1	V. Boswell	Quebec City.
do 24..	do	Detroit, Mich....	1	Dr. C. E. Elliot.	do
do 31..	SS. Sarmatian.....	Glasgow..... ...	1	Jas. McFarlane.....	Clinton, Ont.
		Total.	3		

J. A. COUTURE, *D. V.S.*
Assistant Inspector.

Department of Agriculture.

STATEMENT OF SWINE IMPORTED AT POINTE LEVIS CATTLE QUARANTINE DURING YEAR ENDED 31ST OCTOBER, 1897.

Date of Arrival.	Steamer.	From	Breed and Number.				Owner.	Address.	Date of Discharge.
			Boars.	Sows.	Total.	Breed.			
1897.									1897.
July 15..	Lake Winnipeg.	Liverpool ..	2	4	6	Berkshire.	S. Coxworth..	Whitby, Ont....	August 9.

J. A. COUTURE, *D. V. S.*,
Assistant Inspector.

STATEMENT OF CATTLE IMPORTED AT POINTE LEVIS CATTLE QUARANTINE DURING YEAR ENDED 31ST OCTOBER, 1897.

Date of Arrival.	Steamer.	Line.	From	Ayrshire.	Jersey.	Hereford.	Total.	Owner.	Address.	Date of Sailing.	Date of Discharge.
1896.										1896.	1897.
Nov. 9.	Sarmatian	Allan...	Glasgow..	12	6	.....	18	Robt. Davis ..	Toronto.	Oct. 31.	Jan. 28.
1897.										1897.	
Oct. 5.	Lake Ontario..	Beaver .	Liverpool.	...	...	1 bull.	1	Wm. Hunter .	Toronto.	Sep. 25.	In quarantine.
			Grand Total....				19				

J. A. COUTURE, *D. V. S.*,
Assistant Inspector.

STATEMENT OF SHEEP IMPORTED AT POINTE LEVIS CATTLE QUARANTINE DURING THE YEAR ENDED 31st OCTOBER, 1897.

Date of Arrival.	Steamer.	Line.	From	Shropshire.			Southdown.			Dorset.			Hampshire.			Oxfords.			Cotswold.			Lincoln.			Leicester.			Grand Total.	Owner.	Address.	Date of Discharge.
				Ram.	Ewe.	Total.	Ram.	Ewe.	Total.	Ram.	Ewe.	Total.	Ram.	Ewe.	Total.	Ram.	Ewe.	Total.	Ram.	Ewe.	Total.	Ram.	Ewe.	Total.	Ram.	Ewe.	Total.				
1897.																														1897.
May 5	Ashenti	Dominion.	Bristol	4	4	8																					8	J. A. S. MacMillan	Brandon, Man.	May 19
July 15	L. Winnipeg	Beaver	Liverpool.	13	26	39																					39	John Campbell	Woodville, Ont.	July 29
do 15	do	do	do																			2	2				2	Wm. Oliver	Avonbank do	do 29
do 15	do	do	do										2	2											2	2	2	A. W. Smith	Maple Lodge, Ont.	do 29
do 15	do	do	do													2	2										2	John Kelly	Shakespear do	do 29
do 25	Lake Huron.	do	do	8	1	9							2	2	4												13	John Milton	Marshal, Mich.	Aug. 9
do 25	do	do	do	7	11	18	2		2	2	2	4	3	2	5				4	7	11	1	1	2			42	Robt. Miller	Brougham, Ont.	do 9
do 25	do	do	do				1	4	5				2	4	6												11	Geo. McKerrow	Sussex, Wis.	do 9
do 25	do	do	do				8	10	18							1	1										19	F. W. Barrett	Wadsworth, N.Y.	do 9
do 25	do	do	do							1		1															1	G. C. Woodman	Manistee, Mich.	do 9
do 25	do	do	do		2	2	1	2	3																		5	Geo. Allen	Allerton, Ill.	do 9
do 25	do	do	do										3	3	6												6	J. I. Gordon	Mercier, Penn.	do 9
do 25	do	do	do										1	4	5												5	R. R. Gobeil	Fredon, N.J.	do 9
do 25	do	do	do										1		1												1	M. Bennem	do	do 9
do 25	do	do	do													2	3	5									5	J. C. Williams	Xenia, Ohio	do 9
do 25	do	do	do													1	3	4									4	A. Bordwell	Fargo, N.J.	do 9
do 25	do	do	do							1	3	4															4	R. Stuyvesant	Allamuchy, N.J.	do 9
do 25	do	do	do	1		1																					1	Hon. J. Dryden	Brooklin, Ont.	do 9
do 26	Lake Ontario	do	do							39	39																39	R. Stuyvesant	Allamuchy, N.J.	do 9
Aug. 25	Lake Huron	do	do	6	54	60																					60	Jas. McFarlane	Clinton, Ont.	Sept. 9
Sept. 7	L. Superior	do	do	20		20																					20	Robt. Miller	Brougham, Ont.	do 21
do 21	Montevidian	Allan	London.				2	30	32																		32	Hon. G. A. Drummond	Montreal, Que.	Oct. 5
			Totals	69	98	157	14	46	60	4	44	48	12	17	29	3	9	12	4	7	11	1	3	4		2	2	324			

J. A. COUTURE, *D.V.S.*,
Assistant Inspector.

No. 19.

REPORT ON ST. JOHN CATTLE QUARANTINE STATION.

(J. H. FRINK, D.V.S.)

ST. JOHN, N.B., 31st October, 1897.

SIR,—I beg to submit my annual report of work performed at this station.

From November until May, a greater part of the time has been taken up in the inspection of animals for export abroad. A number of inspections have been made for the detection of tubercle in cattle, of which a statement is appended. An incidence worthy of record was the detection of tubercle in the alimentary and respiratory tracts of swine which had consumed the milk and offal of cattle owned by Mr. A. C. Fairweather, Rothesay, which cattle were badly affected with tubercle. From the results of *post-mortem* examinations it would seem that life is possible and fair health maintained even in the most advanced stages of tuberculosis. No foreign cattle were entered here for quarantine. Two head of swine were brought in from the United States and remained in quarantine fifteen days. In September an examination was made at the farms of several persons in Carleton County, N.B., which farms had been quarantined for sheep scab. Under instructions from the chief inspector, I was to raise quarantine if the places were free from disease and sheep dipped in an antiparasitic. This having been done and no symptoms of the disease being present at that time, the farms were declared free. In October, acting under instructions, I proceeded to Fredericton, N.B., to hold a clinical examination on some Jersey cattle imported by the Provincial Government. The animals examined had stood the tuberculin test, but it was thought that this agent might have been inert, through advanced disease. They were, however, found in good health and condition. Facilities here for the handling and care of cattle for export are yet incomplete, yet some progress has been made in this direction.

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

JAMES H. FRINK,
Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

Inspection for Tuberculosis in Cattle.

Owner.	Residence.	Number Cattle Tested.	Diseased.	Breed.	Surroundings.	Post Mortem Held.	Total Tested.	Total Diseased.	Quarantine, Foreign Animals		
									Cattle.	Swine.	Place of Export.
A. C. Fairweather..	Rothesay, N.B..	15	13	Largely pure bred Jerseys.	Very superior...	13	15	13	None.	2	Bangor, Me., U.S.A
W. R. Knowles.....	Clifton, Gloucester, N.B...	1	None.	Jersey.....	Good.....	.....	1	.....	.....	.....	.....
Wm. Shaw.....	St. John, N.B..	4	2	Pure bred Jerseys	Superior.....	1	4	1	.....	.....	.....
F. P. Esson.....	Millerton, N.B..	1	None.	Grade Jerseys...	Fair.....	.....	1	.....	.....	.....	.....
George Mitchell..	Highfield, N.B..	6	do	do ..	Good.....	.....	6	.....	.....	.....	.....
Provincial Govt.....	Asylum Farm...	33	do	Every known variety.	Unhealthy.....	.....	33	.....	.....	.....	.....
Geo. N. Clark	Kingston, N.B..	3	do	Jerseys and grade	Good.....	.....	3	.....	.....	.....	.....
Lt.-Col. Tucker, M.P.	St. John, N.B..	1	1	Pure bred Holstein.	Superior.....	1	1	1	.....	.....	.....

Inspection of Animals for Export to Great Britain.

Canadian Cattle.	United States Cattle.	Total Number Cattle Shipped.	Condemned.	Cause.	Sheep.	Condemned.	Cause.	Horses.	Condemned.	Quality of Horses.		Sex.	
										Draught.	Carriages.	Mares.	Geldings.
7,263	599	7,862	3	Actinomycosis—2 Injury in transit—1.	3,321	4	Suspect'd sheep scab.	1,410	None.	817	593	480	930

No. 20.

REPORT ON HALIFAX, N.S., CATTLE QUARANTINE STATION.

(Wm. Jakeman, D.V.S.)

Halifax, N.S., 31st October, 1897.

Sir,—I beg to submit my annual report of cattle quarantine at port of Halifax from October 31, 1896, to October 31, 1897.

IMPORTED.

Nov. 23, 1896. Per SS. "Halifax," from Boston:—1 gray mare, the property of G. Little, Esq., of Halifax, N.S.

Nov. 30. Per SS. "Halifax," from Boston:—1 mare, the property of S. Mackeen, Esq., of Musquodoboit, N.S.

Dec. 28. Per SS. "Halifax," from Boston:—1 chestnut mare, the property of P. C. Johnson, Esq., of Halifax, N.S.

Jan. 11, 1897. Per SS. "Halifax," from Boston:—2 mares, the property of R. McLain, Esq., of Cape Breton.

Jan. 11. Per SS. "Corean," from Liverpool:—7 head of Ayrshire cattle, the property of R. Reford, Esq., of Montreal. To this lot three calves were born in quarantine.

April 15. I received a letter from W. B. Scarth, Esq., Deputy Minister of Agriculture, requesting me to test with tuberculin the cattle of J. W. Skinner, Esq., of Wilton, King's County, N.S., as I did per charts forwarded to Dr. McEachran, chief inspector.

April 19. I received a letter from Dr. McEachran requesting me to test with tuberculin the seven head of cattle belonging to R. Reford, Esq., which were then in quarantine.

The test was applied with results as per charts forwarded to Dr. McEachran. One cow, having reacted, was detained for one month, when the test was again applied with an increased reaction. On notifying Mr. R. Reford of the second test, and its results, I received instructions from him to at once slaughter the animal. I immediately wrote Dr. McEachran for further instructions. I was also advised by him to slaughter the cow, and hold a careful *post-mortem* examination on her, which I did, finding her lungs a complete mass of tubercles, a portion of which I carefully packed in a carbolized solution and forwarded to Dr. McEachran.

October 6. At your request I visited the Government Experimental Farm at Nappan, N.S., and, in company with Prof. Saunders, Mr. Robertson and Dr. Hall, of Amherst, applied the test on 15 head of cattle in which there was no reaction as per charts sent Dr. McEachran.

EXPORTED.

Dec. 19, 1896. Per SS. "Numidian" for Liverpool:—1 horse, the property of Mr. Jones.

March 27th. 1897, Per SS. "Halifax City" for London:—13 horses, the property of S. R. Cossy, Esq.

July 15. Per SS. "Alpha" for Jamacia:—93 sheep.

July 15. Per SS. "Duart Castle" for West Indies:—58 sheep and 2 horses.

July 17. Per SS. "Halifax City" for London:—1 gelding, the property of Major Smyth.
Aug. 12. Per SS. "Barcelona" for Liverpool:—2 horses, the property of I. H. Mathers, Esq.
Aug. 12. Per SS. "Taymouth Castle" for Bermuda:—95 sheep and 3 cows.
Aug. 14. Per SS. "Alpha" for Jamaica:—95 sheep and 10 cows.
Sept. 9. Per SS. "Duart Castle" for Bermuda:—60 sheep, 4 horses and 2 cows.
Sept. 16. Per SS. "St. John City" for London:—1 black mare, the property of Capt. Fitzherbert.
Sept. 16. Per SS. "Beta" for Jamaica:—100 sheep, 5 horses and 2 pigs.
Oct. 7. Per SS. "Taymouth Castle" for Bermuda:—106 sheep and 39 horses.
Oct. 15. Per SS. "Beta" for Jamaica:—10 head cattle, 169 sheep and 1 horse, the property of Pickford & Black.
Oct. 23. Per SS. "Avoca" for West Indies:—1 horse, the property of Major Fauner.

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

WM. JAKEMAN,
Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 21.

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE GOVERNMENT VETERINARY INSPECTOR,
TORONTO, 31st October, 1897.

SIR,—I have the honour to report that the general health of horses, cattle and sheep in the province of Ontario, during the past year, has been good with few exceptions.

HORSES.

The province has been free from any serious contagious disease among horses during the past year; not one case of glanders or farcy has come under my notice.

CATTLE

Have been generally healthy. A few animals died in the northern part of the province, near Callendar, the disease was due to local causes, did not spread and was not, on investigation, of an alarming nature. A few cases of black quarter were reported in the neighbourhood of Brantford. In August a disease was reported in the neighbourhood of Sunderland, several young animals died. The actual cause was not clear, it appeared to be of local origin and did not spread beyond affected herd.

SWINE.

Hog cholera existed in the early part of the year in the county of York and it was necessary to quarantine part of East and West York townships, and the city of Toronto. There have been no new cases there since last winter. Outbreaks have

also been reported in the neighbourhood of Odessa in the east; and Brantford, Waterloo, and Berlin in the west. The investigation proved the disease not to be hog cholera, but produced principally by injudicious feeding. The disease also existed in Western Ontario, to a considerable extent; a large number of townships were quarantined before the disease was controlled. A few cases have been recently reported in the neighbourhood of Chatham, Wallaceburg, &c.

SHEEP.

Sheep scab existed in the counties of York and Peel during the winter, and in the spring in the county of Victoria. Steps were taken for its suppression, and so far the disease appears to be under control.

I am, sir,
Your obedient servant,

ANDREW SMITH, *V.S., F.R.C.V.S.*

The Honourable
The Minister of Agriculture,
Ottawa.

No. 22.

REPORT ON POINT EDWARD CATTLE QUARANTINE STATION.

(ARTHUR BROWN, V.S.)

SARNIA, 1st November, 1897.

SIR,—I have the honour to submit my report of cattle and swine received into the Ontario Cattle Quarantine at Point Edward from the time of my appointment as inspector on the 1st of February, 1897 to the 31st of October, 1897.

The swine imported during the above period were very fair in quality, no preference being shown for any particular breed.

There has only been one diseased animal in the quarantine since my appointment, which was a Jersey cow having tuberculosis. The rest of the animals were quite healthy, and I may state that there is no contagious or infectious disease in this district except a few cattle that may be affected with tuberculosis,

Attached you will find a detailed statement of the animals received into quarantine from the 1st of February to the 31st of October, 1897.

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

ARTHUR BROWN, *V.S.*,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

STATEMENT of cattle received into Ontario Cattle Quarantine at Point Edward from the 1st of February, 1897, to the 31st of October, 1897.

Date of Entry.	Jerseys.		Holsteins.		Valuation.	Removal.	Consignee and Address.
	M.	F.	M.	F.			
1897							
April 15..	...	....	1	....	$50 00	May 4, 1897.....	J. W. Lee, Waterford, Ont.
July 8....	....	1	....	....	40 00	Still in Quarantine...	S. Fraleigh, St. Marys, Ont.
Sept. 24..	1	....	....	....	50 00	October 21, 1897.....	James Burns, Lindsay, Ont.
Oct. 12....	....	....	1	....	50 00	Still in Quarantine..	J. F. Woodman, Compton, Que.
Total...	1	1	2	....	$190 00		

Total number of cattle, 4.

ARTHUR BROWN, *V.S.*,
Inspector.

REPORT of Swine received into the Ontario Cattle Quarantine at Point Edward, from the 1st February, 1897, to the 1st November, 1897.

Date of Entry.	White Chester.		Poland China.		Berkshire.		Red Jersey.		Tamworth.		Victoria.		Date of Removal.	Value.	Consignor and Address.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
1897.													1897.	$ cts.	
Feb. 3	1	1											Feb. 17	40 00	J. Barkey, Stouffville, Ont.
Mch. 5					1	2							Mch. 19	50 00	J. Durand, Seaforth, Ont.
do 10				1									do 24	30 00	W. J. Duck, Ridgetown, Ont.
do 25							1						Apl. 8	20 00	D. G. Cuthbertson, Ingersoll, Ont.
Apl. 2											1	2	do 16	60 00	J. S. Clark, Sarnia, Ont.
do 6	1	1											do 20	50 00	Thomas Hutchinson, Thamesville, Ont.
do 12					1								do 26	40 00	J. G. Snell, Brampton, Ont.
do 22							1	1					May 6	50 00	Peter La Marsh, Wheatly, Ont.
do 26							1						do 10	30 00	Berdan & McNeil, Glencoe, Ont.
May 18						1							June 1	20 00	Robert Weir, Wingham, Ont.
do 19					1								do 2	30 00	George Green, Fairview, Ont.
do 22												1	do 5	25 00	Chris. Fahmer, Exeter, Ont.
do 26							4	5					do 9	60 00	D. G. Cuthbertson, Ingersoll, Ont.
June 10	1	1											do 24	25 00	Tilman E. Bowman, Berlin, Ont.
do 15				1									do 29	25 00	R. A. Webster, Merrickville, Ont.
July 14	1												July 29	20 00	John Jolliffe, Rockwood, Ont.
do 29			2						1	2			Aug. 12	250 00	H. Jones, Ingersoll, Ont.
do 30				3									do 13	150 00	do do
Aug. 11	1	1											do 25	40 00	J. A. Farlinger, Morrisburg, Ont.
do 20					1								Sept. 3	30 00	George Green, Stratford, Ont.
Sept. 7			1										do 21	30 00	Robert Willis, Jr., Tilsonburg, Ont.
Oct. 19	1	1											Due Nov. 2	40 00	J. C. Dorman, Ailsa Craig, Ont.
do 21			1										do 4	50 00	Albert Hillman, Bearbrook, Ont.
Total of each kind	6	5	4	5	4	3	7	6	1	2	1	3		1,165 00	

Total, 47.

ARTHUR BROWN, *V. S.*,
Inspector.

No. 23.

REPORT ON EMERSON CATTLE QUARANTINE STATION.

(P. A. Robinson, V. S.)

Emerson, Manitoba, 31st October, 1897.

Sir—On succeeding to the office of quarantine inspector at the stations of Emerson and Gretna, which I did on the 15th March of this year. I verified the inventory of all chattels of whatever kind made and handed over to me by my predecessor.

A copy of this inventory I have forwarded to your department.

In the exercise of the duties of my office I have been guided entirely by the Order in Council of 25th January, 1897, which had the effect of very materially lessening the extent and variety of these duties performed by my predecessor in the office of Cattle Quarantine Inspector at this point, including Gretna.

My duties, in fact, have so far minimized that they now comprise mainly simple inspections, in connection with which I have granted, in all, certificates covering 3,108 head of cattle which have been exported to the United States, a tabulated statement of which I append to this report.

I may also add here, that on taking office on the 15th March last I found in quarantine two head of cattle which had been tested for tuberculosis by my predecessor; and which, they being shown to be free from this disease, I released and allowed to go forward to their destination.

On the 13th April, 1897, there entered at this port two head of cattle which were not accompanied by the certificate of a government veterinarian in the district whence they came.

These I therefore detained and subjected to the tuberculin test as directed by section 21, subsection (d) of the Order in Council.

As a result of the test I found that one of the animals was affected by tuberculosis. This I returned to the country from which shipped as directed by subsection (e), section 21 of the above Order in Council.

Another instance of the application of the tuberculin test was that of four head of cattle entered for the test for export to the United States on the 17th of March, 1897. These four head successfully passed the test.

During the period extending from 15th March to 31st October, just ended, there were imported 27 head of cattle and 28 heads of hogs. I also append herewith a tabulated statement showing these importations.

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

P. A. ROBINSON, *V. S.*
Inspector.

To the Honourable
e Minister of Agriculture.
Ottawa.

Department of Agriculture.

STATEMENT of cattle exported by way of Emerson and Gretna to the United States since the operation of Order in Council of 25th January, 1897.

Month.	No. of Cattle.
1897—March	120
April	225
May	471
June	656
July	1418
August	193
September	25
Total	3,108

P. A. ROBINSON, *V.S.*,
Inspector.

EMERSON, 31st October, 1897.

STATEMENT showing Importations at the Emerson Quarantine Station for term ended 31st October, 1897.

Date.	Importer.	Where from.	Where to.	Cattle.	Hogs.
1897.					
March 25...	M. Carmichael	Dakota, U.S.A....	Emerson, Man....	4	1
do 26...	P. Bonidorm	do	St. Agathe, Man..	7	3
June 18...	A. Johnson	do ...	Gimli, Man.	3	.....
July 28...	Wm. Stewart	do	Red Deer, Alta...	4	2
Oct. 1...	Hy. L. Henrieaux	do	St. Jean, Man....	.....	7
do 4...	D. McDonald	do	Emerson, Man....	3	.....
do 16...	W. Carter	do	St. Malo, Man....	3	15
do 25...	C. McPherson	do	Emerson, Man....	3	.....
	Total			27	28

P. A. ROBINSON, *V.S.*,
Inspector.

EMERSON, 31st October, 1897.

No. 24.

REPORT ON MANITOU CATTLE QUARANTINE STATION.

(M. YOUNG, D.V.S.)

MANITOU, 1st November, 1897.

SIR,—I have the honour to submit this, my report of inspections made by me at the outports of Killarney and Crystal City, during the year ended 31st October, 1897. During the month of November, 1896, there were inspected twenty-two (22) horses and eleven (11) head of cattle, and since the close of that month, only seven (7) horses and fifteen (15) cattle have been inspected on crossing the frontier.

While the above figures indicate the exact number of cattle which have entered Canada at the points named during the year, they do not in any degree, afford reliable evidence as to the number of horses which have entered as "settlers effects" and "for sale." Acting in accordance with the new regulations relating to animals' quarantine, I have not inspected any horses crossing the frontier since February last, and have therefore no means of knowing or affording any information as to the number entered at the customs outports, but I am aware that large numbers of "bronchos" or Western horses, brought in from the United States, have been exposed for sale, and have been driven hither and thither throughout Manitoba, for that purpose during the past summer.

The amended cattle quarantine regulations have proved highly satisfactory to the cattle breeders of this province because of the abolition of the ninety days detention clause. Thousands of cattle from Manitoba have found a market in the United States this season and very satisfactory prices have been paid.

Hereto attached is a statement, in detail, of inspections made by me during the past year.

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

M. YOUNG, *V.S.*

The Honourable
The Minister of Agriculture,
Ottawa.

STATEMENT of Inspections made by M. Young, V.S., for Year ended 31st October, 1897.

Date.	Name of Importer.	Whence Imported.	Destination.	Horses.	Cattle.	Swine.	Remarks.
1896.							
Nov. 3..	Wm. Pollon.....	Devil'sLake,N.D	Riding Mtn, Man	2	....	....	
do 7..	F. Kinnard.....	Rolla, N.D.....	Killarney do	4	.....	.....	
do 10..	A. Peltier.....	Dunseith, N.D.	St. Norbert do	6	.....	.....	
do 18..	D. Thom.....	Elkwood do	L. Dauphin do	2	.....	.....	
do 20..	A. O. Anderson.....	Dunseith do	Killarney do	1	....	.....	
do 20..	J. Mitchell.....	Rolla do	do do	1	.....	.....	
do 28..	Jas. Colter.....	Crystal do	Crystal City do	4	6	.....	Quar. 90 days.
do 28..	John Colter.....	do do	do do	2	5	.....	do
Dec. 4..	Wm. Porter.....	Sumner, Kan...	Oxbow, Assa....	1	.....	.....	
1897.							
Jan. 6..	John Colter.....	Crystal, N.D.	CrystalCity, Man	.....	5	.....	Quar. removed per order of Minister.
Feb. 8..	B. Green.....	St. Johns do	Wakopa do	1	.....	.....	
do 11..	A. Baxter.....	do do	Killarney do	....	2	.....	
do 23 ..	W. Hamilton.....	Rolla do	Lena do	....	11	.....	
Mar. 8..	J. Colter.....	Crystal do	Crystal City do	.....	1	.....	Re-inspected and released.
Aug. 18..	J. J. Moir.....	W. Liberty, Ia..	PelicanLake do	.....	.....	1	
do 18..	W. R. Casement.....	Cavalier, N.D..	Killarney do	.....	2	.....	

M. YOUNG, *V.S.*,
Inspector.

No. 25.

REPORT ON DELORAINE CATTLE QUARANTINE STATION.

(JOSEPH DANN, D.V.S.)

DELORAINE, 31st October, 1897.

SIR,—I beg to submit my annual report of animals inspected by me for the year ending 31st October, 1897.

As settlers' stock and horses for sale are now admitted free of inspection, I cannot say how many have entered at this port and as it is optional with exporters to have their cattle inspected on this side of the line. I do not know how many have crossed the line here.

However, since the 5th of May last, up to date, I have inspected 3,617 head of mixed cattle, from a calf up to an old ox.

I was informed by the exporters that most of the cattle were going to be stall fed on corn, as the hog cholera had killed all the hogs in the corn-raising states.

Horses and cattle in this district are in prime condition.

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

JOSEPH DANN, *D. V.S.*,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 26.

REPORT ON VICTORIA, B.C., CATTLE QUARANTINE STATION.

(M. G. BLANCHARD, V.S.)

VICTORIA, B.C., 1st November, 1897.

SIR,—I have the honour in accordance with instructions to submit a report of my work, as inspector of live stock at this port for the twelve months ended October 31st, 1897.

The quality of the stock imported and inspected by me has been up to the average, there being 36 horses, 2 mules, 10 cattle, 63 hogs and 26,739 sheep. Besides these there have been quite a number of animals, since the last regulations went into force, which did not require inspection, especially horses, which were landed here and transhipped in bond for packing purposes on the White Pass and Chilcat Trails into the Yukon District. Fat cattle have also been imported, but only to a small extent, and there have also been a few cattle for breeding purposes, which were accompanied by the necessary certificates to exempt them from inspection and detention at this port.

Of the horses imported all classes were represented, but draught horses were in the minority. The inspection of horses was ordered to be enforced, owing to a case of glanders reported having come in at Trail.

Of the cattle imported and inspected by me, I quarantined two as they did not have certificates accompanying them, and the other eight were imported by settlers.

The sheep, although consigned to Victoria parties, were distributed to the various cities of the province.

The swine being all entered at the custom house as for breeding purposes, were quarantined the regulation period and all did well.

Appended are detailed statements showing the number of stock inspected by me and the cattle and hogs quarantined.

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

M. G. BLANCHARD, *V.S.*,
Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

Department of Agriculture.

DETAILED STATEMENT of Swine Quarantined at Victoria, B.C., for the year ended 31st October, 1897.

Date Entered	Name of Consignee.	Breed.	Number.	Whence Imported.	Date Released.	Remarks.
1896					1897	
Dec. 27.	J. W. Windsor ...	Berkshire	2	Ohio	Jan. 17.	Quarantined 21 days under the old regulations.
1897						
May 3..	Thos. Ball.....	Essex.	1	California...	May 18.	Quarantined 15 days under the new regulations.
June 8..	Jas. Jackson	Berk. and Essex.	60	Washington	June 23.	Quarantined 15 days under the new regulations.

M. G. BLANCHARD, *V.S.*,
Veterinary Inspector.

DETAILED STATEMENT of Cattle Quarantined at Victoria, B.C., during the year ended 31st October, 1897.

Date Entered	Name of Consignee.	Where Quarantined.	Breed.	Date Tested.	Numbers.	Date Discharged.	Remarks.
1896				1896		1897	
Nov. 10.	J. W. Whittinger.	116 North Pembroke Street ..	Grade..	Nov. 12.	1	Feb. ..	Quarantined 90 days under the old regulations.
1897				1897			
April 7.	J. Mitchel.....	Outer Wharf....	do ..	April 9.	1	April 14	Quarantined 1 week under the new regulations

M. G. BLANCHARD, *V.S.*,
Veterinary Inspector.

DETAILED STATEMENT of Live Stock Inspected at Victoria, B.C., for the year ended 31st October, 1897, by M. G. Blanchard, V.S.

Date Inspected.	Name of Importer.	Where from.	Destination.	Horses.	Mules.	Cattle.	Sheep.	Pigs.
1896.								
Nov. 2..	B. C. Market Co	Oregon.	Victoria				179	
do 3..	do	do	do				400	
do 3..	W. M. Robinson	do	Mayne Island				1	
do 5..	L. Goodacre	Washington	Victoria				35	
do 9..	John Bennett	do	Saanich				94	
do 10..	Mr. Whittinger	do	Victoria			1		
do 10..	J. Wright	Oregon.	do				415	
do 17..	Jas. Wilson	California	Nicola.	2				
do 19..	B. C. Market Co	Washington	Victoria				15	
do 21..	Jas. Wright	Oregon.	do				200	
do 21..	L. Goodacre	do	do				423	
Dec. 3..	B. C. Market Co	do	do				424	
do 5..	Jas. Wright	do	do				398	
do 10..	P. T. Patton	Washington	do				12	
do 10..	B. C. Market Co	Oregon.	do				397	
do 15..	Jas. Wright	do	do				184	
do 15..	L. Goodacre	do	do				103	
do 17..	do	do	do				398	
do 22..	B. C. Market Co	do	do				140	
do 27..	J. W. J. Windsor	Ohio	N. Westmins'r					2
do 29..	Jas. Wright	Oregon.	Victoria				380	
do 30..	R. Eckhart	California	do	1				
do 30..	L. Goodacre	Oregon.	do				71	
1897.								
Jan. 6..	B. C. Market Co	do	do				197	
do 6..	L. Goodacre	do	do				151	
do 12..	Jas. Wright	do	do				186	
do 14..	L. Goodacre	do	do				190	
do 14..	do	do	do				95	
do 19..	Jas. Wright	do	do				150	
do 20..	B. C. Market Co	do	do				400	
do 24..	Grismer Davies Co	New York	United States	3				
do 26..	J. Wright	Oregon.	Victoria				165	
do 28..	B. C. Market Co	do	do				360	
Feb. 2..	J. Wright	do	do				180	
do 2..	do	do	do				195	
do 2..	L. Goodacre	do	do				160	
do 4..	B. C. Market Co	do	do				280	
do 5..	L. Goodacre	do	do				189	
do 9..	Haemans & Wamsley	do	Nanaimo				100	
do 12..	L. Goodacre	do	Victoria				360	
do 12..	Mr. McNeeley	do	Ladners				103	
do 12..	L. Goodacre	do	Victoria				200	
do 12..	J. Wright	do	do				180	
do 20..	do	do	do				179	
do 25..	B. C. Market Co	do	do				284	
do 26..	Haemans & Wamsley	do	Nanaimo				100	
do 27..	J. Wright	do	Victoria				183	
Mar. 7..	L. Goodacre	do	do				163	
do 9..	J. Wright	do	do				181	
do 9..	L. Goodacre	do	do				479	
do 16..	B. C. Market Co	do	do				660	
do 16..	J. Wright	do	do				179	
do 18..	L. Goodacre	do	do				108	
do 24..	do	do	do				319	
do 25..	J. Wright	do	do				179	
April 3..	do	do	do				141	
do 6..	Haemans & Wamsley	do	Nanaimo				50	
do 6..	B. C. Market Co	do	Victoria				120	
do 7..	J. Mitchell	Washington	do			1		
do 10..	J. Wright	Oregon.	do				85	
do 14..	B. C. Market Co	do	do				210	
do 14..	do	do	do				20	
do 17..	J. Wright	do	do				229	

DETAILED STATEMENT of Live Stock Inspected at Victoria, B.C., for the Year ended 31st October, 1897, by M. G. Blanchard, V.S.—*Continued.*

Date Inspected.	Name of Importer.	Where from.	Destination.	Horses.	Mules.	Cattle.	Sheep.	Pigs.
1887.								
April 17	B. C. Market Co	Oregon	Victoria				238	
do 19	J. K. Devlin	Washington	do			1		
do 24	J. Wright	Oregon	do				228	
do 25	L. Goodacre	do	do				239	
do 28	B. C. Market Co	do	do				248	
May 1	do	do	do				120	
do 3	Thomas Ball	California	New Westm'tr					1
do 6	J. Wright	Oregon	Victoria				230	
do 8	L. Goodacre	Washington	do				183	
do 12	D. W. Gilles	do	do				25	
do 15	L. Goodacre	do	do				245	
do 16	B. C. Market Co	do	do				252	
do 19	Mrs. Mee	do	do			4		
do 21	L. Goodacre	do	do				232	
do 21	T. Roberts	do	do			1		
do 22	B. C. Market Co	do	do				213	
do 27	do	do	do				155	
do 28	James Wright	do	do				218	
do 29	L. Goodacre	do	do				208	
June 8	James Jackson	do	do					60
do 8	James Wright	do	do				220	
do 10	L. Goodacre	do	do				240	
do 13	James Jackson	do	do				50	
do 16	D. W. Gilles	do	do				70	
do 17	B. C. Market Co	do	do				497	
do 18	do	do	do				20	
do 19	do	do	do				227	
do 20	L. Goodacre	do	do				420	
do 30	R. Porter & Sons	do	do				18	
July 1	B. C. Market Co	do	do				262	
do 2	James Jackson	do	do				95	
do 7	L. Goodacre	do	do				168	
do 8	R. Porter & Sons	do	do				211	
do 9	L. Goodacre	do	do				16	
do 11	B. C. Market Co	do	do				168	
do 15	L. Goodacre	do	do				169	
do 16	James Jackson	do	do	1				
do 16	R. Porter & Sons	do	do				230	
do 18	B. C. Market Co	do	Vancouver				204	
do 18	L. Goodacre	do	Victoria				355	
do 20	Order Bank of Montreal	do	New Westm'tr				215	
do 27	B. C. Market Co	do	Victoria				220	
do 29	R. Porter & Sons	do	do				230	
do 29	James Jackson	do	do				50	
do 31	L. Goodacre	Oregon	do				153	
Aug. 1	E. E. Green	Washington	do	1				
do 3	E. Maude	do	Alberni		2			
do 6	B. C. Market Co	Oregon	Victoria				218	
do 6	R. Porter & Sons	do	do				100	
do 6	T. R. Robinson	do	Vancouver				100	
do 6	O. Sincus	Washington	Victoria	1				
do 6	E. Maude	do	Alberni			1		
do 6	J. W. Mellor	do	Victoria	3				
do 10	R. Bray	California	do	1				
do 11	L. Goodacre	Oregon	do				420	
do 11	B. C. Market Co	do	do				25	
do 12	R. Porter & Sons	do	do				230	
do 13	J. W. Mellor	Washington	do	2				
do 13	do	do	do	2				
do 14	do	do	do	1				
do 19	L. Goodacre	Oregon	do				407	
do 21	F. M. Yorke	Washington	do	2				
do 25	R. Porter & Sons	Oregon	do				235	
do 25	G. Getschman	Washington	do	2				

DETAILED STATEMENT of Live Stock Inspected at Victoria, B. C., for the Year ended 31st October, 1896, by M. G. Blanchard, V.S.—*Concluded.*

Date Inspected.	Name of Importer.	Where from.	Destination.	Horses.	Mules.	Cattle.	Sheep.	Hogs.
1897.								
Aug. 26..	L. Goodacre	Oregon	Victoria				296	
Sept. 1..	do	do	do				25	
do 1..	D. Schilling	Washington	do	2				
do 6..	B. C. Market Co	Oregon	do				622	
do 7..	R. Porter & Sons	do	do				160	
do 7..	E. J. Cameron	Washington	do	1				
do 10..	R. Porter & Sons	Oregon	do				235	
do 11..	D. Rusworth	Washington	New Westm'tr			1		
do 15..	B. C. Market Co.	Oregon	Victoria				350	
do 17..	R. Bray	Washington	do	3				
do 20..	R. P. Rithet	California	do	1				
do 22..	L. Goodacre	Oregon	do				218	
do 22..	R. Porter & Sons	do	do				235	
do 23..	L. Goodacre	do	do				150	
Oct. 1..	do	do	do				135	
do 5..	B. C. Market Co	do	do				209	
do 5..	R. Porter & Sons	do	do				228	
do 6..	L. Goodacre.	do	do				284	
do 7..	B. C. Market Co	do	do				182	
do 7..	L. Goodacre.	do	do				236	
do 14..	W. Grant	Washington	United States.	6				
do 14..	R. Bray.	do	Victoria	1				
do 15..	R. Porter & Sons	Oregon	do				213	
do 16..	L. Goodacre.	do	do				180	
do 19..	B. C. Market Co	do	do				182	
do 23..	R. Porter & Sons	do	do				221	
do 25..	B. C. Market Co	do	do				205	
do 26..	L. Goodacre	do	do				459	
do 27..	B. C. Market Co	do	do				260	
do 28..	do	do	do				198	
				36	2	10	26,739	63

No. 27.

REPORT ON CHARLOTTETOWN CATTLE QUARANTINE STATION.

(J. L. McMILLAN, V.S.)

CHARLOTTETOWN, 31st October, 1897.

SIR,—I have the honour to submit to you this my annual report for the year ended 31st October, 1897.

During the year I inspected for exportation from Charlottetown, 134 horses, 711 cattle and 1 813 sheep. And found all the animals to be healthy.

One bull was imported by Mr. Charles Palmer from England, which bull was quarantined for 90 days and found to be free from infectious disease.

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

J. L. McMILLAN, *V. S.*

The Honourable
The Minister of Agriculture,
Ottawa.

No. 28.

REPORT OF THE NORTH-WEST MOUNTED POLICE COMMISSIONER.

(L. W. Herchmer.)

Regina, 23rd October, 1897.

Sir,—I have the honour to submit my report on quarantine and the health of animals in the North-west Territories for the past season. I also inclose detailed reports of work done by the veterinary surgeons in charge of the following Districts: Regina District, which includes Eastern Assiniboia, and west as far as Moose Jaw, Maple Creek District, Macleod District, Calgary District, Prince Albert District, Fort Saskatchewan District, Lethbridge District.

On the amendment of the Cattle Quarantine Regulations from the 1st of February, 1897, I assumed charge of all matters relating thereto, and the enforcement of the Act respecting Infectious or Contagious Diseases, under the Department of Agriculture.

A report on each individual case of disease, etc., brought to the notice of the police, and investigated by us, during the year, was duly forwarded to your department at the time, and you were thus, sir, kept thoroughly posted on all matters concerning this branch of your department, transpiring in the North-west Territories from time to time. Many reports have been made to the police of suspected cases, and which on examination were found to be without foundation, the animals concerned merely being run down, in consequence of not being properly looked after, etc. In connection with cases such as these, I would suggest that the owners be called upon to pay the expenses incurred in making inspections, when no disease really exists.

Apart from glanders and actinomycosis, or lumpy-jaw, the general health of horses and cattle in the Territories, has been good. At the beginning of the season the diseases just mentioned existed to an alarming extent all over the country, but prompt measures having been taken, I am glad to be able to report a very great decrease in the number of cases, although at the present time there are some cases of lumpy jaw and glanders reported in the Wolseley neighbourhood, which are being attended to. Those diseases were so bad in that district that I was obliged to keep a veterinary surgeon there the better part of the summer solely on that duty.

To assist me in carrying out the Act *re* Contagious or Infectious Diseases to the letter, I had to engage four qualified veterinary surgeons, graduates from the McGill University, three of whom were especially recommended for this work by Dr. McEachran, and occasionally at points where we had no police veterinarians, the services of civilian veterinarians were authorized by your department to be called upon in urgent cases, and Mr. Carley at Moosomin, Mr. Simpson at Yorkton, and Mr. Churchill at Indian Head, were so employed.

My hands were materially strengthened in dealing with the contagious and infectious diseases which were devastating the country, by an Order in Council passed appointing me ex-officio a quarantine officer of the Department of Agriculture, and also by another, passed on the same date, authorizing the Minister to cause the destruction of horses affected with the disease of glanders in the North-west Territories.

The arrangement with your department that police veterinary surgeons would receive $100 per annum extra pay for their services on its behalf, is very encouraging, and tends to give them more interest in the carrying out of your regulations.

At your request I arranged that Prof. McEachran should meet half of the veterinarians of the North-west Mounted Police at Regina, and the other half at Cal-

gary, on the 9th and the 11th of June respectively, to enable him to examine such of them as had not already passed the Government examination. The result was, I believe, satisfactory to the chief inspector.

I was in communication with Mr. M. E. Knowles, veterinarian for the State of Montana, at the beginning of the season, with reference to cattle questions in the respective North-west Territories of the United States and Canada, and submitted to him certain suggestions relative to the points of crossing on the frontier suitable for United States citizens to enter Canada at, &c., which he adopted. I also arranged for his people to be met by our men at the different points, and assisted as much as possible.

About the end of May it was reported to me that glanders was prevalent in Marias District, Montana, and I immediately issued orders to all the detachments on the boundary concerned, to take every precaution possible, that no affected animals were admitted.

A report was made direct to your department that disease existed amongst cattle on the Indian Reserves at File Hills and Crooked Lake, and the matter was referred to me for inquiry. I had a thorough inspection made, with the result that the cattle were found to be free from disease, but were, like many more in the North-west last winter, run down owing to the shortness of hay, etc., and their condition impoverished in consequence, but with the advent of the new grass, they soon picked up again.

I might here say that it occurred to me that the common procedure of reporting suspected cases of contagious diseases direct to the Department of Agriculture, necessitated unnecessary delay in having them investigated, and I had a notice published in all the newspapers in the North-west Territories to the effect that all such cases should be reported at once to the nearest Mounted Police constable, when the necessary steps would be taken. This met with your approval.

Sheep scab was reported to exist in Montana and Dakota, and I had the necessary precautions taken to prevent the importation of any affected animals into Canada.

It was reported in the month of January that certain American cattle on the other side of Milk River were said to be affected with a contagious disease known as "Spanish Itch," which is an affection similar to scab in sheep, and steps were taken to keep the American cattle as much as possible from crossing the line and commingling with Canadian cattle.

A settler in the Willow Bunch District reports that 100 head of stock have been killed in that district this season by timber wolves or some other species of wild beast. I understand that the ranchers have subscribed a reward for the head and skin of the animal.

Only one instance of sheep scab was reported during the season. This was in a flock belonging to a Mr. Walton in the Maple Creek District. On inspection by our veterinary he found undeniable proofs of the disease, and promptly quarantined the flock, and instructed the owner as to treatment, disinfecting, etc. This was in May, and on the 16th of June, the sheep were declared to be free from disease, and released. This disease is easily eradicated if taken in time, and every care taken to disinfect contact places such as corrals, gate posts, fences, etc., and if owners, on discovering the first appearance of symptoms of scab, would report it at once to the nearest police post, sheep scab would be quite unknown in the North-west in a short time.

It was reported to the Department of Agriculture by one R. Moore, of Yorkton, that a large flock of sheep in that district were in a "frightful state with disease." The matter was referred to me and I immediately ordered the flock to be inspected with the result that no disease was found to exist, their condition, however, was not of the best, the consequence of not being properly looked after, and spear grass. This man Moore who made the complaint is considered a crank, and has given the police unnecessary trouble repeatedly.

There are no cases to report under the head of hog cholera, although it was reported to the police that pigs were dying from a disease resembling hog cholera

at Indian Head. It turned out, however, on the matter being investigated by us, that the pigs in question had been poisoned, it was alleged, by some spiteful neighbour.

I am glad to be able to report the absence of pleuro-pneumonia, no cases having been reported.

The disease of tuberculosis among cattle is on the wane, and very few cases have been reported, with the exception of the Prince Albert District, where some six animals were destroyed for the disease. The application of the tuberculin test has been found invaluable in determining doubtful cases.

Mange in horses.—Only one report of this disease was received. It was from Prince Albert. The animal was at once isolated, and instructions given as to precautions, etc., to be taken. This disease, like sheep scab, is easily curable in its early stages.

The disease of actinomycosis (or lumpy-jaw) has given us plenty of trouble during the season, no less than 34 animals being destroyed in this district alone, and 17 in Calgary, four in Prince Albert, and four in Fort Saskatchewan Districts. The fact of this disease having been placed on the list of contagious diseases under the operations of the Animal Contagious Diseases Act, enabled us to take prompt and effective measures in dealing with it.

This disease in its incipient stage can generally be cured by competent persons, but in its last stage after the lump has burst, and commenced to discharge, I think we should have authority to kill the animal diseased, as in case of glanders in horses, as no matter how carefully quarantined, few settlers having sufficient buildings for perfect isolation, there must be great danger of infection when the lump is discharging.

The disease of lumpy-jaw had a strong hold in the country, as the majority of settlers were entirely ignorant of the cause and nature of it, and had the mistaken idea that it was non-contagious, and for many years no attempt was made to stamp it out, consequently the disease gradually spread. We have been very firm in dealing with it during the season, and I might quote one or two examples:—One S. C. Kenney of Davisburg, Calgary District, was prosecuted for trading off a cow affected with big-jaw, after being warned to keep same quarantined, and was fined $10.00 and costs ($8.00). On the 26th August, one Samuel Sell was tried for allowing two cows to run at large after they had been quarantined. He was convicted and fined $5.00 and costs. Mrs. Walter Murray of Crescent Lake was fined $1.00 and costs for the same offence. This lady has given a good deal of trouble generally in connection with the quarantine of her cattle, and I am of the opinion she got off too easily, although the very fact of criminal proceedings being taken should have a salutary effect.

GLANDERS.

As you will observe from the different reports submitted by our veterinarians, the disease of glanders has been very common indeed. The Act was strictly enforced, and all suspicious cases immediately investigated, and owners compelled to slaughter infected animals and disinfect the premises and contact places. The Mallein test has been found a most reliable aid to diagnosis, and was repeatedly resorted to. Animals were destroyed in the following districts alone, as follows: Regina 49; Calgary, 16; Fort Saskatchewan, 13; and Prince Albert, 25. There are still some cases in the Grenfell district, and Staff-Sergeant Tracey, V.S., is there at the present time investigating. Professor McEachran fortunately was at Calgary when there were several cases on hand, and he approved of the action taken by our veterinarian. The doctor personally quarantined the ranches of Messrs. Hay and Critchley while there, and they were kept so until the disease of glanders was declared to be stamped out.

ANTHRAX.

Six animals are reported to have died from this disease in the Prince Albert district, and 28 in the Blackwood and Gainsboro districts, a list of which will be

found in the respective reports appended, and there have been scattered cases all over. The carcasses in all cases were buried and the usual precautions taken regarding disinfecting, &c. In the west a great many young cattle have been inoculated for anthrax, and the most observing cattle men are so satisfied of its beneficial results that a very large number are being so treated this fall at considerable expense.

AMERICAN CATTLE.

I was authorized by your department to employ the requisite number of line riders at the beginning of the season, to assist in driving American cattle back from the line, and with this aid we were, to a certain extent, able to keep the Canadian side clear of American cattle. This authority, however, was withdrawn from the 15th September, and these line riders were, as far as your department was concerned, discharged, with the exception of one or two whose services I considered were essential, and whose maintenance and pay are now charged to the police. The result of the withdrawal of the line riders is that the country is being invaded again, especially in the Wood Mountain and Maple Creek districts, whose owners make no effort to keep the cattle south, and it is only natural that the cattle should drift over, being attracted by the superior feed and water on this side. I would again urge upon your department the desirability of notifying such American cattle owners that they must keep their stock out of Canada, failing which the cattle should be rounded up, and an example made of some of them. Some owners, however, keep themselves within the pale of the law by having cattle on both sides of the line bearing the same brand, and an instance of this was submitted to you a few days ago.

I would also recommend that at the beginning of next season I be authorized to employ the number of line riders which I consider will be necessary to keep American cattle out of Canada, on behalf of the Department of Agriculture, and that they be kept so employed until the end of the season.

The question of American cattle grazing on our side of the line has been brought before your department time and time again, and I think the time has arrived when it should receive special consideration, as in the interests of our ranchers, and particularly the smaller ones who do not keep cow boys, and whose breeding stock these cattle annoy, Americans should certainly not be permitted to graze their cattle over here with impunity. All the grass we have is required for Canadian cattle.

A supplementary report of work done between this date and the end of the month will follow.

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

L. W. HERCHMER,
Commissioner, N. W. M. Police.

REGINA, 21st October, 1897.

The Commissioner
North-west Mounted Police,
Regina.

SIR,—I have the honour to inclose herewith a summary of all work performed by Inspector Burnett, V.S., Staff Sergt. Mathews, V.S., and all notes in connection with quarantine since, the 1st November, 1896, according to instructions received from commissioner.

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

JOSEPH HOWE,
Superintendent.
North-west Mounted Police.

SUMMARY of Quarantine Work done by Inspector Burnett, V.S., since 31st October, 1896.

Name.	Residence.	Date.	Number of Animals.	Number of Animals.	Disease.	Remarks.
			Horses.	Cattle.		*Inspector—Burnett, V.S.*
Poundmaker	Battleford	Oct. 29, 1896		1 steer	Actinomycosis	Destroyed in Inspector's presence 26th October, 1896. Was informed by the instructor that 8 or 10 head of young stock had died on the reserve, and, from symptoms described, decided that the disease was black leg.
Bresayler Settlement	do	do				Settlers had lost about 50 head of young stock, inspector decided from black leg.
Thunderchild	do	Oct. 30, 1896				1 steer, 1 3-year-old and 1 calf died. Could not determine cause of death, as no decided symptoms could be given. Orders were given to the farm instructors and settlers in Bresaylor Settlement as to the disposition of animals dying from black leg, and as to the necessity of taking stringent measures to prevent the further spread of the disease.
A. Donaldson	Fort Qu'Appelle	Jan. 28, 1897				Examined 1 horse, supposed glanders, and found no disease.
W. H. Fynn	do	do				Examined 1 horse, supposed glanders, and found no disease.
Mr. Kearns	do	do				Examined band of horses, and found no disease.
W. Fenn	do	do	1 gray gelding		Glanders	Destroyed and buried by order of inspector; buildings were thoroughly disinfected.
James Taylor	Grenfell	Feb. 17, 1897	2 horses		Glanders	Examined 2 horses, supposed to be glandered, and found them to be suffering from that disease; they were destroyed and buried.
George Vannelli	do	do do	2 do		Glanders	Examined 2 horses in charge of this man, and found 1 suffering from glanders and 1 suspicious case. When the owner heard inspector's decision, he had them both destroyed and buried.
C. Martin	10 miles north Regina	Mar. 25, do	1 yearling		Glanders	Destroyed and buried by order of inspector; buildings were thoroughly disinfected.
W. Robinson	Touchwood	April, do	2 horses		Glanders	Examined 2 horses, and found them suffering from glanders. The owner had them destroyed and buried and the buildings thoroughly disinfected.
Mr. Skilleter	Grenfell	May 7, do	1 brown mare		Glanders	Examined the horse and found it glandered; it was destroyed and buried.
L. Coy	do	do do	2 horses			Examined 2 suspicious cases of glanders, and quarantined the same. The 2 horses, on being tested, showed reaction, and were destroyed and buried.

SUMMARY of Quarantine Work done by Inspector Burnett, V.S., since 31st October, 1896—*Continued.*

Name.	Residence.	Date.	Number of Animals.	Number of Animals.	Disease.	Remarks.
			Horses.	Cattle.		*Inspector—Burnett, V.S.*
J. Brannar	Grenfell	May 7, 1897	1 aged gelding.		Glanders	Examined 1 aged gelding and 1 yearling, and found them both suffering from glanders; had the same destroyed and buried.
do	do	do do	1 yearling			
R. Napper	Boggy Creek	May 15, do	6 horses		Glanders	Inspector's attention was called to a horse by the owner, and he found on examination it was suffering from glanders; on following day visited Napper's farm, and found 5 more cases. The whole were destroyed and burnt, and the stables, etc., thoroughly disinfected.
Mr. Geo. Murray	Touchwood	April, 1897				Examined about 70 head of cattle. No disease. Lost in calving, 2.
Allan McLeary	do	do				Examined about 70 head of cattle. No disease. Lost in calving, none.
Geo. Scott	do	do				Could not find the owner at home. There was about 300 head of cattle. Counted dead carcases around his place to the number of 39.
Robt. Scott	do	do				Could not find the owner at home. Saw about 40 head of cattle.
Arthur Atherton	do	do				Examined about 80 head of cattle. Owner lost through accident, 2.
Wm. Robinson	do	do				Examined about 113 head of cattle. Owner did not lose any.
J. Neeley	do	do				Examined about 76 head of cattle. Lost in calving, 1 cow.
J. McInnes	do	do				Examined about 64 head of cattle. Lost 1 steer and 1 yearling from impaction of rumen; also one cow from starvation.
P. Hamilton	do	do				Inspected 30 head of cattle. No deaths.
Rev. Mr. Cook	do	do				Inspected 21 head of cattle. Lost 1 from starvation and 1 died on prairie; cause unknown.
J. Hall	do	do				Examined 75 head of cattle. Lost 7 head; cause unknown.
M. Hall	do	do				Examined 205 head of cattle and 400 sheep. No loss.
—— Atkinson	do	do				Examined small bunch. Loss trifling.
W. Fee	do	do				do do
W. Anderson	do	do				Examined about 30 head of cattle. Lost none.
J. Hollis	do	do				do 170 do Lost 15; 12 from unknown causes.

Poor Man's Reserve	do	do				Examined about 150 head of cattle. Lost 8 through accident.
—— McLeod	do	do				Examined about 50 head of cattle. Lost 27. The owner drove these cattle from Regina to Touchwood after winter had set in, which accounts for the heavy loss.
Agency	do	do				Examined 2 head of cattle. Lost 1 calf; presumably black leg.
Geo. Hudson	do	do				Examined 105 head of cattle. Lost 7 from various causes. No disease.
Gordon's Reserve	do	do				Examined 208 head of cattle. Lost 30 including deaths in the fall. From symptoms given he decided that tuberculosis exists in this herd.
Brice Bros	Touchwood	April, 1897				Examined about 240 head of cattle. Lost 15 from starvation.
—— Heubach	do	do				Saw a bunch of about 250 head of cattle, most of which had been wintered by settlers he had called upon. The cattle appeared healthy.
Col. Lake	Grenfell	June 1, 1897	1 Horse		Glanders	Examined 25 head of horses; three suspicious quarantined until Mallein test could be applied by Dr. Geddes, V. S., one found to be affected, destroyed and buried, the stable was disinfected.
J. Taylor	do	do 1, 1897	1 colt		do	Examined the same and found it affected with glanders, it was destroyed and buried and the stable disinfected.
M. L. Coy	do	do 2, 1897				Second visit, a further quarantine of fourteen days was placed on these horses.
Wm. Collins	do	do 2, 1897				Examined five horses and found all free from disease.
Mr. McGregor	do	do 2, 1897				Examined two horses, symptoms suspicious, to be quarantined and test applied.
Chas. Pacey	do	do 2, 1897				Examined horses and found them free from disease.
Indian	do	do 2, 1897	1 horse		Glanders	Examined one horse belonging to an Indian and found it glandered, the same was destroyed and buried.
J. Garbett	do	do 3, 1897	1 do		do	Declared the horse glandered, it was destroyed and buried.
J. Garbett, sr.	do	do 3, 1897	1 do		do	Declared the horse glandered, it was destroyed and buried.
J. Parker	do	do 3, 1897				Found this party's horse free from disease.
D. J. Aldrecht	do	do 3, 1897				do do
Wm. McGregor	do	do 3, 1897				Second visit, examined 25 head, two quarantined, the same to be tested, when tested found to react they were destroyed and buried.
Thomas Fleming	do	do 6, 1897				Inspector Burnett and Dr. Geddes, V. S., inspected 25 head of horses, one suffering from enteric fever, the remainder free from disease.
J. Skilliter	do	do 6, 1897				Found his horse free from disease.
T. Kearns	Qu'Appelle Valley	do 18, 1897				Examined mare suspected of glanders, ordered to be quarantined.
Jas. Beech	Indian Head	do 29, 1897				Examined 86 head of horses, and found nothing more serious than distemper.

SUMMARY of Quarantine Work done by Inspector Burnett, V. S., since 31st October, 1896—*Concluded.*

Name.	Residence.	Date.	Number of Horses.	Number of Cattle.	Disease.	Remarks.
			Horses.	Cattle.		*Inspector—Burnett, V. S.*
Geo. Laird	Broadview	July 26, 1897	3 horses	1 cow	Glanders and actinomycosis	Examined two horses and one cow and found the former suffering from glanders and the latter from actinomycosis they were all destroyed and buried.
Alex. Wilson	Moose Jaw	do 30, 1897	1 bay mare		Glanders	Found the horse suffering from glanders, it was destroyed and buried.
A. L. Davies	do	do 30, 1897		1 cow 1 calf	Tuberculosis	Found these animals suffering from tuberculosis, they were destroyed and buried.
A. W. Tanner	do	do 30, 1897	1 black mare. 1 b'k stallion.		Glanders	Found these animals suffering from glanders, they were destroyed and buried.
Mr. Tait	Regina	do 30, 1897	1 horse		do	Found this animal suffering from glanders it was destroyed and buried.

Inspector Burnett decided that no contagious disease existed amongst any of the above cattle, with the exception of those on Gordon's Reserve, and no other cattle mixed with these. The cause of death was attributed principally to starvation.

31 Glanders.
2 Tuberculosis.
2 Actinomycosis.

35 All destroyed and buried and places thoroughly disinfected.

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

JNO. T. BURNETT,
Veterinary Surgeon.

SUMMARY of Quarantine Work done by S. S. Matthews, V.S., since 29th May, 1897.

Name.	Residence.	Date.	No. of Horses.	No. of Cattle.	Disease.	Remarks.
						Inspector—S. S. Mathews, V. S.
Mrs. Levalle	Willow Bunch	May 29, 1897				Examined 31 horses; no disease.
J. L. Legare	do	do 31, 1897				do 109 do do
J. H. Thompson	Wood Mountain	June 3, 1897				do 20 do do
Indian Reserve	Broadview	do 16, 1897	1 horse		Glanders	Inspected horse and found it suffering from glanders. No owner could be found, so I ordered said animal to be destroyed and buried, which was done. Instructions were given the instructor to disinfect the stable where animal was isolated.
do	do	do 17, 1897	1 do		do	Inspected band of horses, the above animal had been running with, and found one two year-old suffering from glanders, which was destroyed and buried; the band of horses was quarantined.
Manitou Wigwam	Birtle Agency	do 18, 1897	2 horses		do	Found these horses suffering from glanders; destroyed and buried same
Mr. T. B. Hextall	Grenfell	do 20, 1897				Examined band and found no disease.
Indian Reserve	Broadview	do 23, 1897				do about 200 head of horses and found no disease.
F. J. Lyon	Whitewood	do 24, 1897		1 cow	Actinomycosis	do 1 cow, ordered her quarantined; re-examined 5th August, 1897; destroyed and buried.
Mr. Wallace	do	do 24, 1897				do 2 head of cattle and found them free from disease.
Mr. R. Munn	do	do 24, 1897				do 1 steer, and found it free from disease.
Mr. J. Heney	do	do 24, 1897		1 do	Actinomycosis	do 3 suspected cases; only one diseased, which was destroyed and buried.
Mr. W. Carson	do	do 25, 1897		1 do	do	do 1 cow suffering from actinomycosis; destroyed and buried.
Mr. Z. W. Brigman	do	do 25, 1897		1 steer	do	do 1 steer do do do
Mr. N. Doll	do	do 25, 1897		1 do	do	do 1 do do do do
Mr. S. Carson	do	do 26, 1897		2 steers	do	do 2 steers do do do
W. Crisp	Moosomin	do 29, 1897				do 4 head of cattle and found no disease.
J. Grafton	do	do 29, 1897				do 2 do do
Ed. Currier	do	do 30, 1897				do 1 cow and found no disease; tested, no re-action.
John Russell	Fleming	July 1, 1897				do 1 do do
G. McGregor	do	do 1, 1897				do 4 head of horses; no disease.
A. Clarke	Riga	do 2, 1897		1 two yr. old	Actinomycosis	do 1 two year old and found it affected with tuberculosis; destroyed and buried.
R. Kidd	Fairmead	do 2, 1897				do 3 head of cattle; no disease.
J. Matheson	do	do 3, 1897				do 140 do do
W. Hunt	do	do 3, 1897				do 180 do do
P. Chambault	Spy Hill	do 6, 1897				do 1 horse suspected of glanders; no disease.
Wm. Davis	do	do 6, 1897		1 cow	Actinomycosis	do 1 cow affected with actinomycosis; destroyed and buried.
J. Carl	do	do 7, 1897				do 7 head of cattle; no disease.
Jno. Mulberry	do	July 7, 1897				Examined 2 head of cattle. No disease.
Mr. F. Elkison	Pipestone	do 18, 1897				do 8 head of horses. do
Balderson & Senton	Regina	do 11, 1897				do about 85 head of cattle, 12 of which have died; from symptoms given it resembled black leg. Herd ordered to be quarantined.

SUMMARY of Quarantine Work done by S. S. Matthews, V.S., since 29th May, 1897—*Continued.*

Name.	Residence.	Date.	No. of Horses.	No. of Cattle.	Disease.	Remarks.
Col. Lake.	Grenfell	July 18, 1897	2 horses		Glanders	Tested 2 head of horses and found suspected of glanders, and found them diseased; they were destroyed and buried.
Mr. Hillhurst	Broadview	do 19, 1897				Examined 8 horses and found them free from disease
Mr. Ed. Emery	Grenfell	do 19, 1897				do 2 horses, suspected glanders, and found no disease.
Mr. J. Scott	Wolseley	do 20, 1897				do 2 horses, 1 suspicious to be re-examined; re-examined 28th August. No disease.
Mr. W. Finley	do	do 20, 1897		1 steer	Actinomycosis	Examined 1 steer affected with actinomycosis; destroyed and buried.
Mr. D. Ferguson	do	do 20, 1897		1 steer	do	do bunch cattle, 1 affected do do
Mr. Jno. Waddell	do	do 21, 1897				do bunch cattle. No disease.
Mr. Fred. Maggett	do	do 21, 1897				do do do
M. Ed. Lander	Grenfell	do 21, 1897		1 steer	Actinomycosis	do 1 steer, affected with actinomycosis, destroyed and buried.
Agency	Crooked Lakes	do 24, 1897				Re-examined band horses, examined 18th June, and found all correct; released from quarantine.
Mr. A. Gaddie	do	do 24, 1897				Examined 1 horse. No disease.
Mr. A. Peltier	do	do 24, 1897				do 2 horses. do
Joseph Brannan	Broadview	do 26, 1897	1 horse		Glanders	do 6 horses, found 1 affected with glanders, destroyed and buried.
J. Crow	do	do 26, 1897				do 10 horses. No disease.
Town Herd	do	do 28, 1897				do 10 do do
Wm. Thorburn	do	do 28, 1897				do 5 do do
Wm. Boltby	do	do 28, 1897				do 4 do do
Robt. Brannan	do	do 28, 1897				do 6 do do
W. E. Gardner	do	do 28, 1897				do 1 do do
Mrs. Hinchey	do	do 28, 1897				do 2 do do
Wm. Hodson	do	do 28, 1897				do 2 do do
T. B. Tetlock	do	do 29, 1897				do 2 do do
Mr. Brown	do	do 29, 1897				do 1 do do
F. Brownridge	Grenfell	do 29, 1897				do 8 do do
Mr. McKenzie	Grenfell	July 29, 1897	6 horses		Glanders	Tested these horses and declared them glandered all were destroyed and buried.
A. Tulloch	Broadview	do 30, 1897	2 do		do	do do do
Wm. Dixon	do	do 30, 1897				Examined 6 horses; no disease.
F. J. Dash	do	do 30, 1897				do 1 horse do
Wm. Shaw	Grenfell	do 30, 1897				do 4 horses, 1 tested; no disease.
Messrs. Lilly & Kirk	do	Aug. 2, 1897				do 7 do do
Mr. Wright	do	do 2, 1897				do 10 do do
Col. Lake.	do	do 2, 1897	1 horse		Glanders	do 20 horses, 1 that had been tested destroyed and buried.
Mr. H. Hall	Wolseley	do 2, 1897				do 1 two-year old heifer; no disease.
Dr. Elliot	do	do 3, 1897				do 1 horse suspected of glanders; no disease.
Senator Perley	do	do 3, 1897		1 heifer	Actinomycosis	do 2 heifers, 1 actinomycosis; destroyed and buried.
J. Fleming	do	do 3, 1897				do 2 horses; no disease.
Mr. Gallier	Whitewood	do 5, 1897				do 1 suspected case actinomycosis; no disease.

Jno. Bosque	do	do 6, 1897	1 steer	Actinomycosis	do 1 affected with actinomycosis; destroyed and buried.
Mr. Daniels	do	do 6, 1897			do 1 horse; no disease.
Eric Hericon	do	do 6, 1897			do 1 steer do
John & Hoel Davis	do	do 6, 1897	1 steer	Actinomycosis	do 25 head of cattle; 2 of John Davis's suffering from actinomycosis; 1 destroyed and buried and 1 allowed treatment.
J. Heney	do	do 7, 1897			Re-examined 1 cow suffering from lumpy jaw; allowed to hold in quarantine.
Jno. Howard	do	do 7, 1897			Examined band of cattle; no disease.
J. Cosgraves	do	do 7, 1897			Did not examine this herd, as they could not be found.
Mr. Sells	do	do 7, 1897	2 cows	Actinomycosis	Examined 30 head of cattle; 2 affected with actinomycosis; ordered the animals to be isolated as the owner was not at home; gave instructions to Const. Quinn; these animals were destroyed and buried at a later date.
Jno. Gordon	Moosomin	do 9, 1897			Examined 1 horse suspected of glanders; no disease.
W. Crisp	do	do 9, 1897			do 1 steer suspected of actinomycosis; no disease.
Jno. Follis	do	do 10, 1897			do 1 cow do do do
M. Skinner	Ferndale	do 10, 1897	4 steers	Actinomycosis	do a band herded by this man, and found 4 cases of actinomycosis; 2 belonging to himself he destroyed and buried; 1 belonging to Keith Webster, and 1 to R. Coil, both of which were destroyed and buried.
Thos. Wilde	Moosomin	do 10, 1897	1 steer	do	do 6 head of cattle, and found one affected with actinomycosis; destroyed and buried.
Jno. Dafoe	Moosomin	Aug. 10, 1897			Examined 83 head of cattle and found one slightly affected with actinomycosis; advised immediate treatment; owner promised to isolate if it got worse.
D. Carmichael	Cannington Manor	do 16, 1897	1 heifer	Actinomycosis	Examined this animal and found it affected; destroyed and buried.
Neil Munroe	Moose Mountain	do 17, 1897	3 steers	do	do these animals and found them affected do
J. L. Armstrong	do	do 17, 1897	1 cow	do	do this animal and found it affected do
R. Coil	Moosomin	do 19, 1897			do cattle; no disease.
F. Cosgrave	Whitewood	do 20, 1897	2 steers	Actinomycosis	do do and found 2 steers affected with actinomycosis; destroyed and buried.
Cecil McKenzie	Grenfell	do 21, 1897			Examined 3 horses; 1 suspicious, quarantined.
Jno. Hunt	do	do 23, 1897			do herd; no disease.
L. Coy	do	do 24, 1897			do 2 horses do
J. Innis	do	do 24, 1897			do 1 cow do
Thos. Wright	do	do 24, 1897			do 10 horses do
Ernest Kendrick	Cotham	do 25, 1897			do 2 horses do
F. Franks	Hyde	do 28, 1897			do 1 horse do
Cecil McKenzie	Grenfell	do 29, 1897			Re-examined horses in quarantine and released them; no disease.
Dixon Bros.	Wolseley	do 30, 1897	steer & heifer	Actinomycosis	Examined 110 head of cattle; 2 suffering from actinomycosis; destroyed and buried same.
Austin Turner	do	do 30, 1897	1 steer	do	Examined this animal and found it suffering from actinomycosis; destroyed and buried.
Wm. Green	do	do 31, 1897			Examined 1 steer; no disease.
S. R. Barber	do	do 31, 1897			do 1 steer and found it suffering from actinomycosis; treatment allowed.
F. Curey	Blackwood	Sep. 18, 1897	6 head	Anthrax	Examined 240 head cattle; 6 had died from anthrax; bodies buried and disinfected; herd was quarantined.
James Moxon	do	do 20, 1897	14 do	do	Examined about 60 head of cattle; 14 died from anthrax; bodies were buried and disinfected; no disease in remainder of cattle.

SUMMARY of Quarantine Work done by S. S. Matthews, V.S., since 29th May, 1897—*Concluded.*

Name.	Residence.	Date.	No. of Horses.	No. of Cattle.	Disease.	Remarks.
R. Ross	Blackwood	Sept. 20, 1897		5 head	Anthrax	Examined about 30 head of cattle; 5 head died from anthrax; bodies were buried and disinfected; no disease in remainder of cattle.
Wm. Rodgers	Gainsboro'	Oct. 5, 1897		3 do	do	Examined about 200 head of cattle; 3 head died from anthrax; bodies were buried and disinfected; no disease in remainder of cattle.
E. Erwin	North Portal	do 10, 1897				Examined 7 pigs and 4 horses, entering Canada; no disease.
Dan McLean	Moosejaw	do 11, 1897				do and tested 1 cow, tuberculosis; no disease.
A. W. Tanner	do	do 13, 1897	2 horses		Glanders	do do 2 horses, glanders; both destroyed and buried.
R. Maynard	do	do 14, 1897				do 4 horses for glanders; no disease.
D. Gilmore	do	do 15, 1897				do 1 horse do do

18 Glanders.
32 Actinomycosis or Lumpy Jaw.
28 Anthrax or Black Leg.

78—All destroyed and buried, and places thoroughly disinfected.

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

R. G. MATTHEWS, *D.V.S.*

Department of Agriculture.

NORTH-WEST MOUNTED POLICE,
MAPLE CREEK, 6th October, 1897.

SIR,—I have the honour to make the following report of the work done for the Department of Agriculture since April 28th, 1897.

April 30th. Inspected Mr. Marshall's horses and cattle at Ten Mile Crossing.

May 3rd. Inspected Mr. Walton's sheep suffering with scab at Medicine Hat.

May 12th. Inspected Mr. Davis's cow suffering with actinomycosis and had her quarantined.

May 20th. Inspected Mr. Russell's and Mr. Walton's sheep at Medicine Hat.

May 25th. Inspected Mr. Parson's horses and found one suffering from glanders, and had him destroyed. May 28th I destroyed a horse for Mr. Drewery, suffering with glanders.

June 4th. Inspected Mr. Dixon's band of horses and found them all correct.

June 16th. Examined Mr. Walton's sheep and released him from quarantine.

Examined one horse for Mr. Todd and found him suffering with glanders and destroyed him. Inspected two horses for Phillip Miller, who came from Montana, U.S.A.

August 2nd. Inspected twenty-six horses and two mules for R. W. Mack, from the States. Inspected ten horses for an Indian from the States.

August 10th. I examined a horse for Mr. Potter of Medicine Hat, and found him all correct.

August 13th. Examined five horses for Mr. Prichard from the States, all correct.

August 21st. Inspected five horses for Mr. Allen at Ten Mile Crossing, from the States.

August 23rd. Inspected a band of horses of Mr. Mitchell's of Medicine Lodge, and found all correct.

August 24th. Inspected two steers for Mr. Wiess suffering with actinomycosis. Had them quarantined.

August 27th. Inspected fifteen horses for Mr. Weatherby, from the States, and found them all correct.

Sept. 1st. Inspected one horse for Mr. Smith and found him free from disease.

Sept. 2nd. Inspected a horse for Mr. Porter of Medicine Hat, suffering with glanders and had him destroyed and buried.

Sept. 10th. Inspected saddle horses for the Circle Diamond Round up, while gathering American cattle.

Sept. 20th. Inspected two horses for Mr. Heffer, from the States.

Sept. 25th. Inspected one horse for Mr. McKay from the States.

I can find no record of any work done before April 28th, as the greater part of the time between November and the 28th of April, and it being winter, in my opinion there was no work done.

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

J. W. FARR, STF.-SGT.,
Gov. Vet.

The Officer Commanding.
"A" Div.

NORTH-WEST MOUNTED POLICE,
FORT MACLEOD, N.W.T., 11th October, 1897.

To the Commissioner N.W.M. Police, Regina.

VETERINARY DUTIES FOR DEPARTMENT OF AGRICULTURE.

SIR,—I have the honour to inclose a report by Assistant Veterinary Surgeon Wroughton, of his work in connection with the Department of Agriculture.

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

S. B. STEELE,
Superintendent Commanding District of Macleod.

NORTH-WEST MOUNTED POLICE,
BARRACKS MACLEOD, 11th October, 1897.

Officer Commanding Macleod District.

SIR,—In reply to your memo. of the 6th inst. *re* quarantine operations for the information of the commissioner.

I have the honour to report that the duties in connection with the Department of Agriculture have only been undertaken by me since May last. Since that time a monthly report has been sent in by me giving details of the work performed.

In May last, on the 21st, Mr. J. Cowdry reported a cow of his which he believed to be suffering from tuberculosis. This cow was tested and there was a slight reaction. The department, however, ordered the animal to be again tested, which was done on the 27th July. At that time there was no reaction. The animal was then considered by the department free from disease, and allowed to go.

On the 28th May at Boundary Creek, I inspected 62 head of stock belonging to Salter Glenn, Nancy Glenn, and Frederick Kesler; they were free from disease.

During the latter end of June 32 head of cattle came in and were inspected by me on the 1st July. They belonged to George Pyle from Flat Head, Montana. They were all free from disease.

On the 11th July I proceeded to Pincher Creek to decide a disputed case of actinomycosis. The animal was quarantined and placed under treatment (potassium iodide), but without success, and the animal was destroyed. The animal was owned by Mr. Bell of Pincher Creek.

Another animal belonging to Mr. Mollison, of Macleod, was also suffering from this disease, and was placed under treatment, and in his case the results were very gratifying and complete recovery took place.

On the 31st July, on receipt of a report that a horse belonging to William Dunbar, of the Porcupine Hills, was suffering from glanders, I went and made an examination with the mallein test. There was a decided reaction and the animal was destroyed. The animal had been quarantined.

Mr. George, also of the Porcupine Hills, destroyed a beast suffering from actinomycosis.

On the 21st July I inspected 411 head of cattle. These were Canadian cattle rounded up on the other side. They were in splendid condition and free from disease.

In August I communicated with the manager of the Oxley Ranch *re* some big jaw cattle said to be grazing on the ranges. He promised to look after the matter, and give orders to have the animals destroyed when found. He also expressed his willingness for our men to shoot them whenever they came across them.

A form of influenza has been more or less prevalent in some of the construction camps. Several deaths have occurred owing to the animals not being taken in time, A circular was sent out to contractors, horse owners and others notifying them of the infectious and contagious nature of the disease with general information as to detection, segregation and general principles of treatment. The result has been as far as I can learn very useful in checking the disease to a great extent and the mortality has been limited.

From a letter that appeared in the "Calgary Weekly Herald," August 26th by Mr. Jas. Mollison one would be led to believe that disease was rampant in this part of the country, whereas I am firmly convinced that no more healthy country exists on the face of the earth for stock of all kinds. As for the prevalence of anthrax, no such disease exists except in the imagination of Mr. Mollison in this section of the country. That some cases of "black leg" have and will exist there is no doubt. A disease which resembles "anthrax" in many of the symptoms and has been mistaken for it, but is due to a specific germ which is altogether different from the anthrax bacillus.

Reports from all parts of the district have been generally of the best, and I am convinced that this has been one of the healthiest years in an exceptionally healthy country.

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

T. A. WROUGHTON, D.V.S.,
Veterinary Inspector.

NORTH-WEST MOUNTED POLICE,
FORT MCLEOD, N.W.T., 5th November, 1897.

The Officer Commanding,
Depot Division, N.W.M.P.,
Regina.

SIR,—I have the honour to forward Staff Sergeant Mitchell's report of work performed by him in connection with the Department of Agriculture, as requested by your favour of 21st October.

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

S. B. STEELE, Supt.,
Commanding McLeod District.

St. Mary's, 30th October, 1897.

Sir,—I have the honour to report on work performed by me for Department of Agriculture, under instructions from Inspector Starnes, during the interval between November and July, both months included, as follows:—

A three-year old Clydesdale mare, owned by one Miller, north of Gainsboro, was inspected during the month of December, and revisited during the month of March following, under suspicion of glanders, but which proved to be nothing more serious than catarrh.

An ox, supposed to be the victim of tuberculosis, owned by a settler north of Carnduff, was inspected about the end of April. This animal at the time of my visit appeared to be in a dying condition, was destroyed by the owner, and the existence of the disease in question established by *post mortem* lesions.

Two cows, owned by citizens of Estavan, named respectively McDonald and Allen, were tested for tuberculosis about the last of May, but no reaction obtained.

A work-horse, owned by a settler south of Carnduff, quarantined by a police constable under suspicion of glanders, was inspected on the 27th July, found free from that condition, and accordingly released.

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

W. MITCHELL, V.S.,
Vet. S.-Sergt.

The Officer Commanding
Depot Division.

Calgary, 8th October, 1897.

Sir,—I have the honour to forward herewith, Staff-Sergt. Stevenson's report of work performed by the Veterinary Department on behalf of the Department of Agriculture, as requested by your memo. of 4th inst. No record has been kept by former Veterinary N. C. O.'s of this division prior to the date of this report.

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

JAS. O. WILSON,
Inspector Commanding "E" Division.

The Commissioner
North-west Mounted Police,
Regina.

"E" Division,

Calgary, 6th October, 1897.

The Officer Commanding
North-west Mounted Police,
Calgary.

Sir,—I have the honour to make the following report of work done by me since coming to this post.

Monday, 17*th May*.—Examined and shot gray and white cow, owner unknown, brand indistinct. Also ordered Kitley of Calgary, and Leach of Fish Creek to quarantine their cattle. One red cow branded on right hip, property of Leech. Disease, actinomycosis.

Wednesday, 19*th May*.—Examined, shot and buried red bull, branded on left hip. Actinomycosis.

Thursday, 20*th May*.—Examined, shot and buried red and white cow, the property of Aird of Millarville. Actinomycosis.

Friday, 21*st May*.—Examined and quarantined one red cow the property of T. Young of South Forks of Fish Creek, examined, shot and buried roan cow, the property of McGinnis of Fish Creek. Actinomycosis.

28*th May*.—Examined, shot and buried roan steer, the property of P. B. Clealand of Fish Creek. Actinomycosis.

29*th May*.—Examined red steer, the property of Adams of Millarville. Not necessary to quarantine. Examined, shot and buried roan cow owned by M. J. McGinnis. Actinomycosis. Same date examined red, and red and white calf, property of M. J. Jackson of Millarville. Not necessary to quarantine.

3*rd June*.—Examined, shot and buried gray cow, the property of J. Robinson, of Fish Creek. Actinomycosis.

28*th June*.—Examined, shot and buried red cow owned by W. Harrison, of West Nose Creek; also quarantined red steer owned by H. Critchley, actinomycosis; and examined one red and white steer of his. Not necessary to quarantine latter.

29*th June*.—Examined, shot and buried red cow, the property of S. Mayhood of West Nose Creek. Actinomycosis.

1*st July*.—Examined one red and one roan cow, the property of W. Edge, branded on left ribs. Not necessary to quarantine. Also examined red cow, the property of Healy, branded T W on left ribs. Not necessary to quarantine.

2*nd July*.—Examined gray steer, branded on left ribs, owned by Goddar. Not necessary to quarantine. Same date examined, shot and buried red cow, the property of J. Stewart of Jumping Pond. Branded on left ribs. Actinomycosis.

3*rd July*.—Examined, shot and buried gray steer, the property of W. Edge of Jumping Pond, branded on left ribs. Also examined, shot and buried one red and one red and white steer owned by C. G. Healy, of Jumping Pond, branded on left ribs. Actinomycosis. Examined red heifer owned by J. Cowan of Spring Bank, branded on left shoulder. Not necessary to quarantine.

5*th July*.—Examined one red and one white steer and one brindled steer, the property of H. Critchley, branded 110 on left rib. Not necessary to quarantine.

6*th July*.—Examined one red steer branded on left ribs, the property of Inglis, and one red steer branded "110" on left ribs. Unnecessary to quarantine. Same date examined and quarantined black horse, the property of T. J. Sullivan, which showed symptoms of glanders. Sent it home and ordered it isolated until I could apply test. Ordered O. A. Chritchley to quarantine one buckskin and one sorrel horse until they could be tested for glanders.

10*th July.*—Tested two horses for O. A. Chritchley, showing symptoms of glanders. Both gave the reaction so I shot them.

12*th July.*—Constable Sheppard went out to see that these horses were properly buried.

Examined black steer, the property of C. Johnston, of Olds, branded on left hip. Quarantined same. Actinomycosis.

13*th July.*—Examined one black and one red steer branded "D. R." on left rib. Quarantined red steer. Actinomycosis. Unnecessary to quarantine other.

14*th July.*—Quarantined G. Hay's ranch, by order of Dr. McEachran. Also O. A. Chritchley's ranch. Glanders in both cases.

15*th July.*—Shot bay horse owned byO. A. Chritchley, branded "O A" on left shoulder. Buried same and disinfected box stall where horse had been kept. Glanders.

17*th and* 18*th July.*—Tested black horse, the property of T. J. Sullivan. Shot and buried same. Branded "O" on right shoulder. Glanders.

19*th July.*—Examined, shot and buried bay horse, the property of W. H. Kinnisten, of Calgary, for glanders. Disinfected stable. Glanders.

20*th and* 21*st July.*—Tested bay gelding, property of G. Briggs, of Calgary. It was not glanders.

22*nd and* 23*rd July.*—Tested buckskin pony, property of A. Milne. Not glanders.

20*th and* 21*st July.*—Tested and shot black gelding, the property of J. Birney, branded on left shoulder. Also shot roan gelding running with Birney's, branded on left shoulder. Constable Duffus attended to the burial and disinfecting of the place. Disease, glanders.

23*rd July.*—Shot gray stallion, branded "K" on right shoulder, the property of Blackfoot Indians. Also shot black gelding, the property of J. Cushing, branded "C," on right shoulder. Shot pony, the property of A. Skinner. Not branded, and shot and buried bay gelding, the property of J. Cooper, branded "T D" on left shoulder and on hip. Glanders in all cases. Constable Sheppard attended to the burial of Skinner's and Cushing's horses, and disinfecting the places. Examined pony owned by R. Davy. Not necessary to quarantine.

30*th and* 31*st July.*—Tested two horses for the Indian Department, branded "I D" on left shoulder. Shot and buried same and disinfected the stable. Glanders.

2*nd and* 3*rd August.*—Examined, shot and buried red steer, branded on right hip. Actinomycosis. Tested roan gelding, property of S. Mayhood. No reaction. Unnecessary to quarantine.

6*th August.*—Examined J. Hay's horses. Found no symptoms of glanders. Released them from quarantine.

13*th August.*—Went to S. C. Kenny's. Found he had traded his animal, supposed to be suffering from actinomycosis, for a horse. Examined red steer, property of D. Grey, branded X on left ribs. Quarantined same. Actinomycosis.

14*th August.*—Examined, shot and buried red and white steer, property of G. Rogers, branded F R on left ribs.—Actinomycosis.

16*th August.*—Examined, shot and buried gray cow, the property of De Vere Hunt, at Millarville, branded "t 4" on left ribs. Quarantined same. Also quarantined gray cow, branded "A R" on left thigh for same man. Actinomycosis in both cases.

18*th August.*—Examined red cow, the property of D. McDonald, branded "I E" on left hip. Not necessary to quarantine.

20*th August.*—Examined O. A. Chritchley's horses for symptoms of glanders but found none. Found a dead colt which Chritchley said had got hurt. He buried same.

23*rd August.*—Proceeded to Davisburg, accompanied by Constable Cree as evidence against S. C. Kenny, for trading off his animal, after being warned to keep same quarantined. Kenny was fined $10.00 and costs.

30*th August.*—Examined and quarantined red steer, property of V. N. DeMille, branded on right hip.—Actinomycosis.

31*st August and* 1*st September.*—Tested one chestnut gelding branded M on left shoulder, the property of R. Jamieson, of Fish Creek. Shot and buried same, also disinfected stables. Same date tested black mare, property of S. Ray of Fish Creek,

branded "S R" on right shoulder. Shot and buried same, also disinfected stables. Glanders. Visited Leech's ranch, accompanied by Interpreter Brazeau, to see whether his animals were properly quarantined. Found he had turned one out.

9*th September.*—Went to G. Robinson's to investigate the cause of the death of his cattle. The animals having been dead several days, could learn nothing from the carcasses.

11*th September.*—Examined O. A. Chritchley's horses. Found no symptoms of glanders. Released them from quarantine.

12*th September.*—Examined gray horse, property of W. Latimer. Not necessary to quarantine.

13*th September.*—Examined chestnut gelding, property of G. H. Douglas, of Banff, branded "F.H" on near shoulder. Not necessary to quarantine.

13*th and* 14*th September.*—Tested for glanders, one white gelding, property of C. Leroy of Banff. Shot and buried same. Examined gray mare, property of A. H. Wright, of Banff. Not necessary to quarantine. Examined chestnut gelding, property of R. Cobb. Not necessary to quarantine.

18*th September.*—Examined one chestnut mare, and one bay gelding, property of Thos. Thompson, of Okotoks. Not necessary to quarantine, branded "T3" on near shoulder. Examined black mare, branded "HW" on near shoulder; bay stallion, not branded and gray yearling, not branded, property of E. Quinn. Not necessary to quarantine. Examined brown stallion, not branded, property of D. Thorburn. Not necessary to quarantine.

19*th September.*—Examined gray mare, property of F. H. Janes, branded "t3" on near shoulder. Not necessary to quarantine.

29*th September.*—Proceeded to Leech's ranch, to see that cow was properly buried that had been ordered to be shot for actinomycosis. Found it had been properly disposed of.

11*th October.*—Proceeded to Banff to examine two horses supposed to be suffering from glanders. Tested two horses the property of A. D. Wright. They gave no reaction and it was not necessary to quarantine.

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

GEO. T. STEVENSON, D.V.S.
Vet. S. Sgt.

PRINCE ALBERT, 6th October, 1897.

SIR,—I have the honour to make the following report of stock examined by me since the last of November.

Date.	Place.	Owner.	Cattle.	Horses.	Disease.	Remarks.
1896.						
Dec 22....	Prince Albert.....	George C. Spence...	1	....	Tuberculous	1 shot.
do 22.....	do	J. Smith	1	....	do	1 do
do 28.....	do	J. H. McKay.....	1	....	Actinomycosis...	1 isolated.
do 28.....	do	do	1	....	Tuberculous	1 shot.
1897.						
Jan. 11....	do	do	4	....	do	4 isolated.
do 11....	do	do	1	....	Actinomycosis...	1 shot.
Feb. 1.....	Muskeg Lake.....	W. Chaffee.....	....	2	Glanders	2 do
do 6.....	do	Mr. Seymour.....	....	1	do	1 do
do 6.....	do	D. Primo.....	1	....	Black Leg.....	Dead.
do 11.....	do	W. Chaffee	....	4	Glanders	4 shot.
do 15....	do	W. Seymour.....	....	3	do	3 do
Mar. 4.....	Crooked Lake.....	Mr. McKenzie.....	2	....	Actinomycosis...	2 isolated.
do 4.....	do	Mr. McLeods.....	....	1	Glanders	1 shot.
do 5.....	do	Mr. McRae.....	1	....	Actinomycosis...	1 do
do 6.....	McKenzies' Crossing.	Wm. Gordon.....	....	1	Mange.....	1 isolated.
do 10.....	Red Deer Hill.....	M. F. Miller.....	4	....	Tuberculous	4 do
do 18.....	Willoughby.....	J. Smith	4	....	do	Tested and released.
do 24.....	Crooked Lake.....	Mr. Shannon	....	....	Neglect	Several had died.
do 25.....	do	Thomas Racrier.....	....	1	Glanders	1 isolated.
do 30.....	Prince Albert.....	A. Dun.....	....	1	do	1 shot.
Apr. 1.....	do	Thos. Agnew	....	2	do	1 do 1 tested and shot.
do 6.....	Duck Lake.....	Father Paquette....	....	1	Grease Leg.....	
do 9.....	L. Plains.....	A. Whitford.....	....	1	Glanders	1 do
do 14.....	Red Deer Hill	J. Anderson.....	....	1	Neglect	
do 20.....	do	R. Fish.....	....	1	Grease Leg.....	
do 21.....	Island Lake	Thos. Melville.....	....	4	Influenza	
do 22.....	Prince Albert.....	N. W. M. Police....	....	3	Glanders	1 shot, 2 tested and released.
May 4.....	Shell River.....	Mr. Rift.....	1	....	Actinomycosis...	1 shot.
do 5.....	do	Thos. Raney.....	1	....	do ...	1 isolated.
do 5.....	do	E. Holwell.....	2	....	do ...	2 do
do 5.....	do	Mr. Orrs	1	....	do ...	1 do
do 6.....	Sandie Lake.....	Mr. Isbesten.....	....	7	Influenza	
do 7.....	Muskeg Lake.....	Mr. Vallette	....	1	Neglect	
do 7.....	do	Mr. Lafonds.....	2	....	Black Leg.....	Died.
do 10.....	Prince Albert.....	B. Peebles.....	....	1	Glanders	1 shot.
do 13.....	Little Red River....	S. Donaldson.....	....	1	do	1 do
do 25.....	Duck Lake.....	Mr. Vimont.....	2	....	Anthrax.....	2 died.
do 25.....	do	Mr. Rigidal.....	1	....	do	1 do
June 2.....	Red Deer Hill.....	Robt. Giles.....	1	....	Blood poisoning.	
do 15.....	Prince Albert.....	Mrs. Demours	1	....	Actinomycosis...	1 isolated.
do 21.....	Island Lake	George Stevens	2	....	do ...	1 shot, 1 isolated.
do 24-25..	Red Deer Hill.....	Thos. Mullen	4	....	Tuberculous	2 shot, 1 died, 1 released.
do 30J'ly 1	Prince Albert.....	R. Fish.....	....	1	Glanders	1 shot.
July 7.....	do	Mrs. Demours	....	1	Actinomycosis..	1 isolated.
do 8.....	South Branch.....	Ed. Taylor	....	1	do ...	1 do
do 10-11..	Prince Albert.....	N. W. M. Police....	....	1	.....	Tested with Mallein test and released.
do 17-18..	McKenzies' Crossing..	Mr. Gordon	....	2	Glanders	2 tested and shot.
do 23-25..	Willoughby.....	J. Smith	1	....	Tuberculous	Realeased.
do 29.....	Red Deer Hill.....	M. Giles.....	1	1	Glanders and Tuberculous ..	2 shot.
do 31.....	Sioux Indian Camp ...	Sioux Indian	....	1	Glanders	1 do
Aug. 2.....	One Arrows Reserve ..	Indian Dept	1	....	Exema	
do 2.....	do do ..	Mr. Fisher.....	....	1	Mange	1 isolated.

Date.	Place.	Owner.	Cattle.	Horses.	Disease.	Remarks.
1897.						
Aug. 1	Batoche	Louis L. Etonder	1		Actinomycosis	1 isolated.
do 3	Doramead	Mr. Guillet	1		do	1 shot.
do 6	Saskatoon	Mr. Sinclair	10		Black Leg	50 isolated.
do 9	Red Deer Hill	Mr. Hudsons		1	Wound	
do 23	Island Lake	Mr. Stevens	1		Actinomycosis	Released.
do 26	Saskatoon	White Caps Reserve.		1	Influenza	Several have died from neglect.
do 26	do	Mr. Tiffin		1	do	
do 27	do	Mr. Haulhs		1	Inflamation of lungs	
Sept. 6	Prince Albert	N. Neal		1	Glanders	1 shot.
do 17	do	Mrs. Demours	2		Actinomycosis	Released.
do 21	Adams' Crossing	Mr. Adams		2		Had suffered from influenza.
do 22	Kumestimi	Mr. Freeman		2	Influenza	
do 22	do	J. Freeman		1	do	
do 23	do	Mr. Myars		2	Fever	
do 27-28	Prince Albert	Mr. Anderson		1	Glanders	1 shot.
Oct. 7	do	Wm. Little		1	do	1 do owner's request.

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

J. J. MOUNTFORD, *V. S.*,
Vet. S. Sergt.

The Officer
Commanding "F" Division,
Prince Albert.

NORTH-WEST MOUNTED POLICE,
FORT SASKATCHEWAN, 12th October, 1897.

To Officer Commanding
North-west Mounted Police,
Fort Saskatchewan.

SIR,—I have the honour to request that you will forward, herewith, to the Commissioner's Office, Regina, the attached report of services performed for the Department of Agriculture, since November, 1896.

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

C. H. H. SWEETAPPLE, V.S.,
Vet. S. Sgt.

Forwarded,
A. H. Griesbach, Supt.
Commanding "G" Division.
October 14, '97.

FORT SASKATCHEWAN, 12th October, 1897.

SERVICES performed for the Department of Agriculture since November, 1896.

Date.	Name.	Residence.	Number of Animals Examined	Disease.	Remarks.
1897.					
Feb. 2	M. P. Gabel	Stoney Plains	4 cattle	2 symptomatic anthrax.	2 dead, and 2 died of natural causes.
" 9	Mr. Dobson	Innisfail	1 horse	1 glanders	Destroyed.
" 10	Mr. Duff.	Knee Hill Valley	5 "	2 glandered	"
" 10	Mr. Smith	"	2 "	1 "	"
" 10	Renno	"	2 "	1 "	"
" 10	Belton	"	1 cow	1 actinomycosis.	"
Mar. 25	J. Gratrick	Pigeon Lake	1 horse	Nasal gleet.	Gave instructions as to proper treatment.
" 26	W. Cust	St. Albert	1 "	Glandered	Was destroyed just before my arrival.
April 14	J. J. Duggan	South Edmonton	40 cattle	1 actinomycosis.	Quarantined and treated successfully.
May 4	J. J. Duggan	"	88 "	1 "	" "
" 6 to 10	J. Norris, sr.	Hay Lakes	25 "	.....	All apparently in good health, but could not make a satisfactory "tuberculus test," as cattle had not been handled there.
" 14	H. D. Chritchley	Calgary, on trail south, Wetaskawin	133 "	5 actinomycosis.	Reported to authorities at Calgary their destination. Several destroyed there.
" 22	Mr. T. Allen	Near Edmonton	6 horses	4 glandered	Destroyed; remainder quarantined for month. Did not have mallein at the time to test them.
" 26, 27	Settlers	Poplar Lake	40 "	Strangles	
June 14	Mr. LaMontegneau	Dried Meat Lake	37 "	1 glandered	Destroyed.
" 24	Coglan & Wilson	Near Edmonton	20 "	2 catarrh	
" 29	Owner unknown	Horse Hills	15 "	1 glandered	"
Aug. 4	Mr. Bagley	LaCombe	1 cow	1 actinomycosis.	"
" 6	Mr. LaMontegneau	Dried Meat Lake	36 horses	.....	Free from disease.
" 8	Mr. Haynes	South Edmonton	1 cow	1 actinomycosis.	Destroyed.
" 11	Mr. Stephens	"	40 cattle	2 "	Treated successfully.
" 11	Mr. Stanton	"	15 "	1 "	Destroyed.
" 12	Jos. Morris	Edmonton	1 horse	1 glanders	"
Oct. 4 to 9	Settlers	Ponoka	20 "	.....	I found no animals suffering from disease, but a number have died, probably of typhoid fever, from the symptoms described.

C. H. H. SWEETAPPLE, *V. S.*,
Vet. S. Sgt.

Department of Agriculture.

LETHBRIDGE, 7th October, 1897.

The Commissioner
North-west Mounted Police,
Regina.

SIR,—In reply to your memorandum of the 4th instant, I have the honour to forward herewith the inclosed return of work performed by the Veterinary Staff Sergeant here on behalf of the Department of Agriculture since last November.

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

R. BURTON DEANE,
Supt. Commanding "K" Division.

RETURN of animals inspected by Veterinary Staff Sergeant Fraser, N. W. M. Police, at Lethbridge from 1st November, 1896, to 30th September, 1897.

Date.	Description of Animals.	Number.	Where From.	Importer.	Remarks.
Aug. 4.....	Horses	20	St. Paul	Stewart	Free from disease.
do 4.....	do	39	Duluth	Porter Bros	do
Sept. 8	do	36	Minnesota	Doheney & Harvey..	do

R. BURTON DEANE,
LETHBRIDGE, 7th October, 1897. *Superintendent Commanding.*

REGINA, 31st October, 1897.

SIR,—Referring to my report of work done on behalf of the Department of Agriculture during the past season, dated the 23rd instant, I have the honour to submit the following to be added thereto:—

Report from Inspector McGibbon *re* shipments of cattle in Saltcoats District, by Gordon & Ironsides.

Reports from Inspector McGibbon *re* shipments of cattle in Saltcoats District by J. Wake and E. Kennedy, also report of cattle imported by Gordon & Ironsides and J. Wake.

Report of T. V. Simpson, V.S., Saltcoats, of work done by him.

I have also to report the following cases of disease as having been investigated since forwarding my report:—

On the 16th instant disease was reported amongst cattle in Wimberton District, Fort Saskatchewan, and Staff-Sergeant Sweetapple inspected and found that a form of anthrax existed, Mr. Buherer having lost two animals and Mr. J. McDonald one. The Vet. left the necessary instructions as to treatment, disposal of carcasses, etc.

On 19th and 22nd inst. Staff-Sergeant Mountford examined Messrs. Ireland and Young's horses in Prince Albert District for reported glanders. The animals were suffering from influenza.

Staff-Sergeant Tracey is at present investigating cases of lumpy jaw and glanders in the Grenfell and Wolseley Districts, and reports a horse, the property of Rev.

Mr. Hoskins, being found glandered after having the mallein test applied, and was destroyed. He also tested three others, which had been in contact with this animal, with the result that one, the property of Mr. Davis, was released, and the other two, Rev. Mr. Hoskins and Mr. Thompson, owners, were quarantined for six weeks, and to be tested again at the expiration thereof. During his inspections in that district, Sergeant Tracey found the following cases of actinomycosis:—

Mr. J. Martin, one calf. Quarantined and recommended to be slaughtered.

D. Opst, one cow. Quarantined and recommended to be slaughtered.

A. Martin, one cow. Quarantined and recommended to be slaughtered.

D. McKaig, two cows, one yearling steer and one yearling heifer. All of which were quarantined, one cow recommended to be destroyed; remainder under treatment.

Mr. Waddell, one cow. Had strayed, but instructions were left with owner to find animal and quarantine.

Staff-Sergeant Tracey is still in the district inspecting.

Cases of glanders and black-leg have been reported within the last few days in the Moose Jaw District, and I sent Staff-Sergeant Matthew to make a thorough inspection of horses and cattle in that district, and his report thereof will be submitted to you upon his return, also that of Staff-Sergeant Tracey when he returns from the Grenfell District.

To prevent as far as possible the exportation of any diseased animals from the Territories, I have issued instructions to the different officers commanding divisions that all cattle shipped from their respective districts must be examined by the police, and if any disease is detected the suspected animals are to be detained until inspected by a qualified Veterinarian.

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

L. W. HERCHMER,
Commissioner.

To the Honourable
The Minister of Agriculture,
Ottawa.

SALTCOATS, 23rd October, 1897.

Re shipments of cattle by Gordon & Ironsides from Saltcoats District.

SIR,—I have the honour to report in answer to your letter of the 18th October, as follows:—

Total cattle shipped			2,717
"	"	quarantined	27
"	"	released	23
"	"	destroyed	4

Cattle were released on certificates of T. V. Simpson, V. S., the certificates were sent in to Regina at the time. Constable Ashe reports that the four head destroyed were buried.

Detail statement attached. I inclose a certificate from T. V. Simpson, V. S., for 12 head that were released on the 20th October.

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

J. A. McGIBBON,
Inspector.

To the Officer Commanding
North-west Mounted Police,
Regina.

Department of Agriculture.

GORDON & IRONSIDES.

CATTLE SHIPMENTS, 1897, FROM SALTCOATS.

Date	Number of Cattle.	Number Quarantined.	When Released and Number.	Owner.	Name of Inspecting Officer.	Remarks. Diseased Animals how Disposed of.
1897.						
Sept. 21	70	None.	None.....	Gordon & Ironsides..	S. S. McNamara.....	
Total.	70					

J. A. McGIBBON,
Inspector.

GORDON & IRONSIDES.

CATTLE SHIPMENTS, 1897, FROM YORKTON.

Date.	Number of Cattle.	Number Quarantined.	When Released and Number.	Owner.	Name of Inspecting Officer.	Remarks. Diseased Animals how Disposed of.
1897.			1897.			
July 22	201	1	1—Oct. 20.	Gordon & Ironsides..	Insp. McGibbon and Const. Ashe	Released on certificate of W. Simpson, V. S.
Aug. 2	237	18	11—Aug. 8. 7—Oct. 20.	do ..	Const. Ashe	do do
do 2	68	None.	None... .	do ..	do	
do 13	182	5	1—Oct. 20.	do ..	do	On certificate of W. Simpson, V. S. four destroyed and buried.....
do 20	202	1	1—Oct. 20.	do ..	S. S. McNamara....	On certificate of W. Simpson, V. S.
do 23	34	None.	.. ..	do ..	Const. Ashe	
do 26	126	2	2—Oct. 20.	do ..	do	do do
do 30	17	None.	.....	do ..	do	
Sept. 7	207	do .	.....	do ..	Ashe and Chisholm .	
do 10	187	do .	.....	do ..	Const. Ashe	
do 14	238	do .	.....	do ..	do	
do 21	70	do .	....	do ..	do	
do 30	83	do .	.....	do ..	do	
Oct. 12	238	do .	.....	do ..	do	
do 18	234	do .	.....	do ..	S. S. McNamara....	
do 19	233	do .	....	do ..	Const. Ashe	
do 23	90	do .	.....	do ..	do	
Total.	2,647	27	23			Total destroyed, four.

J. A. McGIBBON,
Inspector.

W. S. ASHE,
Constable.

This is to certify that I have to-day released the following cattle free from contagious disease, the property of Gordon & Ironsides:

One dark red steer white hind feet, brand =. One roan spotted steer, brand =. One white and red spotted steer, brand =. One white steer spotted red, droop horns, brand =. One red and white spotted steer, brand =. One small red and white spotted steer, brand =. One red steer white back, droop horns, brand =. One dark red steer, brand=. One dark red muley steer, brand =. One red and white spotted steer, brand =. One red muley, white spots on back and belly, brand =. One light red steer, white on belly, brand =.

T. V. SIMPSON, *V. S.*

YORKTON, 20th October, 1897.

SALTCOATS, 28th October, 1897.

SIR,—I have the honour to report that the shipments of cattle made up to date by J. Wake make a total of 925. They were all inspected. One head was isolated on the 6th August for lump jaw, and treated by T. V. Simpson, V. S. On the 25th September I released this animal. S. S. McNamara and myself inspected it and considered it free from the disease.

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

J. A. McGIBBON,
Inspector.

To the Officer Commanding
North-west Mounted Police,
Regina.

JOHN WAKE.

CATTLE SHIPMENTS, 1897, FROM SALTCOATS.

Date.	Number of Cattle.	Number Quarantined.	When Released and Number.	Owner.	Name of Inspecting Officer.	Remarks. Diseased Animals, how disposed of.
1897.						
Aug. 6	90	1	Sept. 25..	Wake	Constable Chisholm...	Released on 25th September cured; treated by Simpson, V.S. and shipped on 28th September; examined by Inspector McGibbon and S. S. McNamara.
" 6.	17	. .	....	"	.....	From Churchbridge, not inspected.
" 27.	121	None.	.. ....	"	S. S. McNamara.....	Heard from T. Carlton that the animals were all sound.
" 30.	65	" .	.....	"	Constable Ward	From Churchbridge.
Sept. 11.	70	" .	....	"	Inspector McGibbon & S. S. McNamara....	
" 25.	122	" .	....	"	S. S. McNamara	
Total.	485					

J. A. McGIBBON,
Inspector.

Department of Agriculture.

CATTLE SHIPMENTS, 1897, FROM YORKTON.

Date.	Number of Cattle.	Number Quarantined.	When Released and Number.	Owner.	Name of Inspecting Officer.	Remarks. — Diseased Animals, how disposed of.
1897.						
Sept. 11.	160	None.....		Wake.....	Constable Ashe.....	
" 25.	280	"		"	"	
Total	440					

J. A. McGIBBON,
Inspector.

NORTH-WEST MOUNTED POLICE.
SALTCOATS, 23rd October, 1897.

SIR,—I have the honour to state that the total number of cattle shipped by E. Kennedy up to date amounts to 70 head. They were inspected and were found free from lump jaw. See statement attached.

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

J. A. McGIBBON,
Inspector.

To the Officer Commanding,
North-west Mounted Police,
Regina.

CATTLE Shipments, 1897, from Yorkton by E. Kennedy.

Date. 1897	Number of Cattle.	Name of Inspecting Officer.	Number Quarantined.	When Released and Number.	Owner.	Remarks. — Diseased Cattle, How Disposed of.
Sept. 21.	70	Constable Ashe..	None.....	.....	E. Kennedy.	

W. S. ASHE,
Constable.

J. A. McGIBBON,
Inspector.

SALTCOATS, 23rd Oct., 1897.

To Officer Commanding N.W.M.P.,
Regina.

SIR,—I have the honour to report to you that Messrs. Gordon & Ironsides, and J. Wake brought in the following cattle as stockers, and they were inspected by the police. One head has been quarantined and is under treatment. The balance are free from disease.

Brought to Yorkton by Gordon & Ironsides	641
" " Saltcoats by J. Wake	31
Total	672

See two forms attached.

J. A. McGIBBON,
Inspector.

CATTLE Brought into the Country at Saltcoats, as Stockers.

Date. 1897	Number of Cattle.	Number Quarantined	When Released Number	Name of Inspecting Officer.	Owner.	How Brought in Train or Trail.	Remarks.
Sept. 25.	31	None.....	....	Insp. McGibbon	J. Wake..	Train.....	Free from disease.

J. A. McGIBBON,
Inspector.

YORKTON, October 23rd, 1897.

CATTLE IMPORTED.

Date. 1897	Number of Cattle.	Name of Inspecting Officer.	Number Quarantined	When Released and Number.	Owner.	Remarks.
Oct. 12.	80	Const. Ashe...	None.	....	Gordon & Ironsides	Stockers.
18.	163	do ...	None.	.....	do	
22.	398	do ...	1	.....	do	Under treatment of V.S. Simpson.
Total...	641					

W. S. ASHE,
Constable.

J. A. McGIBBON,
Inspector.

Department of Agriculture.

YORKTON, 23rd October, 1897.

The Commissioner
North-west Mounted Police
Regina.

SIR,—As I have been requested to make a report of the work performed by me since last November, on behalf of the Department of Agriculture, I wish to state that the only time I have done work for the department was on August 15th, when I inspected a number of cattle, the property of Gordon and Ironsides. I found four steers badly affected with actinomycosis and advised their destruction; while a few of the steers were found to be affected with a mild form of the disease, these latter were quarantined and treated for actinomycosis and were eventually released.

Respectfully yours,

T. V. SIMPSON, V.S.

NORTH-WEST MOUNTED POLICE.

BATTLEFORD, 1st November, 1897.

SIR,—I have the honour to append, herewith, report on work performed for Department of Agriculture, as requested by the Commissioner :—

Poundmaker's Reserve. Anthrax developed in October, a number of animals died, also at Bresaylor. Carcasses destroyed.

Visited Poundmaker, Thunderchild's and Moosomin's Reserves. Eight animals had died on Poundmaker's since my last visit in October, gave written instructions *re* destruction of carcasses, which were fully carried out. 18th, 19th, 20th, 21st, and 22nd of December, 1896, were the days of my visit. Disease was anthrax.

Animals reported with hoof disease at Moosomin and Thunderchild Reserves (winter camp), 6th, 7th and 8th January. Twenty-eight animals affected; recommended and advised as to treatment.

Animals still reported dying at Poundmaker's, 9th, 10th and 11th January; cannot give an exact report of the number of deaths, but the Instructor had all carcasses burnt as I ordered on my previous visit. Anthrax was still depleting the cattle on this reserve, examined on above dates.

Animals reported dying on Stoney and Red Pheasants Reserves, from supposed infectious and contagious disease. Examined all the animals on both reserves, 12th and 13th January. Animals on Stoney reserve were dying from anæmia, those on Red Pheasant from Hoof Disease and debility, advised as to care and treatment.

Animals reported dying from contagious disease at one St. Heureux's, Jackfish, Lake. With one exception they were all late calves; death was due to anæmia through want of proper nutrition. 6th, 7th, 8th and 9th February.

Steer reported with actinomycosis, examined animal, ordered owner, J. M. Skelton, to quarantine animal. Advised owner to destroy animal which was done. June 17th examination made; animal destroyed by owner on July 5th.

Horses reported with glanders at Pipestone Creek; June 26th left to examine, found two suffering from catarrhal influenza, ordered owner to have animals isolated which action was taken, the animals recovered. Returned on 28th June—3 days.

Animal the property of Mr. Daudlin at Jackfish Lake reported with glanders. Left June 30th, examined animal the following day, found the animal, a mare, suffering from chronic glanders, shot her and destroyed carcass. Returned July 2nd.

Animals reported dying at Pare's Ranch opposite elbow, supposed contagious and infectious disease. Left the 24th July arriving at ranch on the 26th July. From the description of symptoms, death was due to typhoid fever. Forwarded a full and detailed report *re* above case, stating full particulars. Returned on the 29th instant.

I have, etc.,

J. PRINGLE,
Vet. S-Sergt.

The Officer Commanding,
"C" Division.

NORTH-WEST MOUNTED POLICE,

GRENFELL, 4th Nov., 1897.

DEAR SIR,—The following are the only two cases of contagious disease that I have inspected since November, 1896.

1st. On January 18th I inspected an ox owned by one J. Bird and found same to be suffering from actinomycosis (lump jaw). I recommended the animal to be slaughtered, which was done by owner.

2nd. On September 24th, I inspected a horse owned by one R. Brennen of Broadview. The horse was suspected to be affected with glanders, but proved only to be suffering from a bad attack of influenza.

I am, sir, your obedient servant,

W. A. GEDDES, *V.S.*

Officer Commanding
North-west Mounted Police,
Regina.

CALGARY, 31st October, 1897.

SIR,—I have the honour to submit the following annual report of quarantine duty performed by me in "E" Division for year ending 31st October, 1897. Up to 14th May, the then veterinary staff sergeant destroyed 4 animals affected with actinomycosis.

I was transferred to this post on 14th May, 1897.

In the month of May destroyed 6 animals affected with actinomycosis and quarantined 4 suffering from the same disease.

June. Destroyed 3 animals affected with actinomycosis.
" Quarantined 1 " "
July. Destroyed 4 " "
" Quarantined 2 " "
" Destroyed 13 horses affected with glanders.
" Quarantined O. A. Chritchley's and J. Hayes' ranches by order of Dr. McEachran.
August. Destroyed 3 animals affected with actinomycosis.
" Quarantined 3 " "
" Destroyed 2 horses affected with glanders.
Sept. Destroyed 1 " "
Oct. Quarantined 1 animal affected with actinomycosis.

The cattle of this district are numerous and in first class condition; quite a number have died during the past summer, and although they were not reported in time for me to hold a *post mortem* examination, I am fully convinced by the history that the disease was black leg or anthrax.

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

GEO. T. STEVENSON, D.V.S.
Vet. Staff-Sergt.

The Officer Commanding
"E" Division, North-west Mounted Police,
Calgary.

NORTH-WEST MOUNTED POLICE,
MAPLE CREEK, 31st October, 1897.

SIR,—I have the honour to make my annual report of work done for the Department of Agriculture for the year ending 31st October, 1897.

April 30th. Inspected eight head of horses and ten head of cattle for Mr. Marshall, settler at Egg Lake, near Ten Mile Crossing and consider them free from disease.

May 3rd. Inspected Mr. Walton's sheep, of Medicine Hat, and found them suffering with scab, and quarantined and treated them.

May 12. Inspected a cow for Mr. Davis, suffering with actinomycosis, and had her quarantined.

May 20th. Inspected Mr. Walton's sheep, of Medicine Hat, suffering with scab, still in quarantine, also Mr. Russell's sheep, reported to be suffering with scab, but consider them free from disease.

May 25th. Inspected Mr. Parson's horse and found him suffering with glanders and had him destroyed and buried.

June 3rd. Inspected one horse for Percy Drewery and found him suffering with glanders and had him destroyed and buried.

June 4th. Inspected a band of horses for Mr. Dixon, of Maple Creek, and consider them free from disease.

June 16th. Inspected Mr. Walton's sheep, of Medicine Hat, which have been suffering with scab, and consider them free from disease and released them from quarantine.

Also inspected one horse for Mr. Todd, at Maple Creek, and found him suffering with acute glanders, and had him destroyed and buried

Inspected one horse for Mr. Phillip Miller, from across the Line, and consider him free from disease.

August 2nd. Inspected twenty-six head of horses and two mules for R. W. Mack, from the states, Montana, and consider them free from disease.

August 2nd. Inspected ten head of horses for Mr. Antelope, an Indian from Montana, and consider them free from disease.

August 10th. Inspected one horse for Mr. Porter, of Medicine Hat, reported to be suffering with glanders, but consider him free from disease.

August 13th. Inspected five horses for Mr. Puchard, from Montana, and consider them free from disease.

August 21st. Inspected five horses for Mr. Allen at Ten Mile Crossing and consider them free from disease.

August 23rd. Inspected a band of horses for Mr. Mitchell, of Medicine Lodge, reported to have glanders, but consider them free from disease.

August 24th. Inspected two steers for Mr. Weiss, of Josefsburg, suffering with actinomycosis and had them quarantined.

August 27th. Inspected twenty-seven head of horses and one spring colt, for Mr. Weatherby, from Montana, and consider them free from disease.

September 1st. Inspected one horse for Mr. Smith, from Montana, and consider him free from disease.

September 2nd. Inspected one horse for Mr. Porter, of Medicine Hat, and found him suffering with glanders, and had him destroyed and buried.

September 10th. Inspected about one hundred horses for the Circle Diamond Round up, while gathering American cattle in Canada.

September 20th. Inspected two horses for Mr. Heffer, from Montana, and consider them free from disease.

September 25th. Inspected one horse for Mr. McKay, from Montana, and consider him free from disease.

October 2nd. Inspected six horses for Mr. Wilton, from Montana, and consider them free from disease.

Oct. 11th. Inspected one horse for Samuel Cronin, from Montana, and consider it free from disease.

Oct. 20th. Inspected one horse for Mr. Armstrong, from Montana, and consider it free from disease.

Oct. 23rd. Inspected two horses for Mr. Clark and one for Mr. Wynkoff, and consider them free from disease.

Oct. 25th. Went to Medicine Hat en route to Josefesburg and inspected one heifer reported having actinomycosis, and found her suffering with the disease and ordered her quarantined or destroyed and buried. She was quarantined.

Oct. 27th. Inspected two horses for Mr. Laframbois, of Medicine Hat, and consider them free from disease.

Oct. 30th. Inspected one horse for Mr. Axton, from Montana, and consider him free from disease.

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

J. W. FARR,
Staff Sergeant, Veterinary Surgeon.

To the Officer Commanding "A" Division,
Maple Creek, N.W.T.

PRINCE ALBERT, 31st October, 1897.

SIR,—I have the honour to make the following report on the stock in this district.

The general health and condition of the stock in this neighbourhood is good, though quite a number of horses have died during the last summer from typho-malarial fever, but no new cases have been reported during the last month.

I had thirty-four cases of glanders in this district in the last year, all of which were destroyed and the carcasses either buried or burned and the stables disinfected. I found the mallein test a great help in diagnosing seven of the cases. Some nine horses which had been exposed to glanders or were showing slignt symptoms of glanders, were tested. Seven yielded to the test and were destroyed, and their carcases buried. The other two were North-west Mounted Police horses, and were released after a second test.

I had fourteen cases of actinomycosis in cattle during the last year, eight of which were destroyed and the carcases burned or buried, and the stables disinfected. Three were released after treatment, and three are still isolated and under treatment. I have one horse isolated which is suffering from mange, and is under treatment.

I saw the carcases of two cows which had suffered from tuberculosis, and ordered them to be burned. I administered the tuberculin test to twenty head of cattle, three of which yielded to the test and were destroyed, and tubercular deposits were found in the lungs and in other parts of the body. The carcases of the dead animals were burned.

Nine outbreaks of symptomatic anthrax occurred in this district during the last year, two at Muskeg Lake, five in the neighbourhood of Duck Lake, and two in the neighbourhood of Saskatoon. I ordered the carcases of the dead animals to be burned, and isolated all of the cattle which had been exposed to the disease, and advised the owners to use some of the different preventatives, and every precaution has been taken to stamp out the disease. The only cattle affected at the present time is one bunch which is isolated at Duck Lake.

I have examined quite a number of cattle which were shipped from the stock yards at Prince Albert and McDole, and found them all to be in good health and condition.

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

J. J. MOUNTFORD, *V.S.*,
V. S. Sergt.

The Officer Commanding "F" Division,
Prince Albert.

No. 29.

REPORT OF VETERINARY INSPECTOR AT ROSSLAND, B.C.

(R. HICKINGBOTTOM, V.S.)

ROSSLAND, BRITISH COLUMBIA, 15th October, 1897.

DEAR SIR,—I have the honour to report the work I have done since my appointment, up to October 15th, which I herewith inclose.

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

R. HICKINGBOTTOM.
Veterinary Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

REPORT FROM MAY 17TH TO OCTOBER 15TH, 1897.

ROSSLAND, B.C., October 15th, 1897.

For month of May:—

No. horses inspected for Rossland	57
No. of horses inspected with glanders	3
No. horses returned from pasture	6
No. mules inspected	2
No. horses inspected for Waneta	2
No. horses inspected for Sandon	11
No. mules inspected for Sandon	23
No. cows inspected for Rossland	8
No. beef cattle inspected for Rossland	17

For month of June:—

No. horses inspected for Rossland	51
No. mules inspected for Rossland	2
No. cows inspected for Rossland	26
No. cows condemned	2
No. horses inspected for Trail	11
No. cows inspected for Trail	2
No. fat cattle inspected for Trail	2
No. horses inspected for Nelson	49
No. mules inspected for Nelson	11

For month of July:—

No. horses inspected for Rossland	22
No. Mules inspected for Rossland	3
No. horses inspected for Sandon	12
No. Mules inspected for Sandon	26
No. horses inspected for Nelson	19
No. mules inspected for Nelson	6
No. horses inspected for Thomson's Landing	5
No. mules inspected for Thompson's Landing	11

For month of August:—
No. horses inspected for Thompson's Landing..... 13
No. mules inspected for Thompson's Landing..... 2
No. horses inspected for Trail..... 2

For month of September:—
No. cows inspected for Trail..... 12
No. calves inspected for Trail..... 5
No. horses inspected for Rossland 3

For month of October:—
No. horses inspected for Rossland..... 2

R. HICKINGBOTTOM,
Veterinary Inspector.

No. 30.

REPORT OF VETERINARY INSPECTOR AT NELSON, B.C.

(J. A. ARMSTRONG, V.S.)

NELSON, B.C., 1st November, 1897.

SIR,—I have the honour to submit to you this my report in connection with quarantine matters since my appointment as inspector, on July 7th, 1897. Since that time there has entered the following live stock:—

Twenty-five head of milch cows, to which I gave the tuberculin test and found them sound.

Sixteen head of hogs which I inspected and found free from disease.

Twenty-four head of horses which were inspected, none diseased.

One hundred and five head of butchers' cattle which I inspected and found free from disease; I also saw them slaughtered but found no trace of tuberculosis.

There has been no disease here with the exception of a few cases of strangles in a mild form which recovered quickly under treatment.

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

J. A. ARMSTRONG.

To the Honourable
Minister of Agriculture,
Ottawa.

No. 31.

REPORT OF VETERINARY INSPECTOR AT AINSWORTH, B.C.

(J. HENRY, V.S.)

AINSWORTH, B.C., 31st October, 1897.

SIR,—I have the honour to hand you herewith report of animals examined, and fees collected, which includes expenses.

I am not sure that this is the correct form, but had no guide in the matter.

I did not use test for tuberculosis because I was not aware that it was necessary, not having received any instructions to that effect, until after importations of cows had ceased.

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

J. HENRY, *V.S.*

To the Honourable,
The Minister of Agriculture,
Ottawa.

STATEMENT of Animals Examined and Fees Collected.

	Owner.	Fees.
May 12th,	1 horse, Lot Willey	$5 00
	6 mules, do	
do 15th,	1 cow, C. H. Bonnor	1 00
do 19th,	12 pigs, J. C. Eaton	2 50
do 22nd,	12 horses, Jas Brown	7 50
	3 mules	
do 29th,	1 cow, G. A. Carlson	1 00
June 12th,	1 horse, J. W. Evers	1 00
do 16th,	4 horses, Chas. Archambeault	2 50
July 7th,	1 cow, Jas. Bell	1 00
June 19th,	21 mules, Jas. Anderson	12 50
	2 horses, Ole Paterson	2 00
do 28th,	1 horse, Frank Godon	1 00
do 30th,	4 horses, D. Chisholm	4 00
July, 10th,	1 cow, H.S. DePuy	1 00
do 17th,	2 horses, Jas. A. Roberts	2 00
do 28th,	2 horses, M. P. Bogle	2 00
Aug. 6th,	9 horses, John O'Neil	16 00
do 7th,	2 horses, C. E. Laherty	4 00
do 7th,	2 horses, J. H. Currin	4 00
do 7th,	2 horses, S. W. Smith	4 00
do 7th,	1 horse, Lewis Ehrleuwein	2 00

J. HENRY, *V.S.*

No. 32.

REPORT OF INSPECTOR OF LIVE STOCK CARS AND YARDS.

(M. AUGER.)

SIR,—I have the honour to submit to you my report covering the period from my appointment on the 1st of February last, to the 31st of October, 1897.

I have visited most of the places along the line between the provinces of Ontario and Quebec and the United States, in order to see that the conditions of the agreement made between the Canadian Government and that of the United States concerning the sanitary condition of the cars, were properly carried out. As most of the cattle were shipped from Ontario, my inspection has been confined chiefly to that province.

In consequence of the said arrangements made by you with the Washington authorities, an unprecedentedly large number of cattle were shipped across the border up to the time the Dingley Tariff became law, and this considerably increased the extent of my duties. Since the 1st of February I have visited no less than 114 places once, and some of them more than once, and found that as a rule, the companies were doing their best to observe the agreement made concerning the cleaning and disinfection of the cars going from Canada into the United States. Since the coming into force of the Dingley Tariff, there has been an increased shipment of cattle in transit from Detroit and Windsor, through Canadian territory to other points in the United States. I found that nearly all the cars doing this traffic, particularly those of the Michigan Central, were in sanitary condition, the exceptions being the local cars that were picked up at various points on the other side. Some of these I had to return, and there has since been a decided improvement. The companies have come to understand that it is better to clean and disinfect the cars as soon as they are unloaded. At first I found that the cars used for the local Canadian trade, especially the hog cars, were in a very bad condition, but having seen the different agents of the companies in reference to this matter, the cars are now cleaned as soon as they are unloaded, and are kept in a much better condition than before.

After my duties were extended to cover the entire stock yards, I visited 82 yards, and found them in good condition, except at Collingwood, Stayner, Guelph Junction, Stouffville, Markham, Uxbridge, Brantford, Drumbo, Princeton, Paris, Blackwater and Kirkfield. I found the yards at these places in a bad state, and the agents promised to put them right. Having revisited the first six places named, I found the yards had been put in a proper condition; I have not revisited the other places mentioned, but I intend to do so soon.

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

MICHEL AUGER.
Inspector of Live Stock Cars and Yards.

The Honourable
The Minister of Agriculture,
Ottawa.

No. 33.

CANADIAN CATTLE QUARANTINE AND HEALTH OF ANIMALS REGULATIONS.

ORDER IN COUNCIL CONTAINING REGULATIONS RELATING TO ANIMALS' QUARANTINE AND HEALTH OF ANIMALS.

AT THE GOVERNMENT HOUSE AT OTTAWA.
MONDAY, the 25th day of January, 1897.

Present:

HIS EXCELLENCY THE GOVERNOR GENERAL IN COUNCIL.

Whereas a Memorandum of Agreement concerning changes in quarantine of animals between the United States and Canada, dated at Washington, D.C., December 18th, 1896, having been approved by His Excellency in Council on the 12th January, 1897, it is deemed desirable and important that effect be given thereto from the 1st February, 1897.

And whereas to admit of this it is necessary that the present Cattle Quarantine Regulations be amended.

His Excellency, under the provisions of Chapter 69 of the Revised Statutes of Canada, intituled "An Act respecting Infectious or Contagious Diseases affecting Animals," (as amended by Cap. 13, 59 Vict.) and by and with the advice of the Queen's Privy Council for Canada is pleased to order that all previous Orders in Council relating to contagious diseases among animals and health of animals shall be and the same are hereby rescinded, excepting that portion of the Order in Council of the 12th May, 1888, being Chapter 7 of the Consolidated Orders in Council of Canada, referring to the disease of Sheep Scab, and contained in Sections 35 to 52 inclusive of the said Consolidated Order, and the following substituted therefor, and to take effect from the 1st day of February, 1897:—

The whole of the Cattle Quarantine Service of Canada is under the administration of the Minister of Agriculture.

There is a Chief Veterinary Inspector for the Dominion.

The following are hereby declared Cattle Quarantine Stations:—

1. Charlottetown,	P.E.I.	12. Kootenay,	B.C.
2. Halifax,	N.S.	13. Bedlington,	"
3. St. John,	N.B.	14. Waneta,	"
4. Quebec, (Lévis)	Que.	15. Fort Shepherd,	"
5. Point Edward (Sarnia)	Ont.	16. Osoyoss,	"
6. Emerson,	Man.	17. Huntingdon,	"
7. Estevan,	N.W.T	18. Douglas,	"
8. Wood Mountain,	"	19. New Westminster,	"
9. Willow Creek,	"	20. Vancouver,	"
10. East Milk River,	"	21. Victoria,	"
11. West Milk River,	"		

PRINCE EDWARD ISLAND.

Charlottetown.—

NOVA SCOTIA.

Halifax.—Consisting of nine acres of land in the township of Dartmouth, at or near the narrows, on the eastern side of Halifax Harbour. There are three sheds and some 1,732 feet of fencing.

New Brunswick.

St. John.—Between the dates of April 30th and September 30th of each year, Partridge Island in St. John Harbour is declared a Cattle Quarantine Station.

It has not been found necessary to acquire ground for the other months of the year.

Quebec.

Point Lévis.—This is the chief station for the quarantining of cattle arriving in Canada from Europe.

The ordnance land in connection with the fort opposite the Quebec Citadel is used for the purpose and affords ample accommodation.

There are at this station sheds and board-fenced fields to accommodate over a thousand head of cattle, besides a large number of sheep.

Ontario.

Point Edward, Sarnia.—Consisting of some eighty-two acres of land and wooden buildings situate on a point on River St. Clair north of the Grand Trunk Railway Company's line.

The accommodation here is excellent, thoroughly isolated and capable of accommodating a large number of animals.

Manitoba.

Emerson.—The buildings and property formerly occupied by the British North American Commission and lately as a Government Immigration station, situated on the Red River, and comprising lots Nos. 31 and 33 in the Parish of Ste. Agathe, and a reserve of two townships (12 miles) along the frontier between Canada and the United States affording excellent grazing and complete isolation.

North-west Territories.

The quarantine grounds consist of extensive grazing grounds with corrals, importation of animals being made during summer only.

(*a.*) *Estevan.*—Consisting of Township 1, Range 9, and that part of Township 2, Range 9, lying south of Long Creek or Souris River; and that part of Townships 1 and 2, Range 8, adjoining Townships 1 and 2, Range 9, bounded by the Souris River, Long Creek and the international boundary line, all west of the 2nd meridian.

(*b.*) *Wood Mountain.*—Township 1, Ranges 5 and 6, west of the 3rd meridian.

(*c.*) *Willow Creek.*—All that triangular tract of country bounded on the west by the main stream of Willow Creek, on the east by the North Fork of the same creek, and on the north by a small creek or coulée emptying into the said North Fork.

(*d.*) *East Milk River.*—Being that section of country bounded on the west by the Alberta Railway Coal Company's right of way; on the north by the Milk River, on the east by the most westerly of the two creeks or coulées situate in Township 1, Range 12, west of the 4th meridian, and on the south by the international boundary line.

(*e*) *West Milk River.*—Being all the land lying between the Forks of the Milk River, north of international boundary line.

British Columbia.

No regular cattle quarantine stations have as yet been established in British Columbia, but it is proposed to establish seven stations at the following points respectively:—

(*a.*) *Kootenay*, a customs port, on the east side of the Kootenay River, close to the international boundary. A suitable place to be selected.

(*b.*) *Bedlington*, a customs port, on the east side of the Kootenay River, south of Kootenay, close to the international boundary. A suitable site to be selected.

(*c.*) *Waneta*, a customs port, on the east side of the Columbia River, a few miles north of the international boundary. A suitable site to be selected.

(*d.*) *Fort Shepherd*, on the west side of the Columbia River, on the international boundary a few miles south-west of Waneta. A suitable site to be selected.

(*e.*) *Osoyoos*, a customs port, on the international boundary, on Lake Osoyoos. A suitable site to be selected.

(*f.*) *Huntingdon*, a customs port on the international boundary, and a railway junction, some two hundred miles west of Osoyoos.

(*g.*) *Douglas*,—

(*h.*) *New Westminster*,—

(*i.*) *Vancouver*,—

(*j.*) *Victoria*, a suitable site to be selected.

The Minister of Agriculture is hereby empowered to cancel, as Quarantine Stations, any of the places above mentioned and to select such other sites in exchange for or in addition to the above as he may from time to time deem expedient.

CONTAGIOUS DISEASES AMONG ANIMALS.

HEALTH OF ANIMALS ORDER.

Sec. 1. This order comprising all that follows to and including section 64 may be cited as the Health of Animals Order, and is divided as follows:—

Part I.—*Importation and quarantine. Exportation.*

Part II.—*Transit of Animals in Bond.*

Part III.—*Conveyance and Shipment of Animals.*

PART I.

IMPORTATION AND QUARANTINE.

(*Africa.*)

Sec. 2. The importation of animals from Africa is prohibited.

(*Australasia and the Orient.*)

Sec. 3. The importation of animals from Australasia and the Orient through Pacific Ocean ports, is prohibited, except at Vancouver and Victoria.

(*Europe.*)

Sec. 4. The importation into Canada of live animals, coming from Europe, shall be prohibited, except at the ports of Charlottetown, Halifax, St. John, N.B., and Quebec, and such other ports as may hereafter be indicated by the Minister of Agriculture.

Sec. 5. All animals arriving in Canada from Europe through any port on the Canadian seaboard shall be subject to inspection at such port by officers who may, from time to time be appointed for that purpose.

Sec. 6. All neat cattle coming from Europe shall be subject, on entering Canada to a probationary quarantine of ninety days before being allowed to come in contact with Canadian cattle, or to be exported to any other country, and shall not leave such quarantine until duly discharged therefrom by the quarantine officer.

Sec. 7. Any neat cattle coming from any county or district in Europe, in which pleuro-pneumonia is officially reported to exist, or any neat cattle that have been inoculated for pleuro-pneumonia, are prohibited from entering any port in Canada; and all importers or their agents, before embarking any neat cattle for Canada, from Europe, are requested to obtain a certificate from a properly constituted authority

that the county or district from which they come is free from the disease above stated and that the cattle have not been inoculated for pleuro-pneumonia.

Sec. 8. All importers are obliged to certify under oath, before making customs entry, the locality in Europe from which any neat cattle have come.

Sec. 9. A quarantine of 15 days shall be enforced upon all ruminants imported from countries in which foot-and-mouth disease has existed during the six months preceding such importation; a quarantine of 15 days shall be enforced upon all swine imported from all countries other than the United States.

Sec. 10. The inspecting officer shall visit the boats, ships, vessels, cars or vans, and the animals coming into the said ports, superintend the landing of such animals, order them to be placed and disposed of according to the requirements of the case, and see that those to be quarantined are conveyed to the grounds assigned for quarantine, and shall also superintend the landing and disposal of fodder, litter, blankets, troughs and other objects which may have been used by or for the said animals in transit to Canada, either on board ships or cars.

Sec. 11. All horses imported from Great Britain or the continent of Europe destined for Montreal, must be, if the Minister of Agriculture so directs, inspected at the port of Quebec during summer navigation; in absence of special direction of the Minister of Agriculture they may be inspected at the port of Montreal.

Sec. 12. When no contagious disease is discovered, horses and articles used in their care may proceed to their destination.

Sec. 13. Horses must be accompanied by the certificate of a qualified veterinarian and the local authority, at the time of their embarkation, that they have not been brought from a place or locality where glanders "Maladie du Coït" or other infectious or contagious disease was at said time in existence.

Sec. 14. All importers of horses are obliged to certify under oath that the certificate produced applies to the horse which it purports to describe and to no other, and that the locality named is the actual one from which said horse came. Any attempt at evasion or misrepresentation will render the horse liable to seizure and detention pending the orders of the Minister of Agriculture as to its disposal.

Sec. 15. The animals thus subjected to quarantine shall be treated and dealt with under the direction of the inspecting officer, and the articles used in connection with the said animals shall be in like manner employed in their care and maintenance, under the same direction and supervision.

Sec. 16. Should it be found necessary to destroy any of the said animals, or all or any portion of the articles used in the care of the said animals, such destruction shall take place under the orders and supervision of the superintending officer, and in the manner prescribed by him, but not unless permission to that effect has been previously given by the Minister of Agriculture.

Sec. 17. The officers appointed to carry out the law and the foregoing regulations shall have free access to any boat, ship, vessel, car, van, or to any place where animals may be found, in order to inspect the same, and under instructions from the Minister of Agriculture, deal with infected animals and the articles employed in their service, in manner contemplated by the Act. Any person contravening any of the provisions of said act or of any regulations made thereunder is subject to the penalties prescribed thereby.

Sec. 18. The said inspectors or officers may, if it be deemed necessary, order the cleansing and purifying of any infected place, vehicle or other article so inspected, and direct such precautionary measures to be taken as may by him or them be considered advisable, pending the decision of the Minister of Agriculture as to the ultimate disposal of such vehicle or other article.

Sec. 19. The expense of feeding, attending to, and of providing for any animals detained in quarantine shall be borne by the owner thereof, with the exception of that for the use of grounds and shelters; and such cost, if incurred by the inspector of quarantine, shall be paid before the animals are permitted to leave the quarantine; and in case of refusal or neglect to pay the same, the inspector shall, on being so ordered by the Minister of Agriculture, cause the said animals to be sold to meet the said cost,—the balance, if any, to be handed over to the owner.

Sec. 20. The quarantine shall be under the care and subject to the orders of the officers appointed for that purpose, who shall have the general superintendence of the servants or other persons, and of all other matters connected therewith.

IMPORTATION OF ANIMALS FROM THE UNITED STATES.

Breeding Stock.

Sec. 21. All cattle to be admitted for breeding purposes shall be accompanied by:—

(*a.*) A declaration made by the importer that they are actually for breeding and no other purposes.

(*b.*) A certificate signed by a government veterinarian that they have been subjected to the tuberculin test and found free from tuberculosis. Such certificates must show the date of testing and chart of reaction, with a description of the animal giving age and markings. The importer may be required to swear that the certificate refers to the animal represented.

(*c.*) A certificate of inspection signed by a government veterinarian showing that the animals are free from contagious disease, and that no contagious disease of cattle (excepting tuberculosis and actinomycosis) exists in the district whence they came.

(*d.*) When not accompanied by such certificates the animal or animals must be detained in quarantine one week and subjected to the tuberculin test.

(*e.*) Should they be found tuberculous they must be returned to country from which shipped or slaughtered without compensation.

Fat Cattle and Cattle for Feeding, including Range Cattle for Stocking Ranches.

Sec. 22. This class of animals shall be accompanied by a certificate of inspection signed by an official veterinarian showing that the animals are free from contagious disease and that no contagious disease of cattle (excepting tuberculosis and actinomycosis) exists in the district whence they came.

Settlers' Cattle.

Sec. 23. Settlers' cattle when accompanied by certificates of health to be admitted without detention, when not so accompanied they must be inspected. Inspectors may subject any cattle showing symptoms of tuberculosis to the tuberculin test before allowing them to enter.

Sec. 24. Any cattle found tuberculous to be returned to the United States, or killed without indemnity.

Swine.

Sec. 25. Swine may be admitted for breeding purposes subject to a quarantine of fifteen days.

Sec. 26. Swine may be admitted when forming part of settlers, effects when accompanied by a certificate that Swine Plague or Hog Cholera have not existed in the district whence they came for six months preceding the date of shipment, when not accompanied by such certificate they must be subject to inspection at port of entry. If found diseased to be slaughtered without compensation.

Swine for Slaughter in Bond.

Sec. 27. Swine may be imported into Canada without inspection for the purpose of being slaughtered; the importer shall enter the same for warehouse upon the usual form of such entries, stating upon its face the number, live weight and value of the herd, and the rate and amount of duty as prescribed by the tariff in force at the time of making such entry. Such importer shall then execute a bond to the

Queen, with two sufficient sureties to the satisfaction of the Collector of Customs at the port where such carcases are imported or warehoused, in double the amount of such duty; the condition of such bond shall be that upon due exportation within one year of the products of the swine so imported, slaughtered and cured in the form of pork, bacon, hams, shoulders or lard, or payment of duty secured by the said bond, then the said bond shall be and become null and void, otherwise shall remain in full force and virtue.

Sec. 28. After the reception of the swine into the bonding warehouse or slaughter house, it shall not be lawful to remove any of them alive therefrom under any pretense or for any reason whatever.

Sec. 29. The product of such swine, after having been slaughtered, shall not be removed for any purpose from the bonding place without a permit from the Collector or proper officer of Customs, as in the case of all other bonded goods.

Sec. 30. The bond given by the importer, as before specified, shall be cancelled upon payment of the current rate of duty imposed upon swine imported into Canada or upon exportation of sixty-five per cent of the live weight of the swine weighing two hundred pounds and under, or of exportation of seventy per cent of the live weight of the swine weighing over two hundred pounds as originally entered in the form of pork, bacon, hams, shoulders and lard; and if a less quantity than seventy per cent is exported, the duty shall be paid upon the quantity deficient, at the rate imposed upon the live animal, in proportion to value.

Sec. 31. Slaughtered swine may be imported to be cured and packed in bond and entered in the usual way for warehouse, and be placed in the premises established as a warehouse of this class for the special purpose of curing and packing. The weight and value of such carcasses shall be stated upon the face of the entry for warehouse, and the importer shall execute a bond to the Queen with two sufficient sureties to the satisfaction of the Collector of Customs at the port where such carcasses are imported or warehoused, in double the amount of duty accruing thereupon, to be calculated according to the highest rate of duty imposed by the tariff upon any part or parts of the said carcasses, conditioned for the due exportation of the same or payment of duty within one year from date of first entry.

Sec. 32. The meats being the produce of such carcasses, shall be calculated for exportation or duty as the case may be, after allowing in respect of meat in pickle a reduction of five per cent from the original weight or weight for first entry, and these percentages may be deducted by compensation entries from the warehouse books at the time of each ex-warehouse entry, in proper proportions, and if any less quantity is exported than the original weight, less the allowance above specified, the duty shall be collected upon such deficiency at the rate of duty required at the time by law upon meats of the kind exported.

Sec. 33. The live swine imported for slaughter and the swine carcasses introduced for curing and packing shall not be permitted to come in contact with Canadian animals.

Sec. 34. The cars, trucks and other vehicles employed in such traffic shall not be used for the transport of Canadian animals.

Sec. 35. The bonding places hereinbefore mentioned are hereby declared to be infected places, subject to such regulations as the Minister of Agriculture may see fit to adopt for the purpose of preventing the introduction of disease among the live stock of the country.

Sec. 36. The transport of the swine imported for slaughter and of the carcasses imported to be cured and packed, and every proceeding in relation to the said traffic shall be subjected to inspection and regulation in pursuance with the meaning of this Order under the direction of the Minister of Agriculture.

Sec. 37. Swine may be imported at any Customs warehousing port of entry in Canada in bond subject in all respects to the provisions in relation thereto contained in this Order.

SHEEP.

Sec. 38. Sheep for breeding and feeding purposes may be admitted subject to inspection at port of entry, and must be accompanied by a certificate signed by a

government inspector, that sheep scab has not existed in the district in which they have been fed for six months preceding the date of importation. If disease is discovered to exist in them they may be returned or slaughtered.

Sec. 39. Sheep for slaughter will be admitted without certificat'on or inspection

HORSES AND MULES.

Sec. 40. Horses may be admitted for general purposes, for sale, or for stocking ranches and also cow ponies for cattle ranches, or horses which form part of settlers' effects, on inspection at port of entry only.

Sec. 41. Horses may be admitted for racing, show, exhibition or breeding purposes on inspection at the port of entry.

Sec. 42. Horses may be admitted for pasturing or winter feeding on inspection at the port of entry.

(N.B.—Inspection of horses admitted under the above clauses shall not be enforced unless ordered by the Minister of Agriculture when deemed expedient or necessary).

Sec. 43. Horses may be admitted for temporary stay, teaming or pleasure driving at points along the frontier for a period not exceeding one week, on permit by the customs officer at port of entry, such permit may be extended for one week, but no longer. Should he observe nasal discharges or other evidence of disease he may detain the animals and report the circumstances to the district inspector who will decide whether the animal will be admitted or not.

Sec. 44. Horses used for riding or driving to or from points in Manitoba, Northwest Territories or British Columbia, on business in connection with stock raising or mining, and horses belonging to Indian tribes may be admitted without inspection but must report to customs officer both when going out and coming in.

INFECTED VESSELS.

Sec. 45. All vessels which have carried cattle, among any of which "*Foot and Mouth Disease*" shall have been found, shall be prohibited, for a period of sixty days thereafter, from loading cattle in any Canadian ports; and, further until such vessels shall have been thoroughly cleansed and disinfected, under the supervision of an inspector appointed by the Minister of Agriculture.

General Disposition.

Sec. 46. Collectors of customs throughout Canada shall see that the various exigencies and requirements of the present order are fulfilled before granting any permit which requires, before it is given, any act to be performed, or any inspection or other proceeding to be made or taken, and they shall see that the prohibitions prescribed and rules established by this order as hereinbefore mentioned, and the instructions which may be issued by the Minister of Agriculture are obeyed, and in case of any infraction of the provisions of the present order, or any of them, taking place, they shall report at once to the Minister of Agriculture the nature and extent of such infraction.

EXPORTATION.

Sec. 47. No animals shall be permitted to be placed on board any steamship or other vessel for exportation at any Canadian port till they have been inspected by a duly authorized veterinary inspector at such port, and certified by him to be free from contagious disease; such inspection to be made within twenty-four hours of embarkation.

Sec. 48. All animals for exportation by sea must reach the port of exportation eighteen hours before shipment for rest and inspection; and in order to enable the inspector to make a careful, individual examination, owners of such animals must notify him at least twenty-four hours before embarkation. Such notice must be in writing and sent to the office of the inspector.

Sec. 49. Inspectors will mark each animal inspected by them "V. R." Animals will not be allowed to be embarked without such mark and a certificate of inspec-

tion stating the name of the owner, number, sex and class of animals and freedom from contagious disease.

Sec. 50. All inspections for Imports and Exports must be made in daylight.

PART II.

TRANSIT OF ANIMALS FROM THE UNITED STATES.

Cattle.

Sec. 51. The transit of animals shall be subject to such regulations as the Minister of Agriculture shall from time to time prescribe.

Sec. 52. Animals will be admitted from any port of the United States into Canada for transit to any other port of the United States in bond, and (with the exception of swine) will be admitted to Canada in bond for transit to any Canadian port for exportation by sea to Europe or elsewhere. Such animals to be subject to inspection at the Canadian port of shipment.

PART III.

CONVEYANCE AND SHIPMENT OF ANIMALS.

Sec. 53. To provide against the possibility of diseased animals being carried from place to place, through Canadian territory, or conveyed to and shipped from Canadian ports, it is ordered as follows:—

Sec 54. An inspection of animals may be made at any place or port in Canada to which animals are carried in the manner prescribed by the instructions which may be given from time to time by the Minister of Agriculture.

Sec. 55. Such animals as may be found to have been exposed to contagious or infectious disease, or to be labouring under contagious or infectious disease, shall be either detained or slaughtered in pursuance of the provisions of the said Act, under the direction of the Minister of Agriculture.

Sec. 56. The officers appointed to carry out the law and the present regulations shall have free access to any boat, ship, vessel, car, van or other vehicle, or to any place where animals may be found, in order to inspect the same, and under the instructions from the Minister of Agriculture, deal with animals having been exposed to disease or with diseased animals, and the articles employed in their service in the manner contemplated by the said Act, under the penalties prescribed thereby against any person contravening any of the provisions thereof or of any regulations made thereunder.

Sec. 57. The said inspectors or officers may, if it be deemed necessary, order the cleansing and purifying of any place, vessel, vehicle or other article having been made use of to receive or transport, or being about to receive or transport, animals, and direct such precautionary measures to be taken as may be considered advisable.

Sec. 58. Proprietors of or dealers in stock during the progress of inspection at the port of exportation shall, with the hands at their disposal, give every required assistance to the inspector at such port, and move the animals according to the directions given to them by the said inspector. In case the owner refuses or neglects to furnish the necessary assistance, the inspector may employ men at the cost of the shipper, which shall be paid to the inspector before a clean bill of health is given.

Sec. 59. In order to prevent the danger of contagion or infection resulting from the overcrowding or overlading of animals on board ship in any port of Canada, the inspector shall not permit cattle or other animals to be laden on board any ship in such port, until he shall be satisfied that suitable space and provision has been made for the number of cattle or other animals to be shipped on board such vessel, and that a greater number of animals shall not be shipped than such ship can safely and

properly carry, and such inspector shall not grant a clean bill of health to such ship until all such provisions as aforesaid shall be made to his satisfaction.

Sec. 60. The collector of customs of any port where such inspection as aforesaid is adopted and required shall not give a clearance to any ship having cattle or other animals on board for exportation without being shown a clean bill, signed by the inspector, to the effect that the measures provided by the said Act and the present regulations as hereinbefore set forth have been obeyed and carried out.

Sec. 61. On glanders or other contagious disease of horses being discovered on board any steamship, railroad car, stable, shed or other place, it will be the duty of the inspector, on the removal of any infected horse, to superintend the thorough disinfection of such steamship, railroad car, stable, shed or other place, without loss of time, in the manner prescribed under the general regulations for disinfection of premises.

Head Ropes.

Sec. 62. The importation of head ropes which have been used for tying up cattle in the United Kingdom or on board ship is prohibited, and all vessels neglecting to observe this regulation shall be liable to be declared to be infected under "The Animal Contagious Diseases Act"

Inspectors.

Sec. 63. Inspectors must make monthly returns to the Minister of Agriculture of every inspection made by them.

Cleansing Cars.

Sec. 64. No animals are to be allowed to be placed on board cars till the litter from the previous load has been removed and the car white washed with lime and carbolic acid, one pound commercial carbolic acid to 5 gallons of lime wash. Shippers may object to place their animals on uncleaned cars, and may lodge a complaint with the nearest Inspector, who will cause such cars to be cleansed as above at the expense of the railway company, or prohibit their use till this regulation is complied with.

No. 34.

PAN-AMERICAN MEDICAL CONGRESS.

MONTREAL, December, 1896.

SIR,—I have the honour to forward to you the following summary report of the Second Pan-American Medical Congress held at Mexico, on the 16th, 17th, 18th and 19th November, ultimo, where I had the honour of being present as an official delegate of the Canadian Government.

This congress, both by the number, and the value of the papers which were read, and the great number of physicians, who had accepted the invitation of the Mexican Government, has been a great success. More than four hundred and fifty physicians from different countries of North, Central, and South America, have registered their names on the list as members: Canada, United States, Nicaragua, Haiti, Guatemala, Ecuador, Venezuela, Cuba, Uraguay, San Salvador, Honduras, Costa-Rica and Argentine Republic, were all officially represented. The Canadian medical profession was represented by Sir William Hingston, Drs. James Stewart, J. Chalmers Cameron, Alex. D. Blackader, E. P. Benoit, all from Montreal, and Dr. Bryce, of Woodstock, Ont. A great number of our most distinguished physicians had sent letters of apology for not being able to be present at this Congress, either on account of the distance, or professional engagements preventing them from being so long absent from their duties.

The Congress was divided into thirteen sections comprising all branches relating to medicine. The sessions of these different sections lasted four days, during which more than two hundred and fifty papers were read relating to medicine and also to international hygiene. I will not undertake, in this report, to either give you an analysis, or the enumeration of these papers, it would make this report too long, and moreover, these papers will be published in the Official Report of the Congress, which will be transmitted to you.

Such a congress is of great importance, as giving the medical profession an opportunity of becoming informed of the scientific researches made in different countries, and of combining their efforts for the advance of science and the relief of humanity. A country which receives so many foreign members of the medical profession secures a good opportunity to make its institutions, its monuments and its most distinguished men known.

The medical profession of Mexico effectively seconded by the government of the Republic have spared no time or efforts to insure the success of the congress and make the visit of the eminent strangers interesting and pleasant. The President of the Republic, General Diaz, surrounded by his Ministers, presided at the opening of the congress which took place at the "National Theatre." The elite of the society of Mexico was represented at this session, which was a great success. The President, in his address, expressed in behalf of his people, the great pleasure they experienced in having amongst them so many distinguished men, assembled for the advance of a science so useful to humanity. His Government, he said, had not hesitated in coming to the assistance of the organizers of a congress which would prove of great benefit to the public. The General Secretary, Dr. Liceaga, then read his report which was followed with speeches from Dr. Carmona y Valle, President of the Congress, Lawyer Gamboa and Dr. Pepper; the whole mingled with music by the members and pupils of the Conservatory of Music. The room was beautifully decorated with historical flags and statues, flowers, plants and electric lights.

At the general intermediate session, which took place on Tuesday evening, the 17th November, in the Chamber of Deputies, in the presence of the whole Congress, I had the honour as representative of Canada to be called upon to deliver an address on medicine. This session was presided over by the Minister of Justice and Education, Signor Baranda; Drs. Fernandez of Cuba, Wyman of United States and Lavista of Mexico, were the other speakers of the evening.

On Wednesday evening, 18th November, the city gave us at the Municipal Palace, a splendid ball, to which over fifteen hundred were invited. The elite of Mexico society was present, among them the Minister of Foreign Affairs, Signor Maryscal, and most of his colleagues. The Mayor, Signor Camacho, welcomed us in very happy terms. There was at the same time a grand illumination of the Municipal Palace, the National Palace, the Cathedral, the Avenue San Francisco and the Palace of Constitution. There was also during the evening a great musical performance and fire works on the Place of Constitution, in front of the Municipal Palace.

On Thursday afternoon, the 19th November, President Diaz gave, in our honour, a grand reception at his official residence, the castle Chapultepec.

Finally on Thursday evening, 20th November, at the Chamber of Deputies, the last session took place, during which all the official representatives were invited to speak, and I had the honour, in the name of Canada, to deliver the following address:—

"Mr. President, Ladies and Gentlemen,—"More than ever I regret, in ascending this tribune, not being able to speak the beautiful language of this large and most distinguished audience that I have to address at the present moment. Born in the French province of the country I have the honour to represent, I must rely upon my mother tongue to express my feelings, and I entrust myself to your well known benevolence."

"The foundation of the Pan-American Medical Congress was a happy inspiration and its founders may to-day look upon their work with pride. And this is a new proof of the progress of science, the different branches of which mutually help each other; each one of them contributes to the general advance. With electricity

and steam, the distance and frontiers have vanished, and thereby the various schools have also disappeared. There is no more an English school, no more a French nor a German; there is but one and one only: the Universal school of medicine.

"America is of too great importance in the world to not take her place in this school. But, to occupy it in a most advantageous manner, medical America requires to be united, and every one must contribute his knowledge and ideas. We have masters and workers; they must become known to each other, and the only way to accomplish this is the Congress.

"If one so far, notwithstanding the success of the first meeting at Washington, were entertaining doubts as to the vitality of this Pan-American organization, the great success of the Mexican Congress must be sufficient to dispel all distrust and uneasiness. This congress has been a success by the number of delegates and members registered, and by the quality and value of papers contributed; this success is also affirmed by the assiduity and interest with which the members followed the deliberations. But what has contributed to a large extent to make it a success, are the observations made in the City of Mexico itself, observations which, in all institutions visited, have shown the progress made; hospitals, houses of refuge, medical schools, laboratories, schools of art and of science, municipial institutions, drainage and other sanitary works, etc. Everywhere we found medical progress; everywhere we found progress in sanitation.

"As official delegate of Canada, I have a very pleasant duty to fulfil—that of gratitude. Since we landed in your beautiful country we have been the object of the most delicate attentions, surrounded with the most cordial hospitality. You have made us forget that we are far from our homes and country. We at once felt that we were amongst friends and true brothers, who not only offered to us the most cordial hospitality, but gave us sumptuous entertainments, really worthy of Mexico, the Paris of North America.

"I am happy in these circumstances to be the interpreter of the Canadian Government, and of all my Canadian colleagues, in expressing our sentiments of sincere gratitude to the highest constitutional authorities of the country, to the municipal authorities, to the medical profession, to the members of committees of organizations of the congress, and to all citizens of the beautiful City of Mexico, who vied with each other to render our sojourn here as agreeable, interesting and as profitable as possible.

"Your good attentions have touched our hearts, and it is at this moment that we see with regret this congress coming to an end and the hour of our departure from good, sincere and devoted friends so near at hand. These regrets are soothed only through the hope that before long we shall come back to Mexico to enjoy its profuse hospitality, revive the old souvenirs of friendship and good fellowship, which we take away with us, as the result of our sojourn here."

On Friday night, the 20th November, the directors of the most aristocratic association of Mexico, the 'Jockey Club,' crowned in a worthy manner this continued succession of entertainments organized in our honour, by giving in their sumptuous quarters a grand reception for the members of the congress and the ladies who accompanied them.

Outside of the general and special sessions of the congress and the great and splendid entertainments, the excursions to surrounding cities and to the historical and important monuments of the country, the committee of organization was kind enough every day to accompany and point out to us works of importance undertaken by the national and municipal governments. We had the pleasure of visiting the new abattoirs, the penitentiary, the general hospital and the drainage canal of the Valley of Mexico. This canal is a gigantic enterprise undertaken for the purpose of draining the valley and the city of Mexico, placing the latter in a safe position as regards inundations, etc.; it is actually completed and solves the greatest problem of hydrography, and is a great improvement to the sanitary condition of the country. It cost over $10,000,000.

On the whole, Mr. Minister, I am happy to have had the honour of representing my country at this Congress, organized by a prosperous and hospitable country and

of which learned and generous men have made a success. President Diaz has been good enough to express to me, personally, his satisfaction that Canada had accepted the invitation of his Government; and I feel assured that the friendship inspired at such meetings between the representatives of different countries taking part in them, will have only good results in the international relations of the different countries of the American continent.

I add to this report the address that I, as the Canadian delegate, was asked to prepare for the general session of the 17th November (Annex "A"); and I also add a few remarks I felt my duty to make at a meeting of the section of public health, to justify the system of quarantine as maintained by the Canadian Government. (Annex "B").

E. P. LACHAPELLE,
Delegate of the Canadian Government.

To the Honourable,
The Minister of Agriculture,
Ottawa.

Annex "A".

SECOND PAN-AMERICAN MEDICAL CONGRESS-GENERAL SESSION IN THE HOUSE OF DEPUTIES.

MEXICO, Tuesday evening, 17th November, 1897.

HYGIENE, BACTERIOLOGY AND MEDICINE.

By E. P. Lachapelle, M.D., President of the Board of Health of the Province of Quebec, delegate of the Government of Canada.

MR. PRESIDENT, GENTLEMEN,—Unfortunately the time which it has been in my power to devote to this essay has been too short to enable me to bestow upon it all the care that its importance would have required. Having been but recently informed of the high honour which devolved upon me, all I could do was to prepare hastily the few following notes, the value of which I would have been too glad to increase by a more detailed and more complete study. I have had to content myself with collecting some ideas which are not absolutely personal, which have probably been heretofore expressed by many sanitarians, but which nevertheless demonstrate the increasing importance acquired in our days by modern sanitary science, and the ever-increasing humanitary and enlightened part which it takes in up to date society, thanks to the discoveries of the great Pasteur.

However incomplete these few notes may appear, they will, I trust, facilitate a glimpse at my thoughts and that is all I desire.

Pasteur has created an entirely new science: Bacteriology. The greatest credit due to the memory of this wonderful genius will come from his having revealed to the scientific world the secrets of the life of the infinitely small and of his having given evidence of the great rôle which they play in animal life. Active agents of all fermentation in all its forms, primitive causes of infection, of contagion, of epidemics, microbes acting on living matter, modify it to an astonishing degree, and can even transform it so as to endanger human life. So much so, that of all created beings, man is perhaps the one who, owing to the delicacy of his tissue and the complex nature of his vital functions, is the most readily affected by surrounding influences, compelled to borrow from nature his food and oxygen, the admirable working of his organs is due solely to the integral activity of his cellular nutrition, and that activity depends a good deal on the surroundings in which he lives, on the air which he breathes, on the food which he absorbs.

Now when he demonstrated that the air, the water, the food and all that surrounds man and penetrates into him, may contain germs of fermentation which are the sole cause of certain disease, Pasteur has thrown new light on the etiology and pathology of the whole class of diseases, which, being essentially infectious and naturally contagious are one of the greatest causes of the increase of the death-rate. And while in so doing, he proved the effective action of prophylaxis, he placed hygiene in the foremost rank of modern medical science, hygiene being but prophylaxis in action.

In fact hygiene had until then been somewhat empirical. Knowing little of the etiology of diseases and of the pathogeny of symptoms, it could scarcely furnish reliable indications on the means to be taken to avoid danger. The moment the specific cause of certain diseases was indicated it was different. It immediately acquired a boldness all the greater for it having been put precisely on the right path. Bacteriology was like an immense torch which, casting abundant light into the remote depths of nature, showed, hidden in the elements, the germ ready to accomplish its work. Hygiene at once established itself upon a scientific basis, the fundamental point of which is the pathogenic microbe.

Strange to say, a fact which fully deserves to have attention to it, is that the first studies of Pasteur, those which probably did the most towards leading modern medicine into a new and fertile field of investigation, are at the same time those who have mostly benefited the progress of up to date hygiene and have given it all its practical importance. The study of anthrax has proved the virulence and the innocubility of the attenuated virus and that has been sufficient to protect the herds of the French farmer from all danger of the terrible plague. There was a starting point from which vaccination against hydrophobia was to be reached later on, and meanwhile European farmers were none the less benefited through it.

Besides, in all his previous studies, Pasteur seemed to be guided by a desire to protect to prevent rather than to cure. The study of pebrine, which has revealed the several forms of contagion, was undertaken solely for the purpose of saving the silk industry from an impending danger, and when the savant was explaining the primary cause of fermentation, he was seeking, not to throw light on the intimate nature of infectious diseases, but to protect wines and beer. This practical aim which, in all his works, Pasteur had always in view, has made him one of the benefactors of humanity, and while indirectly he has revolutionized medicine and surgery, he has first and above all made hygiene a positive science, by showing it to be the humanitarian object which he himself had in view in his researches and supplying it, by a genial inspiration, with the scientific data which would permit it to attain the desired end.

Hygiene, therefore, in its onward march has merely utilized the data supplied by the master. Having acquired a more exact knowledge of the nature of contagious diseases, it has established its whole method on these two fundamental bases: isolation and disinfection; isolation which tends to prevent the diffusion of germs, disinfection which by its immediate action destroys their power. It is from that moment that hygiene has made such rapid strides in its development, practical results having been the outcome of the efforts made in that direction.

Indeed the new theories did not in any way destroy previous precepts. Ever since the days of Hippocrate, hygiene had always eulogised the beneficent action of pure air, of sunlight and of wholesome food. But when Pasteur had proved that sunlight and desiccation could attenuate or destroy the virulence of the pathogenic germs contained in the air, in the dust, in morbid liquids which permeate the soil, the walls, the clothing, these ancient suggestions were modified in their significance and became more important than ever before, because they ceased to be based simply on observation and became established on precise data demonstrated by experimentation. It has been the great merit of Pasteur, to have supplied hygiene not only with a recognized scientific basis, but moreover with sure and reliable means of investigation and effective action.

Thus the prevention of contagious disease has of late years taken a great development. Modern hygiene has devoted itself to the study of the prophylaxy of

these diseases, and the results obtained were of such a satisfactory character that the law deemed it its duty to support by its authority the carrying out of the means advocated by hygiene. To-day the cities which have no isolation hospital, nor steam disinfecting apparatus, the countries in which the authorities see fit to dispense with boards of health and quarantine organizations are very few in number.

In regulating the sale of articles of food, meat, milk, &c., in formulating its prescriptions with regard to schools, dwelling-houses, &c., hygiene has merely followed to the letter the teachings of Pasteur. It recognized the fact that contagion was taking place not only by direct contact and by the lacerations of tegumens, but also indirectly through respiratory or digestive tracts and it has acted accordingly after careful observations. School's hygiene, sterilization of beverages, inspection of meat and slaughtering of animals are so many chapters, and not the least important, which had to be rewritten.

The changes effected by bacteriology have been felt in all minutest details, such as filtration, which is now practised on a much larger scale than heretofore, and which has become much more effective, entailing in certain cases a very large expense, and all this owing to the fact that the results are controlled by bacteriology.

In becoming a positive science, hygiene has wonderfully increased its field of operation, but it is worthy of note that even in its unexpected applications, it has always shown this practical and humanitarian direction which its founder has given to it. As an evidence of this truth, I will mention the industry of canned foods, which has assumed great developments in recent years. In fact, it is only one of the numerous applications of the prophylaxy of germs, and all the whole technique of the new industry only has one aim in view, viz.: to preserve the food in a sterile medium, to protect it from all fermentative alterations. But if this where the social influence of modern hygiene is shown, that industry founded on a scientific truth and practised for commercial purpose, has not only built the fortunes of the parties who inaugurated it, but has placed within the reach of all a wholesome and cheap food, has helped to protect the people against intestinal disorders by protecting their digestive organs against contagion, and that under such conditions that all have been benefited by it. This is one of the best examples which can be quoted of the enormous social influence which may be acquired by an industry based on a very simple and well demonstrated scientific truth which in the present instance, is the usefulness of food hygiene in the prophylaxis of diseases. Based on bacteriology, hygiene is only just entering a path which, if our expectations are realised, will lead it a long way. It has already made rapid strides by using isolation and disinfection to protect mankind from contagious diseases. But as Vallin said, "the very day on which he discovered that the bouillon in which he cultivated the hen's cholera gradually became unfit for a culture, Pasteur explained the immunity which results from a first attack of certain contagious diseases and realized the already ancient hope that a vaccine of several diseases might be fully created, just as Jenner had discovered on the cow the vaccine of small-pox."

Such a humanitarian role would be entirely within the attribution of hygiene which has taken the protection of public health under its charge and which has spread the practice of vaccination whenever it could. What it has done for small-pox, what it is now doing for diptheria, why should it not do to-morrow for the other virus. I know, that on this question, medicine has taken the lead and has found serumtherapy, but hygiene also has its laboratories and its explorers, and the part which it has taken so far is too practical and too humane to prevent its seeking to go further, even at the risk of trespassing on the ground of medicine.

Besides, it would not be right for physicians to complain in as much as the progress of modern hygiene and the practical results which are obtained through its agency furnish them very valuable information and go far towards ensuring the success of their therapeutics.

To convince oneself of this, perusal of the medical history of the last twenty years would be sufficient. In it would be found evidence that hygiene in the course of its investigations and applications has oftentimes given new data on the etiology

of an infectious disease, on the pathogeny of a toxic symptom, on the prophylactic treatment of an affection, without mentioning the alimentary diet, the physical exercise, etc. This knowledge has, moreover, been received with all the more satisfaction by physicians, that the public mind is more and more tending in that direction by reason of the importance attached to prophylacy.

Of all the special branches of the medicine of to-day, pediatrics is certainly one of those which have been mostly benefited by the teachings of hygiene. If there is a period at which a human being rapidly feels the influence of surroundings, it is certainly during infant life. His tissues are yet barely formed, his vitality is of the frailest kind, and the least infringement of hygienic rules may result for him in the most disastrous effects. Therefore, the feeding of the child is the most important question of that stage of life, and medicine and hygiene have agreed together to make of the sterilization of food the *sine qua non* condition of perfect health. This fact alone clearly indicates the point of contact of the two sciences, which Pasteur's doctrine puts on an equal footing whenever it is a case of therapeutical application. If an advantage was to be given to one over the other, it would certaily be hygiene, which teaches the specialist how to treat the disease by checking the cause, or even more, how to keep the child from becoming ill by means of a preventive treatment. Has it not succeeded, by its intervention, in abolishing almost completely in the establishments where it was carefully applied, mortality from gastro-enteritis? Its beneficient effects have had still a greator reach, for it has proved that certain of the diseases of nutrition, such as rickets, which had been styled constitutional, were simply due to defective feeding. And this new data certainly had its importance, for in explaining the cause it furnishes the treatment. It would, besides, be impossible to demonstrate more clearly the services rendered by hygiene to pediatrics than by stating that ever since it has been methodically introduced in foundling hospitals the mortality of children has fallen to twelve per cent in certain cases. In one disease only, diphtheria, we have seen medicine obtain the same result; but here again it is only acting the part of a corrective, and that on which, above all, it ought to be congratulated, is the fact that serumtherapy may have an immunising and preventive action.

In the hospitals hygiene is already gaining the first rank. What was it that gave to modern surgery its boldness in intervention and its confidence in the results? Is it not antisepsis? Now, antisepsis is nothing more than prevention applied to surgical affections. Septicimia, pyohemia, surgical erysipilas, gangrene, were diseases well and duly classified, against which the surgeons of former days were powerless. Antisepsis is about to make them disappear, and hygiene, by its special researches on antiseptics and on sterilization, will have contributed a very important share towards ensuring that result.

In what a complete manner its intervention in hospitals has changed the aspects of wards and of sick persons! The features of convalescents are animated and their eyes are bright because their cellular nutrition, sustained by a proper hygienic diet, receive the necessary strength to heal up all injuries and to complete the work of the surgeon, while the part affected, protected against all outside attacks by antiseptic dressings, gradually feels in its tissue a new born life which re-establishes the functional and physiological equilibrium. Their bed has ceased to be a wretched pallet and has become the comfortable couch on which they have come to secure a new supply of energy and to make up their loss of strength without being subject to the complications, so often observed in former days. And this is the reason why the unfortunates of our days have ceased to feel that dread of the hospital which in former times led them to drag their physiological miseries along the street, because they know that a well warmed, lighted, well ventilated and very neat room which awaits them, is a safe spot where one remains only just as long as is necessary, where every one is free from danger, where a person is protected against contagion and where the most effectual and recuperating care is bestowed upon the patient. And this new science of the care to be bestowed upon the sick, the science of nursing, is not that also due to hygiene, which comes in to help medicine and which in its simple and candid manner and its resolute action gives to the patients the necessary

courage to undergo the most painful operations through the hands of surgeons? It will be one of the glories of prophylactic hygiene, that it has banished all purulent affections from our lying-in and other hospitals and that it has made these institutions agreeable to the patient and satisfactory to the physician. And that is not all the part played by hygiene. It has also brought its share in the study of diseases. Always in the foremost rank, when there is an epidemic it has been able to make observations which would have escaped the attention of many others and which carried on further by competent persons has given unexpected results which have often been practical. When, for instance, hygiene proved through its statistics, that mortality in pneumonia had greatly increased, it simply stated a fact, the existence of which it had discovered in the performance of its functions. But practitioners were struck with the idea that this fact must have a primary cause and they finally concluded that individual resistance was greatly diminished, owing to the density of population, to overwork and to hereditary degeneration, and who knows whether this is not one of the considerations which have brought physicians to leave aside, in pneumonia, active drugs and confine themselves to defensive treatment while giving all their attention to strengthening the patient. Are not sanitarians entitled to the credit of having discovered that purulent hepatetis, so frequent in hot climates, is due to the frequency of dysentry and to the weakened nutrition caused by the climate? No one has ever studied better than sanitarians the hydric origin of cholera and of typhoid fever, and the transmission of maleria through drinking water. It is certainly due to them that our practice of filtering our drinking water has been brought to its present state of effectiveness. Have we not succeeded, thanks to hygiene, in annihilating scurvy which heretofore decimated the crews of certain ships owing to the fact that the men were deprived of vegetable food and fed on salt meats? In connection with this, the study of adulteration of food and of industrial intoxications is a new chapter added to nosology by modern hygiene. Finally of all contagious diseases, tuberculosis has benefited perhaps more than any other, by hygienic studies; and the treatment of certain forms of this affection by over nutrition and open air, the preventive measures which are daily taken, are the best evidences which can be adduced in favour of the effective aid which is given by hygiene to modern medicine.

Moreover, the action of hygiene is gaining ground every day. Not only does it undertake to improve the sanitary condition of dwelling-houses, to purify the food, to make the air more salubrious to prevent the spread of contagious diseases, but in order to render its action more rapid and more secure, it puts its laboratories at the disposal of the practitioner, informs him of the nature of the disease which he is treating and even furnishes him with the required means of prevention. Consequently, in view of the enormous progress already accomplished, it is fair to assume that not only has bacteriology made of hygiene a positive science, but it has, moreover, enabled it to co-operate with medicine and often to furnish the latter with reliable data.

The point which gives strength and importance to hygiene is that its only care s the preservation of public and private health. Consequently it is making sure and rapid strides towards the first rank in social organization. Mankind will have no occasion to regret this fact as it will enable it to protect its vital forces. This has been well understood by modern nations who have bestowed great care on the organization of public hygiene, are improving the sanitary condition of their territories, protecting their frontiers, establishing sanitary relations with the neighbouring countries and are entrusting recognized authorities with this organization. The universities and educational institutions are doing their share. They recognize more than ever the need of developing the teaching of the new science, and they give to the course of hygiene the importance which is due to it. All this indicates that rapid progress is being made in the right direction. Only one thing remains to be done: to teach all, great and small, the a, b, c of life. The moment the diffusion of the precepts of modern hygiene shall be accomplished, the moment the knowledge of the condition of propagation of communicable diseases shall be spread among all classes, from that moment, it is to be hoped that the people being better

informed will aid instead of checking, as is too frequently done, the efforts made by the public authorities to preserve the general health. Then will the execution of the sanitary laws undoubtedly give results which will be the pride of civilized nations.

Annex "B"

SECTION OF PUBLIC HEALTH.

SESSION of the 16th November, 1896.

DISCUSSION ON THE PAPER: "SCIENTIFIC SANITATION *vs.* QUARANTINE" BY DR. A. B. LADLOCK, KNOXVILLE, TENN.

Dr. E. P. Lachappelle.—I believe there is a misunderstanding, and that the divergence in the opinions expressed by previous speakers comes from the fact that we do not agree upon the meaning of the term "Quarantine." It is evident if we leave to this term its literal signification, and if therefore we mean by quarantine, what was formerely done, that is to say, a compulsory isolation and detention uselessly prolonged, it is evident, there is no doubt, that quarantines do not answer to our present needs and state of knowledge, and that consequently they must be thrown aside. But, if on the contrary, we mean by the term "Quarantine" a station of inspection and disinfection, with isolation and treatment of the contagious patients in hospitals, (that is what is now done), quarantines must not be abolished.

If every ship were provided with rooms for isolating and with means for disinfection by steam, quarantine would be no longer required either for the detention of suspected or contaminated persons or for disinfection.

But, I say, that even if compliance with this plan were complete quarantine as far as inspection goes, should remain, for the reason that we have to take into account the exigencies of trade, and because, from the day quarantine inspection is abolished the regulations will be eluded and sanitary interests sacrificed to the interests of Commerce.

Finally, the Continent of America covers such a great area that it is impossible to compare it with England; and for a long time to come, to hope that we may be able to improve the sanitary conditions of its whole territory to a sufficient degree to prevent epidemic diseases from taking a foothold and finding a favourable ground for their development.

In these circumstances it will, in my opinion, be necessary, for many years to maintain quarantine stations, both for purposes of inspection and disinfection.

APPENDIX TO THE REPORT OF THE MINISTER OF AGRICULTURE

EXPERIMENTAL FARMS

REPORTS

OF THE

DIRECTOR and acting AGRICULTURIST	WM. SAUNDERS, LL.D.
HORTICULTURIST	JOHN CRAIG
CHEMIST	F. T. SHUTT, M.A.
ENTOMOLOGIST and BOTANIST	JAS. FLETCHER, LL.D
POULTRY MANAGER	A. G. GILBERT
FOREMAN OF FORESTRY	W. T. MACOUN
SUPT. EXPERIMENTAL FARM, Nappan, N.S.	GEO. W. FORREST
HORTICULTURIST " " "	W. S. BLAIR
SUPT. EXPERIMENTAL FARM, Brandon, Manitoba	S. A. BEDFORD
" " Indian Head, N.W.T.	ANGUS MACKAY
" " Agassiz, B.C.	THOS. A. SHARPE

FOR

1897

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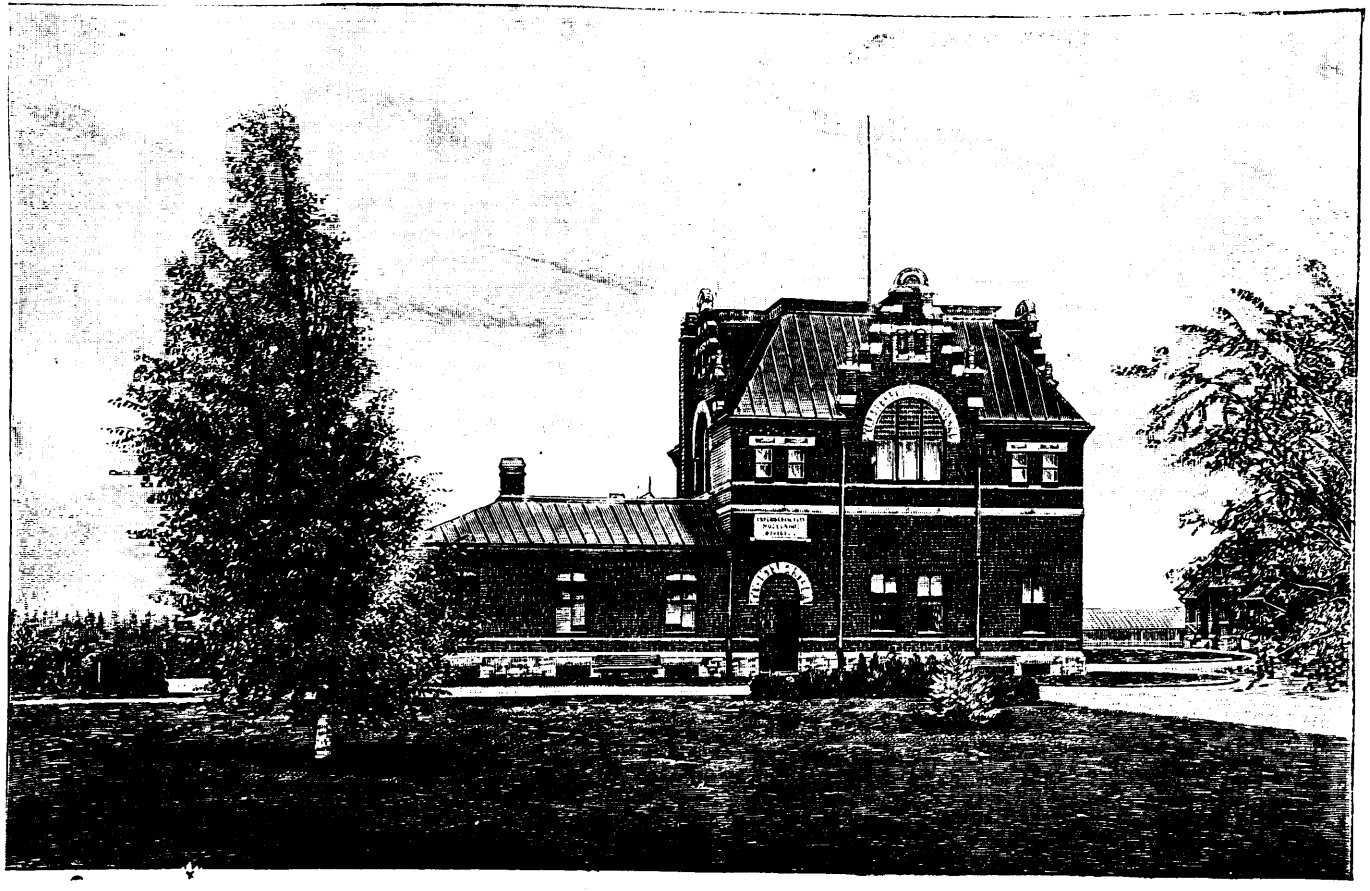


OFFICE BUILDING, MUSEUM AND CHEMICAL LABORATORY OF THE CENTRAL EXPERIMENTAL FARM.

APPENDIX

TO THE

REPORT OF THE MINISTER OF AGRICULTURE

ON

EXPERIMENTAL FARMS.

——o——

OTTAWA, 1st December, 1897.

SIR,—I have the honour herewith to submit to you the eleventh annual report of work done and in progress at the Central Experimental Farm and also at the several Branch Experimental Farms.

Since the resignation of the late Agriculturist Mr. Jas. W. Robertson—in January, 1896—I have carried on the work of the Agriculturist in addition to the duties devolving on me as Director, and in this report as in that of 1896, full particulars of the results of all the experiments conducted with farm crops and stock, are presented in that part written by myself. You will also find appended reports from the following officers of the Central Experimental Farm: From the Horticulturist, Mr. John Craig; from the Chemist, Mr. Frank T. Shutt, and from the Entomologist and Botanist, Dr. James Fletcher. Reports are also submitted from the Poultry Manager, Mr. A. G. Gilbert, and from the Foreman of Forestry, Mr. W. T. Macoun.

From the Branch Experimental Farms there are reports from Mr. Geo. W. Forrest, 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 particulars are given of 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 the information gained from the careful study of the life histories and

habits of injurious insects and noxious weeds, and of the most practical and economical measures for their destruction. In the report of the Entomologist and Botanist there will also be found particulars of the experiments and observations 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 is a gratifying evidence of the desire for information among this class of the community, also of the high esteem in which these 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 these industries in this country.

I have the honour to be, sir,

Your obedient servant,

WM. SAUNDERS,
Director Experimental Farms.

To the Honourable
The Minister of Agriculture,
Ottawa.

ANNUAL REPORT

ON THE

EXPERIMENTAL FARMS

REPORT OF THE DIRECTOR AND ACTING AGRICULTURIST.

(WM. SAUNDERS, LL.D., F.R.S.C., F.L.S.)

In the eleventh annual report of the Experimental Farms herewith submitted there will be found much information on agricultural topics, also on subjects bearing on agriculture; the results of a large number of experiments which have been conducted during the season of 1897 at each of the Experimental Farms with all the more important farm crops. These experiments have been planned to gain further information as to the most productive varieties to sow, also to find out which are the earliest to ripen. Additional information has also been sought as to the best time for sowing, the proper depth to sow, and the quantity of seed that should be used to produce the best results.

The advantages arising from the selection of plump, well matured seed of the best sorts, have been frequently urged and the good results arising from such a course demonstrated. New sorts are obtained by careful selection and cultivation, by the preservation and culture of occasional sports; also by cross-fertilizing. The farmer who tries to make the best of his opportunities may do much to improve both the character and quality of the grain he grows, and may with judicious care often raise crops of such quality as will command high prices for seed from his less thoughtful neighbours.

The judicious use of fertilizers to maintain the fertility of the land and to restore in the most economical manner those important elements of plant food which have been taken from the soil by frequent cropping, is a question of much importance; so also is that of the relative value of natural and artificial fertilizers for this purpose. Many interesting facts are given in this connection in that part of the report where the results obtained from the tests made with different fertilizers and combinations of fertilizers are noted on the special trial plots which have been devoted to that purpose for the past nine or ten years. Further information has been gained regarding the value of green crops for ploughing under to enrich the land, especially such leguminous crops as clover. The fact has been demonstrated that such crops can be put in with spring-sown grain without reducing the yield of such cereals, and that after the grain has been harvested the clover will grow vigorously during the summer, act as a catch crop all the season, by appropriating the elements of fertility which are brought down by the rain, and at the same time gather and lay up in its roots and leaves a large store of nitrogen for the use of subsequent crops. The tests, which have now been continued for several years, have shown such convincing results that during the last season nearly all the grain fields on the Central Experimental Farm have been sown with clover in this way. The quantities of fertilizing constituents which may thus be added to the soil at a small cost, are shown by the analyses which have been made and reported on by the Chemist of the Experimental Farms.

While it must be admitted that conditions of climate and the general character of the season—which are beyond the control of the farmer—are most important factors bearing on crop production, still there are many things which the farmer may do which will greatly increase the chances for abundant returns, provided the season is favourable. It is gratifying to know that during recent years more thought and attention has been given by farmers to their calling, that improvements have been manifest in the preparation of the soil, and the general management of the crops; the stores of fertility in the land have been more carefully husbanded, by a judicious rotation of crops; more attention has also been paid to the care of barn-yard manure, and greater efforts made to replace those elements in the soil, which repeated cropping has removed. The progress which has been made is encouraging; it has given Canadian farmers a reputation which it is most desirable should be maintained, and has, at the same time, aroused a spirit of inquiry in reference to agricultural affairs which promises well for the future. The enterprise and efforts towards improvement shown by our people have resulted in a greatly enlarged export trade to the mother country, particularly in animals and their products. Along these lines of farm work, co-operation and skill finds a large and remunerative field, and such exports can be carried on to an almost unlimited extent without depleting the soil in any material degree.

The scientific investigations which have been conducted at Ottawa have been of much value. Much work has been done in connection with injurious weeds in ascertaining the extent of their distribution and the best methods of checking the inroads of these vigorous invaders. Information has been given in response to many inquiries concerning injurious insects, and practical remedies for their subjugation suggested. Much interesting work has also been done in connection with bee-keeping. Useful work has also been accomplished in the chemical branch in determining the constituents of soils, and in giving suggestions as to the best methods by which they may be made more fertile. Further information has also been gained in reference to the results of the rotting of barn-yard manure under different conditions also in regard to the feeding value of forage crops, and on other kindred subjects.

Additional experience has been gained in connection with the feeding of poultry and their profitable management. Particulars of the results obtained will be found in the report of the Poultry Manager. Records of the rapid progress which has been made in connection with the Arboretum and Botanic Garden with particulars of the growth of the different species of timber trees comprising the forest belts are reported on by the Foreman of Forestry.

The experiments in cross-fertilizing have been successfully continued and a large number of new varieties produced, particularly of fruits which are likely to prove hardy on the North-west plains. The collection of fruits at Ottawa has also been enriched by the addition of many promising sorts.

The results of the practical tests which have been made in the feeding of steers, milch cows and swine at the Central Experimental Farm have been widely disseminated, and the information thus given has served a useful purpose in advancing these important branches of agricultural industry. The experiments conducted at the Branch Experimental Farms in Manitoba and the North-west Territories, along similar lines, have been most useful to those engaged in stock raising in that country, and the introduction of the Awnless Brome Grass and the demonstrations which have been made of its hardiness and value for hay and pasture have laid the foundation for a great extension of the trade in cattle and dairy products in the North-west country.

The many tests which have been made with a very large number of varieties of fruit at the Branch Experimental Farm at Agassiz, British Columbia, have been the means of bringing out much practical information in reference to fruit growing, and has materially aided that branch of industry, so important in the Pacific province.

The results of the tests undertaken in all these different lines of agricultural and horticultural work will be found in the subsequent pages. They have all been planned with the special object of furnishing reliable data for the use of those engaged in agricultural or horticultural pursuits in Canada.

EXPERIMENTS WITH OATS.

During the season of 1897, sixty-five varieties of oats have been tested under fairly uniform conditions, in order to gain information regarding their relative yield, earliness and other characteristics. They were all sown on the 5th and 6th of May on plots of $\frac{1}{20}$th acre each. The soil was a sandy loam of fair quality which received a light dressing of manure, about 12 tons per acre, in the autumn of 1895, when it was ploughed under. The land was ploughed in the autumn of 1896 about 8 inches deep, and disc-harrowed twice in the spring of 1897, and harrowed three times with the smoothing harrow before sowing. In the following table full particulars are given of the results obtained, and in the accompanying figure a view is given of a portion of these experimental plots at the time of harvest.

OATS—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.	Proportion Rusted.
				Inches.	Inches.		Bush. lbs.	Lbs.	
1	Holland	Aug. 18	105	45 to 48	9 to 11	Sided	70 25	27¾	Considerably.
2	Golden Giant	" 17	103	42 to 48	10	"	57 12	26½	Badly.
3	Mennonite	" 5	91	39 to 48	8 to 9	Branching	56 11	30½	Considerably.
4	Improved American	" 7	93	42 to 50	8 to 9	"	53 28	30½	"
5	Early Etampes	" 8	94	36 to 41	8 to 9	"	53 23	30½	"
6	White Schonen	" 7	93	42 to 48	8 to 9	"	53 8	31½	"
7	Early Golden Prolific	" 6	93	42 to 48	8 to 9	"	50 30	33	"
8	White Russian	" 5	92	42 to 48	8 to 9	"	50 30	33½	Badly.
9	Columbus	" 6	92	42 to 48	9	"	49 29	30	Considerably.
10	Wallis	" 7	93	48 to 53	9 to 10	"	49 9	26½	Badly.
11	Joanette	" 7	93	36 to 42	8 to 9	"	49 4	31¾	Considerably.
12	American Triumph	" 6	92	40 to 48	9	"	49 3	32½	"
13	Wide Awake	" 7	94	42 to 48	8 to 9	"	48 23	34½	"
14	Banner	" 9	96	44 to 50	9 to 10	"	47 7	28½	Badly.
15	Golden Beauty	" 6	92	42 to 48	9	"	47 7	29	"
16	Lincoln	" 7	94	42 to 48	8 to 9	"	46 6	35	Considerably.
17	Bonanza	" 3	90	48 to 54	10 to 11	"	45 30	38¼	Badly.
18	Abundance	" 6	93	42 to 48	9 to 10	"	45 15	28½	"
19	American Beauty	" 6	92	42 to 48	8 to 9	"	45 10	29½	"
20	Thousand Dollar	" 6	93	43 to 48	8 to 9	"	45 10	36	Considerably.
21	Buckbee's Illinois	" 9	96	44 to 48	8 to 9	"	44 24	31¼	Badly.
22	Medal	" 8	94	48 to 55	10 to 12	Half-sided	44 14	32	"
23	Siberian O. A. C.	" 9	96	44 to 50	9 to 10	Branching	44 14	30	"
24	Miller	" 9	96	42 to 48	8 to 10	"	43 33	32½	"
25	Scottish Chief	" 3	90	46 to 53	11 to 12	"	43 28	32½	"
26	Holstein Prolific	" 8	94	40 to 48	9 to 10	"	43 28	31¼	"
27	Victoria Prize	" 3	90	54 to 60	11 to 12	"	43 18	32	"
28	Improved Ligowo	" 5	91	45 to 52	8 to 9	"	42 17	33	"
29	Master	" 7	93	48 to 56	10 to 12	Half-sided	42 12	31½	"
30	Hazlett's Seizure	" 9	96	42 to 52	9 to 10	Branching	42 12	33¼	"
31	Welcome	" 3	90	48 to 54	9 to 11	"	41 16	34	"
32	White Wonder	" 3	90	48 to 54	10 to 11	"	40 25	33½	"
33	Early Gothland	" 6	92	42 to 52	8 to 9	Half-sided	40 10	36½	Considerably.
34	Siberian	" 17	103	48 to 54	9 to 10	Sided	40 5	24½	"
35	Bavarian	" 9	96	44	8 to 9	Branching	39 9	28¼	Badly.
36	Russell	" 8	94	48 to 58	10 to 12	Half branching	39 4	32	"
37	Olive	" 8	94	40 to 50	9 to 10	Half-sided	38 23	30	"
38	Brandon	" 9	96	43 to 57	10 to 12	"	38 13	34	"
39	Prize Cluster	" 3	90	43 to 52	10 to 11	Branching	37 7	38	"
40	King	" 9	96	42 to 48	9 to 10	"	37 2	30¼	"
41	Pense	" 9	95	48 to 60	9 to 10	Half-sided	37 2	28¼	"
42	Early Maine	" 8	95	44 to 50	8 to 10	Branching	36 31	29	"
43	Rosedale	" 9	95	36 to 52	8 to 9	Half-sided	36 6	34	"
44	Oxford	" 9	96	48 to 56	10 to 12	"	36 6	33	"
45	Early Blossom	" 9	95	36 to 48	8 to 9	"	36 1	29	"
46	Abyssinia	" 9	95	36 to 48	8 to 9	"	35 3	33	"
47	Cromwell	" 9	96	46 to 56	10 to 12	"	35 25	34	"
48	Rennie's Prize White	" 5	92	48	10 to 11	Branching	34 24	34½	"

OATS—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	No. of days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.	Proportion Rusted.
				Inches.			Bush. lbs.		
49	Imported Irish.....	Aug. 2	89	36 to 48	9 to 10	Branching..	34 4	39½	Badly.
50	Oderbruch	" 9	95	44 to 51	8 to 9	Half-sided..	33 4	34½	"
51	Cream Egyptian..... ..	" 9	95	42 to 51	8 to 9	" ..	33 3	34¾	"
52	Winter Grey.....	" 3	90	48 to 58	11 to 12	Branching..	31 26	36½	"
53	Early Archangel.....	" 5	92	42 to 54	9 to 10	" ..	31 26	38	"
54	Golden Tartarian....	" 17	103	44 to 50	10 to 11	Sided.....	31 8	24	"
55	California Prolific Black	" 13	99	38 to 48	8 to 10	"	30 20	26¾	"
56	Black Beauty.....	" 6	92	45 to 50	10 to 12	Branching..	30 7	33	"
57	Newmarket....	" 4	90	45 to 48	8 to 9	" ..	28 32	30½	"
58	Flying Scotchman	" 6	93	42 to 45	9 to 11	" ..	28 23	36½	"
59	Coulommiers	" 18	104	42 to 45	9 to 10	" .	28 13	29¼	"
60	White Monarch...	" 15	102	38 to 50	8 to 9	" ..	27 32	29½	"
61	Mortgage Lifter. ...	" 2	89	36 to 48	10 to 11	" ..	27 17	35	"
62	Prolific Black Tartarian	" 13	99	42 to 48	8 to 10	Sided.....	23 11	22	"
63	Doncaster Prize.....	" 15	102	39 to 45	8 to 9	Branching..	23 8	31	"
64	Poland	" 7	93	43 to 51	8 to 9	" ..	21 11	36	"
65	Scotch Hopetoun.....	" 15	102	44 to 48	8 to 10	" ..	18 3	26½	"

In the foregoing list are included eleven of the new cross-bred sorts which have been produced at the experimental farms. The names and parentage of ten of these were given in the Annual Report of the Experimental Farms for 1896, the 11th named Holland, was produced at the experimental farm at Brandon in 1892. It is a cross between Giant Cluster male and Prize Cluster female and was included in the test plots of varieties for the first time this year. It stands at the head of the list this season having exceeded in yield all the other sorts experimented with.

Owing to the almost continued wet weather which prevailed at Ottawa for a short time before and during harvest, all the varieties of oats were much injured by rust, their yield and weight was thus much reduced and some of the sorts which have for several years past given the largest crops have on this account fallen behind and hence occupy places lower down in the list.

TESTS FOR THE PREVENTION OF SMUT IN OATS.

Further experiments have been made during the past season in the treatment of seed grain to prevent this troublesome disease. In the Annual Report of the Experimental Farms for 1896, page 12, details are given of tests made with three varieties of oats which were soaked in a solution of potassium sulphide for 24 hours, and in every instance where the grain was so treated, although the seed used was very smutty the crop was practically free from smut. During the past season one variety only was used the Doncaster Prize oats and this was the worst affected with smut of any variety we had. The seed used in this test was from the untreated crop of last year of which about one-fourth of the heads were diseased. Different portions of the seed were soaked for varying periods in a solution of potassium sulphide made by dissolving 1½ pound in 25 gallons of cold water while others were treated with the Bordeaux Mixture made by dissolving 4 pounds of copper sulphate with 4 pounds of lime in 40 gallons imperial measure of water.

HOW TO MAKE BORDEAUX MIXTURE.

This may be conveniently made by taking an ordinary coal oil barrel which holds about 40 gallons imperial measure or 50 gallons wine measure. Fill this about two thirds full of cold water and suspend the 4 pounds of copper sulphate (blue stone) in a

Uniform test plots of cereals at the Central Experimental Farm, Ottawa, 1897.

cotton bag so that it will be entirely immersed just under the surface of the water. In this way it dissolves rapidly. In another vessel slake 4 pounds of fresh lime with 4 gallons of water. After the lime is slaked the creamy mixture should be strained through a fine sieve or a piece of coarse sacking into the barrel containing the copper sulphate in solution when the barrel should be filled with water. After the mixture is thoroughly stirred it will be fit for use.

The oats were treated as follows with the results given. The size of the plots on which the oats were sown was about $\frac{1}{60}$th of an acre each and the heads were counted on 33 by 3 feet (99 square feet).

Material used.	Number of hours soaked.	Total Number of heads.	Number of good heads.	Number of smutty heads.
Bordeaux Mixture	4	2,502	2,500	2
Potassium Sulphide Solution	4	2,711	2,575	136
Bordeaux Mixture	8	3,013	3,011	2
Potassium Sulphide Solution	8	3,366	3,264	102
Bordeaux Mixture	12	3,058	3,055	3
Potassium Sulphide Solution	12	2,740	2,713	27
Bordeaux Mixture	24	2,817	2,815	2
Potassium Sulphide Solution	24	2,592	2,590	2
Untreated	.....	2,730	1,720	1,010

From the above experiment it would appear that smutty oats soaked in Bordeaux Mixture for 4 hours are rendered as free from smut as if soaked for 8, 12 or 24 hours. But where potassium sulphide is used it appears to be necessary to steep the grain in the solution for 24 hours in order to entirely free it from smut. While the solution of potassium sulphide seems to be a reliable remedy for smut in oats provided the grain is steeped in it for 24 hours, the Bordeaux Mixture is a cheaper remedy, more easily obtainable, and appears to be quite as effective with only 4 hours soaking. It is proposed to test this remedy on a more extensive scale during the coming season.

FIELD CROPS OF OATS.

Golden Giant.—3½ acres. Soil a light sandy loam. The land was manured in 1895 with about 12 tons of barn-yard manure per acre. The previous crop was pease. It was ploughed in the autumn of 1896, about 8 inches deep, and in the following spring it was disc-harrowed once, and harrowed twice with the smoothing harrow before sowing. Sown 29th April, two bushels per acre, came up 9th and 10th May, and was ripe 17th August. The time to mature was 110 days. The yield per acre was 53 bushels 25 pounds, weight per bushel 31 pounds. Length of head, 9 to 11 inches, sided, length of straw, 48 to 51 inches. Made a strong and even growth, only a few spots lodged, there was some smut, and the leaves and stems were badly rusted.

Improved Ligowo.—4¼ acres. Soil a clay loam of good quality, which was manured in the autumn of 1894, with about 18 tons of barn-yard manure per acre. The previous crop was barley. The land was ploughed very shallow in 1896, immediately after harvest, to start shed grain and weed seeds, and again later in the autumn about 8 inches deep. In the spring of 1897, it was disc-harrowed twice, and harrowed twice with the smoothing harrow before sowing. Sown 30th April, two bushels per acre, came up 10th May; and was ripe 2nd August. The time to mature was 94 days, and the yield per acre was 44 bushels 10 pounds; weight per bushel, 37 pounds. Length of head, 8 to 10 inches, branching, length of straw, 44 to 48 inches. Made a strong and even growth; a few spots lodged. There was some smut, and the leaves and stems were considerably rusted.

Siberian, O.A.C.—1¾ acre. The soil, preparation and treatment, was the same as that for the Improved Ligowo. The previous crop was barley. Sown 30th April, 1¾ bushel per acre, came up 10th May; and was ripe 5th August. The time to mature was 97 days. The yield per acre, 48 bushels 9 pounds; weight per bushel, 34 pounds. Length of head, 9 to 11 inches, branching, length of straw, 42 to 46 inches. Made a medium to strong growth, fairly even, and all stood well. There was a considerable quantity of smut, and the leaves and stems were badly rusted.

American Beauty.—2½ acres. The soil and treatment was the same as in the case of the Improved Ligowo. The previous crop was barley. Sown 30th April, two bushels per acre, came up 10th May, and was ripe 1st August. The time to mature was 93 days. Yield per acre, 50 bushels 12 pounds; weight per bushel, 35½ pounds. Length of head, 7 to 9 inches, branching, length of straw, 42 to 47 inches. Made a medium but even growth; all standing well. There was some smut and the leaves and stems were badly rusted.

Mortgage Lifter.—1½ acre. The soil where this plot was located was scarcely so heavy or so good, but the treatment was the same, as that for the Improved Ligowo. Sown 30th April; two bushels per acre, came up 10th May; and was ripe 30th July. The time to mature was 91 days. Yield per acre, 39 bushels 15 pounds; weight per bushel, 41½ pounds. Length of head, 7 to 9 inches; branching, length of straw, 38 to 44 inches; the straw was soft and weak. The growth was uneven, and lodged in spots. This variety was very badly affected with smut and the leaves and stems were very much rusted.

Joanette.—1¾ acre. Soil a sandy loam of fair quality. The preparation and treatment was the same as that for the Improved Ligowo. The previous crop was barley. Sown 30th April; 1½ bushel per acre, came up 10th May; and was ripe 9th August. The time to mature was 101 days. Yield per acre, 33 bushels 3 pounds, weight per bushel, 35 pounds. Length of head, 7 to 9 inches, branching; length of straw, 24 to 32 inches. Growth rather weak, but even, and all standing well. There was some smut and the leaves and stems were badly rusted.

Holstein Prolific.—1¼ acre. Soil a sandy loam of fair quality, the preparation and treatment was the same as that for the Improved Ligowo. The previous crop was barley. Sown 30th April; 1¾ bushel per acre, came up 11th May; and was ripe 6th August. The time to mature was 98 days, Yield per acre, 46 bushels 2 pounds; weight per bushel, 33½ pounds. Length of head, 9 to 11 inches, branching; length of straw, 36 to 44 inches. Made a medium and even growth; all standing well. There was some smut and the leaves and stems were badly rusted.

Wallis.—2½ acres. Soil a sandy loam of fair quality. The preparation and treatment was the same as that for the Improved Ligowo. The previous crop was partly mangels, and partly sunflowers. Sown 1st May; 2 bushels per acre, came up 11th May, and was ripe 6th August. The time to mature was 97 days. Yield per acre, 46 bushels 32 pounds; weight per bushel, 33 pounds. Length of head, 9 to 11 inches, branching, length of straw, 40 to 48 inches. Growth medium to strong and fairly even, only a few spots lodged. There was some smut, and the leaves and stems were badly rusted.

Early Gothland.—2 acres. Soil partly clay loam, partly sandy loam, and part peaty. This land was manured in the spring of 1896, with about 12 tons of barn-yard manure per acre. The previous crop was corn. It was ploughed late in the autumn of 1896, from 7 to 8 inches deep, and in the following spring, it was disc-harrowed twice, and harrowed twice with the smoothing harrow before sowing. Sown 4th May; 1¾ bushel per acre; came up 14th May; and was ripe 3rd August. The time to mature was 91 days. Yield per acre, 40 bushels 20 pounds; weight per bushel, 34¼ pounds. Length of head, 8 to 9 inches; half sided; length of straw, 38 to 44 inches. Made a medium growth; all standing well. There was some smut, and the leaves and stems were slightly rusted.

Golden Beauty.—2 acres. This was sown adjoining the Early Gothland, and the preparation and treatment of the land was the same. Sown 4th May; 1¾ bushel per acre;

came up 14th May ; and was ripe 4th August. The time to mature was 92 days. Yield per acre, 41 bushels 11 pounds; weight per bushel, 35 pounds. Length of head, 9 to 11 inches; branching ; length of straw, 38 to 46 inches. Made a strong and even growth, but there were a few spots lodged. There was some smut, and the leaves and stems were badly rusted.

Columbus.—1 acre. This also was adjoining the Early Gothland, and the character of the land and the treatment were the same ; sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 7th August. The time to mature was 95 days. Yield per acre, 36 bushels 8 pounds ; weight per bushel, 30 pounds ; length of head, 9 to 11 inches, branching ; length of straw, 40 to 47 inches. Made a strong and even growth, but some spots were lodged. There was some smut, and the leaves and stems were badly rusted.

Flying Scotchman.—1 acre. This was sown near the Early Gothland ; the soil was similar, and the preparation and treatment of the land the same. Sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 30th July. The time to mature was 87 days. Yield per acre, 35 bushels 22 pounds ; weight per bushel, 38 pounds. Length of head, 7 to 10 inches, branching ; length of straw, 38 to 42 inches. Made a medium and even growth ; all standing well. There was some smut, and the leaves and stems were badly rusted.

White Schonen.—1 acre. The soil and its treatment and preparation were the same as for Early Gothland. Sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 7th August. The time to mature was 95 days. Yield per acre, 38 bushels 23 pounds ; weight per bushel, 33¼ pounds. Length of head, 8 to 9 inches, branching ; length of straw, 38 to 44 inches. Made a medium but even growth ; all standing well. There was some smut, and the leaves and stems were badly rusted.

Early Golden Prolific.—1 acre. The soil was part sandy loam and part peaty. The land was manured in the spring of 1896 with about 12 tons of barn-yard manure per acre. It was ploughed late in the autumn of 1896 from 7 to 8 inches deep, and in the following spring it was disc-harrowed twice and harrowed twice with the smoothing harrow before sowing. The previous crop was Indian corn. Sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 7th August. The time to mature was 95 days. Yield per acre, 37 bushels 6 pounds ; weight per bushel, 31 pounds. Length of head, 7 to 9 inches, branching ; length of straw, 33 to 41 inches. Growth medium and even ; all standing well. There was some smut, and the leaves and stems were considerably rusted.

Early Archangel.—1 acre. The soil was similar and the preparation and treatment the same as for the Early Golden Prolific. Sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 2nd August. The time to mature was 90 days. Yield per acre, 34 bushels 23 pounds ; weight per bushel, 33¼ pounds. Length of head, 7 to 9 inches, branching ; length of straw, 38 to 44 inches. Medium to strong growth ; all standing well excepting in one spot, which was lodged. There was some smut, and the leaves and stems were badly rusted.

Hazlett's Seizure.—1 acre. The soil was sandy loam of a poor quality ; its preparation and treatment the same as for the Early Golden Prolific. Sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 6th August. The time to mature was 94 days. Yield per acre, 26 bushels 26 pounds ; weight per bushel, 30 pounds. Length of head, 9 to 11 inches, branching ; length of straw, 38 to 46 inches. Growth medium ; all standing well. There was some smut, and the leaves and stems were very badly rusted.

Mennonite.—1 acre. The soil was sandy loam of a poor quality ; its preparation and treatment the same as for the Early Golden Prolific. Sown 4th May ; 1¾ bushel per acre ; came up 14th May ; and was ripe 3rd August. The time to mature was 91

days. Yield per acre, 30 bushels 18 pounds; weight per bushel, 29 pounds. Length of head, 7 to 10 inches, branching; length of straw, 36 to 41 inches. Growth medium; all standing well. There was some smut, and the leaves and stems were badly rusted.

Wallis.—1½ acre The soil was sandy loam of poor quality; its preparation and treatment the same as for the Early Golden Prolific. Sown 4th May; 2 bushels per acre; came up 15th May; and was ripe 7th August. The time to mature was 95 days. Yield per acre, 26 bushels 26 pounds; weight per bushel, 33 pounds. Length of head, 8 to 10 inches, branching; length of straw, 41 to 46 inches. Growth medium and even; some spots lodged. There was some smut, and the leaves and stems were badly rusted.

Bavarian.—6½ acres. Soil sandy loam of variable character; part of it of fair quality, and part of poor quality. This land was manured in the autumn of 1896 with about 12 tons of barn-yard manure per acre, and then ploughed under about 8 inches deep. The previous crop was Indian corn. In the spring of 1897, the land was disc-harrowed twice, and harrowed with the smoothing harrow twice before sowing. Sown 6th May; 2 bushels per acre; came up 15th May; and was ripe 12th August. The time to mature was 98 days. Yield per acre, 35 bushels 17 pounds; weight per bushel, 32 pounds. Length of head, 8 to 10 inches, branching; length of straw, 38 to 44 inches. Growth medium and even; all standing well. There was some smut, and the leaves and stems were considerably rusted.

Banner.—5½ acres. Soil sandy loam of poor quality, a part of it peaty. The preparation and treatment was the same as that for the Bavarian. Sown 6th May; 2 bushels per acre; came up 15th May, and was ripe 12th August. The time to mature was 98 days. Yield per acre, 29 bushels 12 pounds; weight per bushel, 31 pounds. Length of head, 8 to 10 inches, branching; length of straw, 38 to 44 inches. Growth medium, rather weak in the lower spots; all standing well. There were a few heads of smut, and the leaves and stems were considerably rusted.

Abundance—4½ acres. The soil was a sandy loam of fair quality, which was manured in the spring of 1896 with about 10 tons of barn-yard manure per acre. The previous crop was barley. This was not ploughed in the autumn, but was ploughed about 6 inches deep in the spring of 1897, and harrowed three times with the smoothing harrow before sowing. Sown 8th May; 2 bushels per acre; came up 16th May; and was ripe 10th August. The time to mature was 94 days. Yield per acre, 49 bushels 14 pounds; weight per bushel, 34½ pounds. Length of head, 8 to 11 inches; branching, length of straw, 44 to 49 inches. Growth strong and even, but badly lodged. There was some smut, and the leaves and stems were badly rusted.

EXPERIMENTS WITH BARLEY.

Experiments have been conducted during 1897 with 52 varieties of barley, 23 of which were 2-rowed sorts, and 29 were 6-rowed. These were all sown in plots of $\frac{1}{20}$th acre each. The soil was a sandy loam of good quality, which received a dressing of barn-yard manure during the winter of 1895-96, the manure being placed on the land during the winter in small piles of about half a cart load each and spread in the spring. The previous crop was part flax and part oats. The land was ploughed in the autumn of 1896 from 7 to 8 inches deep, disc-harrowed once in the spring of 1897 and harrowed 3 times with the smoothing harrow before sowing. The 2-rowed varieties were sown from the 1st to 3rd of May, and the 6-rowed on 30th April and 1st May.

TWO-ROWED BARLEY—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Length of Head.	Yield per Acre.	Weight per Bushel.	Proportion Rusted.
			Inches.	Inches.	Bush. Lbs	Lbs	
1 Newton	Aug. 2	91	30 to 39	2½ to 3	41 7	45½	Slightly.
2 Logan	" 2	93	40 to 51	3 to 3¾	38 31	47	"
3 Canadian Thorpe	" 1	92	33 to 43	2½ to 3	38 26	46¾	"
4 Kirby	July 30	90	36 to 48	2¾ to 3½	38 21	45¼	"
5 Dunham	" 30	90	45 to 53	3¼ to 4	37 18	47	Considerably.
6 Sidney	Aug. 1	92	40 to 48	3 to 3½	35 41	46	Slightly.
7 Leslie	" 1	93	40 to 48	3 to 3½	35 30	48	"
8 Danish Chevalier	" 2	91	30 to 38	3½ to 4½	34 38	45½	Considerably.
9 Victor	" 1	92	34 to 46	3¼ to 4	34 28	48	Slightly.
10 Beaver	" 1	90	46 to 50	3½ to 4	34 8	48¼	"
11 Warren	" 1	92	42 to 48	3 to 3¾	33 6	47	Considerably.
12 Pacer	" 1	92	41 to 48	2¼ to 3	32 41	49	Slightly.
13 Nepean	" 1	92	43 to 48	2¾ to 3¼	31 27	48	"
14 Bolton	" 1	92	42 to 45	3 to 4	31 23	48½	"
15 Jarvis	July 30	90	48 to 53	3½ to 4½	31 9	48¼	"
16 Harvey	" 30	90	36 to 52	3 to 3¾	29 28	47	"
17 Gordon	Aug. 1	92	43 to 48	2½ to 3	29 18	47	"
18 French Chevalier	" 2	93	31 to 39	3¾ to 4¾	24 28	44	"
19 Prize Prolific	" 3	94	33 to 40	3½ to 4½	22 24	44	"
20 Thanet	" 1	90	36 to 44	4 to 4½	21 17	47	Badly,
21 Kinver Chevalier	" 2	91	36 to 44	3¾ to 4¾	19 28	42	Considerably.
22 Monck	" 7	98	36 to 46	3½ to 4	18 26	47	
23 Rigid	" 8	97	36 to 42	2¾ to 3	14 8	46¼	"

Included in the foregoing list are 14 new hybrid sorts of two-rowed barley which have been produced at the experimental farms. The names and parentage of 13 of these were given in the Annual Report of the Experimental Farms for 1896, the 14th named Warren was originated from Baxter's six-rowed fertilized with the pollen of a two-rowed variety, the Duck-bill, in 1892 by Mr. W. T. Macoun at Ottawa.

FIELD CROPS OF TWO-ROWED BARLEY.

Canadian Thorpe.—1¾ acre. Soil a sandy loam of fair quality, which received a dressing of about 12 tons of barn-yard manure, per acre, in the spring of 1895. No fertilizer has been applied since. The previous crop was oats. The land was ploughed late in the autum of 1896 about 8 inches deep and disc-harrowed twice the following spring and harrowed twice with the smoothing harrow before sowing. Sown 7th May; 2 bushels per acre; came up 15th May; and was ripe 2nd August. The time to mature was 87 days. Yield per acre, 35 bushels 27 pounds; weight per bushel, 49¾ pounds. Length of head, 3 to 3¼ inches; length of straw, 36 to 44 inches; growth uneven, medium to weak; all standing well. There was some smut, and the leaves and stems were badly rusted.

SIX-ROWED BARLEY—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Length of Head.	Yield per Acre.	Weight per Bushel.	Proportion Rusted.
			Inches.	Inches.	Bush. Lbs.	Lbs	
1 Odessa	July 27	87	41 to 48	2¾ to 3¼	54 3	44	Considerably.
2 Pioneer	" 26	86	48 to 55	2 to 3	50 40	48	Slightly.
3 Mansfield	" 27	88	42 to 50	2 to 3	49 24	45	"
4 Mensury	" 30	90	42 to 52	3 to 4	49 18	44½	"
5 Trooper	" 26	86	42 to 44	2½ to 2¾	48 41	47½	"
6 Royal	" 25	85	36 to 46	2½ to 3	48 6	45½	"
7 Oderbruch	" 26	86	46 to 51	2 to 3	48 6	47	"
8 Argyle	" 27	87	42 to 48	2 to 3	47 34	44½	"
9 Empire	" 27	87	46 to 50	2½ to 3½	47 9	47	Considerably.
10 Rennie's Improved	" 25	85	36 to 48	2 to 2½	46 26	46	"
11 Stella	" 24	84	42 to 48	2 to 2½	45 25	47	Slightly.
12 Success	" 22	82	42 to 48	2 to 2½	44 15	44½	"
13 Vanguard	" 24	84	44 to 51	2¼ to 3	44 13	45	"
14 Petschora	" 24	84	36 to 48	2¼ to 3	43 36	43½	"
15 Nugent	" 30	90	42 to 48	2¼ to 3	43 6	45½	"
16 Albert	" 30	91	36 to 48	3 to 3¼	43 1	44¼	"
17 Blue Barley	" 24	84	36 to 42	2½ to 3	42 34	42	Considerably.
18 Summit	" 26	86	41 to 48	2 to 3	41 37	48¼	Slightly.
19 Phœnix	" 25	85	44 to 50	2 to 2½	41 11	46	"
20 Excelsior	" 25	85	45 to 53	2½ to 3	40 40	43	"
21 Champion	" 26	86	52 to 56	3 to 3¾	40 10	41	Considerably.
22 Common	" 25	85	33 to 42	2 to 3	40	46¼	Slightly.
23 Surprise	" 27	87	39 to 45	2 to 2¾	38 12	47	"
24 Claude	" 26	87	36 to 48	2¼ to 3¼	37 4	43	"
25 Monde (hulless)	" 24	84	39 to 48	2½ to 3	36 2	57½	"
26 Baxters	" 27	87	38 to 48	2 to 2½	35 7	46	Considerably.
27 Brome	" 30	90	36 to 43	2½ to 3¼	33 1	47	Slightly.
28 Yale	" 30	90	40 to 52	2 to 3	32 26	44½	"
29 Garfield	" 27	87	36 to 48	2 to 3	30 45	45¼	"

Included in this list of varieties of six-rowed barley there are seventeen new hybrid sorts which have been produced at the experimental farms. The names and parentage of 15 of these were given in the annual report for 1896, the two now added are 16 Vanguard and 17 Surprise. These were originated in 1889, at the Central Experimental Farm at Ottawa, by the Director and are both hybrids between Swedish (two-rowed) female with Baxter's (six-rowed) male.

FIELD CROPS OF SIX-ROWED BARLEY.

Royal.—2½ acres. Soil a sandy loam, rather light in character, which received a coating of barn-yard manure of about 12 tons per acre in the spring of 1895. No fertilizer has been applied since. The previous crop was oats. The land was ploughed very lightly after harvest to start weed seeds and shed grain, and again later in the autumn, about 8 inches deep. In the spring it was disc-harrowed twice, and harrowed twice with the smoothing harrow before sowing. Sown 1st May; 1¾ bushel per acre; came up 10th May; and was ripe 26th July. The time to mature was 86 days. Yield per acre, 29 bushels 42 pounds; weight per bushel, 48 pounds. Length of head, about 3 inches; length of straw, 42 to 46 inches. Growth medium to strong and even; all standing well, and the grain ripened very evenly. There was some smut but no rust.

Trooper.—2½ acres. This was adjoining the field of Royal barley; the soil was similar and the preparation and treatment of the land the same. Sown 1st May; 1¾ bushel per acre; came up 10th May; and was ripe 27th July. The time to mature was 87 days. Yield per acre, 26 bushels 15 pounds; weight per bushel, 49¼ pounds. Length

of head, 2½ to 3 inches; length of straw, 40 to 42 inches; growth medium to weak; all standing well. There was some smut but no rust.

Mensury.—2¾ acres. This and the three following plots were adjoining that of Trooper; the soil was similar and the preparation and treatment of the land the same throughout. Sown 3rd May; 1¾ bushel per acre; came up 10th May; and was ripe 25th July. The time to mature was 83 days. Yield per acre, 36 bushels 47 pounds; weight per bushel, 48¼ pounds. Length of head, 3 to 3½ inches; length of straw, 44 to 48 inches. Growth strong and even; all standing well. There was some smut but no rust.

Champion.—½ acre. Sown 3rd May; 1¾ bushel per acre; came up 11th May, and was ripe 25th July. The time to mature was 83 days. Yield per acre, 43 bushels 46 pounds; weight per bushel, 44 pounds. Length of head, 3 to 3¼ inches; beardless; length of straw, 42 to 44 inches. Growth medium to strong; standing fairly well. There was some smut, and the leaves and stems were somewhat rusted.

Success.—½ acre. Sown 3rd May; 1¾ bushel per acre; came up 11th May, and was ripe 22nd July. The time to mature was 81 days. Yield per acre, 43 bushels 29 pounds; weight per bushel, 45¼ pounds. Length of head, 2 to 2¼ inches; beardless; length of straw, 36 to 40 inches. Growth medium and even; all standing well. No smut or rust.

Odessa.—¾ acre. Sown 3rd May; 1¾ bushel per acre; came up 11th May, and was ripe 26th July. The time to mature was 84 days. Yield per acre, 37 bushels 10 pounds; weight per bushel, 48 pounds. Length of head 2¾ to 3 inches; length of straw, 32 to 41 inches. Growth strong and even; standing fairly well, only one spot lodged. There was some smut, and the leaves and stems were slightly rusted.

EXPERIMENTS WITH SPRING WHEAT.

Fifty-six varieties of spring wheat were tested during the season of 1897, grown on plots of $\frac{1}{20}$th acre each. The land selected for the wheat plots was adjoining that used for the test of varieties of barley, the soil was similar and the preparation and treatment of the land the same. The previous crop was barley. The plots were all sown on the 29th and 30th April at the rate of one and a half bushel per acre.

SPRING WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Proportion Rusted.
			Inches.	Inches.		Bush.	Lbs.	Lbs.	
1 Plumper	Aug. 3	95	46 to 50	2½ to 3¼	Bearded	26	42	59	Considerably.
2 Roumanian	" 9	102	48 to 52	2¼ to 2¾	"	26	30	57½	Slightly.
3 Wellman's Fife	" 9	102	52 to 56	4 to 4½	Beardless	24	55	53	"
4 Blair	" 2	94	42 to 48	2½ to 3	"	24	10	58	"
5 Mason	" 2	94	42 to 47	2½ to 3½	"	23	20	59½	Considerably.
6 White Fife	" 8	100	39 to 48	3 to 3½	"	23	5	54½	Slightly.
7 Harold	July 27	89	43 to 52	2 to 3	Bearded	22	50	56	Considerably.
8 Colorado	Aug. 4	94	44 to 51	2¾ to 3½	"	22	15	58½	"
9 Monarch	" 9	102	48 to 52	4 to 5	Beardless	22	7	54	Slightly.
10 Rio Grande	" 8	101	36 to 54	4 to 5	Bearded	22		58	Considerably.
11 Laurel	" 9	101	42 to 54	3½ to 4	Beardless	22		51	Slightly.
12 White Connell	" 10	102	44 to 51	3½ to 4	"	21	30	52½	"
13 Old Red River	" 9	102	42 to 48	3½ to 4	"	21	27	52	"
14 Crawford	" 2	94	42 to 50	2½ to 3½	"	21	20	55½	Considerably.
15 Huron	" 3	96	42 to 50	3 to 3½	Bearded	21		55	Slightly.
16 Advance	" 3	96	42 to 51	3 to 3½	"	20	40	55	"
17 White Russian	" 9	101	42 to 55	3½ to 4½	Beardless	20	35	52	"

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Proportion Rusted.
			Inches.	Inches.		Bush.	Lbs.	lbs.	
18 Cartier	Aug. 2	94	36 to 46	2½ to 3	Bearded..	20	25	59¼	Considerably.
19 Hungarian	" 5	98	48	3 to 3½	" ..	20	20	54¼	"
20 Blenheim	" 5	98	42 to 48	3 to 4	" ..	20	17	55	"
21 Preston	" 5	98	42 to 48	3 to 4	" ..	20	10	55	Slightly.
22 Pride of Baropa	" 5	97	42 to 48	2¾ to 3½	Beardless.	20	10	56¼	"
23 Dufferin	" 2	95	43 to 52	2½ to 3	Bearded .	19	55	57	Considerably.
24 Countess	" 3	95	42 to 46	2½ to 3½	Beardless.	19	55	58½	Slightly.
25 Dawn	" 2	95	42 to 46	2¾ to 3½	" ..	19	55	56	Considerably.
26 Rideau	" 2	95	42 to 52	2¼ to 3	" ..	19	55	53	"
27 Crown	" 3	96	42 to 48	3 to 3½	Bearded..	19	45	55	"
28 Bishop	" 2	95	42 to 50	2½ to 3½	Beardless.	19	30	58	"
29 Goose	" 6	99	42 to 48	2 to 2½	Bearded..	19	15	58½	Slightly.
30 Red Fife	" 9	102	40 to 48	3¼ to 4	Beardless.	19	15	52	"
31 Pringle's Champlain	" 4	97	40 to 48	3½ to 4½	Bearded..	19		56	"
32 Progress	" 6	99	48 to 51	3 to 4	Beardless.	18	55	54½	"
33 Essex	" 8	100	42 to 48	3½ to 4	" ..	18	55	52	Considerably.
34 Ebert	" 3	95	39 to 48	2½ to 3	" ..	18	45	56½	Badly.
35 Stanley	" 5	98	48	3 to 4	" ..	18	10	53½	Slightly.
36 Angus	" 2	94	40 to 48	2½ to 3	" ..	17	50	58	"
37 Admiral	" 8	100	48 to 52	.....	" ..	17	30	52	"
38 Dawson	" 6	98	42 to 48	3½ to 4	" ..	17	25	54	Considerably.
39 Alpha	" 6	99	48 to 52	3 to 4	" ..	17	10	53	Slightly.
40 Vernon	" 8	101	42 to 48	2¾ to 3½	Bearded..	16	50	53	Considerably.
41 Captor, Red Chaff	" 5	98	44 to 51	3 to 4	Beardless.	16	50	52	Slightly.
42 Percy	" 5	98	42 to 51	3 to 3½	" ..	16	39	54	"
43 Fraser	" 1	93	36 to 44	2½ to 3	Bearded ..	16	10	59½	Considerably.
44 Campbell's White Chaff	" 7	100	48 to 51	3 to 3½	Beardless.	16		51	Badly.
45 Black Sea	" 3	96	42 to 48	3 to 3½	Bearded..	15	55	52	Considerably.
46 Jordan	" 6	98	46 to 50	3 to 4	Beardless.	15	37	51	"
47 Golden Drop	" 4	96	43 to 48	2½ to 3	" ..	15		51	"
48 Ladoga	" 3	96	48 to 53	3 to 3½	Bearded..	14	55	53	"
49 Beauty	" 8	101	48 to 52	3½ to 4½	Beardless.	14	35	50	"
50 Captor	" 3	96	36 to 48	2½ to 3½	" ..	14	13	52	"
51 Beaudry	" 3	96	48 to 53	3 to 3½	Bearded..	14		54½	Slightly.
52 Herisson Bearded	" 5	98	45 to 51	1½ to 2	" ..	13	50	52⅔	"
53 Percy, White Chaff	" 5	98	42 to 51	3 to 4	Beardless.	13	37	50	"
54 Red Fern	" 8	101	36 to 48	3½ to 4½	Bearded..	12	59	52½	Considerably.
55 Dions	" 8	101	48 to 52	3½ to 4½	" ..	12	50	52	"
56 Emporium	" 8	101	50 to 54	3½ to 4½	" ..	10	21	51½	"

In the foregoing list there are included thirty-one of the new cross-bred sorts which have been originated at the experimental farms. A list of the names and parentage of fifteen of these was given in the annual report for 1896, a continuation of this list will be found below :—

16. Angus—Early Sonora	Female with	Red Fife		Male.
17. Dawson—White Connell	do	Hard Red Calcutta		do
18. Fraser—Alpha	do	Hard Red Calcutta		do
19. Crawford—Alpha	do	Gehun		do
20. Jordan—Red Fife	do	Anglo Canadian		do
21. Laurel—Red Fife	do	Gehun		do
22. Plumper—Colorado	do	Gehun		do
23. Blair—Colorado	do	Gehun		do
24. Mason—Colorado	do	Gehun		do
25. Cartier—Colorado	do	Gehun		do
26. Bishop—Ladoga	do	Gehun		do
27. Ebert—Gehun	do	Ladoga		do
28. Harold—Gehun	do	Onega		do

29.	Essex—White Fife.....	Female with	Stewart.....	Male.
30.	Countess—Early Sonora....	do	Red Fife.....	do
31.	Rideau—Spiti Valley.....	do	Red Fife.....	do

Of these results in cross-fertilizing six were originated at the Central Experimental Farm by the Director, three in 1889, Nos. 16, 30 and 31, two in 1890, Nos. 20 and 29, and one in 1891, No. 23. Seven were the results of the work of Mr. W. T. Macoun also at the Central Farm; six were produced in 1891, Nos. 22, 24, 25, 26, 27 and 28, and one in 1892, No. 19. Three were originated by Dr. A. P. Saunders, in 1892, two of them Nos. 17 and 21 at the branch experimental farm at Brandon, Manitoba and one No. 18 at the branch farm at Agassiz, British Columbia.

FIELD PLOTS OF WHEAT.

Preston.—½ acre. Soil a sandy loam of fair quality, which received a dressing of barn-yard manure in the spring of 1896, of about 12 tons per acre. The previous crop was potatoes. The land was ploughed in the autumn of 1896, about 8 inches deep, and in the following spring disc-harrowed twice and harrowed twice with the smoothing harrow before sowing. Sown 1st May; 1½ bushel per acre; came up 11th May; and was ripe 7th August. The time to mature was 98 days. Yield per acre, 28 bushels 42 pounds; weight per bushel, 56½ pounds. Length of head, 3 to 3¼ inches; length of straw, 36 to 40 inches. Growth medium to strong and even; all standing well. There was no smut, but the leaves and stems were badly rusted.

Advance.—½ acre. This and the next plot referred to were both adjoining the Preston; the soil was similar and the preparation and treatment of the land the same. Sown 1st May; 1½ bushel per acre; came up 11th May; and was ripe 7th August. The time to mature was 98 days. Yield per acre, 25 bushels 1 pound; weight per bushel, 55 pounds. Length of head, 3¾ to 4 inches; length of straw, 36 to 41 inches. Growth tolerably even; standing fairly well; some of the straw was broken about a foot from the ground. There was no smut, but the leaves and stems were badly rusted.

Herisson Bearded.—½ acre. Sown 1st May; 1½ bushel per acre; came up 11th May; and was ripe 9th August. The time to mature was 100 days. Yield per acre, 25 bushels 58 pounds; weight per bushel, 57½ pounds. Length of head, 2 to 2¼ inches; length of straw, 36 to 40 inches. Growth medium to strong and even; all standing well. There was no smut, but the leaves and stems were badly rusted.

EXPERIMENTS WITH PEASE.

During the season of 1897, seventy-nine varieties of pease have been tested on uniform plots of $\frac{1}{20}$th acre each, and the results are given in the appended table. The land on which these pease were sown was adjoining that used for the plots of barley, the soil however was a lighter sandy loam and not so good in quality. The preparation and treatment of the land was the same as that used for the barley plots. The land was occupied in 1896 with experimental plots of wheat, oats and barley. The plots of pease were all sown on the 3rd and 4th of May with the following results:—

PEASE—TEST OF VARIETIES.

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 Canadian Beauty	Aug. 24	112	Strong	60 to 96	2½ to 3¼	31 50	63
2 Oddfellow	" 6	95	"	36 to 48	1½ to 2	30 30	66
3 Arthur	" 7	95	"			30 20	63
4 Creeper	" 21	109	"	48 to 72	1¾ to 3½	29 40	63¼
5 King	" 20	109	"	60 to 84	2 to 2½	29 35	62
6 Cooper	" 14	103	"	36 to 60	1¾ to 2½	29	62
7 Picton	" 12	101	"	60 to 84	2½ to 3	28 9	63
8 Macoun	" 31	119	"	72 to 96	2¾ to 3	27 40	61
9 Fergus	" 20	109	"	72 to 84	2 to 2½	27 40	61½
10 Prussian Blue	" 12	100	"	72 to 96	2¼ to 2¾	27 20	63¼
11 Gregory	" 17	106	"	48 to 60	2 to 2¾	27 20	61
12 Lanark	" 9	98	"	48 to 72	2½ to 3	27 15	60¼
13 Fenton	" 12	100	"	60 to 72	2½ to 3¼	27 10	60¼
14 Prince Albert	" 28	117	"	84 to 96	2 to 2½	27 5	63½
15 Pearl	" 30	119	"	72	2½ to 3	27	62
16 Crown	" 14	103	"	60 to 72	2 to 2½	26 50	63¼
17 Harrison's Glory	" 9	98	Medium	30 to 36	2¼ to 3	26 40	60¼
18 Forbes	" 14	103	Strong	72 to 84	1½ to 2½	26 40	62
19 Early Britain	" 7	95	"	48	2¼ to 2¾	26 30	59
20 Dixon	" 19	108	"	72 to 84	2½ to 3	26 20	62¼
21 Perth	" 9	97	"	48 to 60	2¼ to 3	26 20	61
22 Victoria	" 30	118	"	72 to 96	2¼ to 2¾	26	61¼
23 Lisgar	" 18	107	"	60 to 84	2¼ to 3	25 50	62½
24 Vincent	" 10	98	"	42 to 48	2½ to 3	25 50	61½
25 Weston	" 28	117	"	72 to 84	2¼ to 3	25 40	62½
26 Carleton	" 19	107	"	60 to 72	2 to 2½	25 40	63
27 New Potter	" 27	115	"	72 to 96	2½ to 3	25 20	62
28 Dover	" 24	113	"	60 to 72	2¼ to 3	25	62½
29 Alma	" 20	106	"	60 to 84	2 to 2¾	25	63
30 Agnes	" 9	98	"	48 to 60	2½ to 3	24 45	61½
31 Prospect	" 17	106	"	60 to 72	2¼ to 2¾	24 40	60
32 Derby	" 28	117	"	60 to 72	2¼ to 3	24 40	61
33 Elephant Blue	" 9	97	"	36 to 48	2 to 2¾	24 40	62
34 Kent	" 26	114	"	48 to 72	2½ to 3¼	24 30	62
35 Duke	" 23	111	"	48 to 72	2¼ to 3	24 30	63
36 Black Eyed Marrowfat	" 19	108	"	60 to 84	2½ to 3	24 20	62¼
37 Elliott	" 12	101	"	48 to 72	2¼ to 3	24 5	61
38 Dexter	" 14	103	"	48 to 60	2¼ to 3	24 3	61¼
39 Chelsea	" 18	107	"	60 to 72	1¾ to 2½	23 50	63
40 Mummy	" 7	95	Medium	36 to 48	2 to 2¼	23 50	64¼
41 Kerry	" 27	116	Strong	84 to 96	2½ to 3¼	23 50	61¼
42 Nelson	" 7	95	"	36 to 42	2 to 2¾	23 45	64¼
43 Elder	" 27	116	"	48 to 72	1¾ to 2½	23 45	62¼
44 German White	" 6	94	"	42 to 48	2½ to 3	23 40	61
45 Clarke	" 18	107	"	48 to 72	1½ to 2½	23 30	64
46 Ogden	" 29	118	"	84 to 96	2 to 2½	23 20	62½
47 Herald	" 17	106	"	60	2 to 2½	23 10	64
48 Hazen	" 12	101	"	72 to 84	2¼ to 3	23 10	63
49 Dover	" 24	113	"	60 to 72	2¼ to 3	23 10	63
50 Grant	" 16	105	"	60 to 84	2¼ to 3	23 10	61½
51 Paragon	" 29	117	"	72 to 84	2½ to 3¼	22 50	61¼
52 Bedford	" 30	118	"	84 to 108	2 to 2½	22 50	62½
53 Tracey	" 17	105	"	60 to 72	2¼ to 3	22 50	62
54 Jackson	" 15	104	"	72	1½ to 2½	22 45	63
55 Leader	" 18	106	"	72 to 84	2½ to 3¼	22 30	60
56 Chancellor	" 5	93	"	48 to 72	1 to 2	22	61¾
57 Comet	" 23	112	"	72 to 84	2 to 3	22	60½
58 Surrey	" 28	116	"	72 to 84	2¼ to 3	21 50	62¼
59 Bruce	" 20	108	"	60	2¼ to 3¼	21 30	60¼
60 Multiplier	" 18	106	"	60	2 to 2½	21	63¼
61 Golden Vine	" 18	106	Medium	30 to 54	1½ to 2¼	20 50	63
62 Nixon	" 18	107	Strong	60 to 72	2 to 3	20 40	62¼
63 Large White Marrowfat	" 12	100	"	48 to 60	2½ to 3	20 30	
64 Bright	" 29	117	"	60 to 84	2½ to 3	20 20	63
65 Centennial	" 21	109	"	60	2 to 2¾	20 20	62¼

PEASE—TEST OF VARIETIES—*Continued.*

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.
66 Moore	Aug. 7	96	Strong	48	2½ to 3	20		59½
67 Archer	" 18	106	"	60 to 72	2 to 2½	20		63¼
68 Vasey	" 26	114	"	60 to 72	2½ to 3¼	19	50	61¼
69 Albion	" 20	108	"	60 to 72	2 to 2½	19	40	63
70 Mackay	" 14	102	"	36 to 60	2¼ to 3	17	40	62
71 Elva	" 23	111	"	72	2¼ to 3	17	5	63
72 Trilby	" 30	118	"	60 to 72	2½ to 3¼	15	40	61
73 Prince	" 18	106	"	60 to 72	2½ to 3	15		62
74 Kingsford	" 9	98	"	36 to 48	2 to 2½	14	55	63½
75 Luther	" 23	111	"	60 to 84	2½ to 3	14	30	61½
76 Excelsior	" 24	112	"	60 to 72	2 to 2½	14	20	62
77 Daniel O'Rourke	" 5	93	Medium	36 to 42	2 to 2¾	14		61½
78 White Wonder	" 5	93	"	18 to 30	2¼ to 2¾	9	5	62
79 Pride	" 6	94	"	24 to 30	2 to 2½	7	40	60

The Pease, White Wonder and Pride, are both low growers and happened to be sown on a rather low spot, on which weeds grew unusually rank, and hence the vines were partly smothered, and the yields very small. Hitherto both these varieties have given good crops. Mackay also which was near the head of the list last year has not given a satisfactory return. The vines were very thin on the plot, due either to faulty germination of the seed, or to the ravages of cut worms.

The following new varieties included in the above list have been tested for the first time, Oddfellow, Harrison's Glory, Elephant Blue and German White.

FIELD CROPS OF PEASE.

Creeper.—½ acre. Soil sandy loam of medium quality, which received a dressing of barnyard manure of about 12 tons per acre in the spring of 1895. No fertilizer has been applied since. The previous crop was hay. The land was ploughed in the spring of 1897 about 6 inches deep, disc-harrowed once and harrowed twice with the smoothing harrow before sowing. Sown 13th May; 2 bushels per acre; came up 22nd May, and was ripe 23rd August. The time to mature was 102 days. Yield per acre, 38 bushels 9 pounds; weight per bushel, 63½ pounds. Growth medium and even; pods small, fairly abundant. Length of straw, 46 to 52 inches.

Agnes.—½ acre. This plot and that of Arthur, which follows, were sown adjoining Creeper; the soil was similar and the preparation and treatment of the land the same. Sown 13th May; 2½ bushels per acre; came up 22nd May and was ripe 25th August. The time to mature was 104 days. Yield per acre, 33 bushels 24 pounds; weight per bushel, 62 pounds. Growth medium and even; pods large. Length of straw, 41 to 52 inches.

Arthur.—½ acre. Sown 13th May; 2 bushels per acre; came up 22nd May, and was ripe 19th August. The time to mature was 98 days. Yield per acre, 38 bushels 14 pounds; weight per bushel, 64 pounds. Well podded; pods small and in clusters, like the Mummy; the straw also resembles the Mummy in thickness and in its upright growth. Length of straw, 39 to 48 inches.

RESULTS OF EARLY, MEDIUM AND LATE SOWINGS.

These experiments have all been conducted on similar land on $\frac{1}{10}$th acre plots, the plots adjoining each other.

OATS SOWN AT DIFFERENT DATES.

Name of Variety.	Date of Sowing.	Date of Ripening	No. of Days Maturing.	Length of Straw.	Weight of Straw per acre.	Yield of grain per acre.	Weight per bushel.	Rusted.
				Inches.	Lbs.	Bush. lbs.		
Banner	April 13	Aug. 2	111	44 to 48	3,220	70 ..	34⅜	Slightly.
"	" 21	" 3	104	44 to 51	2,350	77 22	34½	Considerably.
"	" 28	" 9	103	46 to 51	2,330	69 24	34⅜	Badly.
"	May 5	" 11	98	38 to 48	2,350	66 6	29	"
"	" 12	" 14	94	36 to 48	2,790	54 24	29¼	"
"	" 19	" 14	87	38 to 42	3,050	42 22	24	"
Abundance	April 13	" 1	110	44 to 46	3,100	44 14	37	Slightly.
"	" 21	" 2	103	48 to 51	3,720	58 8	34	Considerably.
"	" 28	" 7	101	46 to 49	3,850	53 8	34⅜	Badly.
"	May 5	" 9	96	34 to 44	3,350	50 10	33	"
"	" 12	" 12	92	46 to 49	3,890	40 10	35	"
"	" 19	" 14	87	36 to 41	3,190	37 12	24	"

BARLEY SOWN AT DIFFERENT DATES.

Canadian Thorpe	April 13	July 26	104	42 to 46	3,200	35	40	49	No rust.
"	" 21	" 26	96	46 to 49	3,610	46	42	44	"
"	" 28	" 30	93	32 to 38	2,830	35	10	48½	Considerably.
"	May 5	Aug. 2	89	46 to 47	2,630	36	2	48¼	"
"	" 12	" 6	86	44 to 47	2,245	19	32	44	Badly.
"	" 19	" 11	84	... .	1,880	21	12	42	"
Odessa	April 13	July 23	101	40 to 46	3,720	40	20	47	No rust.
"	" 21	" 23	93	40 to 42	3,230	53	36	47	"
"	" 28	" 26	89	40 to 42	2,830	41	22	47	"
"	May 5	" 27	83	42 to 48	2,910	36	42	47	"
"	" 12	Aug. 2	82	28 to 36	2,340	31	32	47	Considerably.
"	" 19	" 5	78	26 to 31	2,270	27	34	42¼	Badly.

SPRING WHEAT SOWN AT DIFFERENT DATES.

Red Fife	April 13	Aug. 4	113	38 to 43	1,900	19	20	51½	Considerably.
"	" 21	" 7	108	38 to 44	4,120	20	40	55¼	"
"	" 28	" 9	103	38 to 45	3,640	18	50	50½	Badly.
"	May 5	" 12	99	35 to 39	3,370	16	50	54⅛	"
"	" 12	" 14	94	35 to 39	2,430	10	50	52¼	Very badly.
"	" 19	" 16	89	24 to 36	1,680	7		54¼	"
Stanley	April 13	" 2	111	36 to 38	1,200	16	50	51⅜	Badly.
"	" 21	" 6	107	38 to 44	3,770	20	30	54½	Considerably.
"	" 28	" 7	101	36 to 44	3,260	17	20	52⅜	Badly.
"	May 5	" 9	96	34 to 38	2,660	12	40	51	Very badly.
"	" 12	" 12	92	36 to 42	2,230	7	30	51	Badly.
"	" 19	" 14	87	24 to 36	2,480	6	20	54¼	Very badly.

PEASE SOWN AT DIFFERENT DATES.

Name of Variety.	Date of Sowing.	Date of Ripening	No. of Days Maturing.	Length of Straw.	Weight of Straw per acre.	Yield of grain per acre.	Weight per bushel.
				Inches.	Lbs.	Bush. lbs.	
Mummy	April 13	Aug. 2	111	48 to 52	2,220	23 40	63¼
"	" 21	" 4	105	48 to 54	1,680	28 20	63
"	" 28	" 6	100	48 to 54	1,340	27 .	64
"	May 5	" 7	94	48 to 54	1,530	24 40	65
"	" 12	" 8	88	42 to 48	1,335	23 25	64¼
"	" 19	" 14	87	40 to 48	930	22 50	61
Golden Vine	April 13	" 4	113	55 to 60	2,330	25 50	63
"	" 21	" 7	108	50 to 58	1,680	29 40	63½
"	" 28	" 9	103	50 to 54	1,360	24 50	63
"	May 5	" 13	100	50 to 56	1,270	28 20	63¾
"	" 12	" 14	94	50 to 55	1,230	23 20	64
"	" 19	" 18	91	50 to 55	1,570	19 10	63½

SUMMARY OF RESULTS OF EARLY, MEDIUM, AND LATE SOWINGS FOR THE WHOLE PERIOD.

The following are the average crops which have been obtained, during the full period these tests have been continued—that is eight years with the oats, barley and spring wheat, and three years with the pease :—

Tests continued for Eight Years.						Tests continued for Three Years.	
Oats.	Average Yield per acre.	Barley.	Average Yield per acre.	Spring Wheat.	Average Yield per acre.	Pease.	Average Yield per acre.
	Bush. lbs.		Bush. lbs.		Bush. lbs.		Bush. lbs.
1st Sowing	54 31	1st Sowing	39 43	1st Sowing	18 23	1st Sowing	29 21
2nd "	59 8	2nd "	41 30	2nd "	19 23	2nd "	32 45
3rd "	50 2	3rd "	32 29	3rd "	14 19	3rd "	33 25
4th "	44 14	4th "	29 10	4th "	12 28	4th "	29 14
5th "	39 17	5th "	25 3	5th "	10 34	5th "	26 19
6th "	29 23	6th "	22 33	6th "	8 56	6th "	24 6

EXPERIMENTS WITH INDIAN CORN.

During the season of 1897, twenty-eight varieties of Indian corn have been tested side by side on fairly uniform land. The soil was a sandy loam of fair quality which received in the spring of 1894, an application of about 12 tons of barn-yard manure per acre. No fertilizer has been applied since. The previous crop was pease. The land was ploughed in the autumn of 1896, about 8 inches deep and again in the spring of 1897, about 6 inches deep and harrowed twice with the smoothing harrow before planting. The varieties were all planted 25th May, and were cut for ensilage 17th September. 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.

	Name of Variety.	Character of Growth.	Description of Variety.	Height.	Leafiness.	When Tasselled.	In Silk.	Early Milk.	Condition when cut.	Weight per acre grown in rows.	
				Inches.						Tons.	Lbs.
1	Selected Leaming	Very strong.	Red and yellow dent	132 to 144	Leafy	Aug. 6	Aug. 11		Early milk.	36	1,260
2	Giant Prolific Ensilage	"	White dent.	132 to 144	"	" 7	" 12		"	36	1,062
3	Cloud's Early Yellow	"	Red and yellow dent	120 to 132	"	" 4	" 12		"	32	416
4	Mammoth Cuban	"	"	120 to 144	"	" 6	" 16		"	31	1,228
5	Red Cob Ensilage	"	White dent.	126 to 144	"	" 15	" 23		"	30	1,512
6	Cuban Giant	"	Red and yellow dent	120 to 144	"	" 3	" 11		"	26	800
7	Thoroughbred White Flint	"	White flint	120 to 132	Very leafy	" 9	" 18		Nearly in early milk	26	767
8	Champion White Pearl	"	White dent	132 to 144	Leafy	" 8	" 17		"	25	556
9	North Dakota White	Strong	White flint	96 to 102	"	July 31	" 8		Glazed	25	292
10	Mammoth Eight-rowed Flint	"	Yellow flint	96 to 108	"	" 27	" 4	Aug. 27	Late milk	24	708
11	Ninety Day	Very strong.	White dent.	114 to 126	"	Aug. 4	" 9		Early milk.	23	992
12	Wisconsin White Dent	"	"	120 to 132	"	" 3	" 9		Late milk.	23	596
13	Longfellow	Strong	Yellow flint.	96 to 114	Very leafy	July 30	" 8	Sept. 1	"	22	1,870
14	Pride of the North	Very strong.	Red and yellow dent	120 to 132	Leafy	" 30	" 5	Aug. 31	"	22	1,804
15	North Dakota Yellow	Strong	Yellow flint.	90 to 102	"	" 29	" 4	" 27	Glazed	22	165
16	Early Butler	"	Red and yellow dent	96 to 108	"	" 31	" 5		Late milk.	21	1,296
17	Sanford	"	White flint	96 to 108	"	" 27	" 4	Aug. 27	"	21	1,164
18	Extra Early Huron Dent	"	Red and yellow dent	108 to 120	"	" 31	" 4	" 29	"	20	1,976
19	Compton's Early	"	Yellow flint.	96 to 120	"	Aug. 2	" 11		"	20	1,976
20	Angel of Midnight	"	"	96 to 108	Very leafy	July 27	" 4	Aug. 27	Glazed	20	1,580
21	White Cap Yellow Dent	Very strong.	Yellow and white dent.	120 to 144	"				Late milk.	19	1,290
22	Canada White Flint	Strong	White flint	96 to 108	Leafy	July 26	Aug. 1	Aug. 24	Glazed	18	1,818
23	Wisconsin Yellow Dent	"	Red and yellow dent	102 to 114	"	" 30	" 5		Late milk	18	102
24	King of the Earliest	"	"	96 to 108	Fairly leafy	" 29	" 5	Aug. 31	"	17	980
25	Pearce's Prolific	"	Yellow flint.	84 to 108	Leafy	" 27	" 6	" 27	Glazed	17	848
26	Mitchell's Extra Early	Medium	White flint	60 to 72	Fairly leafy.	" 24	July 26	" 15	Ripe	16	736
27	Mammoth Sweet Fodder	"	Sweet	78 to 96	"	" 24	" 26	" 17	Nearly ripe	13	1,720
28	Kendall's Giant	"	"	66 to 84	"	" 25	" 30	" 25	Late milk	13	400

FIELD CROPS OF INDIAN CORN.

The following varieties were sown in larger field plots :—

Mammoth Eight-rowed Flint.—2 acres. Soil, sandy loam of fair quality, with patches of heavier soil which were partly clay. The land was ploughed in the autumn of 1896 about 8 inches deep and received an application of barn-yard manure of about 15 tons per acre, distributed in small piles of about one-third of a cart-load each, during the winter, and spread in the spring, after which it was ploughed under about 6 inches deep and harrowed twice with the smoothing harrow before sowing. The previous crop consisted partly of pease and partly of buckwheat. Planted 27th May, in hills 3 feet apart each way, 4 to 5 kernels in each hill; came up 10th June; and was cut for ensilage 22nd September. The growth was strong and even, leafy from top to bottom, and 7 to 8 feet high; the ears were well advanced in the glazed condition, some beginning to harden. Yield per acre, 19 tons 38 pounds.

Compton's Early.—2½ acres. This and the three following field plots were adjoining the Mammoth Eight-rowed Flint; the soil was similar, excepting that on which the Angel of Midnight was planted, and the preparation and treatment of the land in each case the same. Planted 27th May, in hills; came up 10th June; and was cut for ensilage on 21st September. Growth, strong and even; leafy from top to bottom; 7 to 8 feet high; stalks extra well eared; and the ears well advanced in the glazed condition, some beginning to harden. Yield, 15 tons 1,190 pounds per acre.

Angel of Midnight.—2 acres. Part of the land in this field was low and clayey, and hence less suitable for this crop. Planted 26th May, in hills; came up 10th June; and was cut for ensilage 22nd September. Growth, strong and even; leafy from top to bottom; height, 7 to 8 feet; stalks extra well eared, and the ears well advanced in the glazed condition. Yield per acre, 12 tons 1,877 pounds.

White Cap Yellow Dent.—2 acres. Planted 26th May, in hills; came up 10th June; and was cut for ensilage 24th September. Growth, strong and even; leafy, especially towards the top; height, 10 to 12 feet; stalks well eared, and the ears in the late milk. Yield per acre, 17 tons 1,797 pounds.

Extra Early Huron.—½ acre. Soil sandy loam of good quality; treatment and preparation the same as that for Mammoth Eight-rowed Flint. Planted 26th May, in hills; came up 9th June; and was cut for ensilage 24th September. Growth strong and even; leafy at top and fairly leafy below; height, 9 to 10 feet; stalks well eared, and ears in the late milk. Yield per acre, 18 tons 730 pounds.

Canada White Flint.—½ acre. This and the thirteen following one-half acre plots, were all in the same field as Extra Early Huron; the soil was similar, and the preparation and treatment of the land the same as for that variety. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 24th September. Growth strong and even; leafy from top to bottom; height, 7½ to 8½ feet; stalks well eared, ears beginning to ripen. Yield per acre, 16 tons 1,460 pounds.

Sanford Flint.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 24th September. Growth very strong and even; leafy throughout; height 7½ to 8 feet; stalks well eared, ears in late milk. Yield per acre, 18 tons 930 pounds.

Rural Thoroughbred White Flint.—½ acre. Planted 22nd May, in hills; came up 11th June; and was cut for ensilage 27th September. Growth very strong and even; leafy from top to bottom; height 9 to 10 feet; stalks well eared, ears in the early milk stage. Yield per acre, 23 tons 1,934 pounds

Pride of the North.—½ acre. Planted 22nd May, in hills; came up 9thJune; and was cut for ensilage 24th September. Growth, strong and even; leafy from top to bottom; height, 9 to 10 feet; stalks well eared, grain beginning to harden. Yield per acre, 16 tons 320 pounds.

Red Cob Ensilage.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 27th September. Growth strong and even; fairly leafy at top, with few leaves at bottom; height, 12 to 14 feet; ears not plentiful, in early milk. This variety is too late in ripening here to make ensilage of best quality. Yield per acre, 24 tons 134 pounds.

Selected Leaming.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 27th September. Growth strong and even; leafy at top, few leaves at bottom; stalks well eared, ears in late milk. Yield per acre, 23 tons 910 pounds.

Early Butler.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 24th September. Growth strong and even; leafy at top, fewer leaves at bottom; stalks well eared, ears beginning to harden. Yield per acre, 17 tons 1,970 pounds.

North Dakota White.—½ acre. Planted 22nd May, in hills; came up 10th June; and was cut for ensilage 27th September. Growth strong and even; leafy throughout; height, 8 to 10 feet; stalks well eared, ears in the glazing stage, beginning to harden. Yield per acre, 19 tons 1,600 pounds.

Ninety-day Corn.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 28th September. Growth strong and even; leafy throughout; height, 10 to 12 feet; stalks well eared, ears in late milk. Yield per acre, 17 tons 590 pounds.

Cloud's Early Yellow Dent.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 28th September. Growth strong and even; leafy above, with very few leaves below; height 10 to 12 feet; stalks well eared, ears in late milk. Yield per acre, 23 tons 1,520 pounds.

Mammoth Cuban.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 28th September. Growth strong and even; leafy above, very few leaves below; stalks well eared, ears in late milk. Yield per acre, 21 tons 434 pounds.

Mammoth Giant Fodder.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 28th September. Growth medium and even; very leafy throughout; stalks well eared, ears in early milk. This variety is rather too late in ripening to be useful in this district. Yield per acre, 14 tons 1,236 pounds.

Giant Prolific Ensilage.—½ acre. Planted 22nd May, in hills; came up 9th June; and was cut for ensilage 28th September. Growth very strong and even; leafy above, with few leaves below; height, 12 to 14 feet; stalks well eared, ears in early milk. This variety is too late in ripening here to make ensilage of the best quality. Yield per acre, 18 tons 870 pounds.

Champion White Pearl.—1¾ acre. The soil was a light sandy loam, which was manured in the spring of 1893 with about 18 tons of barn-yard manure per acre. No fertilizer has been applied since. The previous crop was oats. The land was ploughed in the spring of 1897, disc-harrowed once, and harrowed with the smoothing harrow twice before planting. Planted 18th May, in hills 3 feet apart each way, 4 or 5 kernels to the hill; came up 4th June; and was cut for ensilage 30th September. Growth strong and even; leafy above, with few leaves below; height, 12 to 13 feet; stalks well eared, ears in the glazed condition. Yield per acre, 16 tons 938 pounds.

King of the Earliest.—2 acres. Soil a sandy loam of poor quality, which received an application of barn-yard manure in the spring of 1897, of about 10 tons per acre. After the manure was spread the land was ploughed about 6 inches deep, disc-harrowed once, and harrowed with the smoothing harrow twice before planting; planted 27th May, in rows 3 feet apart; came up 11th June; and was cut for ensilage 17th September. Growth medium to weak; leafy from top to bottom; height, 8 to 9 feet; stalks well eared, ears in the late milk. Yield per acre, 11 tons 105 pounds. In this and the

following plot (Longfellow) the soil was not as good nor as suitable for the crop, and for this reason the yield was less than it would have been under more favourable conditions.

Longfellow.—2 acres. This was planted adjoining the King of the Earliest, on similar soil, which had the same preparation and treatment. Planted 27th May, in rows 3 feet apart; came up 11th June; and was cut for ensilage 17th September. Growth medium to weak; leafy throughout; height, 7 to 8 feet; stalks well eared, ears in glazing stage. Yield per acre, 13 tons 945 pounds.

EXPERIMENTS WITH TURNIPS.

Nineteen varieties of turnips were tested during the past season in plots, side by side, all having the same treatment. The soil was a heavy sandy loam of good quality, more or less mixed with clay. The previous crop was hay. The land was manured in the spring of 1893, with about 18 tons of barn-yard manure per acre; no fertilizer has been applied since. It was ploughed very shallow after the hay crop was taken off, and again later in the autumn about 8 inches deep. In the spring of 1897, it was ploughed again about 8 inches deep and harrowed twice with the smoothing harrow. The land was then made up in drills two feet apart and subsequently rolled with a heavy land roller which flattened the drills nearly one-half leaving a firm seed bed. Three sowings of turnips were made at the rate of about 3 pounds of seed per acre. The first sowing was on the 8th of May, the second on 21st May, and the third on 13th of June. The roots from the first two sets were pulled on the 13th and 14th October, and those from the third set on the 14th October. The yield per acre in each case has been calculated from the weight of roots pulled from two rows each 99 feet long.

TURNIPS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 3rd Plot.	
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1 Shamrock Purple Top	44	1,100	27	1,770	29	245
2 Purple Top Swede	44	770	26	965	18	465
3 Great Mogul	43	130	33	1,650	....	....
4 Perfection Swede	42	1,965	25	1,315	21	75
5 Giant King	41	5	30	885	20	590
6 Marquis of Lorne	40	1,510	26	1,845	25	1,920
7 Jumbo or Monarch	40	905	28	925	29	115
8 Prize Winner	40	850	26	855	21	1,835
9 Mammoth Clyde	39	1,915	28	815	27	1,110
10 Carter's Elephant	38	1,220	34	1,300	31	260
11 East Lothian	38	230	30	445	26	470
12 Prize Purple Top	36	1,975	24	510	14	1,040
13 Hall's Westbury	36	1,590	26	910	27	1,880
14 Hartley's Bronze	36	765	27	780	32	717
15 Skirving's	36	600	28	1,915	21	240
16 Sutton's Champion	35	1,280	22	55	23	282
17 Halewood's Bronze Top	35	345	24	235	17	1,337
18 Bangholm Selected	34	1,300	27	890	23	1,300
19 Selected Champion	32	1,395	27	1,110	22	385

These turnips were all sown in rows varying from 200 to 400 feet in length, which gave opportunity for further experiments, after the two rows of 99 feet each, used to ascertain the yield in the first place, had been pulled. A portion of the roots in this

area, were left in the ground until the 3rd of November, to gain information as to the advantage, if any, which arises from the leaving of the roots in the ground, after the middle of October. Nineteen plots were so left until the 3rd of November, which allowed 20 and 21 days for additional growth for the roots, from the first and second sowings, and 20 days for those of the third sowing.

Results of leaving Turnips in the ground as long as practicable after the usual time of pulling :

YIELD OF ROOTS PER ACRE FROM EARLY AND LATE PULLING.

	Name of Variety.	1st pulling, 13th October, from 1st sowing, 8th May.		2nd pulling, 3rd Novem'r, from 1st sowing, 8th May.		1st pulling, 13th October, from 2nd sowing, 21st May.		2nd pulling, 3rd Novem'r, from 2nd sowing, 21st May.		1st pulling, 13th October, from 3rd sowing, 13th June.		2nd pulling, 3rd Novem'r, from 3rd sowing, 13th June.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Shamrock Purple Top	44	1,100	45	1,080	27	1,770	31	370	29	245	32	707
2	Purple Top Swede	44	770	47	1,040	26	965	30	1,215	18	465	22	522
3	Great Mogul	43	130	42	480	33	1,650	44	1,870	29	520	31	1,177
4	Perfection Swede	42	1,965	41	1,160	25	1,315	32	1,395	21	75	30	555
5	Giant King	41	5	39	1,420	30	885	29	1,675	20	590	29	300
6	Marquis of Lorne	40	1,510	42	315	26	1,845	28	1,750	25	1,920	30	280
7	Jumbo or Monarch	40	905	40	520	28	925	27	1,615	29	115	31	370
8	Prize Winner	40	850	39	375	26	855	28	155	21	1,835	27	1,137
9	Mammoth Clyde	39	1,915	40	1,180	28	815	28	1,365	27	1,110	32	350
10	Carter's Elephant	38	1,220	42	150	34	1,300	32	735	31	260	35	1,940
11	East Lothian	38	230	40	1,840	30	445	28	430	26	470	31	480
12	Prize Purple Top	36	1,975	38	560	24	510	24	675	14	1,040	17	650
13	Hall's Westbury	36	1,590	40	850	26	910	34	1,300	27	1,880	29	557
14	Hartley's Bronze	36	765	41	830	27	780	29	1,015	32	717	32	277
15	Skirvings	36	600	37	148	28	1,915	27	1,220	21	240	30	1,710
16	Sutton's Champion	35	1,280	35	1,885	22	55	26	470	23	282	30	307
17	Halewood's Bronze Top	35	345	37	1,900	24	235	30	1,710	17	1,337	32	1,862
18	Bangholm Selected	34	1,300	38	1,990	27	890	28	100	23	1,300	28	320
19	Selected Champion	32	1,395	35	1,610	27	1,110	27	395	22	385	26	1,487

	Tons.	Pounds.
Average yield per acre from 1st sowing 1st pulling..	38	1,782
" " 1st sowing 2nd pulling..	40	807

An average gain in 20 to 21 days of 1 ton 1,025 pounds per acre.

	Tons.	Pounds.
Average yield per acre from 2nd sowing 1st pulling..	27	1,537
" " 2nd sowing 2nd pulling.	30	182

An average gain in 20 to 21 days of 2 tons 646 pounds per acre.

	Tons	Pounds.
Average yield per acre 3rd sowing 1st pulling	24	673
" " " 3rd sowing 2nd pulling	30	182

An average gain in 20 days of 5 tons 432 pounds per acre.

The results of these experiments show that growth in turnips late in the season proceeds rapidly as long as the weather remains open, and point to the importance of allowing these roots to remain in the ground as long as is practicable, especially if the seed has been sown late ; on the other hand a farmer who leaves a large area of roots in the ground to a very late date is liable to be caught by severe frost when the pulling of such a crop is disagreeable, difficult and expensive.

EXPERIMENTS WITH MANGELS.

The number of varieties of mangels under test during 1897 was twenty. These were all sown side by side adjoining the turnips, the land was similar and the treatment and preparation 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, the first on the 8th May, the second on the 21st May, and the roots from both were pulled on the 13th October

MANGELS—TEST OF VARIETIES.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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 Giant Yellow Intermediate (Steele)	May 8	May 21	Oct. 11	Oct. 11	46	1060	1551		37	305	1238	25
2 Gate Post	" 8	" 21	" 11	" 11	44	1815	1496	55	35	1335	1188	55
3 Canadian Giant	" 8	" 21	" 11	" 11	40	1345	1355	45	28	1420	957	
4 Golden Tankard	" 8	" 21	" 11	" 11	35	950	1182	30	22	605	743	25
5 Mammoth Long Red	" 8	" 21	" 11	" 11	34	1960	1166		28	485	941	25
6 Champion Yellow Globe	" 8	" 21	" 11	" 11	34	1630	1160	30	22	605	743	25
7 Selected Mammoth Long Red	" 8	" 21	" 11	" 11	34	845	1080	45	23	1850	797	30
8 Yellow Intermediate	" 8	" 21	" 11	" 11	33	715	1111	55	21	1560	726	
9 Red Fleshed Tankard	" 8	" 21	" 11	" 11	32	1010	1083	30	28	815	946	55
10 Red Fleshed Globe	" 8	" 21	" 11	" 11	32	405	1073	25	23	365	772	45
11 Giant Yellow Globe	" 8	" 21	" 11	" 11	31	1855	1064	15	26	1790	896	30
12 Prize Mam. Long Red	" 8	" 21	" 11	" 11	31	1690	1061	30	25	655	844	15
13 Golden Fleshed Tankard	" 8	" 21	" 11	" 11	30	1050	1017	30	21	240	704	
14 Warden Orange Globe	" 8	" 21	" 11	" 11	29	1730	995	30	27	835	913	55
15 Selected Mammoth Long Red Extra	" 8	" 21	" 11	" 11	29	850	980	50	18	1950	632	30
16 Giant Yellow Half Long	" 8	" 21	" 11	" 11	29	740	979		19	1765	662	45
17 Ward's Large Oval-shaped	" 8	" 21	" 11	" 11	28	155	935	55	19	280	638	
18 Giant Yellow Intermediate (Pearce)	" 8	" 21	" 11	" 11	25	1535	858	55	16	395	539	55
19 Giant Yellow Globe Special	" 8	" 21	" 11	" 11	24	840	814		17	980	583	
20 Norbitan Giant	" 8	" 21	" 11	" 11	19	1325	655	25	10	130	335	30

FIELD PLOTS OF MANGELS.

The following four half-acre plots were all sown in the same field with the smaller plots reported on. The soil was similar and its preparation and treatment the same.

Giant Yellow Intermediate.—½ acre. Sown 7th May; came up 16th May; and the roots were pulled 12th October. Yield per acre, 18 tons 1,100 pounds.

Mammoth Long Red.—½ acre. Sown 7th May; came up 17th May; and the roots were pulled 12th October. Yield per acre, 17 tons 600 pounds.

Gate Post.—½ acre. Sown 7th May; came up 17th May; and the roots were pulled 12th October. Yield per acre, 21 tons 80 pounds.

Champion Yellow Globe.—½ acre. Sown 8th May; came up 17th May; and the roots were pulled, 13th October. Yield per acre, 23 tons 550 pounds.

EXPERIMENTS WITH CARROTS.

Sixteen varieties of carrots were sown side by side on land adjoining that used for the turnips, the soil was similar and the treatment of the land the same. The seed was sown on ridges 2 feet apart, at the rate of 3 to 4 pounds per acre. Two sowings were

made of each sort—the first on 8th May; the second on 21st May; and the roots from both were pulled on the 11th October. After the drills were made, they were rolled with a heavy hand roller at the time of the first sowing, and before the second set of plots was sown, the surface of the drills was worked with a hand wheel hoe to destroy any weeds which had germinated. The yield per acre has been calculated from the weight of roots gathered from two rows each 99 feet long.

CARROTS—TEST OF VARIETIES.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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 Mammoth White Intermediate	May 8	May 21	Oct. 11	Oct. 11	24	180	803		19	445	640	45
2 Green Top White Orthe	" 8	" 21	" 11	" 11	23	1850	795	30	20	95	668	15
3 Giant White Vosges	" 8	" 21	" 11	" 11	23	200	770		19	940	649	
4 Iverson's Champion	" 8	" 21	" 11	" 11	21	1230	720	30	16	1000	550	
5 Improved Short White	" 8	" 21	" 11	" 11	21	570	709	30	21	240	704	
6 Half Long White	" 8	" 21	" 11	" 11	20	1305	688	25	17	980	583	
7 Half Long Chantenay	" 8	" 21	" 11	" 11	19	1270	654	30	14	1810	496	50
8 Guerande or Oxheart	" 8	" 21	" 11	" 11	19	5	633	25	12	475	407	55
9 Early Gem	" 8	" 21	" 11	" 11	18	1345	622	25	14	1755	495	55
10 White Belgian	" 8	" 21	" 11	" 11	18	740	612	20	15	1680	528	
11 Yellow Intermediate	" 8	" 21	" 11	" 11	17	45	567	25	15	195	503	15
12 Cooper's Yellow Intermediate	" 8	" 21	" 11	" 11	14	490	474	50	11	1430	390	30
13 Carter's Orange Giant	" 8	" 21	" 11	" 11	13	400	440		10	1505	358	25
14 Long Orange or Surrey	" 8	" 21	" 11	" 11	11	1595	393	15	10	625	343	45
15 Scarlet Intermediate	" 8	" 21	" 11	" 11	9	1140	319		7	1510	258	30
16 Long Scarlet Altringham	" 8	" 21	" 11	" 11	8	1490	291	30	8	1380	289	40

As in the case of the turnips a part of the carrot crop was allowed to remain in the ground until the 3rd November to ascertain what advantage would accrue to the weight of the crop by adopting such a course.

YIELD OF ROOTS PER ACRE FROM EARLY AND LATE PULLING.

Name of Variety.	1st Pulling 11th October from 1st Sowing 8th May.		2nd Pulling 3rd Nov. from 1st Sowing 8th May.		1st Pulling 11th October from 2nd Sowing 21st May.		2nd Pulling 3rd Nov. from 2nd Sowing 21st May.	
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
Mammoth White Intermediate	24	180	31	1140	19	445	25	490
Green Top White Orthe	23	1850	24	510	20	95	22	605
Giant White Vosges	23	200	28	1420	19	940	23	530
Iverson's Champion	21	1230	28	265	16	1000	21	570
Improved Short White	21	570	26	360	21	240	20	1580
Half Long White	20	1305	26	1955	17	980	20	1635
Half Long Chantenay	19	1270	19	1380	14	1810	17	660
Guerande or Ox-heart	19	5	22	1210	12	475	19	280
Early Gem	18	1345	19	280	14	1755	19	1765
White Belgian	18	740	16	670	15	1680	14	1370
Yellow Intermediate	17	45	17	980	15	95	15	1405
Carter's Orange Giant	13	400	16	1990	10	1505	13	1720
Long Orange or Surrey	11	1595	18	1785	10	625	14	1260
Scarlet Intermediate	9	1140	10	790	7	1510	8	60
Long Scarlet Altringham	8	1490	10	1450	8	1380	7	1015

YIELD OF ROOTS PER ACRE, FROM EARLY AND LATE PULLING—*Concluded.*

	1st Sowing 1st Pulling.	1st Sowing 2nd Pulling.	2nd Sowing 1st Pulling	2nd Sowing 2nd Pulling.
	Ton. Lbs.	Tons Lbs.	Tons Lbs.	Tons Lbs.
Average yield per acre from	18 91	21 412	.....	.....
An average gain in 23 days of 3 tons 331 lbs. per acre..	.....	.....	.....	.....
Average yield per acre from	.....	.....	14 1,902	17 1,263
An average gain in 23 days of 2 tons 1,361 lbs. per acre..	.....	.....	.....	.....

The results of these experiments point to the advantage of leaving carrots in the ground as long as it is safe to do so before they are pulled.

FIELD PLOTS OF CARROTS,

The following six half-acre plots, were all sown in the same field, with the smaller plots of carrots. The soil was similar, and the preparation and treatment of the land the same.

Mammoth White Intermediate.—½ acre. Sown 8th May; came up 19th May; and the roots were pulled on the 19th October. Yield per acre, 19 tons 200 pounds.

Improved Short White.—½ acre. Sown 8th May; came up 19th May; and the roots were pulled 20th October. Yield per acre, 19 tons 1,762 pounds.

White Belgian.—½ acre. Sown 8th May; came up 19th May; and the roots were pulled 21st October. Yield per acre, 15 tons 1,580 pounds.

Guerande or Ox-heart.—½ acre. Sown 8th May; came up 19th May; and the roots were pulled 22nd October. Yield per acre, 17 tons 170 pounds.

Half Long White.—½ acre. Sown 8th May; came up 19th May; and the roots were pulled 23rd October. Yield per acre, 20 tons 220 pounds.

Iverson's Champion.—½ acre. Sown 8th May; came up 19th May; and the roots were pulled 25th October. Yield per acre, 22 tons 232 pounds.

EXPERIMENTS WITH SUGAR BEETS.

Twelve varieties of sugar beets were tested in 1897. The land was adjoining that of the test plots of carrots and mangels, the soil was similar, and the preparation and treatment of the land the same.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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, Private Stock..	May 8	May 21	Oct. 11	Oct. 11	25	820	847		18	850	614	10
Rennie's No. 98	" 8	" 21	" 11	" 11	25	160	836		16	1220	553	40
Rennie's No. 96 Red Top	" 8	" 21	" 11	" 11	23	200	770		18	960	616	
Improved Imperial	" 8	" 21	" 11	" 11	23	90	768	10	15	30	500	30
Rennie's No. 95	" 8	" 21	" 11	" 11	21	1890	731	30	20	1690	694	50
Rennie's No. 97	" 8	" 21	" 11	" 11	21	570	709	30	12	1960	432	40
Danish Red Top	" 8	" 21	" 11	" 11	20	1745	695	45	14	1755	495	55
Danish Improved,	" 8	" 21	" 11	" 11	19	5	633	25	13	1060	451	
Red Top Sugar	" 8	" 21	" 11	" 11	18	1620	627		16	1110	551	50
Wanzleben	" 8	" 21	" 11	" 11	18	1015	616	55	14	1205	486	45
Rennie's No. 99 Green Top	" 8	" 21	" 11	" 11	15	1790	529	50	12	750	412	30
Vilmorin's Improved	" 8	" 21	" 11	" 11	15	1680	528		15	745	512	25

EXPERIMENTS WITH POTATOES.

One hundred and ten varieties of potatoes have been under test during 1897, grown side by side, in similar soil, for the purpose of gaining information, as to their relative productiveness, and earliness of maturing. The soil in which they were planted, was a sandy loam of fair quality, which received in the spring of 1894, an application of about 12 tons of barn-yard manure per acre. No fertilizer has been applied since. The previous crop was pease. The land was ploughed in the autumn of 1896, about 8 inches deep, and again in the spring of 1897, about 6 inches deep, and harrowed twice with the smoothing harrow before planting.

The potatoes for seed were cut into pieces of from two to three eyes in each, and planted in rows 2½ feet apart, with the sets about a foot apart in the rows. They were all planted on the 21st and 22nd of May and were dug from the 4th, to the 7th of October. The yield per acre has been calculated from the weight of tubers obtained from one row 132 feet long.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Holborn Abundance	402	36	400	24	2	12	356	24	44		White.
Seedling No. 230	400	24	400	24			380	36	19	48	"
French Red	392	42	382	48	9	54	317	54	64	54	Red.
From N. Bergeron	389	24	386	6	3	18	349	48	36	18	Light pink.
Seedling No. 7	381	42	380	36	1	6	343	12	37	24	Bright pink.
Irish Daisy	372	54	369	36	3	18	341		28	36	White.
Chicago Market	356	24	333	18	23	6	284	54	48	24	Pink.
Dreer's Standard	346	38	346	38			324	38	22		White.
Earliest of All	346	30	331	6	15	24	257	24	73	42	Pink and white.
Northern Spy	346	30	346	30			306	54	39	36	Bright pink.
From S. Sabean	343	12	336	36	6	36	319		17	36	White.
Early Thorburn	341		325	36	15	24	258	30	67	6	Pink and white.
Rose No. 9	338	48	334	24	4	24					Pink.
Reeve's Rose	336	36	308		28	36	246	24	61	36	"
Vanier	333	18	333	18			256	18	77		Red.
Daisy	332	37	328	13	4	24	285	19	42	54	Pink and white.
Irish Cobbler	321	12	321	12			259	36	61	36	White.
Flemish Beauty Seedling	315	42	301	24	14	18	218	54	82	30	Bright pink.
London	315	42	304	42	11		255	12	49	30	Pink.
Everett	311	18	302	30	8	48	239	48	62	42	"
Early Sunrise	309	47	298	47	11		244	53	53	54	"
Reading Giant	302	30	302	30			221	6	81	24	Red and white.
Sharpe's Seedling	300	18	292	36	7	42	213	24	79	12	Pink and white.
Blue Cup	298	6	298	6			254	6	44		Blue and white.
Troy Seedling	297	44	297	44			266	56	30	48	White.
Delaware	296	38	295	54		44	282	42	13	12	"
Charles Downing	292	36	292	36			226	36	66		"
Late Puritan	287	22	282	58	4	24	234	34	48	24	"
Wonder of the World	287	6	277	12	9	54	213	24	63	48	Pink and white.
New Variety No. 1	284	21	284	21			227	9	57	12	White.
State of Maine	283	15	283	15			254	39	28	36	"
Crown Jewel	280	8	265	50	14	18	217	26	48	24	Pink and white.
Early Six Weeks	280	22	268	16	12	6	204	28	63	48	Pink.
Seattle	278	34	278	34			216	58	61	36	White.
Clarke's No. 1	278	18	275		3	18	237	36	37	24	Pink.
Early Ohio	277	53	273	29	4	24	242	41	30	48	"
Seedling No. 2, Edwards	270	19	270	19			248	19	22		White.
Vick's Extra Early	269	30	267	18	2	12	210	6	57	12	Pink and white.
White Beauty	268	24	268	24			160	36	107	48	White.
Lightning Express	268	24	266	12	2	12	248	36	17	36	Pink.
McKenzie	267	18	266	12	1	6	243	6	23	6	White.
Great Divide	266	12	258	30	7	42	206	48	51	42	"
Green Mountain	266	12	261	48	4	24	246	24	15	24	"
American Wonder	266	12	258	30	7	42	242		16	30	"

POTATOES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Total Yield per Acre.		Yield per acre of Sound.		Yield per acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Early Rose	265	31	261	7	4	24	228	7	33		Pink.
Carman No. 1	265	22	265	22			249	58	15	24	White.
Dakota Red	264		264				243	6	20	54	Red.
Hale's Champion	264		264								White.
Money Maker	264		260	42	3	18	234	18	26	24	"
Early Gem	261	48	261	48			204	36	57	12	Pink.
American Giant	261	31	256	1	5	30	220	49	35	12	White.
Lizzie's Pride	260	42	254	6	6	36	225	30	28	36	Pink, red eye.
Freeman	260	42	260	42			207	54	52	48	White.
Burpee's Extra Early	259	36	254	6	5	30	204	36	49	30	Pink and white.
Algoma No. 1	258	22	252	52	5	30	206	40	46	12	Pink.
Ideal	255	12	222	12	33		212	18	9	54	"
Early White Prize	254	39	252	27	2	12	213	57	38	30	White.
Russell's Seedling	253		253				48	24	204	36	"
Thorburn	251	54	245	18	6	36	216	42	28	36	Pink and white.
Early Harvest	250	48	247	30	3	18	201	18	46	12	White.
Lee's Favourite	248	36	248	36			182	36	66		Pink.
Polaris	248	36	242		6	36	216	42	25	18	White.
Columbus	244	12	244	12			213	24	30	48	Pink and white.
King of the Roses	244	12	217	48	26	24	204	36	13	12	"
From E. Lortie	243	6	243	6			209		34	6	Light pink.
Record	243	6	214	30	28	36	177	6	37	24	White.
Rochester Rose	242		236	30	5	30	205	42	30	48	Pink.
Early Norther	240	54	237	36	3	18	173	48	63	48	"
Prize Taker	238	42	236	30	2	12	207	54	28	36	"
Quaker City	237	36	237	36							White.
Bill Nye	237	36	237	36			206	48	30	48	"
Pride of the Table	237	3	235	57	1	6	220	33	15	24	Pink.
Beauty of Hebron	235	40	225	46	9	54	212	34	13	12	Pink and white.
Burnaby Seedling	234	1	226	19	7	42	196	37	29	42	"
Brown's Rot Proof	233	45	233	45			187	33	46	12	Pink.
Satisfaction	233	12	233	12			173	48	59	24	White.
Monroe County	232	6	227	42	4	24	181	30	46	12	Pink.
Fillbasket	231		211	12	19	48	184	48	26	24	Bright pink.
Pride of the Market	224	24	224	24			189	12	35	12	White.
Early Puritan	223	18	221	6	2	12	168	18	52	48	"
Victor Rose	218	54	210	6	8	48	179	18	30	48	Pink.
New Queen	218	46	213	16	5	30	192	22	20	54	Pink and white.
Queen of the Valley	218	37	214	13	4	24	204	19	9	54	Bright pink.
Napoleon	218	21	215	3	3	18	197	27	17	36	Pink.
Honeoye Rose	217	48	215	36	2	12	204	36	11		"
Harbinger	216	50	216	50			153	2	63	48	Pale pink.
Rural, No. 2	216	42	216	42			202	24	14	18	White.
Pearce's Extra Early	216	1	211	37	4	24	165	25	46	12	Pink.
Maggie Murphy	216	25	212	1	4	24	203	13	8	48	Bright pink.
World's Fair	214	55	214	55			181	55	33		White.
Hopetul	213	49	208	19	5	30	198	25	9	54	"
Empire State	211	53	211	53			148	5	63	48	"
Rural Blush	211	12	210	6	1	6	167	12	42	54	Pink.
Good News	209		209				143		66		"
Ohio Junior	209		202	24	6	36	151	48	50	36	"
Clay Rose	206	48	204	36	2	12	184	48	19	48	"
Carman No. 3	202	24	202	24			179	18	23	6	"
Brownell's Winner	202	24	202	24			147	24	55		Red.
Peerless Junior	187		183	42	3	18	159	30	24	12	White.
Houlton Rose	184	48	184	48							"
Table King	182	36	89	6	93	30	64	54	24	12	"
I. X. L	179	18	179	18			166	6	13	12	Pink and white.
General Gordon	176	16	176	16			119	4	57	12	Pink.
Stourbridge Glory	161	42	161	42			117	42	44		White.
Sutton's Main Crop	159	30	158	24	1	6	143		15	24	"
Sutton's Abundance	151	48	151	48			112	12	39	36	"
Orphans	149	3	149	3			146	51	2	12	"
Seedling No. 214	139	42	139	42			134	12	5	30	"
Martins	106	42	106	42			58	18	48	24	Purple.
White Kidney	29	42	29	42			25	18	4	24	White.

FIELD PLOTS OF POTATOES.

The following fourteen plots of potatoes were grown in one field, the land was similar throughout, and the preparation and treatment was the same for all. The soil was a light sandy loam, which was manured in the spring of 1893, with about 18 tons of barn-yard manure per acre. No fertilizer has been applied since. The previous crop was oats. The land was ploughed in the spring of 1897, about 6 inches deep, and disc-harrowed once, and harrowed with the smoothing harrow once, then made into drills 2½ feet apart for planting. In the following table the particulars are given of the results obtained :—

Name of Variety.	Size of Plot.	When planted.	Came up.	When dug.	Yield per Acre.
	Acre.	1897.	1897.	1897.	Bush. Lbs.
Early Rose	¼	May 18..	June 12.	Oct. 5..	228 32
Burpee's Extra Early	¼	" 8..	" 1..	Sept. 30..	202 47
Wonder of the World	⅛	" 18..	" 12..	Oct. 4..	191 51
Dakota Red	⅒	" 18..	" 13..	" 5..	191 32
May Queen Early	¼	" 18..	" 12..	" 5..	187 42
American Wonder	⅒	" 18..	" 12..	" 2..	167 32
Early Harvest	⅒	" 18..	" 12..	Sept. 30..	167 18
Carman No. 1	⅒	" 18..	" 12..	Oct. 1..	163 18
Burnaby Seedling	⅒	" 18..	" 13..	" 2..	155 59
Queen of the Valley	⅛	" 18..	" 12..	" 5..	152 53
Late Puritan	⅒	" 18..	" 12..	" 2..	149 57
Everett	⅒	" 18..	" 12..	" 2..	141 11
Rochester Rose	⅒	" 18..	" 12..	Sept. 30..	137 19
I. X. L.	⅒	" 18..	" 14..	Oct. 3..	108 20

EXPERIMENTS WITH CLOVER.

To maintain the fertility of his land is the aim of every good farmer. A judicious rotation of crops, will economize the stores of plant food in the soil, but, where additions require to be made, of these elements of fertility, there are only two methods by which this can be accomplished—one is by applying to the land barn-yard manure, or artificial fertilizers, the other is the ploughing under of green crops, among which there are none so generally useful and valuable as clover. The great value of clover for ploughing under, to enrich the land has long been known, but it is only within the past few years, that the reason has been discovered why it is better for this purpose, than many other plants. The reason is that clover, in common with most other leguminous plants, has the power of taking nitrogen from the air, and laying up the store thus gathered in its roots and leaves, and when turned under, the added fertility becomes immediately available for subsequent crops. If a clover plant is dug, it will be found to have a mass of fine branching roots, which spread in every direction, and penetrate deeply in the soil. If these roots are carefully examined, there will be found attached to them, many little nodules or swellings, each of which contains a colony of microbes, and these microscopic organisms are the active agents employed in taking nitrogen from the air, and converting it into plant food.

Further, the extensive root system which clover has, enables it to penetrate to depths in the soil and subsoil, which few other plants can reach and to bring from these lower strata, supplies of the mineral elements which growing plants require, and when the clover is turned under the decay of its roots and leaves, places within reach of subsequent crops, the additional stores of plant food gathered in the most readily available forms.

The ploughing under of green crops also improves the texture of the soil, and the organic matter thus added, makes the soil more retentive of moisture, thus giving more favourable conditions for subsequent plant growth. The ploughing under of any green crop will thus improve the soil, and besides this every plant used for this purpose, has the power of converting certain proportions of plant food, existing in the soil in insoluble forms, into soluble and available forms, and thus materially adding to the stores of food within reach of the next crop. Clover, however, in common with other leguminous plants, has great advantages over buckwheat, and other crops used for this purpose, from its power of permanently enriching the soil, by adding nitrogen from an extraneous source, and also of bringing from the lower strata of the soil, and subsoil, supplies of mineral food which other plants are unable to reach.

In the reports of the Director for 1895, pages 26 to 30, and 1896, pages 37 to 40, particulars were given of the results obtained from a series of important tests in the field, with different varieties of clover. These were planned and carried out with the object of gaining further information, as to the growth of different sorts of clover within given periods, what quantities of root and top were produced, when clover seed was sown in the spring with a grain crop, and ploughed under in October, also, the quantities turned under, when the clover was allowed to stand over and grow until the third week in the following May, then ploughed under for a crop of Indian corn or potatoes. Experiments were also carried on to determine what quantities of clover seed should be sown, to produce the best results, also to find out whether clover can be sown with grain, from year to year to plough under in the autumn, without lessening the crop of grain. If this can be done, the advantage to the land will be very great, for in addition to the benefits already referred to, the clover will serve as an excellent catch crop, absorbing and appropriating the nitrogenous fertilizers brought down by the rain, during late summer and autumn.

Since experiments of this nature need to be several times repeated in order to eliminate chances of error, arising from peculiarities of season and other conditions, a somewhat similar series of tests have been again made during the past season. It is not the purpose of the writer to discuss here, the relative economy of feeding clover to stock as compared with ploughing it under. There is no doubt that, when the clover area is limited, and the farmer has the stock to feed, it is more economical to pasture a field before ploughing it under, as the farmer will then make a profit on the cattle and still retain in the manure the cattle will give, nearly nine-tenths of the elements of fertility accumulated by the clover. The main object of these experiments, is to encourage the growing of clover generally with grain crops, as it is believed that large areas of land may thus be greatly improved, and rendered much more fertile—with a comparatively small outlay. In the annual report of the Experimental Farms for 1896, p. 39, mention is made of five acres of land devoted to plots, to show the effect of the ploughing under of clover. This field was divided into 20 one-quarter acre plots. These were all sown with grain, two plots of each sort, one with and one without clover, the grain used being wheat, two-rowed barley, six-rowed barley, oats and pease. Particulars as to the yield of grain from these plots, with and without clover, are given in the report referred to. The winter of 1896-97 was very severe, and when these plots were examined in the spring of 1897 the clover was almost entirely winter killed, and as it was not likely that the clover in this condition would give a fair indication as to what such a crop would do for the land under more favourable conditions it was thought best to begin these experiments over again somewhat modified.

PLOTS OF GRAIN SOWN WITH AND WITHOUT CLOVER.

Eight plots of $\frac{1}{20}$th acre each were used for this experiment. The soil was a sandy loam of fair quality, which was manured during the winter of 1895-96 with about 15 tons of barn-yard manure per acre, distributed over the ground in small heaps of about one-third of a cart load each. These were spread in the spring of 1896 and ploughed under about 5 or 6 inches deep. The previous crop was roots. The land was ploughed in the autumn of 1896 about 8 inches deep and disc-harrowed once in the spring, and

harrowed twice with the smoothing harrow before sowing. The plots were all sown on 5th May, two plots with each sort of grain, one of these in each case with Mammoth Red clover in the proportion of 10 pounds per acre, the other without clover. The wheat at the rate of 1½ bushel barley 6-rowed, 1¾ bushel barley 2-rowed, 2 bushels and oats 2 bushels per acre. The wheat ripened 9th August, 6-rowed barley July 26th, 2-rowed barley 2nd August and the oats 9th August.

The following gives particulars of the crop:—

	Bushels.	Pounds.
No. 1—Preston wheat with 10 pounds clover per acre..	16	30
No. 2— " without clover.	19	00
No. 3—Odessa barley, 6-rowed, with clover.	42	24
No. 4— " " without clover.	37	34
No. 5—Bolton barley, 2-rowed, with clover.	37	4
No. 6— " " without clover.	35	00
No. 7—Banner oats, with clover.	57	32
No. 8— " without clover.	61	6

It is proposed to sow the whole area next year with one sort of grain and ascertain the yield from each of these plots.

EXPERIMENTS TO GAIN INFORMATION AS TO THE VALUE OF ROLLING AND HARROWING LAND SOWN WITH CLOVER, ALSO WITH DIFFERENT QUANTITIES OF CLOVER SEED PER ACRE.

The first four plots of $\frac{1}{20}$th acre each were sown on the 6th May with Banner oats, 2 bushels to the acre—10 pounds per acre of Mammoth Red clover was sown in each case with the grain. Notes were taken regarding the clover at the time of the cutting of the grain, 26th July, and again at the close of the season on the 27th October.

Plot 1. Not rolled or harrowed after sowing. Clover seed sown with grain, with attachment behind seed drill. Rain occurred four days after sowing, which afforded favourable conditions for the germination of the seed. 26th July, clover thick and even, some plants about 10 inches high. 27th October, growth strong and even, from 10 to 14 inches high, forming a thick mat for ploughing under; no bloom; yield of oats per acre, 55 bushels 10 pounds.

No. 2. Harrowed only after sowing, not rolled. 26th July, clover thin and uneven, 6 to 7 inches high. 27th October, growth strong and even, 10 to 14 inches high, forming a fine mat for ploughing under; yield of oats per acre, 56 bushels 6 pounds.

No. 3. Harrowed and rolled after sowing. 26th July, growth medium and even, 7 to 8 inches high. 27th October, growth strong and even; height, 10 to 14 inches, forming a dense mat of foliage for ploughing under; yield of oats, 50 bushels 20 pounds. per acre.

No. 4. Rolled only after sowing, not harrowed. 26th July, growth medium and even, 7 to 9 inches high. 27th October, growth very strong and even; height, 10 to 14 inches, forming a very dense mat of foliage for ploughing under; yield of oats per acre, 54 bushels 4 pounds.

Plots 5 to 19 were sown with Odessa barley, using different quantities of clover seed per acre, and on three plots left as check plots no clover seed was used. The soil was a sandy loam of fair quality, which received about 12 tons of barn-yard manure per acre in the fall of 1896, after which the land was ploughed about 8 inches deep. In the spring it was disc-harrowed once and harrowed twice with the smoothing harrow before sowing.

Plot 5. Sown 6th May with Odessa barley, 1¾ bushel per acre; grain sown with drill; 4 pounds Mammoth Red clover per acre sown by hand. 26th July, growth thin and even, 5 to 6 inches high. 27th October, growth fairly strong and even, but too thin either for meadow or for ploughing under; no bloom; yield per acre of barley, 38 bushels 46 pounds.

Plot 6. Sown 6th May with Odessa barley only, no clover used. Yield of grain per acre, 40 bushels 20 pounds.

Plot 7. Sown 6th May with Odessa barley, with 6 pounds Mammoth Red clover per acre. 26th July, growth even and medium, 6 to 7 inches high. 27th October, growth medium, but very even; height, 10 to 12 inches; thick enough to leave for meadow, but not thick enough for ploughing under; yield of barley, 39 bushels 18 pounds per acre.

Plot 8. Sown 6th May with Odessa barley, with 8 pounds Mammoth Red clover per acre. 26th July, growth medium and even, 6 to 7 inches high. 27th October, growth strong and very even; almost too thick for meadow, but scarcely thick enough for best results when ploughed under; yield of barley 40 bushels per acre.

Plot 9. Sown 6th May with Odessa barley, with 10 pounds Mammoth Red clover per acre. 26th July, growth even but thin, 5 to 6 inches high. 27th October, growth very strong and even; height, 10 to 12 inches; too thick to leave for meadow; made a fine thick mat for ploughing under; yield of barley, 43 bushels 36 pounds per acre.

Plot 10. Sown 6th May with Odessa barley, with 12 pounds of Mammoth Red clover per acre. 26th July, growth fairly even; 6 to 7 inches high. 27th October, growth strong and very even; height 10 to 14 inches, making a compact mat for ploughing under. Yield of barley, 46 bushels 2 pounds per acre.

Plot 11. Sown 6th May with Odessa barley, with 14 pounds Mammoth Red clover per acre. 26th July, growth medium and even, 6 to 7 inches high. 27th October, growth very strong and even, forming a thick mat but did not appear to be any better for ploughing under than where 10 or 12 pounds of clover seed had been used. Yield of barley, 45 bushels per acre.

Plot 12. Sown 6th May with Odessa barley, with 10 pounds of Common Red clover per acre. 26th July, growth strong and even, 9 to 10 inches high. 27th October, growth strong, even and thick, making a very fine mat of foliage for ploughing under; height 12 to 14 inches; a large number of the plants were in bloom. Yield of barley, 43 bushels 46 pounds per acre.

Plot 13. Sown 6th May with Odessa barley only, no clover used. Yield of grain, 42 bushels 14 pounds per acre.

Plot 14. Sown 6th May with Odessa barley, with 14 pounds Alfalfa per acre. 26th July, growth even but rather thin, 9 to 10 inches high. 27th October, growth strong and even, but thin; thick enough for meadow but not thick enough for ploughing under. Stalks rather woody and tough, height 12 to 14 inches. Yield of barley, 31 bushels 32 pounds per acre. In this instance the barley was thin on the ground due possibly to variation in the soil.

Plot 15. Sown 6th May with Odessa barley only, no clover used. Yield of grain, 41 bushels 32 pounds per acre.

Plot 16. Sown 6th May with Odessa barley, with 24 pounds Crimson clover per acre. 26th July, growth thin. 27th October, growth thin and even, height 6 to 8 inches; not thick enough for ploughing under. Yield of barley, 36 bushels 22 pounds per acre.

Plot 17. Sown 6th May with Odessa barley, with 6 pounds Alsike clover per acre. 26th July, growth thin but even, and about 5 inches high. 27th October, growth medium and even, height about 6 inches; not thick enough for meadow nor for ploughing under with advantage. Yield of barley, 45 bushels 20 pounds per acre.

Plot 18. Sown 6th May with Odessa barley, with 6 pounds Alsike clover and 14 pounds Orchard grass per acre. 26th July, growth medium and even, height 5 to 6 inches. 27th October, growth medium and even, height 6 to 8 inches; both clover and grass thick enough to make a good meadow. Yield of barley, 43 bushels 16 pounds per acre.

Plot 19. Sown 6th May with Odessa barley, with 14 pounds Alfalfa and 14 pounds Orchard grass per acre. 26th July, growth of Alfalfa thin and even and 10 to 11 inches high, orchard grass fairly even, 7 to 8 inches high. 27th October, Alfalfa fairly thick and even, average height 14 inches; orchard grass 8 to 9 inches, thick enough to make a good meadow. Yield of barley 37 bushels 24 pounds per acre.

SOWING OF FIELDS OF GRAIN WITH CLOVER.

Since our experiments have shown that clover can be grown with fields of grain in the manner described without lessening the yield of grain for the year, the following fields were thus treated, all being sown with Mammoth Red clover in the proportion of 10 pounds to the acre.

Improved Ligowo oats. A field of 4½ acres of a clay loam was sown with this variety of oats on 30th April and 10 pounds of Mammoth Red clover seed used per acre. The oats were cut on 2nd August and gave a crop of 44 bushels 10 pounds per acre. By the middle of October the clover had made a thick and even growth about 10 or 12 inches high. Although the catch of clover in this case was very fair the plants were not so thick on the ground as those in the plots where the land was lighter, the clover roots, however, were stronger and thicker.

			Bushels.	Pounds.
Oats—Early Gothland,	2 acres;	yield per acre	40	20
" Golden Beauty,	2 "	"	41	11
" Flying Scotchman,	1 acre	"	35	22
" Columbus,	1 "	"	36	8
" Early Golden Prolific,	1 "	"	37	6
" White Schonen	1 "	"	38	23
" Early Archangel,	1 "	"	34	23
" Siberian,	1¾ "	"	48	9
" American Beauty,	2½ "	"	50	12
" Mortgage Lifter,	1½ "	"	39	15
" Joanette,	1¾ "	"	33	3
" Holstein Prolific,	1¼ "	"	46	2
" Wallis	2½ "	"	46	32
Wheat—Advance,	½ "	"	25	1
" Herisson Bearded,	½ "	"	25	58
" Preston,	½ "	"	28	42
Barley—Royal, 6-rowed,	2½ "	"	29	42
" Trooper "	2⅓ "	"	26	15
" Mensury "	2¾ "	"	36	47
" Champion "	½ "	"	43	46
" Success "	½ "	"	43	29
" Odessa "	¾ "	"	37	10

This makes a total of 35½ acres of field plots of grain which were sown with clover for ploughing under, in addition to 16½ acres seeded for meadow. In every case the clover made a strong and even growth, and formed a good mat of foliage, which filled the soil well with fibrous roots. The clover, with one or two exceptions, was all ploughed under about the end of October.

WEIGHT OF CLOVER LEAVES, STEMS AND ROOTS PER ACRE.

In the field of Improved Ligowo oats—on clay loam—a small area, 4 feet by 4 (16 square feet), was dug to the depth of 9 inches and all the roots and tops of the clover carefully gathered and weighed. The same was done with nine of the smaller plots, and the weight of the material thus gathered estimated per acre.

From field sown 30th April with Ligowo oats, with 10 pounds Mammoth Red clover per acre:—

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre	5	209
" roots per acre	3	296
Total	8	505

From the following plots, all on sandy loam, the appended results were obtained :—

Plot 5. Sown with Odessa barley, 6th May, with 4 pounds Mammoth Red clover per acre :—

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	2	1,445
" roots per acre	2	1,105
Total	5	550

Plot 7. Sown with Odessa barley, 6th May, with 6 pounds Mammoth Red clover per acre :—

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	3	849
" roots per acre	2	1,147
Total	5	1,996

Plot 8. Sown with Odessa barley, 6th May, with 8 pounds Mammoth Red clover per acre :—

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	3	934
" roots per acre	3	40
Total	6	974

Plot 9. Sown with Odessa barley, 6th May, with 10 pounds Mammoth Red clover per acre :—

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	4	508
" roots per acre	2	1,785
Total	7	293

Plot 10. Sown with Odessa barley, 6th May, with 12 pounds Mammoth Red clover per acre.

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	3	1,997
" roots per acre	2	1,615
Total	6	1,612

Plot 11. Sown with Odessa barley, 6th May, with 14 pounds Mammoth Red clover per acre.

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	3	1,657
" roots per acre	2	849
Total	6	506

Plot 12. Sown with Odessa barley, 6th May, with 10 pounds Common Red clover per acre.

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre.	5	209
" roots per acre	3	296
Total	8	505

Plot 14. Sown with Odessa barley, 6th May, with 14 pounds Alfalfa per acre.

	Tons.	Pounds.
Dug 20th Oct.—Weight of Alfalfa leaves and stems per acre	1	1,745
" roots per acre	1	1,572
Total	3	1,317

Plot 17. Sown with Odessa barley, 6th May, with 6 pounds Alsike clover per acre.

	Tons.	Pounds.
Dug 20th Oct.—Weight of clover leaves and stems per acre	2	847
" roots per acre	2	1,360
Total	5	207

Some idea may be formed of the value of this crop turned under when we consider that each ton of the mixed leaves, stems and roots will add as much nitrogen to the soil as 2 tons of average barn-yard manure, while the essential mineral fertilizing constituents gathered from depths to which the roots of many other plants do not reach, make the clover plant an important enricher of the soil in these ingredients also.

EXPERIMENTS WITH HORSE BEANS.

Two field plots were sown with horse beans during 1897. The soil was a sandy loam of fair quality, rather heavy, which was manured during the winter of 1896-97 with about 15 tons of barn-yard manure per acre. The manure was put out in small heaps of about one-third of a cart load each and spread in the spring and ploughed under about 6 inches deep, then harrowed with the smoothing harrow twice before planting. The beans were planted with the seed drill in rows three feet apart, using about 50 pounds of seed per acre.

Plot 1. One acre. Tick Beans, imported seed. Sown 14th May, came up 31st May, and was cut for ensilage 18th September, when the plants were still green. The growth was medium to strong, vines well podded, a few beginning to ripen. Height 4 to 5 feet. Blight was first noticed on the vines on 7th July but afterwards almost disappeared. Yield per acre, 9 tons 320 pounds.

Plot 2. $1\frac{1}{4}$ acres. This was adjoining plot 1, on similar soil and the land had similar preparation and treatment. The seed was also of the variety known as "Tick," but Canadian grown. Sown 14th May, came up 31st May, and was cut for ensilage 20th and 21st September. The growth was medium to strong and even. Height 4 to $4\frac{3}{4}$ feet, vines well podded and a larger proportion ripe than on the vines grown from the imported seed. Yield per acre, 7 tons 525 pounds.

Horse beans were grown on the Central Experimental Farm first in 1892, but that year they were sown mixed with corn. None were sown separately, and no estimate was made that season as to the weight of fodder produced per acre by the horse beans. The $\frac{41}{100}$th acre plot mentioned on page 80, Report 1892, were Broad Windsor beans. In 1893 horse beans were again sown with Indian corn to the extent of 12 acres, and the average weight of the fodder produced by the beans was 1 ton 765 pounds per acre. Two acres were also sown as a separate field crop that year with much better returns, and since then horse beans have been grown each year as a separate field crop.

The average returns have been as follows:—

	Tons.	Pounds.
1893, average yield per acre	8	927
1894 "	12	896
1895 "	7	276
1896 "	2	1,918
1897 "	8	423

The very light crop in 1896 was mainly due to the prevalence of blight

EXPERIMENTS WITH SOJA BEANS.

(Soja hispida.)

The Soja or Soya bean is an annual leguminous plant, somewhat resembling the upright varieties of the cow pea. These beans are extensively used in Japan as food, both for men and animals. They may also be utilized as a soiling crop, as hay, and as ensilage. There are several varieties of these beans, some of which are much earlier than others, one late variety was tried which appears to be of little or no value, and one early variety which gave a large crop and promises to be exceedingly useful.

The soil on which the late variety was sown was adjoining the horse beans, the land was of similar character, and had the same treatment, the early variety was sown on a light sandy loam, which was manured in the autumn of 1895 with about 12 tons of barn-yard manure per acre. The previous crop was pease. This land was ploughed late in the autumn of 1896, about 9 inches deep, and disc-harrowed in the spring, and harrowed with smoothing harrow before sowing.

Soja beans, late variety, sown 14th May, came up 3rd June, and was cut for ensilage 24th September. The growth was strong and even, but the plants had been slightly injured by frost. There were no pods on the vines. Height 42 to 48 inches. Yield per acre, 1 ton 1,957 pounds. This variety is too late to be of value here.

Early Soja beans. These were received from Peter Henderson & Co., seedsmen, of New York, in the spring of 1897. The seed was sown in rows nine inches apart, and enough was received to sow a plot of 12 by 15 feet. Sown 25th May ; came up 6th June, and was cut 25th September. The plants made very strong growth, they were very leafy and grew to an average height of 3 feet 9 inches. The vines were well podded, pods thickly distributed on branches from 18 inches above ground to the tips. The beans in the pods were more than half grown at the time of cutting. The weight of green fodder cut from this plot was 127½ pounds, equal to a yield of 15 tons 855 pounds per acre. As this plant is said to endure hot, dry weather, it is hoped that it may be found useful to grow for ensilage in those districts where horse beans have not succeeded. As a nutritious and nitrogenous food for animals, the analyses which have been published of this plant, show that it compares favourably with the horse bean. We hope to give this promising fodder plant a more extended trial during the coming season.

EXPERIMENTS WITH SUNFLOWERS.

Two field plots covering 1½ acre were sown with this crop. The soil was a sandy loam which was manured in the spring of 1895 with about 12 tons of barn-yard manure per acre ; no fertilizer has been applied since. The previous crop was oats. After the oats were harvested in 1896 the land was ploughed shallow and harrowed with the smoothing harrow to start weed seeds and shed grain and ploughed later in the autumn about 8 inches deep. In the spring of 1897 the land was disc-harrowed twice, harrowed twice with the smoothing harrow and rolled before sowing. The seed was sown with a Planet Junior hand seed drill in rows 3 feet apart, using 3 to 4 pounds of seed per acre, and the plants were thinned out when they were 3 or 4 inches high so as to leave them from 16 to 18 inches apart in the rows.

Plot 1.—One acre. Mammoth Russian Sunflowers—black-seeded variety. Sown 1st May ; came up 10th May and the heads were cut for the silo on 18th September. The plants were of strong and even growth and the yield of heads was 7 tons 237 pounds per acre.

Plot 2.—One-half acre. Mammoth Russian Sunflowers—light coloured seed. Sown 1st May ; came up 10th May and the heads were cut for the silo 17th September. The growth was strong and even and the seeds fairly well ripened. Yield of heads per acre, 7 tons 580 pounds.

Sunflower heads were first grown as a field crop at the Central Experimental Farm in 1892, and have been grown each year since and used to advantage in a mixed ensilage known as the Robertson Mixture, composed of Indian corn, horse beans and sunflower heads. In harvesting the sunflowers the heads only have been cut and have yielded as follows:—

	Tons.	Pounds.
1892, ½ acre. Yield of heads per acre	7	486
1893, 3 acres—stalks levelled to the ground by a severe storm—average yield per acre.....	3	295
1894, 6½ acres " "	3	1,998
1895, 3 acres " "	5	1,924
1896, 1½ acre " "	7	1,823
1897, 1½ acre " "	7	350

An average for the 6 years of 5 tons 1,813 pounds per acre.

In 1894 three experiments were tried to ascertain the proportion of seeds contained in sunflower heads. In the first 315¾ pounds were shelled giving 74¾ pounds of clean seed, or about 24 per cent. In the second 474¾ pounds of heads were used giving 112¼ pounds of clean seed, rather less than 24 per cent. In the third experiment 165 pounds of heads were used giving 33¼ pounds of clean seed, a fraction over 20 per cent. The first two experiments were with the black variety of the Russian seed, the last was with the light coloured variety. The average yield from the three experiments was about 23 pounds of seeds from each 100 pounds of sunflower heads. The seeds are said to contain 20½ per cent of oil and 15·88 of albuminoids.

EXPERIMENT WITH BUCKWHEAT.

One plot of about $\frac{6}{10}$ths of an acre was sown with buckwheat. The soil was a sandy loam which had been used as a nursery for young forest trees for the past 10 years and had not received any manure or other fertilizer. The land was ploughed in the autumn of 1896 about 8 inches deep and disc-harrowed and harrowed with the smoothing harrow several times before sowing. Sown 23rd June, 3 pecks per acre of the variety known as Silver Hull, came up 28th June and was ripe 15th September. The time to mature was 79 days. Yield per acre 30 bushels 16 pounds.

EXPERIMENTS WITH FLAX.

The experiments with flax, begun in 1896, were repeated in 1897. This year, however, none of the flax was pulled but all was cut with the scythe which, as the flax was fully ripe, caused the seed to shed badly and thus reduced the yield. The soil was a sandy loam of medium to poor quality, which received a dressing of about 12 tons per acre of barn-yard manure during the winter of 1895-96. No fertilizer has been applied since. The previous crop was roots. The land was ploughed in the autumn of 1896 about 8 inches deep and disc-harrowed once in the spring and harrowed twice with the smoothing harrow before sowing each set of plots. The seed was sown broadcast by hand and lightly harrowed to cover it, after which the land was rolled.

FIRST SOWING.

Plot 1. Forty pounds of seed per acre. Sown 5th May, came up 12th May and was ripe 14th August. Made a strong and even growth, all standing well.

Weight of straw per acre..... 3,220 pounds.
Yield of seed per acre..... ..... 8 bushels 42 pounds.

Plot 2. Eighty pounds of seed per acre. Seed sown and ripened same dates as plot 1. Made a strong and even growth but was considerably lodged.

Weight of straw per acre ..... 3,530 pounds.
Yield of seed per acre ..... 6 bushels 34 pounds.

SECOND SOWING.

Plot 3. Forty pounds of seed per acre. Sown 12th May, came up 19th May and was ripe 16th August. Made a strong and even growth; all standing well.

Weight of straw per acre ..... 3,130 pounds
Yield of seed per acre ..... 8 bushels 52 pounds.

Plot 4. Eighty pounds of seed per acre. Seed sown and ripe on same dates as plot 3. Made a strong and even growth; a few spots lodged.

Weight of straw per acre ..... 4,420 pounds.
Yield of seed per acre ..... 6 bushels 44 pounds.

THIRD SOWING.

Plot 5. Forty pounds of seed per acre. Sown 19th May; came up 25th May, and was ripe 17th August. Made a strong and even growth; a few spots lodged.

Weight of straw per acre ..... 3,770 pounds.
Yield of seed per acre ..... 9 bushels 26 pounds.

Plot 6. Eighty pounds of seed per acre. Seed sown and ripe on same dates as plot 5. Made a strong and even growth, all standing well.

Weight of straw per acre ..... 3,230 pounds.
Yield of seed per acre ..... 7 bushels 48 pounds.

FOURTH SOWING.

Plot 7. Forty pounds of seed per acre. Sown 26th May; came up 1st June, and was ripe 25th August. Made a medium and even growth, all standing well.

Weight of straw per acre ..... 3,520 pounds.
Yield of seed per acre ..... 10 bushels 30 pounds.

Plot. 8. Eighty pounds of seed per acre. Sown 26th May; came up 1st June, and was ripe 23rd August. Made a strong and even growth; a few small spots lodged.

Weight of straw per acre ..... 3,460 pounds.
Yield of seed per acre ..... 9 bushels 16 pounds.

The cutting with the scythe, as compared with pulling in 1896, very much lessened the weight of the straw, as well as diminishing the quantity of seed saved.

BROMUS INERMIS.

AWNLESS BROME GRASS.

One acre of this grass was sown in the spring of 1896 with Odessa barley. This was reported on in the annual report of the Experimental Farms for 1896, page 40. This grass wintered well and made a rapid and early growth in the spring, the field being quite green before timothy had made a start. The plants, however, were too thin to entirely cover the ground. The quantity of seed sown per acre was 18 pounds, which is usually sufficient to make a thick mat of growth the second year. Possibly in this instance the seed did not all germinate, some of it may have been too deeply covered. A crop of hay was cut on the 6th of July when the brome grass measured on an average three feet high and yielded 1 ton 1,210 pounds of cured hay to the acre. Timothy gave about 1½ ton per acre. Had this grass been thicker on the ground, the crop would no doubt have been considerably heavier. Later in the season a good aftermath was produced, and the grass thickened up and covered the ground better. The farm animals eat the hay made from this grass very readily. It seems altogether probable that Awnless Brome grass in the eastern parts of Canada will prove valuable, as it has already done in the North-west, both for hay and pasture.

TESTS OF THE ACTION OF FERTILIZERS ON SOME CROPS.

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 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 as explanatory regarding the preparations made and the general plan, together with the way in which they have been carried on, the following paragraphs are quoted from the report of 1893:

"A piece of sandy loam, more or less mixed with clay, which was originally covered with heavy timber, chiefly white pine, was chosen for these tests. The timber was cut many years ago, and among the stumps still remaining when the land was purchased, there had sprung up a thick second growth of trees, chiefly poplar, birch and maple, few of which exceeded six inches in diameter at the base. Early in 1887, this land was cleared by rooting up the young trees and stumps and burning them in piles, on the ground from which they were taken, the ashes being afterwards distributed over the soil as evenly as possible, and the land ploughed and thoroughly harrowed. Later in the season it was again ploughed and harrowed, and most of it got into fair condition for cropping."

"The plots laid out for the experimental work with fertilizers were one-tenth of an acre each, 21 of which were devoted to experiments with wheat, 21 to barley, 21 to oats, 21 to Indian corn or maize, and 21 to experiments with turnips and mangels. Owing to the difficulty and unavoidable delay attending the draining of some wet places, it was not practicable to undertake work on all the plots the first season. The tests were begun in 1888 with 20 plots of wheat and 16 of Indian corn; and in 1889 all the series were completed excepting six plots of roots, Nos. 16 to 21 inclusive, which were available for the work in 1890." In all cases the plots in each series have been sown on the same day.

"In 1890 it was found that all the grain plots had become so weedy that the growth of the crops was much interfered with, and with the view of cleaning the land one-half of each of the wheat and oat plots was sown with carrots in 1891, and one-half of each of the barley plots with sugar beets. In 1892 the other half of each plot in each of these series was sown with carrots. In 1893 it was thought desirable to continue this cleaning process, and carrots were again sown on the half of the wheat and oat plots occupied with this crop in 1891, and also on the half of the barley plots cropped with sugar beets that year." In 1894, 1895, 1896 and 1897 the one-half of the oat plots were sown again with carrots and the half of the plots devoted to wheat and barley were planted with potatoes.

TREATMENT OF SOIL.

"The treatment of the soil on all the grain plots has been to gang-plough soon after harvest, and after the shed grain and weeds have well started to plough again about seven inches deep. In spring the plots have been disc-harrowed twice or gang-ploughed once before applying the fertilizers, and again harrowed with the toothed or smoothing harrow before sowing. On those plots where barn-yard manure has been used, the manure has been lightly ploughed under as soon as possible after it has been spread on the land and harrowed with the smoothing harrow before sowing. Wherever barn-yard manure is spoken of, it is understood to be a mixture of horse and cow manure in about equal proportions."

It is proposed to give each year in the annual report a summary of these permanent fertilizer plots, taking the average yield of the whole of the previous period, adding the results of the current year, and then giving the average yield for the full time. The experience of each year will add materially to the value and reliability of the tests for the whole period.

WHEAT PLOTS.

The seed sown on each of these plots from the beginning has been in the proportion of 1½ bushel per acre, excepting in 1894; and the varieties used were as follows. In 1888-89-90 and 1891 White Russian, and in 1892-93 Campbell's White Chaff. In 1894 the Rio Grande wheat was used, and shortly before sowing, it was tested as to vitality and found to be very deficient in germinating power, less than half the kernels sprouted. As it was not practicable then to secure better seed, double the usual quantity of seed was sown, namely, three bushels per acre, which gave a proportion of growth on each plot of about the usual thickness. In 1895, 1896 and 1897 the Red Fife wheat was used in the usual quantity of 1½ bushel per acre. In 1897 the Red Fife was sown 5th May, came up 12th May and was harvested 10th August, requiring from the date of sowing to maturity a period of 97 days.

The season of 1897 at Ottawa has been fairly good for the growing of spring wheat, and has given crops somewhat above the average. This year the plot on which the fresh manure was used has yielded 1 bush. and 50 lbs. per acre more than that on which the rotted manure was used. This gain has been more than sufficient to offset the gain of the rotted manure plot in 1895, and the fresh manure plot now averages a little higher than any other plot in the series.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{20}$TH ACRE EACH.

No. of Plot.	Fertilizers applied each Year.	Average Yield for Nine Years.		10th Season, 1897. Variety, Red Fife.		Average Yield for Ten 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 since	19 $36\frac{8}{5}$	3,486	23 30	4,070	20 ..	3,544
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre in 1888; 15 tons per acre each year since	19 29	3,528	25 20	4,230	20 $4\frac{1}{10}$	3,598
3	Unmanured	10 $24\frac{4}{5}$	1,855	12 20	2,000	10 36	1,869
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre	10 $23\frac{3}{5}$	1,828	12 ..	2,430	10 $33\frac{5}{10}$	1,893
5	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs. per acre	12 $22\frac{3}{5}$	2,851	15 50	3,290	12 43	2,895
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	17 $11\frac{3}{5}$	3,007	24 40	2,980	17 $56\frac{5}{10}$	3,004
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre	12 $38\frac{3}{5}$	2,096	14 40	3,020	12 $50\frac{4}{10}$	2,188
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	10 $37\frac{3}{5}$	1,715	13 ..	1,490	10 $51\frac{5}{10}$	1,693
9	Mineral superphosphate, No. 1, 500 lbs. per acre	11 $46\frac{1}{5}$	1,699	12 10	2,090	11 $48\frac{5}{10}$	1,738
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre	12 $53\frac{3}{5}$	2,928	15 29	3,320	13 8	2,967
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre	13 10	2,603	19 30	3,330	13 48	2,676
12	Unmanured	10 $1\frac{1}{5}$	1,651	9 30	1,490	9 58	1,635
13	Bone finely ground, 500 lbs. per acre	11 $13\frac{3}{5}$	1,812	17 ..	1,765	11 $48\frac{3}{10}$	1,807
14	Bone finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	14 $29\frac{1}{5}$	2,182	22 20	2,620	15 $16\frac{5}{10}$	2,225
15	Nitrate of soda, 200 lbs. per acre	13 $31\frac{3}{5}$	2,316	15 30	2,330	13 $43\frac{5}{10}$	2.316
16	Muriate of potash, 150 lbs. per acre	15 $20\frac{3}{5}$	1,944	18 ..	2,310	15 $36\frac{3}{10}$	1,981
17	Sulphate of ammonia, 300 lbs. per acre	11 $35\frac{7}{5}$	2,343	15 40	2,260	12 $0\frac{2}{10}$	2,335
18	Sulphate of iron, 60 lbs. per acre	12 $18\frac{3}{5}$	1,911	17 30	1,230	12 $49\frac{5}{10}$	1,843
19	Common salt (Sodium chloride) 300 lbs. per acre	12 $28\frac{8}{5}$	1,693	20 25	1,015	13 $16\frac{5}{10}$	1,625
20	Land plaster or gypsum (Calcium sulphate) 300 lbs. per acre	12 $36\frac{6}{5}$	1,925	16 ..	1,450	12 57	1,878
21	Unmanured in 1889, mineral superphosphate, No. 2, 500 lbs. per acre, each year since	12 12	1,846	15 50	1,890	12 $33\frac{3}{10}$	1,850

BARLEY PLOTS.

The quantity of seed sown per acre on the barley plots was 2 bushels in 1889, 1890 and 1891, 1½ bushel in 1892 and 1893, and 2 bushels in 1894, 1895, 1896 and 1897. Two-rowed barley has been used for seed throughout the whole period. The varieties used were as follows: 1889, 1890 and 1891, Saale; 1892, Goldthorpe; 1893, Duck-bill; and

in 1894, 1895, 1896 and 1897 Canadian Thorpe, a selected form of the Duck-bill. In 1897 the Canadian Thorpe was sown 5th May, came up 12th May and was harvested 3rd August, requiring from the date of sowing to maturity a period of 90 days.

In 1897 the yield of all the barley plots but one was higher than the average of past seasons. The plot fertilized with fresh barn-yard manure has given a better yield than the plot where the manure was used rotted; and this plot still averages 1 bush. 3 lbs. higher than that of the rotted manure for the nine years these tests have been continued.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{10}$TH ACRE.

No. of Plot.	Fertilizers applied each Year.	Average Yield for Eight Years.		9th Season, 1897. Variety, Canadian Thorpe.		Average Yield for Nine 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	32 36½	2,954	42 44	3,840	33 42⅔	3,052
2	Barn-yard manure, fresh, 15 tons per acre	33 43	3,252	43 21	3,725	34 45⅔	3,305
3	Unmanured	14 8⅔	1,592	15 10	1,590	14 14⅓	1,592
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre	14 15⅞	1,446	16 12	1,600	14 26⅓	1,463
5	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs. per acre	19 15⅛	2,191	23 16	2,490	19 36⅔	2,224
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	26 29⅛	2,468	41 2	2,450	28 10⅓	2,466
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre.	22 5⅝	2,472	30 .	1,860	22 47⅔	2,404
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	18 25⅜	1,725	29 18	1,520	19 35⅔	1,702
9	Mineral superphosphate No. 1, 500 lbs. per acre	21 7	2,023	27 24	2,020	21 36⅓	2,023
10	Mineral superphosphate No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre	25 21⅞	2,428	37 4	2,645	26 35⅔	2,452
11	Mineral superphosphate No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre	24 12⅜	2,521	42 24	2,940	26 13⅓	2,568
12	Unmanured	13 20⅜	1,233	16 22	1,310	13 36⅔	1,242
13	Bone, finely ground, 500 lbs. per acre	14 8	1,340	13 46	1,660	14 6⅔	1,376
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	21 16⅜	2,012	28 16	2,080	22 5⅓	2,020
15	Nitrate of soda, 200 lbs. per acre	21 40⅜	2,508	30 10	2,150	22 37⅔	2,468
16	Muriate of potash, 150 lbs. per acre	22 4	1,994	25 40	1,570	22 24	1,947
17	Sulphate of ammonia, 300 lbs. per acre	17 45⅞	2,144	19 8	1,460	18 4⅜	2,068
18	Sulphate of iron, 60 lbs. per acre	18 20⅜	1,842	21 2	1,410	18 34⅔	1,794
19	Common salt (Sodium chloride) 300 lbs. per acre	27 15⅜	2,071	39 8	2,720	28 30⅓	2,143
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre	20 18⅛	1,786	23 26	1,610	20 35	1,766
21	Mineral superphosphate No. 2, 500 lbs. per acre	20 31⅜	1,711	29 28	1,800	21 30⅜	1,721

OAT PLOTS.

The quantity of seed sown per acre on the oat plots was 2 bushels in 1889 and 1890; 1½ bushel in 1891, 1892 and 1893, and 2 bushels in 1894, 1895, 1896 and 1897. The varieties used were as follows: In 1889, Early English; 1890, 1891, 1892, 1893, Prize Cluster; and in 1894, 1895, 1896 and 1897, Banner. In 1897 the Banner was sown 5th May, came up the 13th May, and was harvested 9th August, requiring from the date of sowing to maturity a period of 96 days. In every instance this year, excepting that of plots Nos. 4 and 12, the yield of oats has been considerably above the average of the previous eight years. The crop of plot 2 fertilized with fresh barn-yard manure has again exceeded that of plot 1, treated with rotted manure and the average of the former for nine years now stands 6 bushels 26 pounds higher than that of the latter.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS, $\frac{1}{20}$TH ACRE.

No. of Plot.	Fertilizers applied each Year.	Average Yield for Eight Years.		9th Season, 1897. Variety Banner.		Average Yield for Nine 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	43 23	3,039	70 30	4,410	46 $23\frac{5}{5}$	3,191
2	Barn-yard manure, fresh, 15 tons per acre	50 $8\frac{6}{5}$	3,318	80	4,520	53 $19\frac{1}{5}$	3,452
3	Unmanured	30 $3\frac{1}{5}$	1,608	37 32	1,170	30 $32\frac{5}{5}$	1,559
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre	30 $24\frac{2}{5}$	1,843	28 33	1,545	30 $18\frac{1}{5}$	1,810
5	Mineral phosphate, untreated, finely ground; 500 lbs., nitrate of soda, 200 lbs. per acre	46 31	2,837	58 8	2,240	48 $5\frac{5}{5}$	2,771
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	40 $28\frac{0}{5}$	2,670	68 18	2,590	43 $31\frac{3}{5}$	2,661
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre	42 $23\frac{7}{5}$	3,316	57 22	2,705	44 $12\frac{3}{5}$	3,248
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	37 $11\frac{3}{5}$	2,442	64 14	1,850	40 $11\frac{3}{5}$	2,376
9	Mineral superphosphate, No. 1, 500 lbs. per acre	33 $9\frac{7}{5}$	2,022	52 2	2,010	35 $12\frac{5}{5}$	2,021
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre	43 $11\frac{2}{5}$	2,941	65 30	2,460	45 $28\frac{3}{5}$	2,888
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre	35 $5\frac{1}{5}$	2,373	43 8	3,210	36 $1\frac{3}{5}$	2,466
12	Unmanured	22 $19\frac{4}{5}$	1,632	18 18	1,310	22 $4\frac{3}{5}$	1,596
13	Bone, finely ground, 500 lbs. per acre	31 26	2,023	45 30	1,890	33 $11\frac{3}{5}$	2,008
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	35 $10\frac{5}{5}$	2,237	57 12	2,470	37 $25\frac{0}{5}$	2,263
15	Nitrate of soda, 200 lbs. per acre	43 $31\frac{1}{5}$	2,725	60	2,840	45 $23\frac{3}{5}$	2,738
16	Muriate of potash, 150 lbs. per acre	33 23	2,265	51 16	2,180	35 $22\frac{2}{5}$	2,256
17	Sulphate of ammonia, 300 lbs. per acre	41 $30\frac{3}{5}$	3,165	56 16	2,740	43 $17\frac{4}{5}$	3,118
18	Sulphate of iron, 60 lbs. per acre	34 $15\frac{3}{5}$	2,210	54 29	2,335	36 $24\frac{3}{5}$	2,224
19	Common salt (Sodium chloride) 300 lbs. per acre	33 $16\frac{3}{5}$	2,025	53 18	2,300	35 $24\frac{4}{5}$	2,056
20	Land plaster or gypsum (Calcium sulphate) 300 lbs. per acre	31 $7\frac{2}{5}$	2,137	49 4	2,010	33 $6\frac{3}{5}$	2,123
21	Mineral superphosphate, No. 2, 500 lbs. per acre	30 $3\frac{1}{5}$	1,924	57 22	2,060	33 $5\frac{3}{5}$	1,939

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 in 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 and 1897 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 and 1897. For the first four years the No. 1 series was planted in drills three 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 six years both sorts have been grown in hills. The corn in both series of plots was planted in 1897 on 19th May, and cut 16th September. In most instances the yield of fodder on these plots during the past season has been below the average of past years.

With Indian corn the rotted manure has given in both plots a larger return this year than the fresh manure, but the average of ten years tests still shows the fresh manure in advance of the rotted in plot 1 by 1 ton 787 pounds per acre, while in plot 2 the advantage is with the rotted manure by 1,965 pounds per acre.

EXPERIMENTS WITH FERTILIZERS, ON PLOTS OF INDIAN CORN, $\frac{1}{10}$TH ACRE EACH, CUT GREEN FOR ENSILAGE.

No. of Plot.	Fertilizers applied each year.	Average Yield for Nine Years.				10th Season, 1897.				Average Yield for Ten 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, well rotted, 12 tons per acre	15	1,172	12	107	21	440	15	900	16	299	12	786
2	Barn-yard manure, fresh, 12 tons per acre	17	1,739	11	1,175	14	1,210	9	1,640	17	1,086	11	821
3	Unmanured	8	1,356	5	1,866	3	860	4	1,040	8	306	5	1,583
4	Mineral phosphate untreated, finely ground, 500 lbs. per acre in 1888—800 lbs. per acre each year since	7	647	5	190	3	605	3	1,190	6	1,843	4	1,890
5	Mineral phosphate untreated, finely ground, 500 lbs. per acre in 1888—800 lbs. per acre each year since; nitrate of soda, 200 lbs. per acre	11	467	8	1,074	6	540	8	1,610	10	1,474	8	1,128
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	16	1,095	11	1,293	15	810	10	1,500	16	866	11	1,114
7	Mineral phosphate untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre	15	560	10	1,389	14	1,805	13	800	15	484	10	1,930

EXPERIMENTS WITH FERTILIZERS, ON PLOTS OF INDIAN CORN—*Concluded.*

No. of Plot.	Fertilizers applied each year.	Average Yield for Nine Years.		10th Season, 1897.				Average Yield for Ten 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	
		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	11	1,747	8	982	11	700	10	380	11	1,642	8	1,322
9	Mineral superphosphate No. 1, 500 lbs. per acre	10	1,947	8	206	8	1,010	8	300	10	1,453	8	215
10	Mineral superphosphate No. 1, 350 lbs. per acre; nitrate of soda, 200 lbs. per acre	13	1,762	10	1,040	10	960	9	1,380	13	1,082	10	874
11	Mineral superphosphate No. 1, 350 lbs.; nitrate of soda, 200 lbs; wood ashes, unleached, 1,500 lbs. per acre	16	165	12	746	17	1,440	14	810	16	492	12	1,152
12	Unmanured	11	291	9	368	8	1,370	7	...	10	1,799	8	1,931
13	Bone, finely ground, 500 lbs. per acre	11	1,534	9	8	11	210	9	1,010	11	1,402	9	108
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	12	284	8	1,592	14	205	10	1,405	12	676	8	1,973
15	Nitrate of soda, 200 lbs. per acre	13	303	10	132	9	1,540	8	700	12	1,627	9	1,789
16	Sulphate of ammonia, 300 lbs. per acre	13	1,024	10	136	10	1,490	8	800	13	471	9	1,802
17	Mineral superphosphate No. 1, 600 lbs.; muriate of potash, 200 lbs.; sulphate of ammonia, 150 lbs. per acre	13	3	9	703	14	600	12	1,250	13	263	9	1,358
18	Muriate of potash, 300 lbs. per acre	9	618	5	1,992	8	1,310	6	300	9	487	6	23
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	11	1,244	7	1,800	12	660	7	1,400	11	1,386	7	1,760
20	Wood ashes, unleached, 1,900 lbs. per acre	10	401	7	83	8	1,650	7	1,060	10	126	7	181
21	Bone, finely ground, 500 lbs.; sulphate of ammonia, 200 lbs.; muriate of potash, 200 lbs. per acre	13	634	9	266	11	700	7	1,910	13	241	9	31

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. The preparation of the land has been the same for both these roots. It has been ploughed in the autumn after the crop is gathered, disc-harrowed or gang-ploughed once in the spring, harrowed with smoothing harrow once, then ridged, 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 and 1897 one variety only has been used, namely, the Mammoth Long Red. From 4 to 6 pounds of seed have been sown per acre, each year, in rows 2½ feet apart. In 1897 the mangels were sown 5th May, came up 17th May, and were pulled 11th October.

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 and 1897 the Prize Purple Top Swede. The land used for the turnips, which are usually sown later than the mangels, is allowed to stand after disc-harrowing or gang-ploughing, then cultivated once and ridged and rolled immediately before sowing. In 1897, the turnips were sown 10th June, came up 15th June, and were pulled 16th October. The crops of turnips have been larger during the past season on all the plots excepting 17 and 21 than the average of previous years, while in the case of the mangels all of the plots excepting 1, 2, 5, 6, 7 and 18 have given a smaller yield than the average of the past eight years. The rotted manure has averaged better results than the fresh manure with the mangels, but the turnips have given better results with the fresh manure.

EXPERIMENTS WITH FERTILIZERS ON ROOTS; PLOTS OF MANGELS AND TURNIPS $\frac{1}{10}$TH ACRE EACH.

No. of Plot.	Fertilizers applied each Year.	Average Yield for Eight Years.		9th Season, 1897. Varieties.		Average Yield for Nine 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, well rotted, 20 tons per acre	22 800	13 1,285	27 1,180	24 1,020	22 1,953	14 1,700
2	Barn-yard manure, fresh, 20 tons p. ac.	21 1,594	14 864	25 1,030	23 140	22 420	15 784
3	Unmanured	9 933	7 422	7 1,260	9 1,860	9 525	7 1,026
4	Mineral phosphate, untreated, finely ground, 1,000 lbs. per acre	8 1,419	7 704	8 810	10 310	8 1,351	7 1,327
5	Mineral phosphate, untreated, finely ground, 1,000 lbs.; nitrate of soda, 250 lbs.; wood ashes, unleached, 1,000 lbs. per acre	13 632	8 1,244	16 870	13 1,350	13 1,325	9 367
6	Barn-yard manure, partly rotted and actively fermenting, 12 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	18 196	12 632	20 1,800	20 1,590	18 819	13 516
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	9 1,668	8 1,497	14 170	12 1,520	10 613	9 389
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	14 1,628	11 1,271	11 480	15 280	14 834	12 50
9	Mineral superphosphate, No. 1, 500 lbs. per acre	9 1,594	8 1,558	7 370	12 740	9 1,014	9 356

EXPERIMENTS WITH FERTILIZERS ON ROOTS; PLOTS OF MANGELS AND TURNIPS– *Concluded.*

No. of Plot.	Fertilizers applied each Year.	Average Yield for Eight Years.		9th Season, 1897. Varieties.		Average Yield for Nine 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.
10	Nitrate of soda, 300 lbs. per acre	14 1,209	8 1,305	14 470	12 590	14 1,127	9 114
11	Sulphate of ammonia, 300 lbs. per ac.	11 1,181	10 62	11 620	14 1,950	11 1,119	10 1,161
12	Unmanured	7 1,377	6 1,968	4 1,470	8 1,860	7 721	7 400
13	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,000 lbs. per acre	10 1,041	8 165	9 840	12 300	10 796	8 1,069
14	Wood ashes, unleached, 2,000 lbs. p. ac	11 1,096	7 1,916	8 1,680	8 420	11 494	7 1,972
15	Common salt (Sodium chloride), 400 lbs. per acre	10 95	7 1,011	8 1,790	7 1,750	9 1,839	7 1,093
16	Mineral superphosphate, No. 1, 500 lbs.; nitrate of soda, 200 lbs. per ac.	13 1,589	10 1,226	12 670	11 950	13 1,265	10 1,418
17	Mineral superphosphate, No. 1, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	12 1,415	9 1,243	12 120	8 670	12 1,271	9 957
18	Mineral superphosphate, No. 1, 500 lbs.; muriate of potash, 200 lbs. p. ac.	12 657	10 1,033	12 1,550	10 1,410	12 756	10 1,075
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, 1,500 lbs. per acre	14 493	11 816	12 1,190	13 1,290	14 126	11 1,313
20	Wood ashes, unleached, 1,500 lbs.; common salt (Sodium chloride), 300 lbs. per acre	14 1,440	10 1,052	13 690	10 1,470	14 1,134	10 1,098
21	Mineral superphosphate, No. 2, 500 lbs. per acre	15 898	10 1,808	13 910	10 1,500	15 455	10 1,774

CARROT PLOTS.

Carrots have been sown on alternate halves of the oat plots for the past seven years, for the purpose of cleaning the land from weeds. This work was begun in 1891, and the plots have been sown each year with the variety known as the Improved Short White. In 1897, carrots occupied the east half of the plots. The seed was sown 5th May, came up 18th May, and the roots were pulled 18th October. The crop this year on plots 1, 2, 6, 7, 8, 9, 10, 11 were above the average of the preceding years. The other plots were all below the average.

EXPERIMENTS WITH FERTILIZERS ON HALF PLOTS ($\frac{1}{20}$TH ACRE) OF CARROTS (IMPROVED SHORT WHITE), AFTER OATS.

No. of Plot.	Fertilizers applied each Year.	Average Yield for six years.		7th Season, 1897. Improved Short White.		Average Yield for seven years.	
		Weight of roots per acre.		Weight of roots per acre.		Weight of roots per acre.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre	18	1,875	25	990	19	1,749
2	Barn-yard manure, fresh, 15 tons per acre	20	1,003	24	120	21	20
3	Unmanured	12	1,990	10	1,870	12	1,401
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre	13	511	9	1,890	12	1,565
5	Mineral phosphate, untreated, finely ground, 500 lbs. ; nitrate of soda, 200 lbs. per acre	15	1,633	12	60	15	551
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 befcre using	19	61	19	330	19	99
7	Mineral phosphate, untreated, finely ground, 500 lbs. ; nitrate of soda, 200 lbs. ; wood ashes, unleached, 1,000 lbs. per acre	15	305	18	1,470	15	1,329
8	Mineral phosphate, untreated, finely ground, 500 lbs. ; wood ashes, unleached, 1,500 lbs. per acre.	12	345	14	370	12	920
9	Mineral superphosphate, No. 1, 500 lbs. per acre	9	1,798	10	360	9	1,878
10	Mineral superphosphate, No. 1, 350 lbs. ; nitrate of soda, 200 lbs. per acre	12	81	13	1,570	12	579
11	Mineral superphosphate, No. 1, 350 lbs. ; nitrate of soda, 200 lbs. : wood ashes, unleached, 1,500 lbs. per acre	15	1,160	15	1,840	15	1,257
12	Unmanured	11	541	*4	790	10	577
13	Bone, finely ground, 500 lbs. per acre	12	183	*7	800	11	843
14	Bone, finely ground, 500 lbs. ; wood ashes, unleached, 1,500 lbs. per acre	17	1,630	*9	850	16	1,233
15	Nitrate of soda, 200 lbs. per acre	15	359	13	1,240	14	1,913
16	Muriate of potash, 150 lbs. per acre	16	1,093	15	190	16	678
17	Sulphate of ammonia. 300 lbs. per acre	11	331	9	1,530	10	1,931
18	Sulphate of iron, 60 lbs. per acre	12	173	10	1,480	11	1,788
19	Common salt (Sodium chloride), 300 lbs. per acre	14	68	11	1,340	13	1,393
20	Land plaster or gypsum (Calcium sulphate) 300 lbs. per acre	14	738	9	1,060	13	1,355
21	Mineral superphosphate, No. 2, 500 lbs. per acre	11	1,525	8	1,670	11	689

* Plots 12, 13 and 14 were on a piece of rising ground on light soil and were injured by wind ; plot 12 suffered more than the others.

POTATO PLOTS.

The alternate halves of the wheat and barley plots which were occupied by carrots and sugar beets in 1891, 1892 and 1893 were planted with potatoes in 1894, 1895, 1896 and 1897. These were planted in rows 2½ feet apart, with the sets about one foot apart in the rows.

Those grown in 1897 after wheat were planted 14th May, came up 9th June and were dug 10th October. On each of these plots there were nine rows each of Empire State, Early Sunrise and Clarke's No. 1.

Those grown after barley were planted 14th May, came up 9th June, and were dug 29th September. On these plots there were nine rows each of Vanier, Lee's Favorite and Northern Spy. In the tables following, the yield of each variety for each plot is given, also the crop, in bushels, per acre.

EXPERIMENTS WITH FERTILIZERS ON HALF PLOTS ($\frac{1}{20}$TH ACRE) OF POTATOES AFTER WHEAT.

No. of Plot.	Fertilizers applied each Year.	West Half of Plots.				
		Yield of 9 rows Empire State.	Yield of 9 rows Early Sunrise.	Yield of 9 rows Clarke's No. 1.	Total Yield per Acre.	
		Lbs.	Lbs	Lbs.	Bush.	Lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre in 1888 ; 15 tons per acre each year since	196½	251	285	244	10
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre in 1888 ; 15 tons per acre each year since	207½	258	280	248	30
3	Unmanured	103½	103½	100	102	20
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre	108½	108½	73½	96	50
5	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs. per acre	116½	113½	110½	113	30
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	194½	223½	229½	215	50
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre	153	178	160½	163	50
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	124½	127	131	127	30
9	Mineral superphosphate, No. 1, 500 lbs. per acre	112	74½	127	104	30
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre	143½	137½	155	145	20
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre	184	222½	223	209	50
12	Unmanured	120½	86½	89	98	40
13	Bone, finely ground, 500 lbs. per acre	133½	103	90	108	50
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	162½	153	136	150	30
15	Nitrate of soda, 200 lbs. per acre	113½	108½	111½	111	10
16	Muriate of potash, 150 lbs. per acre	136½	135	114½	128	40
17	Sulphate of ammonia, 300 lbs. per acre	109	84½	82	81	50
18	Sulphate of iron, 60 lbs. per acre	117	105½	92½	105	00
19	Common salt (Sodium chloride), 300 lbs. per acre	127½	103	72½	101	00
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre	152½	98	88	112	50
21	Unmanured in 1889, mineral superphosphate, No. 2, 500 lbs. per acre each year since	135½	117½	103½	118	50

EXPERIMENTS WITH FERTILIZERS ON HALF PLOTS ($\frac{1}{20}$TH ACRE) OF POTATOES AFTER BARLEY.

No. of Plot.	Fertilizers applied each Year.	East Half of Plots.				
		Yield of 9 rows Vanier.	Yield of 9 rows Lee's Favourite.	Yield of 9 rows Northern Spy.	Total Yield per Acre.	
		Lbs.	Lbs.	Lbs.	Bush.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre.	317	230	329	292	
2	Barn-yard manure, fresh, 15 tons per acre.	273½	217	293½	261	20
3	Unmanured	134½	95	141	123	30
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre.	84½	73	154	103	50
5	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs. per acre	112½	60½	143½	105	30
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	235½	142½	266	214	40
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre	179	94	203½	158	50
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre	195½	93	202½	163	31
9	Mineral superphosphate, No. 1, 500 lbs. per acre.	162	124	183½	156	30
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre.	178½	137	202	172	30
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre	215	130½	198½	181	20
12	Unmanured	121½	59½	104½	95	10
13	Bone, finely ground, 500 lbs. per acre.	122½	71½	154½	116	10
14	Bone, finely ground, 500 lbs.; wood ashes, unleacbed, 1,500 lbs. per acre	232½	122½	233½	196	10
15	Nitrate of soda, 200 lbs. per acre	96	72½	134½	101	
16	Muriate of potash, 150 lbs. per acre	147	79	142½	122	50
17	Sulphate of ammonia, 300 lbs. per acre	98	74	162	111	20
18	Sulphate of iron, 60 lbs. per acre	150	88½	150½	129	40
19	Common salt (Sodium chloride), 300 lbs. per acre	133½	63	121	105	50
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre.	142½	76½	191½	136	50
21	Mineral superphosphate, No. 2, 500 lbs. per acre.	154½	114½	195	154	40

In the following table particulars are given of the crops of potatoes obtained each year from 1894 to 1897, inclusive, from each of the plots devoted to experiments with fertilizers, also the average results of these tests for four years. It will be seen that plot 1, to which well rotted barn-yard manure has been applied, has given the best results in the plots after barley, while in those after wheat plot 2 on which fresh manure was used, has a very slight advantage. None of the artificial fertilizers or mixtures of these fertilizers have given results as good as those obtained from barn-yard manure. Of the single fertilizers tried, the best crops have been had from the Mineral Superphosphate of lime, and the next best from Muriate of Potash.

TABLE showing Crops of Potatoes obtained during four years from Fertilized Plots.

No. of Plot.	1894.		1895.		1896.		1897.		Average for four years.	
	After Wheat.	After Barley.	After Wheat.	After Barley.	After Wheat.	After Barley.	After Wheat.	After Barley.	After Wheat.	After Barley.
	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.
Plot No. 1....	264 50	247 20	306 20	241 40	302 50	253 50	244 10	292 ..	279 32	258 42
" " 2....	234 20	265 40	366 ..	249 50	270 10	233 40	248 30	261 20	279 45	252 37
" " 3....	141 10	123 50	144 40	101 30	90 ..	99 50	102 20	123 30	119 32	112 10
" " 4....	142 50	128 10	127 50	93 40	84 40	98 10	96 50	103 50	113 2	105 57
" " 5....	150 ..	104 40	157 40	98 30	94 ..	98 50	113 30	105 30	128 47	101 52
" " 6....	218 10	180 10	317 20	243 50	256 20	196 40	215 50	214 40	251 55	208 40
" " 7....	172 ..	156 30	213 ..	151 20	165 ..	135 20	163 50	158 50	178 27	150 30
" " 8....	155 50	162 30	174 20	150 40	133 50	128 20	127 30	163 31	147 52	151 15
" " 9....	178 50	197 10	169 10	152 10	130 ..	147 40	104 30	156 30	145 37	163 22
" " 10....	174 50	172 50	169 30	123 40	119 50	99 50	145 20	172 30	152 22	142 12
" " 11....	175 20	232 40	274 30	163 ..	182 30	193 30	209 50	181 20	210 32	192 37
" " 12....	102 30	118 30	119 50	71 20	77 40	80 ..	98 40	95 10	99 40	91 15
" " 13....	109 10	97 50	102 50	82 30	85 50	64 ..	108 50	116 10	101 40	90 7
" " 14....	180 40	172 ..	204 20	181 20	176 ..	115 ..	150 30	196 10	177 52	166 7
" " 15....	174 ..	114 40	99 50	81 20	105 30	88 50	111 10	101 ..	122 37	96 27
" " 16....	146 20	141 40	148 ..	133 ..	131 40	119 10	128 40	122 50	138 40	129 10
" " 17....	98 50	93 10	95 50	94 ..	69 50	54 50	81 50	111 20	86 35	88 20
" " 18....	89 40	97 40	103 20	97 10	69 10	71 50	105 ..	129 40	91 47	99 5
" " 19....	64 10	156 ..	73 ..	59 ..	52 50	109 ..	101 ..	105 50	72 45	107 27
" " 20....	85 ..	171 10	60 40	49 40	83 10	107 ..	112 50	136 50	85 25	116 10
" " 21 ...	105 ..	155 10	90 20	119 10	95 50	119 16	118 50	154 40	102 30	137 4

The varieties which have been tested during the four years named and the weights obtained of each sort in pounds per row are here given. These rows have in each case run through the whole series of fertilized plots, and as the conditions under which the different varieties have been grown may be considered as very similar, if not identical, the results may fairly be regarded as indicating the relative productiveness of the different sorts under trial.

Name of Variety.	1894.	1895.	1896.	1897.	Average.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Northern Spy	.....	.....	.....	434	434
Queen of the Valley	.....	462	358	.....	410
Vanier	.....	.....	.....	387	387
Early Sunrise	.....	407	367	321	365
Thorburn	357	329	351	.....	346
Wonder of the World	406	344	247	.....	332
Empire State	.....	.....	.....	328	328
Beauty of Hebron	406	257	308	.....	323
Daisy	.....	376	268	.....	322
Early Rose	235	426	294	.....	318
Clarke's No. 1	.....	.....	.....	317	317
Lee's Favourite	333	284	295	247	290
Burpee's Extra Early	.....	.....	276	.....	276
May Queen Early	.....	269	259	.....	264

DISTRIBUTION OF SEED GRAIN.

A further distribution of seed grain was made in the spring of 1897, chiefly of samples of the most promising sorts which had been grown at the several experimental farms. These have been sent out to farmers on application, one sample only to each applicant, with the object of placing within their reach pure samples and true to name of the best and most productive sorts in cultivation. By the careful handling of these samples the farmer can soon obtain sufficient seed for a large area and may thus be provided with the best sorts without any further cost than that of his own labour. The appreciation of this part of the experimental farm work is shown by the increasing demand for samples.

Preparations have been made for another distribution in 1898 which will consist as heretofore of promising sorts of oats, barley, wheat, pease, Indian corn and potatoes. The several branch farms will also again distribute samples to farmers residing in the provinces and territories where these farms have been established.

The samples sent out from the Central Experimental Farm at Ottawa during the early months of 1897 were distributed as follows:—

Kind of Grain.	Prince Edward Island.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	North-west Territories.	British Columbia.
Oats	838	1,977	1,263	6,087	3,686	618	328	187
Barley	332	1,016	414	3,019	1,418	206	136	95
Wheat	460	926	625	2,454	1,781	314	178	87
Pease	172	457	288	920	1,223	140	117	56
Indian Corn	80	336	189	648	808	58	28	18
Potatoes	137	326	201	1,316	996	210	105	99
Total number of samples sent	2,019	5,038	2,980	14,444	9,912	1,546	892	542
Number of applicants supplied	2,016	5,035	2,978	14,416	9,906	1,536	890	529

Total number of samples distributed, 37,373. Number of applicants supplied, 37,306.

The following list shows the number of 3-pound packages of the different varieties which have been distributed:

Oats.		Barley, Six-rowed.	
Banner	2,740	Odessa	2,112
Abundance	2,571	Trooper	868
Wallis	1,843	Mensury	547
Bavarian	1,806	Royal	235
Improved Ligowo	1,198	Vanguard	163
Early Gothland	1,089		
Golden Giant	904		
American Beauty	578		
Golden Beauty	434		
Columbus	348		
Joanette	284		
White Schonen	281		
Abyssinia	232	Two-rowed.	
Holstein Prolific	230	Canadian Thorpe	1,009
Hazlett's Seizure	194	French Chevalier	646
Flying Scotchman	98	Sidney	514
Early Archangel	96	Duckbill	495
Mennonite	58	Newton	47
Total	14,984	Total	6,636

LIST of the number of 3-pound packages of the different varieties distributed—*Concluded.*

PEASE.	
Prussian Blue	1,798
Daniel O'Rourke	640
Large White Marrowfat	462
Mummy	327
Black-eyed Marrowfat	89
Canadian Beauty	57
Total	3,373
INDIAN CORN.	
Champion White Pearl	650
White Cap Yellow Dent	588
Compton's Early	226
90 Day Corn	223
King of the Earliest	178
Longfellow	124
Mammoth Early Flint	92
Angel of Midnight	84
Total	2,165
WHEAT.	
Red Fife	1,184
White Fife	999
Wellman's Fife	982
White Connell	685
Preston	597
Percy	376
Red Fern	327
WHEAT—*Continued.*	
Herisson Bearded	287
Crown	238
Huron	206
White Russian	206
Ladoga	201
Rio Grande	180
Advance	177
Alpha	99
Stanley	71
Total	6,825
POTATOES.	
Northern Spy	505
Empire State	471
Clarke's No. 1	304
Lee's Favourite	250
Early Sunrise	241
Queen of the Valley	234
Daisy	197
Burpee's Extra Early	194
Vanier	186
Pearce's Extra Early	180
May Queen Early	140
Wonder of the World	129
Beauty of Hebron	123
Chicago Market	121
Early White Surprise	49
Thorburn	46
Dakota Red	20
Total	3,390

SPECIAL DISTRIBUTION OF CROSS-BRED CEREALS.

Some of the more promising of the cross-bred and hybrid cereals were available this year in sufficient quantity to be included to some extent in the general distribution of 3-pound bags. There were, however, others of which only a small quantity could be had. These were sent out in 1 pound bags to farmers in the several provinces, as follows :—

	Prince Edward Island.	New Brunswick.	Nova Scotia.	Quebec.	Ontario.	Manitoba.	North-west Territories.	British Columbia.
Cross-bred wheats	8	20	14	63	80	21	19	1
Cross-bred pease	52	97	127	216	267	23	24	18
Total	60	117	141	279	347	44	43	19

Making 1,050 samples in all, which, added to the distribution of the Central Farm, makes the total number of samples sent out 38,423.

Testing the vitality and germinating power of seed grain and other agricultural seeds at the Central Experimental Farm, Ottawa.

Distribution of samples of seed grain at the Central Experimental Farm. Getting ready for the mail.

DISTRIBUTION OF SAMPLES FROM BRANCH EXPERIMENTAL FARMS.

Samples of 3 pounds each were also distributed from the branch experimental farms as follows:—

Experimental Farm, Nappan, N.S.

Oats	345
Barley	183
Wheat	91
Pease	83
Rye	6
Potatoes	302
	1,010
No. of applicants supplied	543

Experimental Farm, Brandon, Man.

Grain of all sorts	357
Potatoes	210
	567

Experimental Farm, Indian Head, N.W.T.

Oats	401
Barley	259
Wheat	253
Pease	233
Rye	18
Flax	2
Potatoes	372
	1,538

Experimental Farm, Agassiz, B.C.

Oats	57
Barley	29
Wheat	51
Pease	49
Potatoes	68
	254

This makes a total of 3,369 samples sent out by the branch experimental farms which, added to the number distributed by the Central Farm, makes a total of 41,792. Much interest is taken by farmers generally in this branch of the work, and by this means some of the better varieties are rapidly finding their way into general cultivation.

TESTS OF THE VITALITY OF GRAIN AND OTHER SEEDS FOR 1897.

The number of samples of seed grain and other seeds which were tested for their germinating power during the season of 1897 was 2,174. The following figures show the variations in the average vitality of the more important cereals during the past five years:—

	1893.	1894.	1895.	1896.	1897.	Average for the five Years.
Wheat	81·8	90·5	88	87·7	83·5	86·3
Barley	84·9	89	85·7	90·1	90	87·9
Oats	93	95·5	93·3	89·8	93·6	93

Many of the samples sent for test are much below the average in vitality, hence the figures given above do not fairly represent the vitality of grain of average quality grown in different parts of the Dominion. One of the chief objects in continuing these tests from year to year, is to give farmers 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, and this work is done and reported on free of charge. Samples can usually be reported on within a fortnight after they are received.

RESULTS of Tests of Seeds for vitality, 1896-97.

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	482	100·0	.....	77·5	6·0	83·5
Barley	465	100·0	17·0	81·8	8·2	90·0
Oats	662	100·0	.....	88·7	4·9	93·6
Rye	2	75·0	67·0	64·5	6·5	71·0
Pease	241	100·0	.....	.....	.....	77·2
Corn	23	100·0	28·0	.....	.....	85·8
Clover	13	87·0	26·0	.....	.....	72·6
Grass	10	98·0	17·0	.....	.....	74·9
Turnips	13	84·0	28·0	.....	.....	72·4
Carrots	5	68·0	23·0	.....	.....	42·0
Mangels	4	78·0	18·0	.....	.....	43·0
Beets	10	98·0	42·0	.....	.....	76·6
Sunflowers	3	98·0	92·0	.....	.....	95·3
Lettuce	17	95·0	2·0	.....	.....	58·0
Onions	18	100·0	42·0	.....	.....	68·1
Leeks	6	75·0	27·0	.....	.....	51·5
Tomatoes	20	90·0	16·0	.....	.....	67 0
Cabbage	29	98·0	33·0	.....	.....	69·8
Brussel Sprouts	2	79·0	43·0	.....	.....	61·0
Cauliflowers	4	83·0	50·0	.....	.....	69·2
Radish	13	80·0	30·0	.....	.....	48·4
Spinach	4	55·0	31·0	.....	.....	43·5
Cucumbers	11	82·0	34·0	.....	.....	62·5
Sweet Peas	11	100·0	48·0	.....	.....	83·0
Musk Melon	7	96·0	24·0	.....	.....	66·5
Water Melon	9	82·0	.....	.....	.....	50·0
Squash	11	100·0	4·0	.....	.....	66·9
Peppers	7	59·0	8 0	.....	.....	27·7
Celery	6	77·0	28·0	.....	.....	55·0
Chervil	2	28·0	9·0	.....	.....	18·5
Citron	2	84·0	32·0	.....	.....	58·0
Mustard	3	93·0	84·0	.....	.....	89·6
Cress	3	94·0	79·0	.....	.....	88·0
Parsley	4	49·0	7·0	.....	.....	29·2
Tobacco	3	71·0	55·0	.....	.....	65·0
Asparagus	6	79·0	12·0	.....	.....	45·8
Flax Seed	3	84·0	58·0	.....	.....	72·3
Buckwheat	2	96·0	93·0	.....	.....	94·5
Sage	2	24·0	10·0	.....	.....	17·0
Summer Savory	2	22·0	13·0	.....	.....	17·5
Thyme	2	10·0	7·0	.....	.....	8·5
Tares	1	86·0	86·0	.....	.....	86·0
Canary Seed	1	31·0	31·0	.....	.....	31·0
Horse Beans	1	98·0	98·0	.....	.....	98·0
Sweet Marjoram	1	19·0	19·0	.....	.....	19·0
Endive	1	30·0	30·0	.....	.....	30·0
Kale	1	81·0	81·0	.....	.....	81·0
Salsify	1	49·0	49·0	.....	.....	49·0
Parsnips	3	24·0	5·0	.....	.....	17·3
Poppy	3	89 0	53·0	.....	.....	71·0
Candytuft	3	97·0	59·0	.....	.....	84·0
Mignonette	2	36·0	7·0	.....	.....	21·5
Chrysanthemum	1	43·0	43·0	.....	.....	43·0
Salpiglossis	1	43·0	43·0	.....	.....	43·0
Zinnia	1	88·0	88·0	.....	.....	88·0
Stocks	1	1·0	1·0	.....	.....	1·0
Portulacca	1	8·0	8·0	.....	.....	8·0
Hesperis	1	13·0	13 0	.....	.....	13·0
Larkspur	1	80·0	80·0	.....	.....	80·0
Pansy	1	71 0	71·0	.....	.....	71·0
Pink	1	59·0	59·0	.....	.....	59·0
Sweet William	1	75·0	75·0	.....	.....	75·0
Coriander	1	36·0	36·0	.....	.....	36·0
Berberis	1	3 0	3·0	.....	.....	3·0
Mountain Ash	1	.....	.....	.....	.....	.....
Caragana	1	86·0	86·0	.....	.....	86·0
Total number of samples tested, highest and lowest percentage	2,174	100·0	00·0	.....	.....	.....

Experimental Farms.

TABLE showing the number 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	140	100·0	0·0	72·9	6·9	79·8
Barley	176	100·0	60·0	78·5	10·0	88·5
Oats	190	100·0	0·0	93·6	3·5	97·1

QUEBEC.

Wheat	61	100·0	16·0	84·7	4·5	89·2
Barley	51	100·0	56·0	84·3	6·7	91·0
Oats	54	100·0	79·0	92·2	4·2	96·4

MANITOBA.

Wheat	57	100·0	36·0	82·5	4·9	87·4
Barley	43	98·0	17·0	75·3	9·6	84·9
Oats	103	100·0	39·0	85·4	7·1	92·5

NORTH-WEST TERRITORIES.

Wheat	83	99·0	23·0	77·5	6·7	84·2
Barley	66	100·0	64·0	83·6	8·6	92·2
Oats	104	100·0	22·0	80·0	8·2	88·2

NOVA SCOTIA.

Wheat	74	99·0	25·0	71·7	6·8	78·5
Barley	65	100·0	69·0	86·1	5·9	92·0
Oats	100	100·0	33·0	87·2	3·8	91·0

NEW BRUNSWICK.

Wheat	21	100·0	66·0	88·3	3·8	92·1
Barley	15	100·0	49·0	78·8	7·5	86·3
Oats	31	100·0	77·0	90·5	3·7	94·2

PRINCE EDWARD ISLAND.

Wheat	9	93·0	66·0	75·9	6·3	82·2
Barley	6	99·0	67·0	74·5	14·3	88·8
Oats	15	100·0	78·0	93·5	2·4	95·9

BRITISH COLUMBIA.

Wheat	37	99·0	71·0	81·2	5·1	86·3
Barley	43	100·0	72·0	91·6	3·9	95·5
Oats	65	100·0	68·0	91·5	3·4	94·9

METEOROLOGICAL OBSERVATIONS.

TABLE of Meteorological Observations taken at the Central Experimental Farm, Ottawa, 1897; maximum, minimum and mean temperature for each month, with date of occurrence, also rainfall and snowfall.

Months.	Maximum.	Date.	Minimum.	Date.	Mean.	Rain-fall.	Snow-fall.	Number of days Precipitation.
	°		°		°	in.	in.	
January	45·5	3rd	—25·7	25th	12·2	0·38	15·50	16
February	40·0	21st	—12·0	26th	15·7	0·35	15·75	13
March	49·9	30th	—18·0	1st	23·4	1·53	28·50	16
April	77·0	23rd	13·2	20th	40·8	1·72	1·00	13
May	76·0	9th	33·5	8th	53·0	3·29	.....	14
June	84·0	23rd	36·8	2nd	60·7	3·01	.....	16
July	97·2	8th	55 2	27th	71·2	5·19	.....	15
August	85·2	8th	42·2	24th	62·6	3·40	.....	14
September	92·0	9th	32·3	28th	59·4	0·45	.....	6
October	85·0	15th	22·2	10th	48·2	0 69	.....	8
November	54·0	26th	6·8	30th	29·8	2·19	5·75	18
December	44·9	11th	—15 6	25th	17·3	1·98	22·50	16
						24·18	89·00	165

Rain or snow fell on 165 days during the 12 months.
Heaviest rainfall in 24 hours, 1·18 inches on July 12th.
Heaviest snowfall in 24 hours, 7 inches on March 25th.
It will be seen the highest temperature during the 12 months was 97°·2, on July 8th.
The lowest temperature during the 12 months was —25°·7, on January 25th.
During the growing season rain fell on 13 days in April, 14 days in May, 16 days in June, 15 days in July, and 14 days in August.
September shows the lowest number of days on which rain fell, viz., 6.
Rain or snow fell on 18 days during November.

WILLIAM T. ELLIS, *Observer.*

RESULTS OF EXPERIMENTS IN THE CROSS-FERTILIZING OF PLANTS, SHRUBS AND TREES.*

In the spring of 1868 the writer began a series of experiments in cross-fertilizing and hybridizing which have been continued at intervals ever since.** This work has included experiments with varieties of the gooseberry, red and white currant, black currant, raspberry, blackberry, grape, apple, pear, plum, cherry and peach; also with different sorts of wheat, barley, oats, pease and rye, and with several species of wild flowers and ornamental shrubs.

THE GOOSEBERRY AND CURRANT.

The first crosses attempted in 1868 were with the gooseberry. These were made with the object of improving the size and quality of what are known as the American gooseberries, by introducing strains of some of the best English sorts, and at the same time to obtain varieties free from the gooseberry, mildew, *Sphærotheca mors-uvæ*, which has in the past affected nearly all the English gooseberries grown here, so badly both in foliage and fruit as to discourage their culti-

* Read before the Botanical Section of the British Association for the Advancement of Science at Toronto, Ont., August, 1897.

** The term "cross-bred" is used when referring to crosses produced between different varieties of the same species, and the word "hybrid," when referring to forms produced by crossing plants which are recognized as distinct species.

vation. Those which are known as American or native sorts are believed to have resulted from crosses between the wild species and European forms, and are noted for their hardiness, productiveness, and freedom from mildew. Several hundred seedlings resulted from these efforts, some of which are still in cultivation. Two of them—one named Pearl (a cross between Downing and Aston's Seedling, or Broom Girl) and Red Jacket (a cross between Houghton and Warrington)—are both popular sorts, on account of their size, productiveness, and freedom from mildew, and are now extensively grown both in Canada and the United States. Among the early experiments some trials were made with the wild sorts—the small, smooth gooseberry, *Ribes oxyacanthoides*, and the prickly gooseberry, *Ribes Cynosbati*. No success attended the efforts with the former; but among the crosses obtained on the prickly gooseberry *R. Cynosbati* with Warrington were several interesting sorts, one of which was quite smooth, another sparingly hairy, and a third somewhat more hairy. This latter is still under cultivation at the Central Experimental Farm at Ottawa. In growth and habit the bushes resemble the female parent, but the fruit is considerably larger and much improved in quality, and the berries when ripe are tinged with red. Efforts were also made during these early years to cross the black, red and white currants with the gooseberry, but without success. After five or six years the new seedlings had increased to such an extent that their number was embarrassing, and no more work was undertaken on this line until 1890, after the establishment of the Canadian Experimental Farms, when a larger field for such work was opened. On my arrival from London, Ontario, at Ottawa, in 1887, all the surviving seedlings of all sorts of any promise—more than 800 in all—were taken to the Central Experimental Farm, and since then, with the help of assistants, many new forms have been produced. Among others, hybrids have been obtained between the cultivated black currant, *Ribes nigrum*, and a cultivated variety of the gooseberry, *Ribes Grossularia;* also between the black currant and white currant, a variety of *Ribes rubrum*. In each instance the black currant was chosen as the female. Three of the hybrids between the black currant and the white currant, and twenty-eight of those between the black currant and gooseberry, are still under trial. There are in this instance some well marked points of difference between the female and the male, and the hybrids, in many respects, are intermediate in their character. The branches of the black currant are without thorns, whereas those of the gooseberry are thorny; the hybrids have the branches thornless as in the female.

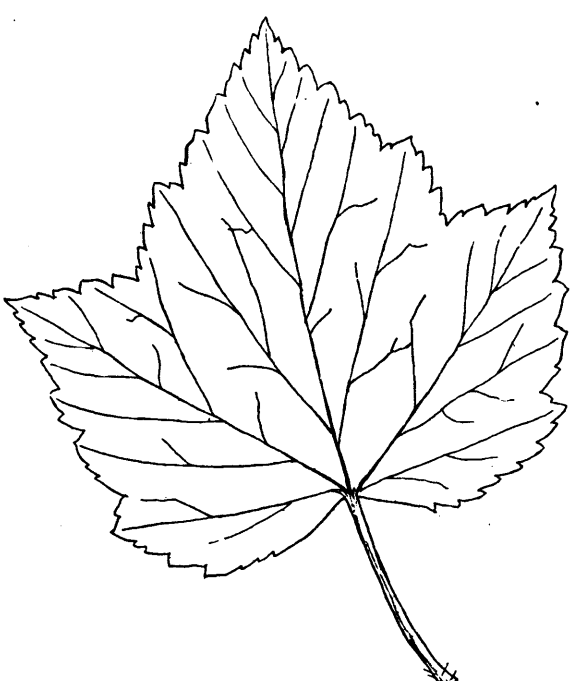


Fig. 1.—Leaf of Black currant.

The leaves of the black currant (Fig. 1) are large, three lobed, with the points of intersection between the lobes slightly notched, and the margins are serrated; the teeth coarse, somewhat irregular and pointed. (See figure.) The leaves are also supplied with a large number of oil cells, so that when bruised they exhale a strong and characteristic odour. The leaf stalks are very slightly hairy towards the base.

In the gooseberry the points of intersection between the lobes of the leaves are deeply notched (Fig. 2), and the marginal serrations are more irregular and rounded, with short, blunt points.

The leaves when bruised are odourless, and the leaf stalks are shorter and more decidedly hairy with the hairs extending further up the stalk.

In the hybrids the leaves are intermediate in form (Fig. 3), and almost as deeply cleft at the junction of the lobes as are those of the gooseberry. The serrations are also of an intermediate character, being less pointed than in the black currant and less rounded than in the gooseberry. The leaves of most of the hybrids have no odour when bruised, except in two instances where the black currant odour is faintly perceptible. The leaf stalks are more hairy than those of the black currant, but less hairy than those of the gooseberry.

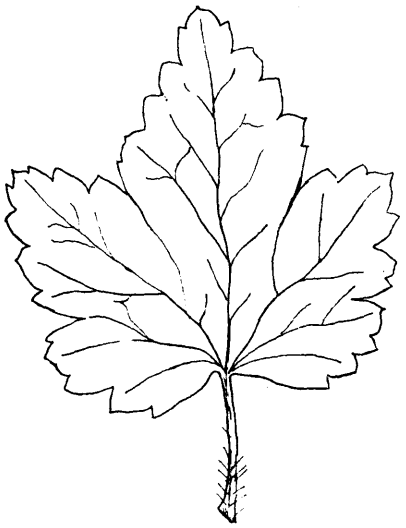


Fig. 2.—Leaf of Gooseberry.

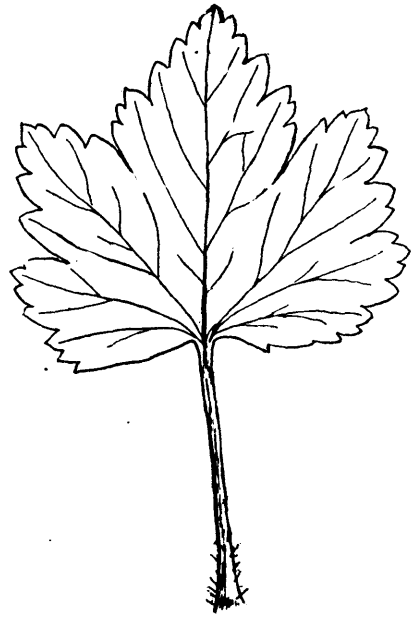


Fig. 3.—Leaf of Hybrid : Black currant with Gooseberry.

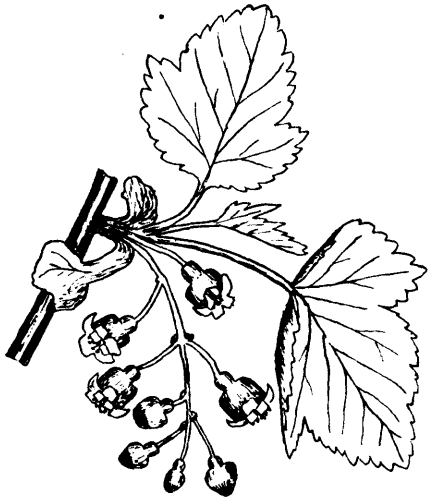


Fig. 4.—Flowers of Black currant.

The flowers of the black currant are borne on long bunches of seven to twelve (See figure 4), whereas in the gooseberry they are usually in pairs and occasionally there are three in a cluster. (Fig. 5.) In the hybrids they are borne in clusters of from four to seven. (Fig. 6.) In the structure of the pistil of the flower there is also a notable difference. In the black currant the pistil is single, smooth throughout, and somewhat thickened and robust towards the tip, which is flat and blunt (See figure 7*b*.) In the gooseberry it is longer and divided to the base, both branches being slender and very hairy for nearly half their length, the slender divisions diverging towards the tip. (See figure 7*c*.) In the hybrids the pistil is single for about half its length or more, but divided towards the tip, and the divisions divergent. (See figure 7*a*.) There are also differences in the time of blooming. The flowers of the gooseberry are open some days before those of the black currant; while those of the hybrids are intermediate in that respect.

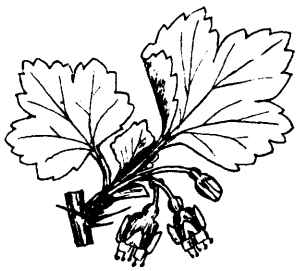


Fig. 5.—Flowers of Gooseberry.

All the hybrids have flowered freely every season for several years past, and although no imperfection can be detected in the floral organs, no fruit could be found on any of them until last year, when two berries were found on one bush and one on another. These were borne singly, like the gooseberry, and were about the size of a large black currant, but of a dull reddish colour The seeds these contained were carefully saved and sown, but none of them have yet germinated. This season only one specimen of fruit was found and this dropped before it was fully matured. With the view of inducing the fruit to set more freely, clusters of the flowers have been artificially fertilized with pollen from adjacent flowers on the same bush, also from flowers of the black currant and the gooseberry; but none of these experiments have been successful.

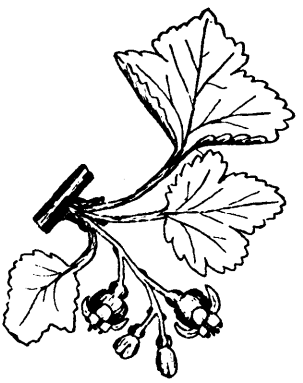


Fig. 6.—Flowers of Hybrid.

(*a.*) (*b.*) (*c.*)

Fig. 7.

a.—Pistil of hybrid enlarged to three diameters.
b.— " black currant " " "
c.— " gooseberry " " "

The several differences and resemblances noticed seem to establish the true hybrid character of the progeny, a point further confirmed by the fact that the gooseberry and white currant characteristics in these hybrids are recognized by insects and parsitic plants The gooseberry saw-fly (*Nematus ribesii*), which is not known to touch the foliage of the black currant, consumes, with great avidity, the leaves of the gooseberry and white currant; it also feeds freely on the hybrids, which, although raised from seed of the black currant, are thus recognized by this insect as partaking of the nature of the male parent. The gooseberry mildew, also *Sphaerotheca mors-uvae*, B. & C., which is not known to affect the black currant, attacks the hybrids freely, showing that the gooseberry characteristics which they possess are recognized also by this fungus enemy of the gooseberry.

Another group of experiments with shrubs in this genus has been the crossing of the cultivated black currant, *Ribes nigrum*, with the wild black currant of the western plains, *Ribes floridum*. From this cross a number of seedlings have been produced, partaking more or less of the characteristics of both parents, some of which promise to be worthy of cultivation for their fruit. During the past season a number of additional crosses in this genus have been successfully made, from which some further results of interest are looked for.

The Grape.

From 1868 to 1875 a large number of hybrids were produced by fertilizing prepared flowers of the native or improved native grapes with pollen of the European varieties. During this time more than 3,000 grape flowers were operated on, from which about 400 seedlings were obtained. No winter protection was given to any of these young seedlings, and a large proportion of the new introductions from year to year perished during the winter following. Many others were discarded for the reason that they produced staminate flowers only, and some on account of lack of vigour in the vines or the poor quality of the fruit. Only a few of these seedlings have survived to the present time, and of these two only are specially worthy of mention, viz., Emerald and Kensington. These are both yellowish green grapes and Kensington is specially productive.

In the case of the latter, the female was the Clinton, which is an improved form of the native frost grape, *Vitis cordifolia;* the male was Buckland's Sweetwater, a variety of *Vitis vinifera*, a large greenish white grape grown under glass. The Clinton is a vigorous grower, and very hardy, and in fruiting produces a bunch which is small to medium in size, long, narrow and very compact, somewhat lightly shouldered. The berry is small, round, and black and quite acid. The Buckland's Sweetwater is a less vigorous grower, is tender; the berries are large, pale yellowish green and oval in form; while the bunch is large and loose. The resulting hybrid resembles the Clinton in vigour of growth and hardiness of vine, also in the character of the foliage; the fruit, however, is of a pale yellowish green colour, the berries are oval, the bunch large and shouldered and moderately loose. The fruit is intermediate in size and quality, between the parents. In the fruit of the Clinton the seeds are short and plump, whereas in that of the Buckland's Sweetwater they are longer and less plump; in the hybrid the seeds resemble in form those of the Buckland's Sweetwater.

A considerable number of other crosses were made between one of the cultivated forms know as Concord, which is believed to have been derived from the fox grape, *Vitis labrusca*, and varieties of *Vitis vinifera*. The leaves of the Concord vine are thick and leathery, and downy on the under side, while the leaves of the derivatives of *Vitis vinifera* are smooth below and comparatively thin in texture. All the seedlings resembled the Concord in the character of their foliage, but there was much variation in the appearance and quality of the fruit.

The Raspberry and Blackberry.

The first crosses were made with raspberries in 1869, and the work has been continued at intervals up to the present time. In 1869 a red variety, known as the Philadelphia, a form of *Rubus strigosus*, which was very productive but lacking in flavour, was crossed with a high-flavoured yellow sort known as Brinckle's Orange, but the progeny in this case was tender and unhealthy in character and none of them have survived. In 1870 a cultivated form of the black cap raspberry, *Rubus occidentalis*, was fertilized with pollen of the Philadelphia. This latter experiment was undertaken mainly for the purpose of gaining some information as to the influence of sex on the character and habit of the offspring. The black raspberry, *Rubus occidentalis*, which was chosen as the female, propagates by rooting from the pendulous tips of the branches, which, late in the season, touch the ground; while the male, the red raspberry, *Rubus strigosus*, sends up suckers from the buds developed on the roots, and these roots extend under the surface to a considerable distance from the base. Twenty-four plants were raised from this cross, all of which fruited in 1873, and some of them were very prolific. In every instance the seedlings rooted from the tips, but not freely, and in two or three instances an occasional sucker was thrown up from the roots, a few inches from the crown. Subsequently these plants were propagated more freely by layering in spring the canes, the growth of the previous summer, when they rooted at almost every joint. The fruit of the best of these hybrids was larger than that of either of the parents; it was intermediate in colour, being dark purple with a whitish bloom, while the flavour was a striking combination of the characteristics of both.

During the following four or five years many additional crosses were made with raspberries, and many attempts were made to cross the raspberry *Rubus strigosus* with the blackberry *Rubus villosus*, but without much success. Most of the efforts failed, but seeds were produced on several occasions. Sometimes these did not germinate, and several times, when one or two seeds did start, the young plants were weakly and died before much growth was made

Large Fruits.

Many crosses were also made with the larger fruits, from 1889 to 1895, some of which have since borne well; but they were not sufficiently promising to justify their propagation. Many attempts have been made to cross the apple with the pear, and *vice*

versa, but without success. Similar experiments have also been tried with the different varieties of cherries, notably those belonging to the Bigarreau class with the Duke and Morello types. Seedlings of these were grown for a time, the foliage of which was intermediate in character, but none of them lived long enough to produce fruit. Efforts were made to cross the plum with the peach, also the plum with the cherry, both without success. After the work of cross-fertilizing fruits had been continued for eight or nine years, the number of seedlings accumulated to such an extent as to be burdensome to look after, and further efforts, which would have added to their number, were for a time suspended.

Flowering Plants.

In the meantime some experiments were made with flowers. Attempts were made for several seasons to cross the wild geraniums, *Geranium maculatum* and *G. robertianum*, with several of the best cultivated pelargoniums, with the hope of obtaining improved forms of hardy perennial geraniums, but without success. A wild perennial species of verbena, *V. hastata*, was pollenized with some of the finest forms of the cultivated verbena, with a similar object ; and in this instance a number of crosses were obtained, but these were planted out in an open border without protection, where they all died during the following winter. Crosses were also made with Aquilegias, and very distinct intermediate forms obtained. Experiments were also tried to see if evidence could be had of superfoetation in this flower, the varieties of which are so easily cross-fertilized. The sorts selected for this work were a red-flowering form, *Aquilegia Canadensis*, and the double blue and white forms of *Aquilegia vulgaris*. The red was crossed with the white and the pistils touched the following day with pollen from the blue flowers ; the white with the blue, and retouched with the red ; and the blue with the red, and retouched with white. A large number of seedlings were raised, most of which showed two colours quite distinctly, but no trace of the influence of the third colour could be detected in any instance.

Wild Crab Apples.

In the spring of 1887, among other seeds received from the Royal Botanic Gardens at St. Petersburg there was a package of the seeds of a small wild Siberian crab, known as the berried crab, *Pyrus baccata*. From these a number of young trees were raised, some of which have now been tested at the branch experimental farm at Brandon, Manitoba, for six years, and at Indian Head, N.W.T., for five years, and in every instance these trees have been found quite hardy, and during the last two seasons some of them have borne good crops of fruit. This crab, although it bears abundantly, has very small fruit, not much larger than a cherry. Another variety, known as *Pyrus baccata prunifolia*, is more than double the size of *P. baccata*, and this also, although tested for a shorter time, appears to be equally hardy. These trees are dwarf in habit, with branches extending close to the ground ; they are also very sturdy and thickly branched and from their build are well adapted to resist the winds and other climatic difficulties from which many trees suffer on the North-west plains.

Having tried during the past nine years, under many different conditions as to shelter, about 200 varieties of the hardiest sorts of cultivated apples and crab apples obtainable from Northern Europe and elsewhere, at both these North-west farms without success, efforts are now being made to improve the two wild crabs referred to, in size and quality of fruit, by cross-fertilizing them with many of the hardiest sorts of apples grown at Ottawa, also with the larger crabs. The first crosses were obtained in 1894 and the young trees, which came up in 1895, were transplanted from the seed bed to a small experimental orchard on the Central Farm, in 1896, where they are now growing to the number of 175, and some of these will probably fruit within two years. The foliage of these seedlings varies much in character, some resembling that of the varieties of cultivated apples used as the male, while others are more like that of the wild type of the female. During 1896 and 1897 this work has been continued on a much larger

scale and orchard plots suitably protected are being provided at each of the branch experimental farms in the North-west, large enough to admit of the testing of all the young seedlings as fast as they can be produced, and it is confidently expected that within a very few years, as a result of this work, varieties of apples will be available for cultivation in the North-west, of a hardy character and such as will be valuable to the settlers on the plains.

CHERRY AND PLUM.

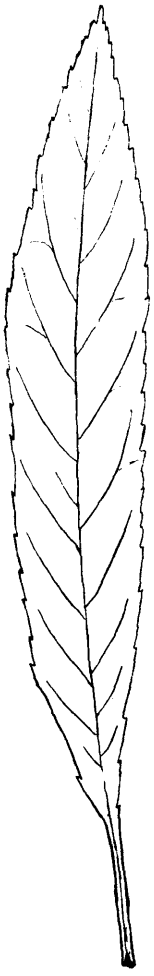


Fig. 8.

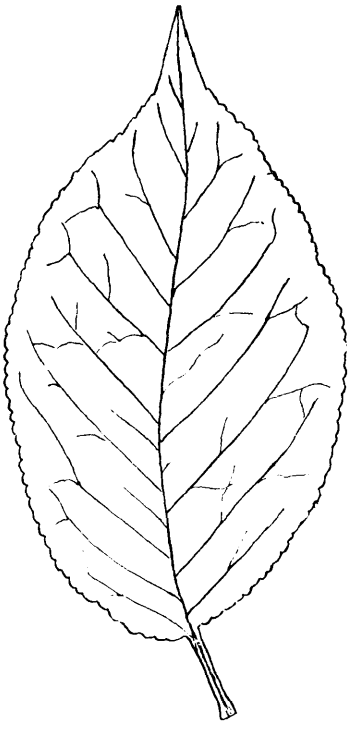


Fig. 9.

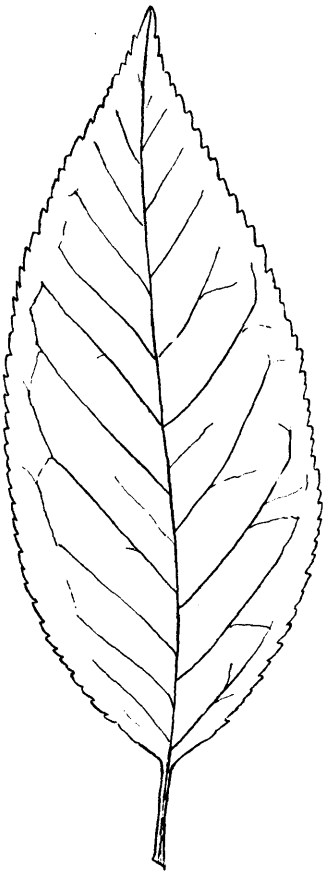


Fig. 10.

The Sand Cherry, *Prunus pumila*, a native fruit, which is very hardy and has a wide distribution, was chosen as the starting point for another line of experimental work. The usual wild form of this fruit is a small black cherry with a disproportionately large stone covered with a thin coating of juicy but astringent flesh. Specimens are, however, occasionally found having fruit fully twice the usual size, with a much larger

proportion of pulp and of very fair quality. All attempts to cross this with different varieties of cherry have failed, but in 1896 a single cross was effected with a variety of cultivated plum known as Col. Wilder, an improved form of *Prunus americana*. The seed from this cross was planted in the autumn of 1896 and germinated in the spring of this year. The young tree has made a strong and vigorous growth, and at the present time is nearly 2 feet high, with leaves much wider than those of the Sand Cherry, and closely resembling those of the plum. Figure 8 represents the leaf of the Sand Cherry and 9 the leaf of the plum, while 10 shows that of the hybrid. Fruit of this interesting cross will be watched for with interest.

The wild plum, *Prunus americana*, which is found native in the river valleys in Manitoba, has been crossed during the present season with several of the improved forms of the cultivated plum, from which some good results are expected.

Spring Wheat.

In most parts of Canada the summer season is comparatively short, and hence it is very important to secure as far as is practicable, early ripening varieties of grain. In 1888 some crosses were effected with spring wheat, using a Russian variety known as the Ladoga, as female, and both the Red and White Fife varieties as male. The Ladoga was obtained from Northern Russia and ripens about a week earlier than the Fife wheats; it is, however, lacking in vigour and does not average as heavy a yield as the Red or White Fife and the grain is not so fine in quality. The object in attempting this cross was to obtain, if possible, a wheat equal in quality, vigour and productiveness to the Red Fife, and at the same time, earlier in ripening, and thus to combine the good qualities of both parents. Most of these crosses are intermediate in earliness and ripen at least three or four days earlier than the Red Fife. Some promising sorts have sprung from this source, which are rapidly growing in favour, notably Preston and Stanley from Ladoga and Red Fife, and Alpha and Percy from Ladoga and White Fife.

Another source whence early ripening grain has been obtained, is India, where, in 1889, through the kindness of Lord Dufferin, then Viceroy, a number of different sorts were collected and forwarded to Canada for test on the experimental farms. These were obtained at different altitudes in the Himalaya Mountains, of from 420 to 11,000 feet. All the Indian varieties tested have been early in ripening, and two of the earliest and most promising of the wheats—Hard Red Calcutta and Gehun—ripen as early as the Ladoga, but, in common with all the varieties tested from India, they have lacked vigour and productiveness. These have also been crossed with Red Fife and the crosses have derived earliness of ripening from the Indian blood, with increased vigour and productiveness from that of the Red Fife.

Where a bearded wheat has been used as the female and a beardless type as male, a large proportion of the progeny has at first been bearded. With the second sowing, both the bearded and beardless sorts sport, the beardless varieties frequently producing bearded heads, while the bearded ones more rarely produce those which are beardless. The bearded varieties will vary in the length and stiffness of the beards, and many of them vary in the colour of the chaff, some in the same cross having white chaff, others red; the chaff also varies as to its smooth or downy character. Any of these varieties may be made permanent by persistent selection.

In a cross between Red Fife, male, and an Indian variety of wheat named Spiti Valley, female, both of which were beardless, several bearded sorts were produced in the second generation.

Some winter wheats have been crossed with spring wheats, using the spring varieties as female. These have all ripened when sown as spring wheats, but, although the plants have had vigorous foliage, they have been slow in heading and later in ripening than most of the spring wheats, and as they have not proved specially productive, most of them have been discarded.

This work has been continued from year to year and gradually extended so as to include barley, oats and pease, and during the past nine years more than 700 new varieties have been produced among these important farm crops. All those which show a lack of vigour, or are unpromising for other reasons, are promptly discarded; but there are still under test at the Central Experimental Farm more than two hundred new varieties, all of which are of more or less promise. In a test of the comparative yield of 39 varieties of spring wheat, including all the named ones, with the cross-bred sorts, carried on last year at all the experimental farms, the Preston, one of the crosses referred to between Ladoga and Red Fife—a bearded sort—headed the list, with an average of 35 bushels 37 pounds per acre; while Stanley, a cross of the same parentage, but beardless, stood fifth in order of yield, with 31 bushels 50 pounds per acre.

Barley.

Some very distinct hybrids have been produced between the two-rowed barley *(Hordeum distichon)* and the six-rowed *(Hordeum hexastichon)*. These are ancient types and have long been regarded as distinct species. The six-rowed type has been found, according to DeCandolle, in the earlier Egyptian monuments and in the remains of the lake dwellings of Switzerland. The two-rowed barley is said to have been found wild in Western Asia, and is also of ancient origin. In the two-rowed barley, the additional rows found on the six-rowed form are represented by chaffy scales lying flat on the face of the head. In the hybrids produced by using the six-rowed form as male, these chaffy scales in some instances are all filled; in others, only a part of them are filled and the kernels at first are usually smaller and thinner than those which occupy the normal position on either side of the head. With subsequent cultivation the relative size of the kernels is more equalized and, in some cases, they become very even in size throughout. The two-rowed barley stools much more freely than the six-rowed sorts, the heads are also longer, and the objects in mind in effecting these crosses have been to produce varieties of six-rowed barley with longer heads and with an increased tendency to stooling. Several have manifested a prolific character. One produced from a single grain 4,529 grains, and the next year the crop was 28 pounds. In another instance 2,274 grains were grown from a single grain, and the crop the second year was 15½ pounds. A considerable number of these hybrid barleys are now being tested in field culture, and some of them have made promising records.

Wheat with Rye.

Many attempts have been made at the Experimental Farm to cross wheat and rye, but without success until 1892, when one of my assistants in this work, Mr. W. T. Macoun, succeeded in effecting a cross, using a variety of winter wheat as female and winter rye as the male. The one resulting kernel was sown in September, 1892, and, although to all appearance it was a wheat kernel which was sown, the plant which grew from it had the purplish appearance of rye, and the heads at the time of spearing had stripes of purple on the spikelets, as in rye, and in other respects closely resembled rye. Nineteen heads in all were produced on the plant, but there was not a single kernel found in any of them.

Oats.

Some experiments have also been made in the crossing of oats and crosses have been effected between those with branching and those with sided heads; also with white and black oats, white and yellow, and with thin hulled and thick hulled sorts. Many striking instances of intermediate forms have been secured and some of the new varieties have given excellent crops.

Pease.

About 175 crosses have been made in this group and some promising and prolific forms originated. By rigid selection and rejecting of all the less promising sorts, the varieties under test have been reduced to less than one-third of the original number, and further testing is now limited to 56 varieties.

The Barberry.

The last group of hybrids to which I propose to refer is one between *Berberis Thunbergii*, female, a Japanese species, and the common purple barberry of Europe, *Berberis vulgaris purpurea*, male. The differences between these two species are very marked and the evidences of the hybrids of which there are four partaking of the characteristics of both parents seem to be clearly shown.

In *Berberis Thunbergii* the branches are armed with thorns which are about $\frac{3}{8}$ths of an inch in length, with a short branch on either side, near the base, the branches being about one-fourth the length of the central spine. In *B. vulgaris purpurea* the thorns are long, being about $\frac{6}{10}$ths of an inch, with the side branches near the base varying from half to two-thirds the length of the centre spine. Whereas, in the hybrid the two branches which spring from the base are about equal in length with the centre, showing in this respect a departure from both parents, but more nearly resembling the male.

Fig. 11.

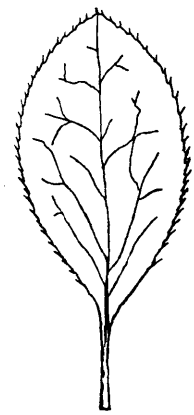


Fig. 12.

The leaves of *Berberis Thunbergii* are small, obovate, tapering towards the base, a leaf of this species is shown in figure 11, with the surface smooth on both sides and the margin entire; colour, deep green above, paler beneath. In *B. vulgaris purpurea* the leaves are larger and nearly oval, with the margin fringed with sharp spines (see figure 12). The upper surface is of a dull brownish purple colour; below it is green, with more or less of a purplish hue. In the hybrids the leaves are longer and broader than in *B. Thunbergii* with five or six short spines at wide intervals along the margin on each side and another short spine at the tip (see figure 13). The upper surface of the leaves is dark green, more or less tinged with purple, the purple shading being quite decided in the young growth. The lower surface is of a paler shade of green.

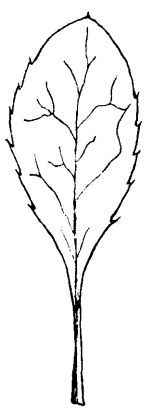


Fig. 13.

In *Berberis Thunbergii* the flowers are borne singly on the under side of the branches and are loose and open, with both calyx and corolla of a very pale yellowish colour (figure 14). The outer surface of the calyx is tinged with red and the stamens are yellow. In *B. vulgaris purpurea* the flowers are in long clusters, from 17 to 21 in a cluster (figure 15); they are of a bright yellow colour, with the outer surface of the calyx bright red and the stamens yellowish green. The flowers are smaller and more compact than in *B. Thunbergii* and are nearly a week later in time of blooming. In the hybrids the flowers are borne in clusters of from five to nine in each (figure 16); they are loose and open and a little larger than those of *B. Thunbergii* and *B. vulgaris purpurea*.

Fig. 14.

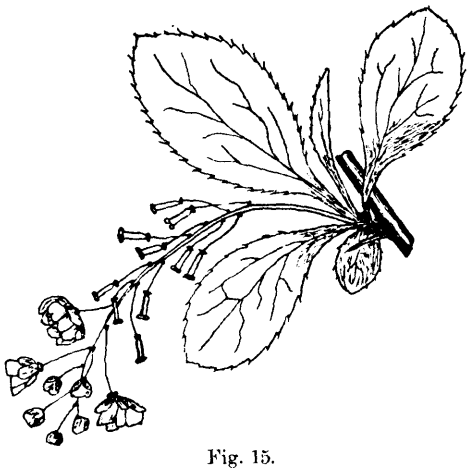


Fig. 15.

The young fruit of *B. Thunbergii* when first formed, is of a pale green colour; that of the purple barberry is of a bright red hue; while the fruit of the hybrids is of a dull reddish shade.

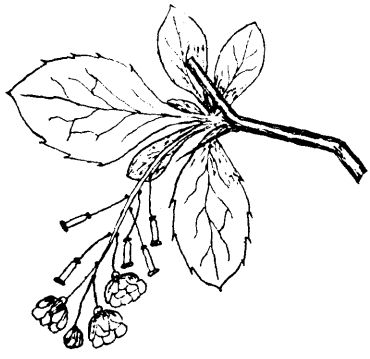


Fig. 16.

From these particulars it will be seen that the hybrid barberries, of which there are four, are intermediate in character between the parents, in leaf, flower and fruit, also in the time of blossoming.

Very efficient help has been rendered me in carrying on this work during the past nine years, by my assistant, Mr. W. T. Macoun; also by Dr. C. E. Saunders, who has done much of the recent work on the fruits, and Dr. A. P. Saunders, who made some of the earlier crosses in wheat and who rendered special assistance in the cross-fertilizing of cereals at the branch experimental farms during the summer of 1892.

TUBERCULOSIS.

It is much to be regretted that further trouble has developed from this disease, more particularly among the cattle at the Central Farm. When Bulletin No. 20 was published, in February, 1894, and the subsequent report issued on the branch farms in the annual report of the experimental farms for that year, giving full particulars of the discovery of tuberculosis and the means applied for its eradication, with the very thorough after precautions taken in disinfecting the premises, it was hoped that immunity from this disease would be had in future. At that time, however, the insidious nature of tubercular disease, the extent to which it prevails and the difficulty of completely eradicating it, were not so fully understood as now, and with the reliability of tuberculine thoroughly established and the process of testing officially recognized, there will probably be no difficulty in future in the way of using the tuberculine test from time to time, and thus preventing any lurking germs of this disease from further spreading in the herd.

After the number of cattle had been reduced at the Central Farm by the slaughter necessary to get rid of this disease in 1893, additional cows were required to carry on some experiments in dairying. These could not be bought at that time subject to the tuberculine test, the use of tuberculine as a test for the disease had been but very recently introduced, and many skilled veterinarians did not believe in its reliability, and

it was generally disbelieved in by those engaged in the cattle trade. Negotiations were also then in progress with the British Government looking to the removal of the embargo on Canadian cattle, and it was held to be most unwise, by those interested in the export of cattle, that any further attention should be drawn to this disease, which had in several instances been referred to in the press, either ignorantly or with an object, as pleuro-pneumonia. Under these circumstances, it was decided that any animals required for the use of the farms should be selected with care from healthy herds, and subjected only to the test of physical examination. Thus a number of grade cows were selected in Quebec and Ontario and placed in the barn, every one of which appeared to be perfectly healthy. No pure-bred animals were purchased.

From the experience recently had it is probable that some incipient germs of the disease must have existed in one of the young animals (a Jersey bull), which was tested in 1893 and did not then react, and that these subsequently developed. It also seems clear, from the post mortem examinations, that in the case of two of the grade cows which were purchased in Ontario the disease had developed to that extent to justify the belief that these animals were more or less diseased when they were purchased. It was in all probability from these two sources that the disease spread in the herd, and in confirmation of the correctness of this view it may be said that most of the other animals which reacted when the tuberculine test was used showed the disease but slightly developed, as if the infection had been recent.

While there is no doubt that a diseased animal in the herd is the most common cause of the spread of the disease, there are other possible sources of infection. This is undoubtedly an infectious disease, which can only be produced by the introduction into the system of those minute organisms known as the bacilli of tuberculosis. As this disease is identical with consumption in the human family, and may be communicated from man to animals, as well as from animals to man, it is evident that in a public institution which is visited annually by many thousands of people, this additional source of danger to the cattle is always present.

In September last some purchases were made of pure-bred animals for the improvement of the herds at Nappan and Ottawa. Since animals had been bought and exchanged several times at Nappan since 1893 without submitting them to the tuberculine test, it was decided that this test should be again applied to all the herd there. It was also the intention that similar precautions should be taken at each of the other experimental farms as soon as they could be conveniently arranged for. During a visit made to the Nappan farm by the writer early in October all the animals were tested with tuberculine by Dr. Jakeman, of Halifax, and Dr. F. G. Hall, of Amherst, and no reaction occurred in any case, showing that this herd was free from tuberculosis.

Up to this time there had not been the slightest suspicion that there was anything wrong with the herd in Ottawa. No symptoms had at any time occurred to awaken such suspicion, and the animals appeared to be in excellent health. Before arrangements had been made for the testing of the herd in Ottawa, on the 21st of October the Jersey bull already referred to, which had not fed well for a day or two and was supposed to be suffering from a slight attack of indigestion, died from the effects of an overdose of saltpetre, which, through the misunderstanding of an order, was bought in place of salts. On post mortem examination of this bull one lung was found to be badly affected with tuberculosis. Arrangements were at once made to test the entire herd, and the tests were conducted by Drs. James and Perley, of Ottawa. Particulars of the temperatures observed are given in the appended chart. The normal temperatures were taken 23rd October, the tuberculine was injected that evening and the reactions noted 24th October.

TUBERCULINE TESTS.

Number.	Name of Animal.	Age, Years.	Normal Temperature.			Temperature after injecting Tuberculine.						Extent of Reaction.
			8 a.m.	11 a.m.	1 p.m.	5 p.m.	6 a.m.	9 a.m.	12 p.m.	3 p.m.	6 p.m.	9 p.m
1	Beauty, grade cow	11	101	101·6	101 4	101	101·7	101	101·4	101	100·2	. . .	− ·2
2	Devon Bull (Earl of Salcomb)	5	100·6	100·6	101·4	101	102·1	104·4	106·6	103	102·4	102	+5·2
3	Canadian Bull	7	100·8	101·4	101·4	101·6	100·6	100·8	102·4	102·8	102·2	. .	+1·2
4	Ayrshire Bull	9	100	101	100·6	101·2	100	101	104	102·3	102	102	+2·8
5	Holstein Bull	5	101·6	102	101·4	100·8	101·4	100·7	102	103	103·6	....	+1·6
6	Ayrshire Cow Maggie	14	101·3	101·4	101	100·2	101	102	106	105·6	106·4	105·2	+5
7	Forest Girl, grade	12	101·4	101·2	101·2	101	101	102	100·7	102	100	....	+ ·8
8	Nancy, grade	10	101·4	101·6	101·2	100	102·2	105·6	105·1	104·5	104·5	104·8	+4·6
9	Mayflower, grade	9	101·2	101·4	101·6	100.2	102·3	105·5	106·3	106·1	105·8	105·2	+4·7
10	Geranium	11	101·2	101·4	101·4	100·1	101·4	103·6	105·4	103·6	102	101	+4
11	Clara	7	101·4	101·4	102	101·4	102·6	105	107	106	105·6	104·6	+5
12	Gladiolus	12	102	102	101·6	101·2	101·4	105·6	106·6	106 3	107	103·3	+5
13	Oriole	3	101·6	101·4	101·4	101·2	101·4	103·6	105·9	105	105·2	104·3	+4·3
14	Spot	3	102	101·4	102·2	100·6	103	105·8	106·2	105·2	103·8	103·6	+4
15	Rosemary	3	101·4	101·6	102	100·4	106	107·4	106	105·2	104	103·2	+5·4
16	Jewel	5	101	101·4	102	100·2	103·4	106·6	107·2	104	104·2	101	+5·2
17	Lady Cornelia	5	101·4	101·8	102	101·3	103·5	106	106·2	105·2	104	103·7	+4·2
18	Annie Rooney	6	101·6	102	102·4	101	101·6	102	104·2	104	104	102·2	+1·8
19	Pauline	12	101·8	103	103 2	103	102·6	103·2	104·8	104	105	104·6	+1·8
20	Topsy	6	101·2	101·7	101 9	101·2	103·4	107·4	107	106	106	104·6	+5·2
21	Florence	9	100·2	101·4	101·4	100·6	101·6	101·6	101·8	102·2	100	.....	+ ·2
22	Clenna Rex	9	100·4	100·4	100·4	100·6	101·7	102	104	103·6	104·8	103·6	+4·2
23	Lily Rex	4	102	102	102	101·2	102·7	107	106·6	106·2	103·2	102	+5
24	Nancy Rex	3	101 4	101·2	102·8	101	101·6	101	101·6	101·8	101·2	....	−1
25	Louette	7	100·8	101·2	101·4	100·4	103	106·6	106·9	103·2	105·6	106·2	+5·5
26	Therese	9	100·6	100·8	101·8	100·6	101	100	102	102·8	100·2	....	+1
27	Verbena	9	101·4	100·8	101·4	100·2	101·6	101·4	101·6	101·2	100	....	+ ·2
28	Dolly	6	101·2	101	101·4	100·4	101·3	104	103·9	103	100·4	101	+2·5
29	Hazel	9	100·6	101·4	101·6	100·6	102	102	101·4	101·2	101	....	+ ·4
30	Linda	10	101·2	101	101·2	100·8	101·4	101·4	101	102	101·2	.....	+ ·2
31	Rosella	2½	102	101·8	101·8	101·2	105·6	107	107·2	105·6	105	103·9	+5·2
32	Primrose	7	101·6	102	102·3	101	102·2	104	106·2	104	103	103	+3·9
33	Madame	10	101·4	101	101·2	100	102·5	105·6	106·9	104·8	103·8	104·8	+5 5
34	Tulip	3	101·6	101·8	102	100·4	102	101·4	102·2	100·6	101·2	.....	+ ·2
35	Margaret	10	101	101·4	101·6	101·2	101·6	101 5	102	101	101	....	+ ·6
36	Noretti	6	100·4	101·4	101·8	100·6	101·4	101·4	100	101·2	100	...	− ·4
37	Lady Olga	¾	102	102·2	102	102·2	102	102	102·4	102	102	102	+ ·4
38	Neptune	¾	102	102·2	101·8	101·8	102·2	100·8	102·6	102	102·2	102	+ ·4
39	Florence	¾	101 5	101·6	101	101	101·4	100·7	102	101·8	101·4	101	+ ·4
40	Saudie	9	100·6	101 3	101·2	102	151·5	103·2	105·2	105	104·8	103·8	+3·2
41	Julia	5	101	101·2	101·2	100	100	100·6	101·3	102·3	101·4	101·4	+1·1
42	Empress	12	103	103	102·4	103	103	102·6	101·3	103	102·2	102·1	=
43	Olive	3	102	102·2	101·8	101·1	101·2	101·6	102·6	102·2	102	102	+ ·4
44	Dairy Maid	2½	102	101·2	102·2	101·3	100·4	100·5	102·5	102	101·4	101·5	+ ·3
45	Black Beauty	2½	101·4	101·1	101	100·8	101·2	101·3	101·4	101·2	101	100·6	=
46	Butterfly	2	101·8	102	102	102·2	100·9	100·6	101·2	102	102	101·8	− ·2
47	Maude	2	102	102	102	101·2	101·6	101·6	101·8	101·4	101·2	101	− ·2
48	May Belle	2	101·2	101	102·2	101	100·6	100·7	100·9	101	101	101	− ·3
49	Polly	2	101·4	101·2	101	101·2	101·6	101 8	102·2	102	102·2	102·1	+ ·8
50	Sylvia	2	102	101·6	101·6	101·4	100·6	100·7	102·2	102	101·4	101·1	+ ·2
51	Queenie	1½	202	101·6	101·6	101·6	103·8	105·6	106·2	105·4	104·9	104	+4·2
52	Clenna May	1½	101·2	101·8	101	100·6	100·8	100·6	101·6	101	101	100·7	− ·2
53	Lily Belle	1½	100·2	101	102·2	102	153·2	105·1	106·9	106	104·2	103·2	+4·7
54	Gem	1½	101·4	100·8	100·8	101·2	100·9	101·8	102·1	101·6	101	100·5	+ ·7
55	Myrtle	2½	101·4	102·8	101·1	101·2	100·2	100·5	101·8	102·4	101	101	+ ·6

As soon as possible after the tests were completed all the animals which were free from disease were removed to another building where no animals had been previously kept.

Of those which had reacted, ten of the milking cows were reserved for experimental tests, and these were forwarded to Montreal for that purpose. They are Nos. 6, 10, 12,

13, 14, 15, 16, 17, 22 and 32. The remainder were killed and post mortem examinations made. Dr. D. McEachran, Chief Veterinary Inspector, of Montreal, was present and superintended this work and was assisted by Drs. James and Perley, of Ottawa.

Physical examinations were made of several of the animals before they were slaughtered, but the results only confirmed the opinion now generally held by the best veterinary authorities that it is practically impossible to detect the presence of this disease by the most careful examination, except in advanced cases and where the more important organs are considerably involved.

No. 2. Devon Bull.—Earl of Salcomb, age 5 years; bred at the Experimental Farm; was tested in 1893 and did not then react. Post mortem—Lungs full of masses of soft tubercle, some cheesy. The liver and mediastinal and bronchial glands all contained tubercle in a soft condition, most of it indicating comparatively recent formation.

No. 3. Canadian Bull.—Quintal, age 7 years. Was tested in 1893, but did not then react. Both lungs somewhat diseased, containing nodules of tuberculous matter. A small quantity of tubercle was found at the apex of one lobe of the liver. Bronchial and mediastinal glands diseased and partly filled with tubercle.

No. 4. Ayrshire Bull.—MacDuff, 9 years. This bull was tested in 1893, but gave no reaction then. In one lung there were several small masses of tubercle in different parts of its substance. Mesenteric glands, liver and peritoneum all slightly affected.

No. 5. Holstein Bull.—Netherland Chief, age 5 years; bred at the Experimental Farm; was tested in 1893, but did not then react. A careful examination of all the organs and glands was made and no evidence of disease discovered. In this instance the reaction after the injection of tuberculine was comparatively slight.

No. 8. Nancy.—Grade cow, age 10 years; bought in 1894. In the lungs there were some small patches of tubercle, the mediastinal glands were considerably diseased and the bronchial glands slightly affected.

No. 9. Mayflower.—Grade cow, age 9 years: bought in 1894. In this animal both the lungs and mediastinal glands were considerably diseased.

No. 11. Clara.—Grade cow, age 7 years; bought in 1895. Lungs grown to the ribs and diseased in spots. Bronchial and mediastinal glands considerably affected with soft tubercle.

No. 18. Annie Rooney.—Grade cow, age 6 years: bred at the Central Experimental Farm; was tested in 1893, but did not then react. One of the mediastinal glands was slightly affected. Diligent search failed to reveal any diseased condition in any of the other glands or organs.

No. 19. Pauline.—Grade cow, age 12 years; bought in 1893. In this cow the spleen was very much enlarged and thickened and the interior was filled with masses of tubercle, and one end of this organ was much decayed, of a dark colour, almost black, and gave a very offensive odour. The left lung was very badly diseased. The bronchial and mesenteric glands were also much affected. The indications in this case were that the disease had existed in the animal for a long time.

No. 20. Topsy.—A grade cow, age 6 years; bred at the Experimental Farm; was tested in 1893, did not then react. In this animal the retropharyngeal, mediastinal and bronchial glands were all slightly affected, but no disease was found in any of the large organs.

No. 23. Lily Rex.—A Jersey cow, age 4 years; bred at the Experimental Farm; was tested when a calf in 1893, but did not then react. Small quantities of tubercle were found in several parts of the lungs. The mediastinal glands were also considerably affected.

No. 25. Louette.—A grade cow, age 7 years; bought in 1893. The mesenteric glands, mediastinal glands and peritoneum were all slightly affected. Disease was also found to a slight extent in the udder.

No. 28. Dolly.—A grade cow, age 6 years; bought in 1893. The liver, mesenteric and mediastinal glands were all slightly tuberculous.

No. 31. Rosella.—A grade heifer, age 2½ years; bred at the Experimental Farm. Anterior lobe of left lung considerably diseased; mediastinal glands also tuberculous.

No. 33. Madame.—A grade cow, age 10 years; bought in 1893. Lungs slightly diseased. Bronchial glands considerably affected; mediastinal glands also slightly tuberculous.

No. 40. Saudie.—A grade cow, age 9 years; bought in 1893. One lobe of the lungs was considerably diseased. Liver also diseased at tip of one lobe. The latter, however, was not clearly tuberculous. The posterior mediastinal glands were much enlarged and badly diseased. This cow had probably been affected for some years.

No. 51. Queenie.—A grade heifer, age 1½ year; bred at the Experimental Farm. The peritoneum was very slightly affected with small pustules, which appeared to be tuberculous. The disease was not clearly demonstrated in this case. All the organs and glands were carefully examined, but no tubercle was detected in any of them.

No. 53. Lily Belle.—A Jersey heifer, age 1½ year; bred at the Experimental Farm. A small mass of tubercle was found in one of the lungs; liver very slightly affected. Small tuberculous patches were found distributed over the peritoneum.

After the animals were all removed the barn was thoroughly disinfected as follows: It was first well swept, scraped and cleaned, when the entire surface, including floors, walls, ceiling, stalls and other woodwork, was carefully sprayed with a solution of corrosive sublimate (mercuric chloride) of the strength of 1 in 640, made by dissolving half an ounce of corrosive sublimate, mixed with an equal weight of muriate of ammonia (ammonium chloride) in 2 gallons (20 pounds) of water. Sulphur was next used—burned in three iron pans placed on the floor in different parts of the building, with the doors and windows all closed, and this fumigation was maintained for about 12 hours. The day following, about 3 p.m., a second fumigation was begun with muriatic acid gas, prepared as follows: Twelve open glazed earthenware dishes were procured, each capable of holding about six pints, which were elevated on ordinary flour barrels equally distributed throughout the building, and all openings carefully closed. In each of these dishes was put 2½ pounds of common salt (sodium chloride) and on this was poured one pint, fluid measure, of strong sulphuric acid. Muriatic acid gas was rapidly disengaged from each generator, and in a short time the fumes were so dense as to saturate the air in the barn with a thick cloud of vapour. Gas was constantly given off all night and every nook and corner penetrated, and exhalations from the vessels had not ceased when the building was opened the following morning.

Subsequently the walls and woodwork were swept, and a second spraying made similar to the first with the corrosive sublimate solution. Then the floors, stalls and passages were all thoroughly soaked with the corrosive sublimate solution by means of mops and afterwards scraped with sharp hoes, so as to remove all coating from the woodwork, then mopped again with the corrosive sublimate solution freely used and subsequently allowed to dry. After this the walls, ceiling and stalls received three coats of lime whitewash, when the cattle which were free from disease were returned to the barn. Twenty-two steers were subsequently bought for feeding experiments. These were isolated until tested with tuberculine, but no reaction took place in any case, showing that they were free from disease. These have since been placed in the barn with the other cattle.

The instructions sent to the branch experimental farms in the west to have the tuberculine test applied to all the animals have since been carried out.

EXPERIMENTAL FARM, BRANDON, MANITOBA.

At this farm the herd consisted of 20 animals, all of which were tested by Dr. Cox, V.S., of Brandon, from 6th to 8th of December, and found free from disease. Twelve steers, which were purchased for experimental feeding tests and kept isolated until the tuberculine could be used, have also been tested and one of these reacted, the highest temperature being two degrees above the highest normal.

This animal was slaughtered and a careful examination made, but no evidence of the disease was found.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

The herd at this farm consisted of 51 animals, all of which were subjected to the tuberculine test by Inspector Burnett, V.S., of the Mounted Police, early in December, and only two reacted. In one case a Durham cow, Prairie Wildflower, six years old, the highest reaction was $2\frac{2}{5}$ degrees above the highest normal; in the other, a Holstein cow, Abi 2nd of Assa., five years old, the reaction was greater, the temperature reaching $3\frac{2}{5}$ degrees above the highest normal. Both these animals were tested in 1894 and did not then react. On examination after killing the disease was found in the Durham cow in several of the organs, and in the Holstein the lungs were both slightly affected. Evidence of the disease was also said to have been detected in connection with the heart.

EXPERIMENTAL FARM, AGASSIZ, B.C.

At this farm the herd numbered 19 animals. These were all tested with tuberculine by Dr. J. Gibbins, of Vancouver, on December 14 and 15, and no reaction occurred in any case, showing that no tuberculous disease existed there.

EXPERIMENTS IN THE FEEDING OF STEERS, 1896-97.

During the past season three groups of steers, four animals in each group were fed for 16 weeks, with the object of ascertaining how far it is economical for farmers to withhold grain during the first part of the feeding period. All were fed on the same bulky fodder mixture, consisting of 50 lbs. of Indian corn ensilage, 25 pounds of roots, 5 pounds of cut hay and 5 pounds of cut straw. This ration was also used at the outset, for the preparatory feeding from 15th November to 15th December, 1897. No meal was given during this period, and the food consumed was not weighed. Before the feeding tests began the twelve steers were divided into three very even groups.

The meal which was used in these experiments was made of equal parts by weight of pease, barley, oats and bran, and in estimating the cost of the rations, this mixture has been valued at the uniform rate of one cent per pound.

In estimating the cost of the rations the ingredients composing the bulky fodder portion have been valued at the following prices:—Corn ensilage at $2 per ton, roots at $2 per ton, hay at $8 per ton and straw at $4 per ton. The value of these ingredients will vary in different localities, but they have been fixed at about the cost of production at Ottawa and will afford a basis for comparison in all parts of the Dominion.

The feeding period was divided into three portions, one of 8 weeks and two following of 4 weeks each.

To group No. 1 no meal was given for the first eight weeks, 2 pounds of meal were given to each animal per day for the next four weeks, and 6 pounds to each animal per day for the last period of four weeks.

To group No. 2 two pounds of meal were given to each animal per day for the first period of eight weeks, four pounds to each per day for the next four weeks, and six pounds each per day for the last period of four weeks.

To group No. 3 four pounds of meal were given to each steer per day for the first period of eight weeks, and six pounds to each per day for the two remaining periods of four weeks each.

These rations are not as rich in digestible protein (flesh forming material) as are usually recommended in standard rations. They have a wider nutritive ratio that is a larger proportion of digestible carbohydrates (starch, sugar, gum, &c.,) and fat to the protein than the standard rations usually contain. The standard feeding rations for

steers vary from 1 of protein to 6 to 8 of carbohydrates and fat whereas the nutritive ratio in the rations used in these experiments were about as follows :—

Group 1.—1st 8 weeks 1·11, next 4 weeks 1·10, last 4 weeks 1·8·5.
Group 2.—1st 8 weeks 1·10, next 4 weeks 1·9·4, last 4 weeks 1·8·5.
Group 3.—1st 8 weeks 1·9·4, remaining 8 weeks 1·8.5.

During the course of these tests the steers had all of the bulky fodder mixture they would eat up clean, they had access to water in a trough in front of their stalls and were supplied also with salt in a small box at the side of the manger.

The steers were weighed when purchased and were weighed again three times on 17th December at the close of the preparatory feeding. The first weights taken and the average of the three last weighings were as follows, the weights being given in the order in which the animals were finally grouped :—

Group 1.	15th Nov.	15th Dec.	Group 2.	15th Nov.	15th Dec.	Group 3.	15th Nov.	15th Dec.
No. 1.....	1,050	1,070	No. 5. ...	1,140	1,150	No. 9.....	1,170	1,205
" 2.....	1,010	1,020	" 6.....	1,070	1,095	" 10.....	1,095	1,115
" 3.....	1,085	1,120	" 7. ..	1,075	1,090	" 11.....	Raised at C. E. F.	1,060
" 4.....	1,130	1,170	" 8. ...	1,050	1,075	" 12.....	Raised at C. E. F.	1,035
Totals..	....	4,380	.....	.....	4,410	.....	.....	4,415

From the figures given it will be seen that the heaviest of the three groups as arranged for the test was only 35 lbs. heavier than the lightest of the groups.

Group No. 1.

Results for the first eight weeks, during which time no meal was given.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 1..	65·55	.....	110	1·96	7·87	4 02
No. 2.....	65·55	.. ..	80	1·43	7·87	5 50
No. 3.....	65·37	.....	80	1·43	7·84	5 48
No. 4.....	69·16	....	115	2·05	8·30	4 05
Average.....	66·41	....	96¼	1·72	7·97	

Cost of producing each 100 pounds of increase for the group, $4.64.

Results for the next four weeks, during which time each animal received two pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 1	63·75	2	70	2·50	9·65	3 86
No. 2	64·92	2	60	2·14	9·79	4 57
No. 3	64·92	2	30	1·07	9·79	9 15
No. 4	68·39	2	35	1·25	10·20	8 16
Average	65·49	2	48¾	1·74	9·86	

Cost of producing each 100 pounds of increase for the group, $5.66.

Results for the remaining four weeks, during which time each animal received six pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 1	60·68	6	48	1·71	13·28	7 77
No. 2	60·68	6	54	1·93	13·28	6 88
No. 3	60·68	6	64	2·29	13·28	5 80
No. 4	64·57	6	56	2·00	13·74	6 87
Average	61·65	6	55½	1·98	13·39	

Cost of producing each 100 pounds of increase for the group, $6.76.

Group No. 2.

Results for the first eight weeks, during which time each animal received two pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 5	63·70	2	70	1·25	9·64	7 71
No. 6	65·46	2	115	2·05	9·86	4 81
No. 7	65·55	2	110	1·96	9·87	5 04
No. 8	65·55	2	110	1·96	9·87	5 04
Average	65·06	2	101¼	1·80	9·81	

Cost of producing each 100 pounds of increase for the group, $5.42.

Results for the next four weeks, during which time each animal received four pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 5	60·79	4	80	2·86	11·29	3 95
No. 6	64·79	4	48	1·71	11·77	6 88
No. 7	64·79	4	55	1·96	11·77	6 01
No. 8	64·79	4	45	1·61	11·77	7 31
Average	63·79	4	57	2·08	11·65	

Cost of producing each 100 pounds of increase for the group, $5.72.

Results for the remaining four weeks, during which time each animal received six pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 5	58·36	6	66	2·36	13·00	5 51
No. 6	60·54	6	31	1·11	13·26	11 95
No. 7	60·29	6	34	1·21	13·23	10 93
No. 8	58·86	6	14	·50	13·06	26 12
Average	59·51	6	36¼	1 30	13·14	

Cost of producing each 100 pounds of increase for the group, $10.15.

Group No. 3.

Results for the first eight weeks, during which time each animal received four pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 9	65·61	4	60	1·07	11·87	11 09
No. 10	64·52	4	125	2·23	11·74	5 26
No. 11	64·84	4	115	2·05	11·88	5 79
No. 12	59·12	4	120	2·14	11·09	5 18
Average	63·52	4	105	1·87	11·64	

Cost of producing each 100 pounds of increase for the group, $6.21.

Results for the next four weeks, during which time each animal received six pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 9	42·96	6	40	1·43	11·15	7 80
No. 10	55·82	6	25	·89	12·69	13 13
No. 11	58·29	6	60	2·14	12·99	6 07
No. 12	58 29	6	80	2·86	12·99	4 54
Average	53·84	6	51¼	1·83	12·43	

Cost of producing each 100 pounds of increase for the group, $6.79.

Results for the remaining four weeks, during which time each animal received six pounds of meal per day.

Steer.	Fodder consumed per day.	Meal per day.	Total increase in weight.	Increase in weight per day.	Cost per day.	Cost per 100 lbs. of increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Cts.	$ cts.
No. 9	57·46	6	37	1·32	12·90	9 77
No. 10	54 36	6	56	2·00	12·52	6 26
No. 11	58·14	6	59	2·11	12·98	6 15
No. 12	58·14	6	32	1·14	12·98	11 39
Average	57·02	6	46	1·64	12·84	

Cost of producing each 100 pounds of increase for the group, $7.82.

The results of the foregoing experiments appear to show that it is economical to withhold the feeding of grain, or to feed but little of it, during the first portion of the feeding period. The steers in group No. 1 fed without grain for the first 8 weeks cost on an average 9·80 cents per day for the whole period of 111 days; group No. 2 11·10 cents and group No, 3 12·14 cents per day. This shows an average cost of 1·30 cents per day more for each animal in the second group than for those in the first group, and 2·34 cents per day more for each steer in the third group than for those in the first group. This makes the average cost of feeding each animal in the second group for the 111 days during which these tests were continued $1.44 more than for those in the first group, while the average gain in weight at the close of the experiment was six pounds more per head in the first group than it was in the second. The steers comprising the third group cost on an average $2.60 per animal more than those in the first group, while the advantage in gain was only 1¾ pounds per head.

	Lbs.
Group No. 1—Total gain per steer for full feeding period 16 weeks	200½
" No. 2 " " " "	194½
" No. 3 " " " "	202¼

EXPERIMENTS IN THE FATTENING OF SWINE.

Experiments in the fattening of swine have been continued since 1890, using different rations from year to year with the object of gaining information as to the best methods of producing pork of the best quality and at the lowest cost. In all cases particulars have been given regarding the different sorts of feed used and the quantities consumed, also the increase in live weight of the animals under experiment.

THE FEEDING OF SWINE WITH SHORTS.

Lot 11.—This pen contained four cross-bred swine, one Yorkshire sire with Berkshire dam, farrowed 7th June, 1896, and three Berkshire sire and Tamworth dam, farrowed 26th May, 1896, and were fed entirely on shorts soaked in cold water for 30 hours, and were given all they would eat up clean. This feeding test was begun on 25th September, 1896, and continued for sixteen weeks, or until 6th January, 1897. The pigs were weighed every two weeks, and the increase in weight and the quantity of food consumed, are given in the accompanying table for each four weeks:—

No. of Swine, Four.	Sept. 23.	Oct. 21.	Nov. 18.	Dec. 16.	Jan. 6, 1897	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	287	408	500	586	624	.....
Increase in weight	.....	121	92	86	38	337
Feed consumed, shorts	.....	452	413	382	241	1,488
" per lb. of increase	.....	3·73	4·48	4·44	6·34	4·41

The average live weight of each pig when this feeding test was begun was 71¾ pounds; average weight of each at the conclusion of the experiment, 156 pounds. Sold 6th January, 1897. Shrinkage in weight—

Live weight, fasted 14 hours	624 lbs.
Dressed weight, 24 hours after killing	457 "
Percentage of shrinkage from weight after fasting	22·27

THE FEEDING OF SWINE WITH GROUND BARLEY.

Lot 12.—This pen contained four cross-bred swine, one Yorkshire sire and Tamworth dam, farrowed 7th June, 1896, and three Berkshire sire and Tamworth dam, farrowed 26th May, 1896. These were fed for the whole period of sixteen weeks entirely on barley ground and soaked for 30 hours in cold water; they were given all they would eat up clean.

No. of Swine, Four.	Sept. 23.	Oct. 21.	Nov. 18.	Dec. 16.	Jan. 6.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	291	435	546	694	735	.....
Increase in weight	.....	144	111	148	41	444
Feed consumed, ground barley	.....	531	550	552	299	1,932
" per lb. of increase	.....	3·68	4·95	3·72	7·29	4·35

The average live weight of each pig when this feeding test was begun was 72¾ lbs.; average weight of each at the conclusion of the experiment, 183¾ lbs.

Sold 6th January, 1897. Shrinkage in weight—

Live weight, fasted 14 hours	735 lbs.
Dressed weight, 24 hours after killing	548 "
Percentage of shrinkage, from weight after fasting	25·44 "

THE FEEDING OF SWINE WITH GROUND INDIAN CORN.

Lot 13.—This pen contained four cross-bred swine, one Yorkshire sire and Berkshire dam, farrowed 7th June, 1896, and three Berkshire sire and Tamworth dam, farrowed 26th May, 1896. These were fed for the whole period of sixteen weeks entirely on Indian corn ground and soaked for 30 hours in cold water; they were given all they would eat up clean.

No. of Swine, Four.	Sept. 23.	Oct. 21.	Nov. 18.	Dec. 16.	Jan. 6.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	296	460	558	665	688	.....
Increase in weight	.....	164	98	107	23	392
Feed consumed, ground Indian corn	.....	585	457	413	178	1,633
do per lb. of increase	.....	3·56	4·66	3·85	7·73	4·16

The average live weight of each pig when this feeding test was begun was 74 pounds; average weight of each at the conclusion of the experiment 172 pounds.

Sold 6th January, 1897. Shrinkage in weight—

Live weight, fasted 14 hours	688 lbs.
Dressed weight, 24 hours after killing	529 "
Percentage of shrinkage from weight after fasting	23·11

THE FEEDING OF SWINE ON A MIXTURE OF SHORTS, BARLEY AND INDIAN CORN.

Lot 14.—This pen contained three cross-bred swine, one Yorkshire sire and Berkshire dam, farrowed 7th June, 1896, and two Berkshire sire and Tamworth dam, farrowed 26th May, 1896. These were fed for the whole period of sixteen weeks with a mixture of equal parts by weight of shorts, ground barley and ground Indian corn, soaked in cold water for 30 hours; they were given all they would eat up clean.

No. of Swine, Three.	Sept. 23.	Oct. 21.	Nov. 18.	Dec. 16.	Jan. 6.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	228	363	448	557	596	.....
Increase in weight	.....	135	85	109	39	368
Feed consumed, equal weights of shorts, barley and corn	.....	463	420	398	189	1,470
Feed consumed, per lb. of increase	.....	3 42	4·94	3·65	4·84	3·99

The average live weight of each pig when this feeding test was begun was 76 pounds; average weight of each at the conclusion of the experiment 198½ pounds.

Sold 6th January, 1897. Shrinkage in weight—

Live weight, fasted 14 hours	596 lbs.
Dressed weight, 24 hours after killing	447 "
Percentage of shrinkage, from weight after fasting	25·00

THE FEEDING OF SWINE WITH PEASE, BARLEY, OATS AND SHORTS ADDING SIX POUNDS SKIM MILK PER PIG PER DAY.

Lots 15, 16, 17 and 18.—These pens contained twelve cross-bred swine in all, which were fed for twelve weeks on all they would eat up clean of a mixture of equal parts by weight of ground pease, barley, oats and shorts, soaked in cold water for 30 hours with 6 pounds of skim milk per day to each pig. These feeding tests were begun on the 10th March, 1897, and continued for twelve weeks or until 19th May, 1897.

Lot 15.—Consisted of two cross-bred swine Essex sire with Yorkshire dam, farrowed 10th September, 1896.

No. of Swine, Two.	Mar. 10.	April 7.	May 5.	May 19.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	210	255	309	333	
Increase in weight		45	54	24	123
Feed consumed, meal		130	154	75	359
" milk		336	336	168	840
" per lb. of increase, meal		2·88	2·85	3·12	2·91
" " milk		7·44	6·22	7	6·82

Lot 16.—Consisted of three cross-bred swine, two Essex sire and Yorkshire dam—farrowed 10th September, 1896, and one Tamworth sire and Berkshire dam, farrowed 10th October, 1896.

No. of Swine, Three.	March 10.	April 7.	May 5.	May 19.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	282	345	418	458	
Increase in weight		63	73	40	176
Feed consumed, meal		178	188	103	469
" milk		504	504	252	1,260
" per lb. of increase, meal		2·82	2·57	2·57	2·66
" " milk		8	6·90	6·30	7·15

Lot 17.—Consisted of four cross-bred swine, one Essex sire and Yorkshire dam, farrowed 10th September, 1896, two Tamworth sire and Berkshire dam, farrowed 10th October, 1896, and one pure Berkshire.

No. of Swine, Four.	March 10.	April 7.	May 5.	May 19.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	378	479	585	632	
Increase in weight		101	106	47	254
Feed consumed, meal		221	257	143	621
" milk		672	672	336	1,680
" per lb. of increase, meal		2·18	2·42	3·04	2·44
" " milk		6·65	6·33	7·14	6·21

Lot 18.—Consisted of three cross-bred swine, two Essex sire and Yorkshire dam, farrowed 10th September, 1896, and one Tamworth sire and Berkshire dam, farrowed 10th October, 1896.

No. of Swine, Three.	March 10.	April 7.	May 5.	May 19.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	284	340	424	460	
Increase in weight		56	84	36	176
Feed consumed, meal		155	218	105	478
" milk		504	504	252	1,260
" per lb. of increase, meal		2·76	2·59	2·91	2·71
" milk		9	6	7	7·15

The average live weight of each of the pigs in these groups, when these feeding tests were begun, was 96⅙ pounds; average weight of each at the conclusion of the experiment, 157 pounds.

THE FEEDING OF SWINE WITH UNGROUND OATS.

Lot 19.—This pen contained four cross-bred swine—two Berkshire sire and Tamworth dam, farrowed 1st May, 1897; and two Yorkshire sire and Berkshire dam, farrowed 6th May, 1897. These were fed for the whole period of twelve weeks with unground oats, soaked in cold water for 54 hours, all they would eat up clean, with 3 pounds of skim milk per day to each pig. This feeding test was begun on the 1st September, 1897, and continued until the 24th November, 1897.

No. of Swine, Four.	Sept. 1st.	Sept. 29th.	Oct. 27th.	Nov. 24th.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	389	443	546	681	
Increase in weight		54	103	135	292
Feed consumed, oats		299	421	510	1,230
" " milk		336	336	336	1,008
" " per lb. of increase, oats		5·53	4·08	3·77	4·21
" " " " milk		6 22	3·26	2·48	3·45

To gain information as to how much of this unground grain passed through the swine undigested, the excrement was carefully collected for one day (24 hours) and washed, when, from about 14 pounds of oats fed, 2 pounds 6 ounces of undigested grain was separated, which when dried weighed 22½ pounds per bushel. When tested as to its germinating power, eleven per cent of this grain sprouted.

The average live weight of each pig, when this feeding test was begun, was 97¼ pounds; average weight of each at the conclusion of the experiment, 170¼ pounds.

Sold 25th November, 1897. Shrinkage in weight:—

	Pounds.
Live weight, fasted 14 hours	659
Dressed weight, 24 hours after killing	492
Percentage of shrinkage from weight after fasting	25·33

THE FEEDING OF SWINE WITH UNGROUND BARLEY.

Lot 20.—This lot consisted of four cross-bred swine—three, Berkshire sire with Tamworth dam, farrowed 1st May, 1897; and one, Yorkshire sire with Berkshire dam, farrowed 6th May, 1897. These were fed for the whole period of twelve weeks with unground barley, soaked in cold water for 54 hours, all they would eat up clean, with 3 pounds of skim milk per day to each pig.

No. of Swine, Four.	Sept. 1st.	Sept. 29th.	Oct. 27th.	Nov. 24th.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	397	477	619	797	.....
Increase in weight	.....	80	142	178	400
Feed consumed, barley	.....	354	511	591	1,456
" " milk	.....	336	336	336	1,008
" " per lb. of increase, barley	.....	4·42	3·59	3·32	3·64
" " " " milk	.....	4·20	2·36	1·88	2·52

To gain information as to the proportion of this unground barley which passed through the swine undigested, the excrement was carefully collected for one day (24 hours) and washed, when, from about 17 pounds of barley consumed, 2 pounds 2 ounces of undigested grain was separated, which when dried weighed 35 pounds per bushel. This was tested as to its germinating power, but not one of the kernels sprouted.

The average live weight of each pig, when this feeding test was begun, was 99¼ pounds; average weight of each at the conclusion of the experiment, 199¼ pounds.

Sold 25th November, 1897. Shrinkage in weight:—

	Pounds.
Live weight, fasted 14 hours	798
Dressed weight, 24 hours after killing	592
Percentage of shrinkage from weight after fasting	25·81

THE FEEDING OF SWINE WITH UNGROUND PEASE.

Lot 21.—This pen contained four cross-bred swine, three Berkshire sire and Tamworth dam, farrowed 1st May, 1897, and one Yorkshire sire and Berkshire dam, farrowed 6th May, 1897. These were fed for the whole period of twelve weeks with unground pease soaked, in cold water for 54 hours, all they would eat up clean, with 3 pounds of skim milk per day to each pig.

No. of Swine, Four.	Sept. 1.	Sept. 27.	Oct. 27.	Nov. 24.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	402	498	660	830	.....
Increase in weight	.....	96	162	170	428
Feed consumed, pease	.....	349	505	572	1,426
" " milk	.....	336	336	336	1,008
" " per lb of increase, pease	.....	3·63	3·11	3·36	3·33
" " " milk	.....	3·50	2·07	1·97	2·35

To gain information as to the proportion of the unground pease which passed through the swine undigested, the excrement was carefully collected for one day (24 hours) and washed, when from about 17 pounds of pease fed, only 2 ounces of undigested grain

was separated. This quantity was too small to admit of the weight per bushel being ascertained, and when tested as to germinating power none of these pease sprouted.

The average live weight of each pig when this feeding test was begun was 100½ pounds; average weight of each at the conclusion of the experiment 207½ pounds.

Sold 25th November, 1897. Shrinkage in weight:—

	Pounds.
Live weight, fasted 14 hours	830
Dressed weight 24 hours after killing	626
Percentage of shrinkage from weight after fasting	24·57

THE FEEDING OF SWINE WITH UNGROUND INDIAN CORN.

Lot 22.—This lot consisted of three cross-bred swine, Poland China sire and Yorkshire dam, farrowed 25th June, 1897. These were fed for the whole period of thirteen weeks with unground Indian corn soaked in cold water for 54 hours, all they would eat up clean, with 3 pounds of skim milk per day to each pig. This feeding test was begun on the 29th September, 1897, and continued until the 29th December, 1897.

No. of Swine, Three.	Sept. 29.	Oct. 27.	Nov. 24.	Dec. 22.	Dec. 29.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	216	320	430	537	570	.....
Increase in weight	.....	104	110	107	33	354
Feed consumed, Indian corn	.....	272	319	388	49	1,028
" " milk	.....	252	252	252	63	819
" " per lb. of increase, Indian corn	.....	2·61	2·90	3·62	1·47	2·90
Feed consumed, per lb. of increase, milk	.....	2·42	2·29	2·35	1·90	2·31

To gain information as to the proportion of the unground Indian corn which passed through the swine undigested, the excrement was carefully collected for one day (24 hours) and washed, when, from about 11 pounds of corn consumed, 8 ounces of undigested grain was separated, which when dried weighed 40¼ pounds per bushel and germinated in the proportion of 8 per cent.

The average live weight of each pig when this feeding test was begun was 72 pounds; average weight of each at the conclusion of the experiment 190 pounds.

Sold 31st December, 1897. Shrinkage in weight:—

	Pounds.
Live weight, fasted 14 hours	564
Dressed weight, 24 hours after killing	461
Percentage of shrinkage from weight after fasting	18·26

THE FEEDING OF SWINE WITH MIXED OATS, BARLEY AND PEASE, ALL UNGROUND.

Lot 23. This lot consisted of three cross-bred swine, Poland China sire with Yorkshire dam, farrowed 25th June, 1897. These were fed for the whole period of thirteen weeks on a mixture of equal parts by weight of oats, barley and pease all unground and

soaked in cold water for 54 hours. The pigs were given of this mixture all they would eat up clean and each one received in addition 3 pounds of skim milk per day.

Number of Swine, Three.	Sept. 29th.	Oct. 27th.	Nov. 24th.	Dec. 22nd.	Dec. 29th.	Totals.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Total live weight	212	302	407	500	527	
Increase in weight		90	105	93	27	315
Feed consumed, mixed grain		245	314	401	49	1,009
" " milk		252	252	252	63	819
" " per lb. of increase, mixed grain		2·72	2·99	4·31	1·81	3·20
" " per lb. of increase, milk		2·80	2·40	2·70	2·33	2·60

To gain information as to the proportion of the unground mixed grain which passed through the swine undigested, the excrement was carefully collected for one day (24 hours), and washed, when from about 11 pounds of grain consumed 10 ounces of undigested material was separated. Of 100 kernels tested as to germinating power, two of the oats only sprouted.

The average live weight of each pig when this feeding test was begun was $70\frac{2}{3}$ pounds; average weight of each at the conclusion of the experiment, $175\frac{2}{3}$ pounds.

Sold 31st December, 1897. Shrinkage in weight:

	Lbs.
Live weight, fasted 14 hours	521
Dressed weight, 24 hours after killing	412
Percentage of shrinkage from weight after fasting	20·92

VISIT TO THE BRANCH EXPERIMENTAL FARM, NAPPAN, N.S.

A visit was paid to the Experimental Farm at Nappan, N.S., in October. Notwithstanding the unfavourable wet weather in the early part of the season, the crops on this farm turned out well, as will be seen from the particulars given in the report of Mr. Geo. W. Forrest appended. The great advantage resulting from the under-draining of land was very clearly demonstrated this year. A large proportion of the land under cultivation on this farm has been tile-drained, and thus outlets have been provided for the prompt discharge of surplus water, which has permitted early and thorough cultivation and given conditions favourable for the growing crops.

Early in October the superintendent, Mr. Geo. W. Forrest, resigned his position, and Mr. R. Robertson was appointed his successor. During the year some of the less useful animals in the herd of cattle were disposed of for beef, and late in the season a number of choice dairy cows were purchased, including some pure bred Guernseys, and these additions have much improved the character of the herd.

In the horticultural division of the work many new varieties of large fruits have been added to the orchards and the plantations of small fruits have been similarly increased. Many varieties of vegetables have also been tested. The ornamental trees and shrubs and sample hedges have all made fair progress, and the flowers in the beds and borders have given a constant succession of bloom throughout the summer.

VISIT TO THE WESTERN BRANCH FARMS.

At the request of the committee of arrangements for the entertaining of the members of the British Association, I left Toronto on August 24th in charge of a party of these distinguished visitors from Europe and accompanied them to the Pacific coast. We were favoured with fine weather during the whole journey and every facility was afforded the party by the officers of the Canadian Pacific Railway for seeing the more interesting portions of the country by day. In this way an excellent idea was formed regarding the extent and resources of the country and unusual opportunities given for seeing its great natural beauties. The extensive wheat areas between Winnipeg and Regina were all seen by daylight when the harvest was in progress, and opportunity was also afforded for seeing the experimental farms at Brandon and Indian Head and of examining specimens of the more important cereals and other products grown there, also of seeing similar crops at Agassiz and of testing some of the many excellent varieties of fruits produced there. The cities and towns, along the route vied with each other in the hospitalities shown to the members of this distinguished party, and special entertainments were given at Winnipeg, Vancouver and Victoria. The visitors expressed their surprise at the wonderful extent of the country and of its agricultural and mineral resources, and their admiration of the great beauty and diversity of the mountain scenery along the route of travel On the return journey, the usual annual inspection of the Experimental Farms was made.

AGASSIZ, B.C.

Several days were spent here in inquiring into the progress of the work and arranging the details of future experimental operations. The season had been favourable and the crops of grain and roots were good and well above the average. The fruit crops also had given satisfactory returns. Apples and pears were fruiting well, the plum crop also had been an excellent one, and considerable quantities of fruit had been shipped to the mining districts in British Columbia and to the towns and cities in Manitoba and the North-west Territories. An additional area of land has been cleared at the experimental farm during the year and brought under cultivation, the fruit orchards have also been further extended and many new varieties of fruit added. The orchards which were planted at different heights on the bench lands on the mountain side are all making good progress, and some of the young trees were heavily laden with fruit. The plantations of forest and ornamental trees are also doing well, and the flower beds and borders have been brilliant and attractive with bloom throughout the season. Excellent progress has been made in all branches of the work and much evidence was afforded of careful and judicious management.

INDIAN HEAD, N. W. T.

The grain crops at this branch farm were very good the past season and the yield of grain has been considerably above the average over a large part of the Indian Head district. Where the land was summer-fallowed many farmers realized thirty bushels or more per acre of first class wheat. At the price which grain now commands such crops are very encouraging and very profitable to the farmer and should bring about rapid settlement of this fertile portion of the great plains.

In the early part of the season the weather was very dry and the outlook on the experimental farm was unpromising, but timely rains in June produced a luxuriant growth and an abundant harvest of grain. Through lack of rainfall in the autumn the crop of roots was very light.

The beneficial effects of the shelter provided by forest plantations on the Indian Head experimental farm were clearly shown during the past season. Plots of several varieties of grain sown within the influence of shelter compared with plots of the same sorts sown beyond such influence, gave a difference of from 25 to 50 per cent in the

yield in favour of the sheltered locations. Further experiments have been carried on with the Awnless Brome Grass, *Bromus inermis*, with very satisfactory results. This grass has now become well known and is much appreciated by the farmers in the territories, who find it to be hardy and reliable, and a most useful grass both for hay and meadow in the North-west country. The farm generally was in excellent order, the buildings and stock were also inspected and found to be in a satisfactory condition.

BRANDON, MANITORA.

Most of the grain crops on this farm turned out fairly well and some of them were good, but they were not so heavy as those at Indian Head. The Brandon district suffered considerably from drought in the spring and also from the prevalence of unusually severe winds and spring frosts. Oats suffered most and in some instances where the land was exposed a large proportion of the young plants were destroyed. Notwithstanding these drawbacks the crops of grain obtained at the experimental farm were much larger than the average crops of the province and most of the grain was of good quality. The corn crop was lighter than usual owing to very dry weather in the autumn; for this cause also the yield of roots was below the average.

Experiments have been continued with many grasses for hay and pasture but the Awnless Brome grass takes the lead here as at Indian Head as the most successful in its growth and generally useful in its character of all the varieties thus far tested. The forest belts, avenues and hedges have made good growth and the general collection of trees and shrubs in the Arboretum surrounding the house of the Superintendent is increasing in interest every year. Many promising additions have recently been made to this collection. The general condition of all branches of the work in progress here was very satisfactory.

CHANGES IN THE STAFF.

During the year two changes have occurred in the staff. The Superintendent of the branch experimental farm at Nappan, Mr. Geo. W. Forrest, resigned and Mr. R. Robertson was appointed in his place. Mr. John Craig also resigned his position as Horticulturist of the Central Experimental Farm.

CORRESPONDENCE.

The following is a summary of the letters received and sent out at the Central Experimental Farm from November 30, 1896, to November 30, 1897, also of the number of reports, bulletins and circulars sent out by mail during the same period.

	Letters received.	Letters sent.
Director	32,301	19,408
Horticulturist	2,576	2,495
Chemist	1,249	1,410
Entomologist and Botanist	1,920	2,110
Poultry Manager	1,306	1,159
Accountant	1,319	1,539
	40,671	28,121

Circular letters sent, including circulars sent with samples of seed grain. . . . 41,857
Number of Reports and Bulletins mailed 256,730

The large increase in the correspondence and in the volume of farm literature distributed during the past year is an index of the increasing interest taken in the work of the experimental farms. The figures given show that the letters received during the year have averaged 130 per day and the number sent out has averaged 90 per day. The total distribution of reports, bulletins and circulars has reached a daily average for the whole year of 953.

ACKNOWLEDGMENTS.

I acknowledge most gratefully my indebtedness to the Director of the Royal Gardens, Kew, England, for another valuable collection of the seeds of trees, shrubs and plants, also a large collection of willows. Many packages of the seeds of rare and interesting species have also been received from the Director of the Arnold Arboretum, Jamaica Plains, Mass. Further contributions have also come from the Royal Botanic Gardens at Sapporo, Japan. A collection of the seeds of hardy perennials has been received from the Missouri Botanic Gardens at St. Louis, Mo., and another very useful collection of similar plants from the Botanic Garden of Smith College, Northampton, Mass. A large and interesting collection of seeds of useful sorts of trees and shrubs from the northern parts of Russia has also been received from Mr. J. Niemetz, Councillor of State, Winnitza, Podolia, Russia. To Prof. John Macoun, Naturalist of the Geological and Natural History Survey, and to Mr. J. M. Macoun, Assistant Naturalist, my hearty thanks are due for seeds of many rare and useful species collected in different parts of the Dominion.

I desire also to acknowledge the continuance of the faithful services rendered by all the officers at the central and branch experimental farms, and for their earnest and diligent co-operation in carrying on the many lines of experimental work which has been planned.

A special acknowledgment is due to those members of the staff who have rendered me efficient aid in carrying on those branches of the work of which I have had personal charge. To the Farm Foreman, Mr. John Fixter, who has carefully managed and watched over the field experiments and taken notes on the crops at different stages in their growth, also to my assistant, Mr. W. T. Macoun, who, in addition to his work as Foreman of Forestry, which is this year reported on separately, has had charge of all the uniform test plots of cereals and potatoes, also of the small plots of new cross-bred and hybrid cereals, and has taken records of the growth and yield of the many varieties under test. From Mr. R. R. Elliott, Herdsman, I have also received much valuable assistance. He has carefully carried out the work planned and taken notes on the results of the experiments conducted in the feeding of cattle and swine. Accurate work has also been performed by Mr. Wm. Ellis in testing the vitality of seeds, the propagation of plants and the taking of the meteorological records. The employees also of the farms in every branch of the work have discharged their several duties faithfully and well.

WM. SAUNDERS,
Director Experimental Farms.

REPORT OF THE HORTICULTURIST.

(JOHN CRAIG.)*

DR. WILLIAM SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I beg to submit a report of some of the work carried on by the Division of Horticulture of the Central Experimental Farm for the year 1897, being the eighth annual report which I have had the honour to prepare.

I have found it impossible to condense into the limited space available, a full account of the work of the year. Some of this has been cumulative in results, the work being carried on for a term of years and culminating this season. This is particularly true of two lines of research, viz., methods of root grafting as affecting the health and vigour of the resulting tree, and the results of experiments with native and American plums. Both topics would require a considerable space to do them justice, besides a generous amount of illustration.

Blossoming Records.—The work of recording the blossoming period of our leading varieties of large and small fruits throughout the Dominion has again occupied my attention, and has been carried on with the kind assistance of interested fruit growers. The names of these recorders appear at page 101, Report 1896. The work of compiling these records and of reducing them to intelligible and useful form is very great, and it has been found impracticable with the assistance at hand to prepare the data in time for this report.

Fruit Crop.—As expected the crop of apples throughout the Dominion this year was small, after the phenomenally large yield of last season. Not only was it small as to quantity, but the quality of the product was much below the average—chargeable chiefly I may say to the laxity of growers in putting into practice those principles of fruit culture now so well understood, viz., the necessity of fertilizing adequately, pruning carefully, and spraying perseveringly.

TEST ORCHARDS AT THE CENTRAL FARM.

Apples.—These are planted out in two separate blocks. No. 1, contains a collection of named American varieties including a number of others of more remote introduction from Europe. This has been commonly designated the "Standard" orchard, including as it does those varieties which on account of general adaptability have become "standards" the country over. In it is contained a block each of Wealthy, Duchess and Tetofsky apple-trees. The first variety has been used as a top-grafting stock since 1891. There are now a large number of varieties among these top-grafts new to Canada and approaching fruiting age. The lines separating "hardy" from "tender" apples are quite closely drawn at Ottawa. Leading varieties of Western Ontario like King, Northern Spy and Greening are entirely unreliable on their own stocks in the Ottawa Valley. Experiments

* Resigned, November, 1897.

in top-grafting have been planned with a view of ascertaining the effect—if any—of hardy stocks upon doubtfully hardy scions. For this purpose considerable space in the "Standard" orchard has been given to trees of Haas (*Gros pommier*, *Fall Queen*), Gideon, McMahan White, and Hibernal; all vigorous growing trees and promising stocks. These will be ready for top-grafting next spring.

Apple Orchard No. 2, commonly known as the "Russian" orchard has been devoted to the testing of varieties of apples imported directly or indirectly from East Europe—principally Russia and Germany. Frequent references to these apples will be found in my preceding reports. Among them are a number of useful fruits, notably *Pointed Pipka*, *Switzer*, *Romna* and *Winter Arabka*.

Seedling Apple Orchard.—About 50 trees fruited this year. They were all Russian seedlings. The fruits were described and the trees numbered and labelled. None of those fruiting this year appear to be worthy of propagation.

Pear Orchard.—The soil of the pear orchard, a cold light sandy loam, is unsuitable to the growth of this fruit. The trees have been destroyed by blight and winter killing in large numbers each year. Particulars of the varieties on trial including those which have succumbed to blight and winter injury appear at page 136, Rep. 1896. Flemish Beauty is the only American variety that has borne fruit thus far, though the tree is not strictly hardy. Bessemianka, Gakovka, Lemon, Tonkovietka and Sapieganka, Russian pears, are perfectly hardy but blight badly. The fruit also is very poor in quality and exceedingly perishable.

Plum Orchard.—None of the *Prunus domestica* class have been entirely successful upon their own roots or upon the Myrobolan stock. The collection of American seedlings is now very large. It has been found that seedlings of *P. Americana* make the best propagating stocks for the descendants of *P. domestica*, *P. angustifolia* and for the named varieties of *Americana*. Provision has been made in this orchard for extensive top- and stock-grafting experiments. Among the valuable varieties of American plums are: Stoddard, Hawkeye, Yosemite Purple, Cheney and Hunt.

Cherry Orchard.—The serious injury wrought to this orchard two years ago by root killing has been duly noted. It has been observed that those trees propagated in 1891 upon "Bird cherry" stock, *Prunus Pennsylvanica*, have thus far escaped root damage by frost. These trees have been thrifty and healthy and this season bore a small crop of fruit. Bird cherry, sprouts, but not more freely than the Mazzard type. A number of each variety of cherry trees in the orchard have been propagated upon this stock, are in nursery now and will be ready for planting out next fall.

MEETINGS ATTENDED.

I was present by invitation and gave addresses during the year at the following horticultural meetings:—

Nova Scotia.—Colchester County Fruit Growers' Association, Truro, 19th January. Nova Scotia Fruit Growers' Association, Wolfville, 22nd and 23rd January.

Quebec.—Pomological Society, Howick, 27th and 28th January. Pomological Society, Stanstead, 17th and 18th August.

Ontario.—Napanee Horticultural Society, 15th February. Deseronto Horticultural Society, 16th February. Picton Horticultural Society, 17th February. Trenton Horticultural Society, 18th February. Smith's Falls Horticultural Society, 23rd February. Lindsay Horticultural Society, 24th February. Port Hope Horticultural Society, 25th January. Cobourg Horticultural Society, 26th February. Leamington Horticultural Society, 13th April. Olinda Horticultural Society, 12th January. Lincoln and Wentworth Fruit Growers' during August.

I was present by invitation at the meeting of the Vermont State Horticultural Society, Grand Isle, in September ; also attended officially the meeting of the American Pomological Society in Columbus, Ohio.

Acknowledgments.—I am again deeply indebted for valuable technical assistance rendered to this Division during the year, to the following eminent scientists :—Mr. J. Dearness, Inspector of Schools, London, Ont.; Dr. W. T. Connell, Pathologist of Queen's University, Kingston, Ont.; Dr. B. D. Halsted, Experiment Station, New Brunswick, N.J.; Prof. B. T. Galloway and Dr. Erwin T. Smith, of Pathological Division, Dept. of Agriculture, Washington, D.C.; Prof. L. R. Jones, Experiment Station, Burlington, Vt.; Prof. A. D. Selby, Experiment Station, Columbus, Ohio.

To the *Fruit Growers of Canada* I wish to tender my warmest thanks for their generous help whenever called upon, and for their kindly appreciation of my efforts put forth in the interests of the fruit industry of this country.

DONATIONS.

I beg gratefully to acknowledge the following donations received during the year :—

Sender.	Donation.
Agricultural College, Guelph, Ont	Plants of new varieties of strawberries.
Bartlett, J., Oshawa, Ont	Vegetable seeds.
Brodie, R., St. Henri, Que	Cherry scions.
Bustin, Wm., Belleisle, N.S.	Apple scions.
Closson, Bros., Highland Creek, Ont.	Cuttings of Ruby currant.
Cone, E. W., Wisconsin	Patrick strawberry plants.
Dempsey, W. H., Trenton, Ont	Scions, apples and pears.
Evans, A. A., Kingsey, Ont	" yellow choke cherry.
Experimental Station, Burlington, Vt	" apple, plants Prunus Besseyii.
" Geneva, N.Y.	Hunn, strawberry plants.
Fairfield, F. S., Orono, Ont	Seedling plums ; cherry scions.
Fisher, M. J., Maxville, Ont	Scions, apple.
Glass, A., St. Catharines, Ont	Seedling strawberries.
Graham, J. I., Vandeleur, Ont	Scions, apple.
Horton, E. L., Port Steamburg, N.Y	Seed beans.
Harsant, T. A., Glen Orchard, Muskoka	Seedling raspberries.
Iowa Agricultural College, Ames, Ia	Apple, pear and plum trees.
Mugnier, J. B., Albertine, N.B	Scions, apple.
Mowbray, W., Sarnia, Ont	" "
McFarlane, D. H., Pictou, N.S	Scions, plum.
McCallum, Dr., Smith's Falls, Ont	" apple.
Morden, J. A., Hyde Park, Ont	" "
MacKombir, J. T., Grand Isle, Vt	Plants, raspberry, grape cuttings.
Nichols, Rob., Mitchell, Ont	Seedling grapes.
Porter, F. W., Mt. Forest, Ont	Raspberry plants.
Read, M. A., Port Dalhousie, Ont	Hybrid grape and raspberry plants.
Stead, A. H., Tapley's Mills, N.B	Scions, pear.
Stephens, C. L., Orillia, Ont	Seedling, gooseberry.
Stevenson, Wm., Guelph, Ont	Strawberry plants.
Steele, Brigg's Co., Toronto, Ont	" "
Sewell, W. W., Carthage, Ind	" "
Trotter, R., Owen Sound, Ont	Scions, Baker prune.
Waters, J. M., Fernhill, Ont	Raspberry plants.
Yeisley, Chas., Lisbon, Ia	Scions of apples.

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

JOHN CRAIG,
Horticulturist.

December 2, 1897.

SMALL FRUITS.

SEEDLING BLACK CURRANTS.

The following seedling black currants have been under my observation during the past seven years. They have been propagated in a small way, and have been tried in different situations on the Central Farm. They have also been sent to the branch farms and to some of the leading Canadian small fruit growers.

After these trials I feel justified in expressing the opinion that they are worthy of introduction. They, with 15 others, were selected in 1893, after four years' fruitage, out of more than 100 seedlings which had been under test at the Central Farm since 1887. Since that time they have maintained their individual points of excellence, and each one described is, I believe, superior to any other named commercial variety of the same season. They were originated as follows:—

About the year 1879 a considerable number of seedling black currants were grown in London, Ont., by Dr. Wm. Saunders, the present Director of the Experimental Farms, from extra large selected berries of the Black Naples. One of these seedlings produced very large fruit of good quality, and the bush was productive. In 1884 several hundred seedlings were raised from large berries of this seedling, then known as Saunders' Seedling, but subsequently lost. When Dr. Saunders removed to Ottawa in 1887 to organize the system of experimental farms in Canada he brought with him from his experimental gardens in London about 150 of the most promising of these seedlings. By discarding from year to year all those of less promise they have been gradually reduced to the number stated.

DESCRIPTION OF VARIETIES.

BEAUTY.—Half natural size.

Beauty.—Plant, a strong uniform grower; berries, above medium; skin, thin, free from astringency; quality, good; bunches, large; berries refuse to separate easily from the pedicel. In gathering, it is best to pull the entire bunch, rather than attempt to pick the berries individually in the ordinary way. Field Note.—Ripe, July 13, 1896. Still holding to the bush, August 10, 1896. This year it ripened July 18, and was picked August 3.

Standard.—Bush, low spreading, fairly vigorous; bunch, medium size; berries, medium to large, round; skin, thin; flavour, pleasant, brisk acid. Ripe, July 3, 1896; July 10, 1897. Very productive.

STANDARD.—Half natural size.

SUCCESS.—Half natural size.

Success.—Bush, a medium grower; cluster, large; berry, medium to large; skin, firm but thin; quality, best; season, the earliest in the collection. This, with its productiveness, are its strong points. This variety was distributed in a limited way, through the Fruit Growers' Association of Ontario, three years ago. Many favourable reports have been received concerning its behaviour under varying conditions.

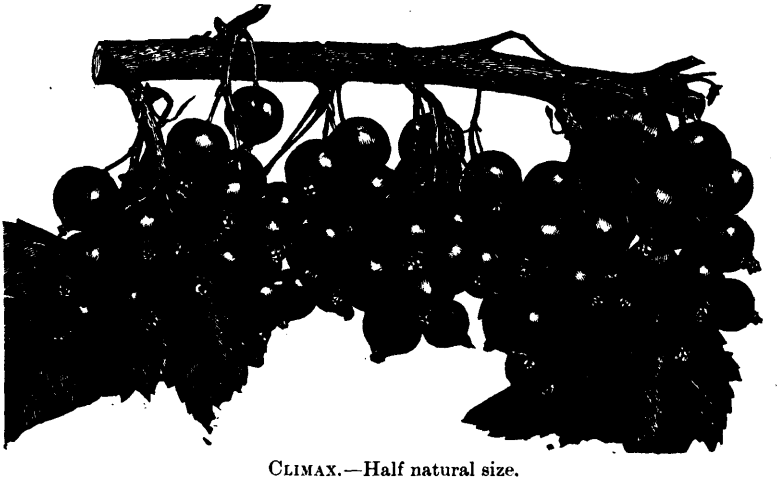
The four varieties following have not, one year with another, proved equal to the three above, but are all superior to *Lee's Prolific* and *Black Naples* in regard to size, quality and productiveness.

LEE'S PROLIFIC.—Half natural size.

BLACK NAPLES.—Half natural size.

Monarch.—Plant strong, vigorous; bunch, long, usually well filled; berries, medium size, ripen evenly in bunch; skin, thin; quality, good. Ripens among those of early mid-season. Very productive.

Climax.—Plant strong, vigorous. (No. 3 in row not true.) Bunch, large; berries, glossy; skin, thin, brisk subacid; quality, good. This is one of the latest, ripening with, or a little before Beauty. In productiveness it is one of the best.



CLIMAX.—Half natural size.

Star.—Plant, moderately vigorous, flat-topped; bunch, large; berry, of the largest size, round, glossy; skin, rather thick; flavour, a pleasant subacid; quality, best. The weak points of this variety are its time of ripening — mid-season — and its manner of ripening—rather uneven. It is not more uneven, however, than Lee's Prolific, and is much larger and finer in quality.

STAR.—Half natural size.

Winona.—Plant, a strong grower, upright in habit; bunch, above medium, long, well filled; berry large, round, clings well to pedicel; skin, thin, non-astringent; one of the most prolific, ripening with or a few days after the earliest. This variety is of the type of Monarch, but usually a few days earlier.

THE GOOSEBERRY PLANTATION.

The present collection of gooseberries was set out in the spring of 1893. It is composed of 10 American and 107 English varieties, beside a few of their hybrids. The soil is light sandy loam underlaid by limestone ledge and shale. Before setting the plants a portion of the area received a light surface dressing of blue clay. The ground was well manured before planting. The American varieties and hybrids were propagated by layers at the Central Farm. The English varieties were imported as two-year old plants. They were set in rows 4 x 6 feet apart. Cultivation was thorough. The plantation was mulched with barn-yard litter in the autumn of each year. No special winter protection was given. Two years ago the ground was heavily mulched with barn-yard manure; since then cultivation has been suspended, such weeds as appeared being pulled by hand. The English varieties have not been successful. A few have done fairly well and bear paying crops, but much the larger percentage have proved melancholy failures. This failure should, I believe, be largely credited to the character of the soil. In this locality and throughout the Ottawa valley gooseberries are not successful on the lighter sandy soils, but do well on the heavier soils. A clay loam is desirable—one that is rich, friable but not loose, and one naturally moist is preferable. A protected situation is also necessary—where the snow lodges early in the autumn and remains late in the spring. Unless the fruit grower of Eastern Ontario or the province of Quebec has such a situation and is also prepared to spend some time in spraying the plants to prevent mildew, I would not advise him to plant English gooseberries as a money making venture. He had better stick to the hardier American kinds, such as Pearl, Downing and Houghton. With the conditions as described above and within easy reach of a market, I believe this fruit may be grown profitably in many portions of Canada. There is now a market for considerable quantities of *ripe* gooseberries where formerly the gooseberry was not recognized as a dessert fruit in any uncooked condition.

It may be said that the indifferent success of the trials at the Central Farm gives but scant grounds upon which to base recommendations for their cultivation. I am speaking now, however, more on the strength of observations made elsewhere than upon our experience at Ottawa. The following table contains a list of the varieties on trial with notes regarding their health and hardiness. "Slight" means a very small amount of frost injury to the tips. "Little" describes a killing back of three or four inches. "Considerable" where killed back to two-year old wood. "Severe" shows that some plants have been destroyed by winter killing. "Health" refers to their relative immunity from mildew.

GOOSEBERRIES.

Variety.	Winter Injury.	Health 1 to 10 max.	Fruit.
Alcock's King	Slight	8	White?
Aston Red	"	9	Red.
Amber	Considerable	6	Yellow.
Admiration	"	5	Red.
Alma	Severe	7	
Antagonist	Slight	5	White.
Am. Seedling (Am.)	Hardy.	10	Green.
Archville	Slight	7	"
Beauty	Considerable	8	Red.
British Crown	"	7	
Briton	"	7	Yellow.
Broom	Slight	9	"
Bank of England	Severe	4	?
Bright Venus	Considerable	8	?
Bumper	Slight	4	?
Crown Bob	"	8	Red.
Clayton	Badly	6	"
Champion Red			"
Conquering Hero	Little	8	"

GOOSEBERRIES—*Concluded.*

Variety.	Winter Injury.	Health 1 to 10 max.	Fruit.
Champagne	Considerable	6	White.
Columbus	Slight	8	"
Catharina			Yellow.
Compton's Bird Lime	Considerable	5	Green.
Companion	"	5	Red.
Ironmonger	Little	7	"
Imperial Red	Severe	6	"
Industry	Little	7	"
Keen Seedling	"	6	"
Keepsake	Considerable	7	Green.
King of Trumps	Slight	8	Red.
London	Little	9	"
Lord Derby	Severe	7	Green.
Lancashire Lad	"	6	Red.
Lancashire Gunner	"	7	?
Lomax Victory	"	5	?
Lily of Valley	Considerable	5	White.
Leader	"	6	Yellow.
Leveller	Little	7	"
Lady Houghton	Considerable	5	Green.
Lady Leicester	Little	6	"
Lancer	Considerable	7	White.
Napoleon le Grand	Severe	6	Red.
Marigold	Considerable	6	Yellow.
Mountain of Snow	Slight	8	White.
Moses	"	7	Red.
Mountain Seedling (Am.)	Hardy	9	"
Ottawa (hybrid)	"	9	Green.
Prince Regent	Severe	6	Red.
Peru	Slight	8	White.
Shiner	Severe	4	Green.
Souter Johnny	Considerable	3	?
Snowball	Little	6	White.
Snowdrift	Severe	7	"
Snowdrop	Slight	8	Red.
Smith's Imp. (Am.)	Hardy	10	Green.
Trumpeter	Little	7	Yellow.
Tally-ho	Severe	7	"
Transparent	"	6	"
Whinham's Industry	Considerable	6	Red.
Walnut	Little	6	White.
White Eagle	Severe	7	"
White Crystal (Am.)	Little	9	"
Whitesmith	Considerable	7	"
Wandering Girl	Slight	8	"
Yellow Sulphur	"	8	Yellow.

VARIETIES RECOMMENDED.

Red Jacket.—American but of English parentage; originated at London, Ont., by Dr. Wm. Saunders; received from George S. Josselyn, Fredonia, N.Y.; plant, fairly mildew free; berry, reddish-green, sometimes brightly tinged with red; size, $1\frac{1}{8}$ x $\frac{7}{8}$ inches; smooth, roundish oval; fair quality; ripe, Aug. 5, 1897.

King of Trumps.—English; from Wm. Fell & Son, Hexham, Eng.; mildews considerably, but is a vigorous grower; berry light red, spined; size $1\frac{3}{8}$ x 1 inch; slightly pyriform, sometimes oblique; firm, meaty, not high flavoured. This variety quite closely resembles Aston Red.

London.—English; from Wm. Fell & Son; plant a strong grower; berry, dark red; pyriform; $1\frac{1}{4}$ x $\frac{3}{4}$ inch: flavour, sweet, pleasant; skin, thin: free from mildew.

Speedwell.—English; from Wm. Fell & Sons; a fair grower; berries pale red, sparsely spined, oval or pyriform; ripe Aug. 1; quality rather poor, productive.

Riccardo.—From same source as last named variety; a strong healthy grower; berries 1½ x 1⅛ inches; tinged with red; roundish oval or slightly pyriform; mildly subacid; ripe last week of July.

Among other better known varieties may be mentioned Crown Bob and Lancashire Lad. The two varieties of English gooseberries best known and most widely cultivated are Whitesmith and Industry.

Of American varieties Downing or Pearl undoubtedly stand at the head of the list. White Crystal has been very productive, but drops badly and is of poor quality.

LARGE FRUITS.

THINNING PEACHES AND PLUMS.

The importance of thinning peaches and plums during seasons of heavy yields is fully demonstrated by the results of the following experiment carefully carried out and clearly described by Mr. Martin Burrell, St. Catharines, Ont. The crop of peaches throughout the peach belt of southern Ontario last season was very large and the size of the average sample of fruit very small. No doubt the extremely hot weather of early summer was largely responsible for the small size of the fruit; again the usual period of high temperature characterizing the Crawford season had the effect of forcing the whole crop on the market very hurriedly. Prices went down to zero and poor fruit was an absolute drug. For a few days only the best grades brought in remunerative returns. Had the fruit been of good size it would have paid growers and buyers to have stored it a few days pending the clearing of the markets—as it was, a large proportion of the early Crawfords were sacrificed. The experiments conducted by Mr. Burrell for this division are therefore timely, and it is hoped that fruit growers will bear in mind the necessity of carrying out practices of this kind in these days of close competition.

With regard to thinning plums, though the results are not so marked as in the case of the peaches on account of the variety selected, there is no doubt that thinning Lombards is an absolute necessity, taking one year with another. If allowed to bear at will the tree overbears, the fruit soon becomes small and poorly coloured and will hardly pay the cost of picking, transportation and selling. The trees, too, break down and become debilitated. It is expensive work, but it will pay. The fruit should be thinned early in the season. Hand labour seems to be the only practicable method at present.

NOTES BY MR. BURRELL.

The thinning experiment on peaches were conducted on six-year old trees of the Hyne's Surprise variety, an almost free stone, white fleshed peach ripening between the season of the Early Rivers and the Yellow St. John. (10th to 25th Aug.) Three trees of each variety were selected as nearly alike as possible. The first was thinned on 22nd June, the second ten days later and the third left as a "check" tree. The thinning process was performed on the first tree when the peaches were quite small, between one-half and two-thirds of an inch from apex to base. On the second tree the peaches were from an inch to an inch and a quarter long. The fruit was picked as it ripened, three or four pickings for each tree In the results appended "firsts" were 7 inches or more in circumference, and "thirds" were too small to be marketable.

PEACHES.

Tree.	Thinned.	No. Off.	Quarts.	Time.	Amount of Fruits in Lbs. and Number.				
					Firsts.	Seconds.	Thirds.	Total.	
				hrs.	Lbs.	Lbs.	Lbs.	No.	Lbs.
No. 1..	June 22..	1,500	11	1¼	107	75½	2	1,290	184½
No. 2..	July 2..	800	16	1	85½	73	.....	1,115	158½
No. 3..	Check....	.....	.....	.....	20	93½	21	1,419	134½

With reference to the above figures it should be explained that the peaches under 'firsts' went about 6 to the lb.; the 'seconds' of trees No. 1 and No. 2 went about 8 to the lb., but in the case of No. 3 the sample was much smaller, going about 10 to the lb., and the 'thirds' about 15 to the lb.

At first sight it appears as if No. 1 tree ripened a great number of peaches considering the large number (1,500) that were taken off, but a considerable proportion of this 1,500 would not have 'set' and would shortly have dropped anyway. It must also be pointed that about 25 per cent more rot obtained on the 'check' tree, and had these extra rotten been counted, the total number on the 'check' tree would have been much heavier. It will be seen that on the thinned trees the gain, in size, was immense, and this is where the great commercial advantage lies. Had the trees been of a later variety with a longer season of ripening, the difference would probably have been still greater. In thinning, an endeavour was made to leave the peaches about two inches apart. I am convinced, however, that a much larger number could profitably have been taken off. The cost of thinning out trees of this size would amount to only from ten to twelve cents a tree. In conclusion, it may be urged from the above experiment, that, when a big crop of fruit is set, thinning peaches is a highly remunerative process for the following reasons :—

1. It increases the weight of yield.
2. It largely increases the size of the fruit.
3. It reduces the number of matured seeds, thereby considerably lessening the drain on the vitality of the tree.
4. It renders the crop less liable to 'rot.'

Some of the best Michigan and Georgia peach growers thin to six inches apart.

PLUMS.

Tree.	Thinned.	No. Off.	Quarts.	Time.	Lbs. of Fruit.	No. of Plums.	Size, No. to Lb.	No. of other Plums.
				Hrs.				
No. 1....	June 21..	3,000	7	1½	164	4,852	29½	645
No. 2....	July 3..	1,800	9	1½	145	4,900	34	114
No. 3 . .	Check....	.....	.....	.....	*170	6,650	39	1,011

* 12 lbs. of this 170 consisted of inferior and unmarketable fruit.

In the thinning experiment conducted on plums three trees of "Moore's Arctic" were taken; an early variety of small to medium size. The crop was far too heavy even on the thinned trees. This fact and the dry weather during the growing season partially

accounts for the small size of the plums. Although the results with plums were not so marked as in the case of peaches, the evidence points the same moral. In both cases it will be observed that the early thinning bore the most profitable results, and it will manifestly pay to commence all work of this kind immediately after the fruit sets."

THINNING at C. E. F.

Variety.	When Thinned.	Number of Thinned Specimens in ½ bushel.	Weight, of ½ bushel Thinned.	Number Specimens in ½ bushel not Thinned.	Weight of ½ bushel not Thinned.
			Lbs. Oz.		Lbs. Oz.
APPLES—					
Krimskoe	June 17	109	22·	126	22· 8
Duchess	" 17	96	19·	123	18· 4
PLUMS—					
R. B. W.-Seedling, No. 3	" 17	560	19·	640	18· 4

The above small experiment points the same moral and emphasizes the result obtained by Mr. Burrell.

APPLE STORING EXPERIMENTS.

Quite an extended series of trials were made last winter with a view of securing information regarding methods of storing apples in winter. Some of the points involved were (1) wrapped *versus* unwrapped fruit; (2) cellar *versus* ground floor storage; (3) close, *versus* ventilated packages. The experiments began in the autumn, were carried through the winter, the final examination being made July 29, 1897. Twenty-four varieties of apples were included in the trials. The results given below are averages:—

1. Wrapped *versus* unwrapped apples.

	Per cent. Sound.	Comparative weight. Scale of 100.
Wrapped and stored in cellar	42·	37
" store-room	36·	33
Unwrapped in cellar	32·8	29
" store-room	33·	23

Specimens wrapped in paper kept best, there were fewer rotten apples, and they lost least by evaporation. The ground floor store-room did not preserve them as well as the cellar.

CLOSE *versus* VENTILATED PACKAGES.

This was tested by packing equal quantities of six varieties of apples in boxes of the same make with, and without ventilation. Half of the cases were placed in the cellar the other half in the upper store-room.

Results.

Package.	Stored.	Per cent of fruit sound.
Not ventilated.	Cellar.	42
do	Store-room.	64·6
Ventilated.	Cellar.	49
do	Store-room,	45·8

The tight package preserved the fruit best in store-room, but not in cellar; per contra the ventilated did better in cellar than in storeroom.

GOOD KEEPERS.

1st. Class. *To April or later.*

Walbridge.	Lawver.	Scott's Winter.
Salome.	Sharp's Russet.	Ben Davis.
Rawles Janet.	Hartshorn	Thompson's 35.
Nodhead.	Swayzie Pomme Grise.	

2nd. Class. *To March.*

Watterson No. 3.	Golden Stone.
Ontario.	Pewaukee.
Flushing Spitzenberg.	Plumb's Cider.

3rd Class. *To February.*

Princess Louise.	Wealthy.	Haas.
McMahon.	Gideon.	Orange Winter.
Longfield.	Fameuse.	McIntosh.

ADDITIONAL NOTES ON COVER CROPS.

This subject was discussed somewhat exhaustively in the report for 1896. Several points of interest have presented themselves since that.

CLOVERS INJURED BY WINTER OF 1896-97.

The destruction of the clover crop by the severe weather of January, 1896, (without snow) was general throughout the Ottawa valley. *Mammoth Red* and *Common Red* were completely killed out in the Farm orchards. *Alfalfa* (*lucerne*) fared a little better, a small percentage of the plants showing vitality in the spring of 1897. It was noted that whenever the plots of Mammoth Red and Alfalfa over-lapped in the orchard that both varieties came through the winter better than when growing separately. Acting upon this hint, plots containing equal quantities of Alfalfa and Mammoth Red were sown last autumm. 6 pounds of each clover were used per acre and sown August 1st. The seed germinated uniformly and the plants made a strong growth which continued till the arrival of frosty nights. At this time the average height of the Alfalfa was 16 inches, and the Mammoth Red 10 inches. The one formed an appropriate complement to the other—the spreading stools of the Mammoth Red covering the ground with a thick mat beneath the more slender and taller growing Alfalfa.

SOWING THE SEED.—It is wise for orchard cover purposes to use not less than 25 pounds of seed per acre.

The soil should be in an excellent condition as regards tilth—entirely free of weeds and lumps or clods of earth. The best time to sow the seed at Ottawa is between July 25 and August 5. At this time purslane or "pursley" (*Portulaca oleracea*) is the most troublesome orchard weed. If it has obtained a foothold, the best thing to do is to turn it under with a gang plough. Surface cultivation will not exterminate it but merely check its growth, and that only during dry weather. The clover seed may be sown satisfactorily with a hand broadcasting seeder. If the soil is

in a proper condition—that is, has been thoroughly harrowed—all that is necessary afterwards is to roll it. This should be done immediately the seed is sown as it germinates so quickly, under favourable conditions, that a late rolling often does more harm than good by crushing the tender sprouts.

Part of the farm orchard was not seeded down this year until August 10. This was too late to hope for the best results. The open autumn, however, gave unusual opportunities for late growth and a fair cover was secured though not equal to other parts sown 10 days earlier.

FURTHER EXPERIMENTS IN THE PRESERVATION OF GRAPE JUICE.

The experiments in connection with the preservation of grape juice detailed in the Report for 1896 (page 166–8) were continued with other antiseptics and by different processes again this season.

The juice of five varieties of grapes was used, viz., Clinton, Black Elvira, Bacchus, Brant and Concord.

Amount of juice from 100 pounds of grapes of each variety :—

	Gals.	Qts.
Clinton, 100 pounds	8	0
Black Elvira, 100 pounds	8	2
Bacchus, 100 "	7	1
Brant, 100 "	7	0
Concord, 100 "	7	0

Series I.

Heated to 160° for 10 minutes. Bottled December, 1896.

Variety.	Quantity.	How Treated.	Condition, November, 1897.
Clinton	1 pint	Sugar, 2 oz	Slight boiled flavour; fresh, palatable.
Bacchus	1 "	" 2 oz	Fresh, palatable.
Brant	1 "	" 2 oz	Slightly soured.
Concord	1 "	" 2 oz	Fresh, but juice lacks briskness.
Black Elvira	1 "	" 2 oz	Palatable, good.

Series II.

Heated to 150° for 10 minutes. Bottled December, 1896.

Variety.	Quantity.	How Treated.	Condition, November 1, 1897.
Clinton	1 pint	Sugar, 2 oz.; salicylic acid, ·175 grms	Fresh, palatable; good flavour and condition.
Bacchus	1 "	Sugar, 2 oz., sal. acid ·175 grms	Milder than last, pleasant.
Brant	1 "	Sugar, 2oz., salicylic acid, ·175 grms	Juice light red in colour, pleasant flavour.
Concord	1 "	Sugar, 2 oz., sal. acid, ·175 grms	Muddy, flavour fair; no fermentation.
Black Elvira	1 "	Sugar, 2oz., salicylic acid ·175 grms	Mouldy, not in good condition.

SERIES III.

Bottled cold, December, 1896.

Variety.	Quantity.	How Treated.	Condition, November, 1897.
Clinton	1 pint .. .	Formalin, 4·8 c. c., 1%; sugar, 2 oz	Unfermented, flavour unpleasantly pungent.
Clinton (A).	1 "	Formalin, 2·4 c. c., ½%; sugar, 2 oz	Unfermented, very dark, flavour disagreeable.
Bacchus	1 "	Formalin, 4·8 c. c., 1%; sugar, 2 oz	Same disagreeable astringent after-taste.
Bacchus (A).	1 "	Sugar, 2 oz.; formalin, ½%	Unpalatable.
Brant	1 "	Formalin, 1%; sugar, 2oz.	Fermentation had not taken place in any case, but each sample was characterized by an unpleasant pungent burning after-taste, undoubtedly caused by the formalin.
Brant (A)...	1 "	Formalin, ½%; sugar, 2 oz.	
Concord	1 "	Formalin, 1%; sugar, 2 oz.	
Concord (A).	1 "	Formalin, ½%; sugar, 2 oz.	
Black Elvira	1 "	Formalin, 1%; sugar, 2 oz.	
B. Elvira (A)	1 "	Formalin, ½%; sugar, 2 oz.	

SERIES 1V.

Heated 10 minutes at 130° on two consecutive days. Bottled December, 1896.

Variety.	Quantity.	How Treated.	Condition November, 1897.
Clinton	1 pint	Sugar, 2 oz	Fermented.
Bacchus	1 "	" 2 oz.....	"
Brant ...	1 "	" 2 oz	"
Concord	1 "	" 2 oz.....	"
Black Elvira	1 "	" 2 oz.....	"

SERIES V.

Heated 10 minutes at 160°. Bottled December, 1896.

Variety.	Quantity.	How Treated.	Condition, November, 1897.
Clinton ...	1 pint	Without sugar.....	Fresh, unfermented ; rather acrid.
Bacchus	1 "	"	" brisk, pleasant acid, good.
Brant	1 "	"	" " palatable.
Concord	1 "	"	Rather insipid, unfermented.
Black Elvira	1 "	"	Fresh, acid slightly astringent.

SERIES VI.

Not heated. Bottled December, 1896.

Variety.	Quantity.	How Treated.	Condition, November, 1897.
Black Elvira	1 pint ...	Formalin, ½%; sugar, 2 oz.	Unfermented, unpleasant flavour.
" (A)	1 "	" ½%	Slightly fermented.
Clinton	1 "	" ½%; sugar, 2 oz.	Fairly good, unfermented.
Clinton (A).	1 "	" ½%	Disagreeable, flavour pronounced.
Bacchus	1 "	" ½%; sugar, 2 oz.	Unfermented, but unpleasant.

SERIES VII.

Heated 10 minutes at 170°. Bottled December, 1897.

Variety.	Quantity.	How Treated.	Condition, November, 1897.
Clinton	1 pint	Sugar, 4 oz	Sweet, pleasant, palatable, unfermented.
Black Elvira	1 "	" 4 oz	Astringent, unfermented.

DEDUCTIONS.

1. Formalin while a proved ferment arrester imparts such a disagreeable flavour to the juice that it cannot be used, at least as strong as in the proportion of $\frac{1}{4}$ per cent.

2. Sugar added to the juice with formalin masked the flavour of the latter somewhat, but did not obliterate it entirely.

3. Salicylic acid, ·175 grammes with 2 ounces sugar to each pint produced the most palatable beverage.

4. Samples were successfully preserved when heated for 10 minutes at 160°, with sugar at the rate of 2 ounces to each pint of juice. Duplicate samples without sugar were also successfully preserved but were not generally as palatable as the former.

5. 160° Fahr. seems to be the lowest safe temperature that may be used in the preservation of grape juice. The juice may be held at this temperature for 15 or 20 minutes without imparting to it any unpleasant boiled flavour.

SPRAYING.

The apple orchards on the Central Farm were sprayed four times with Bordeaux mixture and Paris green. As a result of this work it was difficult at harvesting time to find an imperfect specimen of fruit. Even such varieties as McIntosh Red and Lawver were almost entirely free from "apple spot." The formula used was that recommended by this division for the past four years, viz.: 4 pounds each of copper sulphate and lime to each barrel of water. Paris green was always added at the rate of 4 ounces to each barrel of the mixture. This did not entirely prevent injury from codling moth, but undoubtedly lessened the loss from this source very materially. In addition to this standard fungicide, Lysol—a substance mentioned in last year's report—and formalin, a new antiseptic, were tried with the following results.

Lysol.—Reference was made to this substance in the annual reports of 1895–96. It was strongly recommended as an insecticide and fungicide by some German horticulturists. The results secured here do not corroborate these reports, and no good reason can be shown why it should be recommended as a fungicide, though it is but fair to add that last year's work warranted a claim being made for its usefulness as an insecticide. The experiments of this season did not show that it promised qualities superior or equal to the present standard insecticides.

1. Four ounces to 5 gallons water, equal to $\frac{1}{2}$ per cent solution on Duchess apple trees. Three applications did not give marked results. Foliage and fruit were normal and healthy. The crop of apples on these trees was too small to allow of reliable comparison being made.

2. Eight ounces to five gallons of water equal to 1 per cent solution; foliage healthy; fruit somewhat gnarled. The gnarly appearance was noticed soon after the first application.

3. Twelve ounces to five gallons equal to 1½ per cent solution. Foliage continued healthy throughout the season. The fruit on one tree was fairly sound and clean, on the other it was badly deformed and rusty. This seemed justly attributable to the Lysol. Further additional reference to this substance will be found in connection with the peach spraying experiments.

Formalin.—This antiseptic and preservative was tested as a fungicide on Duchess apple trees in the following strengths:—

4. One ounce to five gallons of water. Foliage was not affected injuriously; fruit clean. Aphides present on foliage were not killed.

5. Two ounces to five gallons. This had no perceptible injurious or beneficial effect upon foliage or fruit. Aphides did not seem to be disturbed.

9. Four ounces to five gallons.; no injury to foliage. Three pecks of apples picked, only four specimens wormy. Check trees were wormy to the extent of 8 to 10 per cent only. This would seem to indicate that formalin possessed some deterrent influence against codling month.

BORDEAUX MIXTURE WITH PARIS GREEN *vs.* PARIS GREEN IN WATER.

This question is often asked: Is Paris green as efficacious against codling moth when used with Bordeaux mixture as when it is applied by itself? Careful experiments carried on in 1895 and 1896 answered the question in the affirmative. The experience of this season corroborates that of former years. Paris green was used in both cases at the rate of one pound to 160 gallons of fluid. Three applications were made. When applied in water alone considerable injury resulted to the foliage of the Tetofsky apple trees under experiment. No injury was noted in the case of other trees treated three times with Bordeaux mixture and Paris green. As to effects on codling moth larvæ a Transcendant crab tree sprayed with Bordeaux mixture and Paris green yielded five bushels of fruit. Of these, nine specimens only were wormy; one Hyslop treated as above, yielding three and one-quarter bushels, gave thirty-six wormy specimens.

PARIS GREEN AND WATER.

One Jumbo crab tree yielding one and one-quarter bushel gave five wormy specimens.

One Orion crab tree yielding one bushel gave fourteen wormy specimens.

It will be noted that the proportion of wormy apples is small in both cases and does not point to important practical differences. It is my opinion that it would not pay a fruit grower to incur the expense involved in making a separate application of Paris green in view of the very doubtful benefit derived.

BORDEAUX MIXTURE—SIX POUNDS OF COPPER SULPHATE *vs.* FOUR POUNDS.

Some horticulturists advise the use of six pounds of copper sulphate with four pounds of lime to each barrel of water in making Bordeaux mixture. This formula has in one or two instances given better results when used against potato rot, than formula 4:4. In combating diseases of fruit trees its advantages have never been apparent to me. If four applications are made, many varieties of apples will be more or less russetted by the 6:4 formula (See Rep., 1896, p. 174), and during seasons of heavy precipitation the foliage may suffer injury.

A careful comparison was made this year of the two formulas when applied to heavily laden crab trees. With the 4:4 formula the foliage and fruit were healthy and clean throughout the season. No injury to the leaves was observed, while with the 6:4 formula all the fruit was distinctly russetted and the foliage slightly scorched. In the case of a Quaker Beauty Crab part of the fruit was rendered unsalable. The number of wormy specimens in both series was about the same.

ARSENATE OF LEAD.

The experiments with this insecticide commenced in 1895, continued in 1896, were again carried on this year. The results would seem to indicate that it is an effective remedy against codling moth. The insecticide was made by dissolving one-half of an ounce of arsenate of soda in one quart of water, three-quarters of an ounce of acetate of lead in an equal quantity, then pouring the two together and diluting with water, to five gallons. This mixture sprayed three times on two trees of Orange crabs yielding five bushels, gave an average of five wormy specimens in each bushel.

ARSENATE OF LEAD WITH BORDEAUX MIXTURE.

The above formula was used in connection with Bordeaux mixture, 4 : 4 formula replacing Paris green. One tree each of Jumbo and Ball's Winter crab apples were selected. Three applications were made. The result was disastrous to both foliage and fruit. The former was badly scorched, while the latter was rendered entirely unfit for market on account of the skin bearing deep patches of russet besides numerous blotches and cracks. The number of wormy specimens averaged four to each bushel of fruit. Check trees standing alongside were healthy and normal, so that there seems no reason to doubt that the corrosive and injurious action was due to some unfavourable combination of the insecticide with the fungicide. In former experiments this injurious effect was not noted.

TABLE showing per cent of Sound and Wormy Fruit obtained by the different mixtures.

Mixture.	HANDPICKED.		WINDFALLS.		HANDPICKED AND WINDFALLS.
	Per cent Sound.	Per cent Wormy.	Per cent Sound.	Per cent Wormy.	Per cent Wormy.
1 Lysol ½ per cent sol	97·2	2·8	92·2	7·8	10·6
2 Lysol 1 per cent sol	92·7	7·3	80·	20	27·3
3 Lysol 1-1½ per cent sol	96·3	3·6	93·9	6·1	9·7
4 Formalin ⅛ per cent sol	100.	.....	94·1	5·9	5 9
5 Formalin ¼ per cent sol	98·9	1·1	85·	15·	16·1
6 Formalin ½ per cent sol	96·9	3·1	95·3	4·7	7·8
7 Bordeaux 4 : 4 Paris green	99·2	·8	98·9	1·1	1·9
8 Paris green	100·	.....	99·5	·5	·5
9 Bordeaux 6 : 4 Paris green	99·7	·3	99·2	·8	1·1
10 Paris green	98·8	1·2	99·6	·4	1·6
11 Arsenate of Lead	99 3	·7	98·8	1·2	1·9
12 Bordeaux mixture, arsenate of lead	100·	.....	99·	1·	1·
13 Checks	92·	8·	89·	11·	19·

SPRAYING EXPERIMENTS AT ST. CATHARINES.

(Superintended by Martin Burrell, Esq.)

Object of the experiment :—To prevent peach leaf curl, rot of the fruit of peach and plum, and orange rust of the quince.

Lysol of three strengths was used : (1) ½ per cent (2) 1 per cent, and (3) 1½ per cent. (4) Copper sulphate, 2 lbs. to 25 galls. of water for first application followed by Bordeaux mixture. (5) Bordeaux mixture, 3 : 3, 40 gallons. The first application was made on Apr. 17, when the peach buds were beginning to swell. The 2nd on May 22, 3rd on May 26 (repeated on account of rain), 5th on June 12, 6th on July 10.

RESULTS.

Lysol on peach trees. (1) ½ per cent. Effect on foliage: Twig blight (Monilia) was not arrested; leaf curl was abundant. Effect on fruit: No perceptible benefit. (2) 1 per cent; foliage, considerably "curled" and blighted. Fruit, an average amount of rot. (3) 1½ per cent; foliage, less affected by curl than No. 1 and 2. Twig blight in evidence. Fruit fairly sound. (4) Copper sulphate and Bordeaux mixture. The trees in this row developed yellows and were destroyed before harvesting time. (5) Bordeaux mixture 3 : 3 lbs., 40 galls., and Paris green, 3 oz. Foliage, five trees out of the six in this row were practically free of curl leaf. Twig blight caused by Monilia appeared here and there, no injury to the foliage was noted as an effect of the spray. Fruit almost free from rot. (6) Bordeaux mixture, 4 lbs. copper sulphate. 8 lbs. lime, 4 oz. Paris green. Four applications beginning May 22. This formula was compared with No. 5. At the time of the first application "curl leaf" had already developed and was not obviously checked by the spray. (7) Check row: badly affected by curl leaf; considerable blight.

Lysol was also used on *plum* trees, but without any apparent benefit 1½ per cent; solution injured the leaves slightly. On *quinces* it did not prevent the development of orange rust. Having tried this substance for three years with unsatisfactory results, there does not seem to be any good reason for retaining it longer among the list of insecticides and fungicides used as sprays.

Mr. Burrell makes the following observations:—

"In regard to the experimental work of spraying peach and plum trees to prevent curl leaf and rot, although you have the details, I might say that the season throughout was unfavourable for the successful application of the mixtures, frequent showers and rapid changes of temperature creating unusual and somewhat difficult conditions. Unfortunately, too, the disease of "yellows" appeared on several of the trees in one of the treated rows; these trees were of course promptly cut out and burned. While the spraying was not so effective as might have been desired against the peach curl and monilia, some good was accomplished; the fruit on the trees sprayed with the Bordeaux mixture being from 15 to 25 per cent freer from rot than on the unsprayed trees. The Lysol was not noticeably effective either as an insecticide or as a fungicide. The 1½ per cent solution (6 oz. to 10 galls.) was slightly injurious to the foliage. At this strength some of the smaller green aphides were killed, but the half grown and mature lice were unhurt.

"The applications to the quince trees for the prevention of orange rust were not productive of any very marked results, as very little orange rust appeared this year on any quince trees.

"I may say, however, in gathering the quinces I observed that the foliage of the two rows sprayed (4 times) with Bordeaux mixture was much more glossy and healthy than that on the rest of the trees, and that the quinces were uniformly good. The row sprayed with 'lysol' was much the same as the two unsprayed rows, and in each case the foliage was less healthy than on the rows treated with Bordeaux mixture, and some slight indications of rust were noticed."

DEDUCTIONS.

Lysol.—Gave no marked results either as a fungicide or insecticide.

Bordeaux mixture 3 : 3 gave the best results in preventing peach curl, fruit rot and twig blight. This standard remedy seems most effective and is therefore recommended. Care should be exercised in preparing the mixture in order that injury to peach and plum foliage may not result. It is wise to use *fresh lime* only, and expedient to employ the ferrocyanide of potassium test before applying Bordeaux mixture to peach trees.

TREATMENT OF APHIDES IN THE ORCHARD.

It is not often that orchard trees under good cultivation suffer from the attacks of aphides. The summer of 1897 was marked by the most serious visitation of this little insect that I have known. Plum trees were severely attacked throughout Ontario and Quebec. Cherry trees in some instances lost their foliage in midsummer, while in bad cases the growth of vigorous apple trees was completely arrested in midseason. The attack began in spring with the unfolding leaf buds and was continued with more or less vigour till the leaves fell. Two weeks of fiercely hot weather in July and again towards the end of August retarded the increase somewhat, but the check was only temporary. Nursery stock and young orchard trees suffered most. The Farm orchards were sprayed four times to prevent injury from this little pest. Among remedies the following were tried :—

KEROSENE EMULSION (Riley-Hubbard formula).

Rolfe apple tree.—Applied June 15. Examined June 16. A few (about 10 per cent) of aphis killed. Sprayed again June 17. Examined June 19. About 20 per cent of aphis killed. Leaves of tree quite rusty ; considerably injured by spray.

Rubicon apple tree.—Sprayed June 28. Examined June 29. Not more than 10 per cent killed ; foliage slightly spotted. Sprayed again July 3. Examined the following day. About 50 per cent of aphis killed ; foliage considerably injured.

Borsdorf apple tree.—Sprayed June 28. Examined June 29. About 80 per cent of aphis killed. Foliage badly injured. Sprayed again July 3. Examined July 5. Aphis nearly all dead, but foliage badly injured.

In every case where kerosene emulsion was used two or more times, the foliage was considerably injured although every care was exercised in preparing and applying the emulsion. For this reason other insecticides were tried.

TOBACCO WATER.

Made by soaking 8 lbs. of home grown tobacco leaf and stems in a barrel of water for 48 hours with 2 lbs. of soft soap added, applied to *Scotts Winter*. Three applications completely cleared the tree.

Rolfe apple tree.—Treated June 25. Examined June 26. About 50 per cent of aphis killed. Sprayed again June 26. Examined June 28. No living insects visible.

Fanny apple tree.—Treated on June 24, and again on the 26th. Examined June 28. A few colonies were found upon twigs that were not thoroughly sprayed.

Ordinary tobacco waste did not give satisfactory results. Three sprayings of tobacco water made from this material only killed about 50 per cent of the insects upon a Rubicon apple tree. The efficacy of this brand was increased by soaking the stems in hot water. One application destroyed about 95 per cent.

A tree of the *Peter apple*, sprayed once with tobacco decoction prepared as just described, was cleared of aphis on July 14, by one application.

TOBACCO WATER AND LEMON OIL.

One half pint of lemon oil was added to five gallons of water. This was applied to a badly infested *Scotts Winter* apple tree. A single application completely ridded the trees of aphis. The foliage and young wood were somewhat discoloured, but did not appear to be injured.

QUASSIA CHIPS AND WHALE OIL SOAP.

To prepare :—Quassia chips, 4 lbs., boiled ½ an hour in 4 gals. water. Whale oil soap, 2 lbs., stirred in. Diluted to 1 barrel or 45 gals. water.

Ruby Gem apple.—Sprayed on July 14. Examined July 16. About 90 per cent of aphis dead.

Glowing Coal apple.—Sprayed July 14. Insects all dead where leaves were not tightly curled. Other trees treated at the same time showed about the same results. Very much depended upon the thoroughness of the application. This held good all the way through.

SUMMARY.

1. For ease of preparation, cheapness, and efficacy against aphides tobacco water with soft soap or whale oil soap is recommended for general orchard use.
2. Tobacco water and lemon oil gave the most decisively satisfactory results. The lemon oil more than doubles the cost of the preparation which, without it, is less than one half cent per gallon.
3. Quassia chips and whale oil soap make an insecticide rather more expensive than the last and nearly as effective.
4. In spraying to destroy aphides the greatest possible care ought to be exercised in order that the liquid should reach every part of the lower leaf surface.
5. Two or three applications at intervals of a few days should be made in order to destroy the colonies escaping the first spray.

FUNGOUS DISEASES.

The year was marked by the vigour and activity of many of the fungous diseases parasitic on cultivated plants.

Apple spot (*Fusicladium dendriticum*, Fckl.) was phenomenally virulent upon the foliage of apple trees. This may be accounted for by the favourable climatic conditions for its growth, prevailing during the latter part of June and the greater portion of July. It is a regrettable fact that many growers omitted spraying their orchards this year on account of the small crop of fruit. This is bad policy and will not pay in the long run. Many orchards were partially and some completely defoliated in midsummer. So severe was the attack that growers in certain sections thought a new kind of blight had struck their orchards. It was, however, only an old enemy in new guise. Even orchards sprayed most carefully were not exempt by any means, but they were vastly superior in vigour of foliage to those not sprayed. Several cases of plum spot (*Cladosporium carpophilum* v. Thümen) affecting *apricots* were noted. In one instance the fruit was entirely destroyed. *Native plums* where not sprayed were again severely attacked. Owing to this cause not more than one-quarter of a crop was harvested in the Ottawa valley where this type of plum is largely grown. The native plum crop on the Central Farm was fair as to quantity and good as to quality. The trees were sprayed three times with Bordeaux mixture.

The season was also marked by a severe outbreak of the disease which so frequently injures Flemish Beauty pears, variously known as "pear cracking," "pear leaf blight," &c. (*Entomosporium maculatum*). *Numerous samples were received from widely separated sections showing the disease to be very general in its attack. Its presence in the orchard may be noted in early summer by the appearance of small black spots upon the leaves and smoky patches dotting the skin of the fruit. The leaf spots increase in size; the leaves turn yellow and fall in late summer; meantime the fruit spots have grown in size; invading the skin and assuming a horny external covering, they eventually check the growth of the pear causing uneven development, resulting in the growth of cracks in the skin and a general aborted and gnarled appearance.

Treatment.—Bordeaux mixture is invaluable in preventing the development of this disease. It is of little use if not applied as soon as the buds begin to swell. Four ap-

* It is probable that two or three distinct diseases are confused with the last named enemy. A bulletin upon this subject has recently been issued by the Cornell Experiment Station.

plications are necessary. It does not seem possible of late years to obtain a good sample of Flemish Beauty pears except with careful spraying.

Peach mildew appeared in a few orchards. This disease is superficial in habit of growth, causing grayish patches upon the fruit and covering the under side of the leaves and the bark of the young shoots with a powdery gray coating. It is often brought in from the south with young peach trees. If such trees develop the disease during the first season in orchard they should be discarded. Close pruning would undoubtedly check the growth of the disease, but it is unwise to begin orcharding with unhealthy trees. I have had no experience in spraying to prevent mildew, but see no good reason why standard fungicides should not be effective.

Shot hole fungus (Septoria pruni).—This parasite should rank among the first-class pests of the season. Many letters like the following were received. "Dear Sir:—What is the matter with the inclosed plum leaves? They are from Lombard's. The trees were planted five years ago, are in good sandy ground and have been well cultivated." Henry Shaw, Waterville, N.S. "Shot hole fungus" is readily recognized in its later stages by the small, neatly cut, circular perforations surrounded by a purplish ring which so plentifully mark affected leaves. It is a serious enemy to plum culture. Whenever a plum tree is enfeebled by uncongenial soil, the attacks of borers, or the effects of climate, shot hole fungus is nearly certain to appear. In cases of severe attack the tree loses its foliage prematurely. This prevents the fruit from ripening, the proper development of leaf and fruit buds, bringing about generally disastrous results.

Remedial.—If the trees are sprayed to prevent plum rot (*Monilia fructigena*), Septoria will also be largely prevented. The trouble is, that growers do not think it necessary to spray young trees not in bearing. Healthy foliage is essential to the proper storing of the leaf and fruit buds, and unless this is secured by spraying assisted by good cultivation, success will not be attained.

Grape mildew (*Peronospora*) was not so injurious as might have been expected on account of the character of the season, and yielded in the Farm vineyard to the persistent application of Bordeaux mixture.

GOOSEBERRY MILDEW.

This has been the chief difficulty met with at the Central Farm in the cultivation of the English gooseberry. The plantation is situated on light sandy loam. Although carefully sprayed each season there has always been present a certain amount of mildew. This combined with frost injury has rendered most of them unproductive. For further particulars (as to susceptibility of varieties) see notes on Gooseberries.

An experiment in shading the plants from the sun's rays by growing a hill of corn on the south, east and west sides was tried. The seed of a medium growing variety of corn was planted on the sides indicated, about two feet from the gooseberry plant.

Three plants each of the following varieties of gooseberries were shaded, viz., Snowball, Lady Leicester, Marigold, Conquering Hero, Fillbasket and Riccardo. (Notes taken Sept. 30.)

Results.

Scale 1 : 10. Healthy, 10. Badly diseased, 1.

Date, 1897.		Shaded.		Not shaded.
Aug. 16	Snowball..... 8	plants growing..	6	not growing.
do	Lady Leicester.... 7	do ..	7	growing.
do	Marigold..... 7	fair condition ...	5	very sickly.
do	Conquering Hero.. 5	poor condition...	6	fair condition.
do	Fillbasket..... 9	good condition...	7	fair condition.
do	Riccardo.....10	healthy.....	9	good condition.

With one exception the plants protected by the growth of corn were healthier than plants of the same variety not so protected. These results should only be regarded as indicative and not conclusive. The experiment should be repeated on a larger scale another year on the same plantation. With regard to fungicides. Bordeaux mixture was applied in the forepart of the season—later when this began to stain the fruit, a weak solution (1 pound to 160 gallons) of copper sulphate was applied. This proved fairly effective. Weekly applications were necessary, however, in order to hold the disease in check. It seemed quite as effective as ammoniacal copper carbonate, is much easier prepared and exceedingly cheap. It is best to have a concentrated solution on hand which may be diluted as needed.

FUNGUS (*Heterosporium gracile*, Sacc.)

Many species of Iris in the perennial border were severely attacked by the above named fungous disease. It is first noticed by the presence of circular yellow spots upon the foliage. These spots increase in size and number; the leaves wither and the flower stalks fail to develop, or wither in the act of flowering. At this stage, if the plant is pulled up the bulb will in most cases be found to be affected with a soft rot resembling very much the crown rot which so frequently destroys celery in winter. This disease develops and spreads rapidly in cool moist weather, such as characterized the month of July. It usually appears in the first half of June, its later development depending upon temperature and moisture. The German Iris section appears to be more susceptible to the disease than other types. This parasite is a serious drawback to the cultivation of the Iris.

Treatment.—Bordeaux mixture was used with apparently good effect, although no exact comparisons were made. When plants are badly diseased it is wise to dig them up and burn them. In the case of a badly infested bed it is advisable to remove the healthy plants to new ground and use the old ground for some other class of plants.

A DRY ROT OF APPLES.

A preliminary note regarding the appearance of this fungus was made in last year's Report (see page 171). The disease again appeared this year, being present upon St. Lawrence as early as Aug. 25. No other additions to the list of affected varieties given last year were noted. Dr. W. T. Connell has been engaged in studying the parasite during the past year, but is not yet ready to report the results of his investigations which he hopes to complete to his own satisfaction this autumn. The fungus found in greatest abundance in the affected areas is one closely resembling *Penicillium glaucum.*

A PEACH DISEASE.

During the past three years I have received from time to time, chiefly through the kind offices of Mr. Milton G. Bruner, Olinda, Ont., specimen peach twigs very much resembling in general characteristics those affected with peach rosette. On July 20, 1897, Mr. Bruner forwarded a number of samples, writing as follows:—"I send you by this mail samples of peach twigs affected by a disease resembling the descriptions I have read of rosette. The specimens are from two different orchards. One of them from Mr. Conover's, near Leamington. This orchard is well cared for and is one of the handsomest in that vicinity. It shows that he has spared no pains in looking after it. The foliage of most of the trees looks healthy and unaffected; trees are making a vigorous growth; yet it is polluted with this rosette-like disease. Peach growers are becoming alarmed, as whereever it has made its appearance it has spread steadily and quite rapidly. It affects orchards at Leamington, as well as Olinda, and seems to have taken a strong hold at both places."

The external characteristics of the disease, are (1) abnormally thickened annual shoots; (2) a marked conduplication of buds; (3) tufted, broom-like growths involving a single twig or branch or sometimes the entire top of a tree; (4) the colour of the foliage a somewhat lighter green than normal; (5) leaves much narrowed and contorted. Upon examining the orchards in question, I found that often a single tufted branch would be noticed upon a tree; again, half of the top would be involved and on other occasions

the entire tree would bear the peculiar tufted broom-like growths. The twigs were always abnormally thickened by the shortening of the internodes and the close packing together of the buds. Affected trees are not known to recover; growth is greatly retarded and such trees are usually barren. As the disease Peach rosette (whose life history, like the yellow's, has never been worked out) is peculiar to the south and unknown here, specimen twigs taken from these trees were submitted to Dr. Edwin F. Smith, Assistant Pathologist U. S. Dept. of Agriculture, Washington, D.C. Dr. Smith writes under date of July 8, that "the tufted shoots somewhat resemble rosette, but I do not like to pronounce it such. If it is a genuine rosette, the limbs bearing such growths will die this fall, or be dead next spring." In answer to further letters on the subject he writes on August 8, that "the samples sent are not affected with rosette." This is satisfactory as far as the disease known by that name is concerned, but the form so much resembling it at Olinda and Leamington appears to be as much to be dreaded. Not only do trees attacked, not recover, but a single specimen appears to act as a centre from which the malady spreads slowly throughout the orchard.

Remedial.—While true rosette has not been found in the northern peach-growing states it is to be hoped that we have not already a form equally injurious. In view of this possibility, peach growers should not hesitate to remove promptly trees that show symptoms of the presence of this obscure enemy. I am pleased to state that through the intelligent and energetic efforts of Mr. Bruner (fruit tree inspector) fruit growers in the neighbourhood of Olinda are amply warned regarding the gravity of the case and the necessity of instituting radical preventive measures. I regard this enemy as one of the most serious affecting the peach interests of the western peninsula of Ontario, and fruit growers are urged to apply the most heroic treatment possible when these rosette-like growths make their appearance. The mere removal of the affected branch is not sufficient; the tree must come out root and branch.

A SERIOUS GRAPE TROUBLE.

For a number of years—six or seven or more—grape growers between Hamilton and Niagara Falls have noticed here and there in their vineyards unthrifty and sickly looking vines. In some instances the trouble would be confined to a few vines occupying a small area. Again it would be more or less scattered throughout the vineyard. It was brought to my notice in the summer of 1896, by a letter, accompanied with grape foliage, forwarded by Mr. W. M. Hendershott, St. David's, Ont. Early in June of the same year, Mr. L. Woolverton, of Grimsby, forwarded a vine similarly affected, and on 26th June wrote as follows :—

GRIMSBY, 16th June, 1896.

DEAR MR. CRAIG,—I received your letter regarding the affected grape vine, and since that time have been examining the vine more particularly, root, branches and leaves, but have not yet been able to discover any cause for the peculiar disease. To-day Mr. L. Hagar called me in to see his vineyard, and I found that it was sadly affected with the same trouble. He has a large vineyard, and in it there appear to be at least two or three hundred vines that are dying, because of the disease. It appears to be spreading. Last year it began with a few vines of Moore's Early, which were destroyed by it, and this year it has extended as I have stated above. Evidently it is a very serious trouble, and requires immediate attention, or the whole vineyard will be destroyed. Strange to say, it is mostly the Concord which is affected with him, a variety which is seldom infested by Phylloxera. I have dug up a whole vine in Mr. Hagar's vineyard, and forwarded it to you by mail, so that you may have it carefully examined. Please do this and send me your reply as early as possible, in order that we may know what treatment to give our vines.

I am, sir,

Yours very truly,

L. WOOLVERTON.

APPEARANCE OF AFFECTED VINES.

Leaves.—The older leaves normal as to size, but lighter in colour than normal; leaves towards the ends of the canes only partially developed thin, yellow to light, yellow in colour.

Canes.—Short jointed; tendrils often abortive. The trouble manifests its presence by the appearance of yellow coloured areas upon the leaves; these extend until the entire leaf is involved. Growth is checked and becomes sluggish as the leaves turn yellow. When the vine is seriously affected, the older leaves drop off, the younger ones turn deep yellow, remain only partially developed. This with the short-jointed character of the wood renders such vines easily recognizable in the vineyard.

Roots.—The root system of affected vines is very imperfect. As the trouble progresses, the laterals lose vitality, decay and fall away, so that a badly affected vine has only the larger system of roots. The lower rootlets appear to die first, and vines were examined which had completely lost the roots originally thrown out from the base of the cutting. The vines most affected in Mr. Hagar's vineyard were those situated on the lower levels and were chiefly confined to Concord's and Moore's Early. This vineyard, in common with many others in that vicinity, is situated near the base of the ridge which bounds the peach belt along the shore of Lake Ontario

Mr. Hagar has lost over one hundred vines of Moore's Early and Concords from this cause Mr. Hendershott's vineyard at St. David's is similarly situated, and is flanked by the limestone ridge. As in the case of Mr. Hagar the vines on the lower portions are usually effected more than those on the higher levels. Roger's varieties, Moore's Early, and Concord suffer most, while Niagara seems to be fairly exempt. The malady makes its appearance soon after growth begins and reaches its height about the end of June or middle of July. In cases of mild attack it may disappear to a large extent as the season advances, notably more pronouncedly during dry seasons than in wet ones—though this may not be considered an invariable rule. Vines lightly affected frequently recover sufficiently to perfect their fruit. Those badly attacked lose their fruit after the leaves. Moore's Early succumbs more readily than other varieties and dwindles down to unhealthly sprouting crowns in two or three years.

Microscopic Examination.—Parts of the affected plants were submitted to Mr. J. Dearness, London, Ont., who kindly reports as follows under date of 6th July :—

"The cause of this disease of the grape is obscure to me. In petioles of discoloured leaves and peduncles of the fruit bunches, I find abundance of minute oval to round spore-like bodies requiring a high magnification to define, but no mycelium or other vegetable phase of an ordinary fungus. These may be bacterial, possibly produced in the disorganized tissue without being the cause of it. The small branches of the root have a diseased appearance, but although I have teased a number of scrapings, shreds and sections of these under the microscope, I fail to find fungus or eggs, sloughs, etc., of aphides or Phylloxera. The roots from the thickness of a pencil upwards seem all right. May there be some injurious cause affecting spongioles and absorption areas of the root tips? So far as I can form an opinion it inclines to locating the disease in the green tissues of the plant. In section after section through the petioles the cambium is destroyed, medullary rays more or less collapsed, in fact nothing left retaining form but cortex bundles and pith."

Specimens were also submitted to the chief of the Division of Vegetable Pathology, Washington, D.C., but nothing definite was learned regarding the cause. Mr. Galloway writes that "the specimens show no fungus attacks, such injuries might result from the plants being in dry soil or wet soil. Grapes affected with a root rot due to a fungus sometimes behave in the manner described by you."

Remedial Experiments.—Presuming that the trouble might be due to unfavourable soil conditions producing imperfect nutrition, some fertilizer experiments were planned and commenced last spring at St. David's and at Grimsby.

Experimental Farms.

The following diagram shows the plan of the experiment, arranged at both places. The fertilizers used were kindly furnished free of cost by the German Kali Works of New York at the instance of Mr. B. VonHerff, to whom I am indebted for valued suggestions in this connection.

I visited both vineyards three times during the summer, noting carefully the health and conditions of the vines in each plot. Nothing definite was ascertained—the work will in all probability need to be continued for a number of years before safe conclusions may be formed.

The plot experiments aim to determine whether the presence or absence of lime plays any important part in producing the characteristic unhealthy condition of the vines. If carried out thoroughly a large amount of additional information will undoubtedly be gained incidentally. The question of where, when and how to use commercial fertilizers is one of great importance to the fruit growers of the Niagara district. It is believed that these experiments inaugurate a line of work that will prove of great value to those who follow up-to-date practices in feeding their vineyards.

The series of plots on the right duplicate those on the left, but in each case 100 pounds of lime has been given in addition.

FERTILIZER EXPERIMENTS, GRAPES, APRIL, 1897.

(W. M. Hendershott, St. David's, Ont.)

27 Vines in each Plot. Plots 30 x 90 feet.

N.

1	30 lbs. Acid Phosphate. 6 " Muriate of Potash.	Ditto. 100 lbs. Lime.	1*a*
2	6 lbs. Muriate of Potash. 10 " Nitrate of Soda.	Ditto. 100 lbs. Lime.	2*a*
3	No Fertilizer.	100 lbs. Lime.	3*a*
4	30 lbs. Acid Phosphate. 10 " Nitrate of Soda.	Ditto. 100 lbs. Lime.	4*a*
W.			E.
5	30 lbs. Acid Phosphate. 10 " Nitrate of Soda. 6 " Muriate of Potash.	Ditto. 100 lbs. Lime.	5*a*
6	30 lbs. Acid Phosphate. 10 " Nitrate of Soda. 12 " Muriate of Potash.	Ditto. 100 lbs. Lime.	6*a*
7	30 lbs. Acid Phosphate. 10 " Nitrate of Soda. 12 " Sulphate of Potash.	Ditto. 100 lbs. Lime.	7*a*
8	No Fertilizer.	100 lbs. Lime.	8*a*

S.

POTATO SCAB.

A large amount of experimental work has been devoted by station workers to the potato disease known as "scab." To Prof. Bolley, of North Dakota Experimental Station, is due the credit of discovering the nature of the malady, and a remedy—corrosive sublimate—which has proved eminently successful in fighting the disease. The dangerously poisonous character of the remedial agent gives it a decidedly undesirable feature. In searching for a germicide less harmful to the person handling it, Prof. Arthur, of the Indiana Experiment Station, reported last winter, through the columns of the agricultural press, and later by special bulletin, that formalin (formic aldehyde), a lately introduced and harmless antiseptic substance, had given him better results in combating potato scab than had corrosive sublimate.

While potato scab is not in potato culture in Eastern Canada a disease of the first importance, yet a considerable percentage of the potato crop is rendered unsaleable by this disease each year. Some experiments were therefore planned and carried out, having for their object the determination of the comparative value of various substances in preventing this disease. Two varieties of potatoes—Clark's No. 1 and Northern Spy—were selected for the trial. The potatoes were washed and found to be an average sample, with a fair proportion of scabby specimens. Each variety was divided into 18 lots of 5 pounds each, care being taken to make the samples as even as possible as to quality. Each sample was soaked for two hours in one of the germicidal solutions. In the case of sample H the potatoes, when cut, were rolled in the *flowers of sulphur*. They were all planted, May 21, on a clean piece of unmanured, sandy loam. They were given good cultivation and sprayed to prevent injury from potato bugs. Each lot occupied 50 feet in the row. The crop was harvested on September 29, the rotten potatoes being separated from the sound and weighed. In order to get an estimate of the percentage of scabby potatoes, an average peck of the produce of each sample planted was selected and the number of diseased specimens counted out. Full particulars are given in the subjoined tabular statement.

EXPERIMENTS TO PREVENT POTATO SCAB.

Potatoes planted 21st May ; Harvested 29th September ; 5 pounds of seed used in each case. Each row 50 feet long.

—	Weight of Sound Potatoes.		Weight of Rotten Potatoes.		Number of Scabby Potatoes in a Peck.	Number of Clean Potatoes in a Peck.
	Lbs.	Oz.	Lbs.	Oz.		
A Clark's No. 1	69	..	3	8	3	85
A Northern Spy	51	..	..	..	2	42
B Clark's No. 1	60	.	3	8	17	75
B Northern Spy	59	8	..	..	4	33
Check—						
Clark's No. 1	62	..	4	..	20	70
Northern Spy	66	..	..	..	.....	48
C Clark's No. 1	70	8	3	8	7	72
C Northern Spy	71	..	..	..	3	49
D Clark's No. 1	45	..	3	..	12	94
D Northern Spy	66	8	..	..	1	42
Check—						
Clark's No. 1	50	..	8	..	43	33
Northern Spy	69	8	1	..	..	36

EXPERIMENTS TO PREVENT POTATO SCAB—*Concluded.*

—	Weight of Sound Potatoes.		Weight of Rotten Potatoes.		Number of Scabby Potatoes in a Peck.	Number of Clean Potatoes in a Peck.
	Lbs.	Oz.	Lbs.	Oz.		
E Clark's No. 1	62	8	4	8	6	73
E Northern Spy	51	8	..	..	5	67
G Clark's No. 1	55	8	4	8	28	77
G Northern Spy	50	..	..	8	7	66
Check—						
Clark's No. 1	59	8	4	8	40	63
Northern Spy	65	..	..	8	.....	41
H Clark's No. 1	52	8	2	8	15	97
H Northern Spy	47	8	..	..	2	66
F Clark's No. 1	36	8	1	8	23	98
F Northern Spy	52	..	..	..	.....	82
M Clark's No. 1	28	..	5	..	.....	90
M Northern Spy	38	8	..	..	.....	88
Duplicate—						
L Northern Spy	16	8	..	..	.....	157
L " planted 23rd June, 1897	19	..	..	..	.....	140
I Clark's No. 1	57	..	6	8	16	60
I Northern Spy	48	8	..	..	7	62
J Clark's No. 1	52	8	3	8	38	47
J Northern Spy	60	..	..	..	14	56
Check—						
Clark's No. 1	43	8	4	8	74	3
Northern Spy	47	8	..	..	17	53
K Clark's No. 1	64	8	4	..	25	64
K Northern Spy	73	..	..	..	7	67
L Clark's No. 1	4	..	1	..	.....	53
L Northern Spy	22	..	..	..	.....	85
Check—						
Clark's No. 1	50	8	5	8	33	54
Northern Spy	64	..	..	..	6	70
Duplicate—						
M Northern Spy	24	8	..	..	3	111
M " planted 23rd June, 1897	29	8	..	..	.....	99

GERMICIDES.

A Corrosive sublimate, ½ ounce to 4 gallons of water.
B Kainite 8 ounces " "
C Nitrate of soda 4 " " "
D " " 2 " " "
E Potassium sulphide 1 " " "
F " " 2 " " "
G Nitrate of soda 1⅛ " " "
H Flowers of sulphur (seed rolled).
I Formalin, 2 ounces to 4 gallons of water.
J " 1 " " "
K " ½ " " "
L Lysol, 3 per cent solution.
M " 1½ " "

DEDUCTIONS.

It will be seen that the variety Northern Spy was affected to a very small extent by either rot or scab, so that the weight of evidence is given by Clark's No. 1. It will here be noted that over 90 per cent of the yield of the check (untreated) plots of this variety were affected by scab.

In this experiment, as in that reported later in connection with treating bean seed, Lysol gave the most decisively satisfactory results. Corrosive sublimate ranks next, with a very small percentage of affected tubers. Formalin gave very unsatisfactory results as compared to lysol and corrosive sublimate. I cannot account for this variance with the results secured by Professor Arthur. It will be noted that there were duplicate plots of the lysol treated seed, and that the results are harmonious throughout. Nitrate of soda and kainit both gave better results than formalin.

ROSES INJURED BY ABUNDANT GROWTH OF MUCOR.

Rather an unusual occurrence is described in the following letter, which accompanied a package of rose foliage arriving on 3rd May last:—

"MONTREAL, May 3, 1897.

"DEAR SIR,—The inclosed leaves you will find are covered with black dots. Whether it is a fungus or scale insect I should like to know. The leaves are from rose bushes forced under glass in the usual way with florists in this country. The roses are in good condition as to health and vigour, and the fungus, or whatever it is, has appeared only within the last two weeks. About two weeks ago we mulched the rose beds with fresh cow manure obtained from a neighbouring farm. I think it is from this source it came, as it is only since then that it has appeared, and now the whole house is covered with it, even the glass and woodwork. Other plants in the same house are covered with it also. If you can inform me of any means whereby I can cure it and get the house cleaned, I will feel much obliged to you.

"Yours sincerely,

"GEORGE KERR,

"*Gardener to C. Campbell.*"

I took occasion to visit the houses in question, and found the condition of the plants substantially as described by Mr. Kerr. The fresh cow manure laid over the bushes to the depth of three to four inches had furnished the right conditions for the rapid growth of *mucor*, a low form of saprophytic fungus. The small black spherical bodies, like little pellets, covering the rose leaves, mostly on the under sides, were the sporangia of the organism. These had been adjuncted with such force as to carry them a distance of four and a half feet from the breeding beds and lodge them on leaves, glass, woodwork or whatever they might strike. The propelling power seemed remarkable. This organism, while not parasitic in character, rendered the flowers and plants unsaleable and caused considerable loss. The fermentive action was promptly arrested by covering the beds with a light coating of air slaked lime—land plaster would probably serve equally well. Under ordinary circumstances the sporangia will begin to be ejected about ten days after the application of the manure to the beds.

CELERY LEAF SPOT (*Cercospora apii*).

The prevalence of celery leaf spot or rust as it is called by gardeners was the source of much loss this year to the truck growers in the vicinity of large cities,

"OUTREMONT, August 3.

"DEAR SIR —Inclosed please find a few celery leaves that I picked from my celery patch. They become rusted and fall off, which prevents, to a large extent, the head from forming. Kindly inform me the cause, and give a remedy to prevent it, as it is a great

loss to me. The soil is a light loam with very little sand and underlaid with gravel. This is the second year that celery has been grown on the same ground. An early reply will greatly oblige.

"Very respectfully,

"MAURICE RODLEY."

This disease caused considerable damage to the trial plots of celery grown on gravelly soil on the Experimental Farm and fertilized with spent hot-bed manure. Where this manure was not used the disease was much less injurious. It was kept in check with fair success by using Bordeaux mixture. When the plants are badly attacked all affected leaves should be removed by hand before applying the fungicide. The old trench system with its coating of barn-yard manure on bottom is to be discouraged.

A FUNGOUS PARASITE OF SAN JOSE SCALE.

Prof. Rolfs, Botanist to the Florida Experiment Station, reported last summer the discovery of a fungous parasite (*Sphærophila coccophila*) attacking a native scale (*Aspidiotus obscurus*) of Florida. He was also successful in transplanting the parasite to colonies of San José scale (*A. perniciosus*) Coms., in neighbouring orchards where it flourished even to the extinction of its pernicious host. This was a most important discovery, notices of the work of Prof. Rolfs appeared contemporaneously with the discovery of the San José scale in some of the orchards of southern Ontario. I immediately secured, through the kindness of Prof. Rolfs, a quantity of parasitized scales in the hope of establishing this friend of the fruit grower in infested Canadian orchards. Cultures of the fungus were made by Dr. W. T. Connell of Queen's University, Kingston. These were taken to St. Catharines, Ontario and applied to several trees of Abundance plum, badly infested by San José scale. One treated tree was inclosed in a covering, or tent of cheese cloth and examined from time to time. At the close of the season, the presence of the parasite could not be detected by the aid of a hand lense upon the treated trees under cover or unprotected and a laboratory examination made by Dr. Connell later in the season failed to discover any trace of growth or development of the fungus. It is possible that had the climatic conditions been different the trial might have been successful. As regards moisture the conditions were favourable, but the temperature was rather below the normal for a few days succeeding the application of the cultures. I believe, however, the trial on the whole was a fair one, and failing to succeed, this parasite cannot be looked upon as a practical preventive of San José scale in the climate of southern Ontario.

The following letters from Dr. Connell show the good work done by him in this connection.

"KINGSTON, 6th August.

"DEAR SIR,—I inoculated the plum wood affected with the San José scale, with the scale fungus *Sphærophila coccophila* on Friday last, 30th July. I have examined it from time to time since, and find that the fungus is growing well, invading the bark, and in many cases attacks and grows into the bodies of the scale insect themselves. Whether it grows into the insect during life, I cannot yet say, but it appears highly probable that such is the case.

"My method of inoculation was to brush over portions of the wood (bark) a watery dilution of the fungus grown on bread. I find that when wood is kept dry, that growth is very slight ; while when more moist, growth occurs freely in bark.

"Yours very truly,

"W. T. CONNELL.

"KINGSTON, 23rd August.

"DEAR SIR,—I have carefully examined the specimens of plum wood sent by you a few days since. I have not been able to detect any of the scale fungus (*Sphærophila coccophila*) upon the wood.

"With regard to the plum wood, inoculated by myself the early part of this month, with the Fungus, I (as I reported) obtained a good growth. The Fungus simply penetrates the surface layers and remains quite superficial. It has attacked most of the insects, but occasionally one is noted not attacked. Growth ceases when the wood is dried.

"Yours very truly,

"W. T. CONNELL."

BEAN ANTHRACNOSE.

(*Colletotrichium Lindemuthianum*, Sacc.)

This serious disease affecting bush beans was treated of in the annual report for 1892, and again in 1894. It was again very prevalent the past season. In previous reports soaking the seed in copper sulphate 1 oz. to 2 gals. of water, and spraying the plants subsequently with Bordeaux mixture was recommended. In the following table the results obtained from soaking the seed of Early Mohawk in various substances—most of them germicidal in character—are submitted. It will be seen that Lysol in the proportion of 1½ pound to 100 pounds of water gave exceedingly satisfactory results; four per cent only, of the pods being spotted when this substance was used. Formalin was also exceedingly satisfactory, standing second in order of efficacy. There is little to choose between the three solutions of this substance used. Potassium sulphide, a well-known germicide, stands third in order of efficacy. Nitrate of soda, corrosive sublimate and kainit follow in the order named. The two latter do not show marked germicidal qualities. If further trials with this substance should corroborate these results, Lysol should then supersede copper sulphate as a preventive of bean anthracnose, as the results obtained here are much more satisfactory than those obtained in the former experiments with copper sulphate.

VEGETABLES.

SOAKING SEED IN VARIOUS SUBSTANCES TO PREVENT BEAN ANTHRACNOSE.

Seed sown May 22. 2 oz. seed to 20 feet of row.

Variety.	Seed soaked 2 hours. Substances used.	Weight of 500 Pods.	Number Pods Spotted in 500.	Number Pods Clean in 500.	Weight of Beans when Thrashed out.	Percentage of Pods Diseased.
		Lbs. Oz.			Lbs. Oz.	
Mohawk. ..	Corrosive sublimate: ½ oz. to 4 galls	9 0	82	418	5 9	19
"	Kainit: ½ lb. to 4 galls. water	10 0	134	366	5 6	36
" ..	Nitrate of soda: 1 oz. to 1 gall. water	8 0	68	432	5 2	15
"	Nitrate of soda: 1 oz. to 2 galls. water	10 0	71	429	4 10	16
"	Potassium sulphide: ½ oz. to 2 galls. water	10 0	41	459	5 2	9
"	Nitrate of soda: 1 oz. to 3 galls. water	9 0	58	442	4 12	13
" ...	Formalin: 1 oz. to 2 galls. water	8 0	46	454	4 3	10
"	" ½ " ..	10 0	38	462	4 12	8
"	" ¼ " .	11 0	40	460	5 8	9
"	Lysol: 3 per cent solution.....	Failed to germinate.				
"	" 1½ " .	9 0	20	480	4 14	4
"	*Check untreated.....	.....	.....	....	... .	57

* From Report of 1892.

Beans—Variety Tests.

The varietal test of bush beans detailed in the accompanying table includes 48 kinds. Thirty feet of row of each variety was sown either on May 17 or May 18. Very few varieties were exempt from anthracnose.

Early Varieties.	Late Varieties.	Medium Early.
Challenge Wax.	Boston Favourite.	Detroit Wax.
Black-eyed Wax.	Emperor William.	Early Refugee.
White Advancer.	White Marrow.	Golden Refugee.
Wardwell's Dwarf Kidney.	Refugee or 1,000 to 1.	Ne Plus Ultra.

Experiments with Beans all Sown 17th and 18th May—Table I.

Bush Beans.	Ready for Table.	Total Weight of Green Pods.	Length of Row.	Remarks.
Variety.		Lbs. Oz.	Feet.	
Algerian Black Wax	July 16..	17 0	30	Foliage and pods slightly rusted; pods round yellow; a fair to good grower.
Black Eyed Wax	" 10..	16 0	26	Foliage and pods slightly rusted; a dwarf grower.
Best of all Bush	" 26..	18 12	30	Foliage slightly rusted; pods clean; long green; slightly flattened; good.
Boston Favourite Large Goddard.	" 23..	23 5	30	Foliage and pods slightly rusted; robust grower; inclined to run; pods green; smooth.
Bismarck Black Wax	" 16..	10 13	30	Foliage and pods considerably rusted; pods yellow; nearly round; of fair length.
Burpee's New Stringless Green Pod	" 14..	5 13	10	Foliage slightly rusted; pods slightly rusted; pods green; nearly round.
Challenge Wax	" 9..	18 8	30	Foliage considerably rusted; pods slightly; pods yellow; nearly round.
Canadian Wonder, French	Aug. 6..	17 6	25	Foliage and pods considerably rusted; pods long; green.
Detroit Wax	July 14..	19 8	30	Foliage slightly rusted; pods flat; yellow; a fairly good bean.
Date Wax.	" 16..	13 2	30	Foliage considerably rusted; pods slightly; dwarf grower.
Dwarf Lyonnaise	Aug. 6..	17 9	26	Foliage and pods slightly rusted; pods long; green; inclined to curl.
Dwarf White Wax	July 18..	13 7	26	Foliage very slightly rusted; pod yellow; flat; medium size.
Dwarf Mexican Tree	Aug. 24..	18 8	30	Healthy; pods short green.
Dwarf Blue Podded Butter	July 16..	8 6	15	Foliage slightly rusted; a long, blue flat pod.
Early China	" 14..	15 9	30	Foliage considerably rusted; pods slightly; pods green.
Emperor William	" 17..	19 4	30	Foliage badly rusted, pods slightly; foliage rough; pods rough and unshapely.
Early Mohawk	" 14..	18 4	30	Foliage slightly rusted; pods clean.
Extra Early Maine Bush	" 16..	24 5	30	Foliage very slightly rusted; pods clean, long and smooth; a good grower; an excellent bean.
Extra Early Refugee	" 16..	19 4	30	Foliage and pods very slightly rusted; pods green; nearly round.
Early Long Yellow Six Weeks	" 16..	12 7	30	Foliage considerably rusted; pods slightly; pods green, long and flat.
Extra Early Valentine	" 16..	21 1	30	Foliage very slightly rusted; pods healthy; green; of good size.
Emperor William	" 23..	13 2	25	Foliage considerably rusted; pods slightly; pods green; flat.
Extra Early Refugee	" 16..	27 6	30	Healthy; free grower; yellow pod; roundish.

EXPERIMENTS WITH BEANS, &C.—TABLE I.—*Concluded.*

Bush Beans.	Ready for Table.	Total Weight of Green Pods.	Length of Row.	Remarks.
		Lbs. Oz.	Feet.	
Extra Early Market	Aug. 6..	6 2	10	Foliage and pods very slightly rusted; pods long; green; nearly round.
Golden Eyed Wax	July 16..	23 14	30	Healthy; good grower; clean foliage; pods yellow; smooth; long; flat.
Golden Refugee	Aug. 8..	27 14	30	Healthy; pods yellow; medium size; nearly round.
Improved Prolific Black Wax	July 16..	15 7	30	Foliage very slightly rusted; pods yellow; slightly rusted.
Improved Golden Wax Bush	" 14..	23 3	30	Foliage and pods slightly rusted; pod yellow; flat.
Longsword, French	" 12..	23 8	30	Foliage slightly rusted; pods green and smooth, 5 to 7 inches long.
Large White Kidney or Royal Dwarf	" 31..	21 5	30	Foliage and pods very slightly rusted; pods medium length; flat; green.
Low's Companion	" 25..	21 13	30	Foliage slightly rusted; pods long; green; flat.
Marvele of Paris	" 16..	29 11	30	Healthy; pods green; long; smooth; a good variety.
Marblehead Dwarf Horticultural (Lima)	" 10..	12 4	30	Foliage and pods considerably rusted; a poor variety here.
Nettle Leaved Bagnolet	" 12..	15 7	30	Foliage badly rusted, pods slightly; pods green; flat.
Ne Plus Ultra	" 16..	18 2	30	Foliage and pods slightly rusted; pods long; green; flat.
Pride of Newtown	" 14..	23 1	30	Foliage and pods slightly rusted; pod green; long; flat; a good variety.
Round Yellow Six Weeks	" 16..	11 1	30	Foliage slightly rusted; dwarf grower; fair length of pod.
Refugee or 1,000 to 1	Aug. 6..	33 8	30	Foliage healthy; pods slightly rusted; robust grower, with whitish pods; a good late variety.
Refugee Wax	July 14..	20 6	30	Foliage and pods slightly rusted; yellow round pod; a fair variety.
Red Flageolet Wax	" 16.	12 1	25	Foliage slightly rusted: pods yellow; flat; smooth and good.
Rust Proof Golden Wax	" 14..	15 5	30	Foliage and pods considerably rusted; pods long; yellow; flat.
Triumph of the Frames	" 14..	8 1	22	Foliage slightly rusted; pods clean at first; rusted late in the season; dwarf grower; a fair bean.
The Black Shah	Aug. 6..	12 5	15	Foliage and pods slightly rusted; pods long, green, flat and narrow.
White Advancer, French	July 12..	16 13	30	Foliage slightly rusted; pods clean; later:—Foliage considerably rusted; pods slight; pod green; 4 to 6 inches long.
White Marrow	" 20..	26	30	Foliage and pods slightly rusted; a strong grower; inclined to run; pod; flat; green.
White Valentine	" 16..	26 4	30	Foliage very slightly rusted; pods green; a strong grower.
Wardwell's Dwarf Kidney Wax	" 12..	19 4	28	Foliage and pods very slightly rusted; pods yellow, long, flat and smooth; a good bean.
Yosemite Mammoth Wax	" 16..	17 3	28	Pods badly rusted late in season; pods yellow; large; near round; has a tendency to curl.

POLE BEANS.

The following 19 varieties were sown at the same time as the bush beans. The season proved too short to allow of the maturation of the latest kinds. Leaving out the scarlet runner type, the yields do not approximate with those secured from the "bush" section :—

BEST VARIETIES.

Early Varieties.	Late Varieties.
Southern Crease.	Black Algerian Wax.
Holborn Masterpiece.	Dutch Case Knife.
Golden Champion.	Speckled Cranberry.
Flageolet Wax.	Speckled or Cut Short.

Experiments with Beans all sown 18th May.—Table II.—Pole Beans.

Pole Beans.	Ready for Table.	Total Weight of Green Pods.	Length of Row.	Remarks.
Variety.		Lbs. Oz.	Feet.	
Black Algerian Wax...	Aug. 16	15 12	30	Foliage very slightly rusted; pods medium size yellow, flat.
Dutch Case Knife.....	" 18	21 0	30	Foliage and pods slightly rusted; pods very long, flat and green.
French Asparagus.....	" 30	1 12	30	Foliage and pods slightly rusted; pod green, round, from 6 to 8 inches long.
Flageolet Wax.....	" 6	9 14	30	Foliage and pods considerably rusted; pods yellow, long, narrow and flat.
French Yard Long....	.....	.....	25	Late; no pods when frost came, Sept. 26.
Golden Andalusia.....	Aug. 16	17 7	30	Foliage and pods slightly rusted: pod yellow of medium size, flat.
German Wax	" 16	16 12	15	Foliage and pods very slightly rusted; pods yellow, from 4 to 6 inches long, flat.
Golden Champion.. ...	July 31	8 4	15	Foliage and pods slightly rusted; a yellow round pod.
Holborn Masterpeice...	" 31	11 11	30	Foliage badly rusted, pods clean; pods slightly rusted, from 6 to 10 inches long, green.
Horticultural Speckled Cranberry	Aug. 18	34 6	30	Healthy; pods about 4 inches long, green, flat.
Jubilee Runner.....	.....	.....	30	Foliage slightly rusted; only 4 pods on row at date of first frost; pod green, 8 to 10 inches long.
Kentucky Wonder....	Aug. 6	15 5	30	Foliage and pods considerably rusted; pods green, narrow to round, medium length; a poor variety.
Mont d'Or.....	July 25	17 0	30	Foliage slightly and pods badly rusted; pods long, yellow and flat.
Southern Prolific... ..	Aug. 14	50 12	30	Healthy; pods green, long, flat and narrow.
Scarlet Runner.....	" 14	49 1	30	Healthy; large flat green pod.
Speckled, or Cut Short.	" 18	23 14	30	Healthy; pods green about 3 inches long, flat.
Southern Crease, black.	July 21	8 3	30	Foliage and pods badly rusted; a short green pod.
White Algerian Wax..	Aug. 8	17 10	30	Foliage and pods slightly rusted; a yellow medium size pod.
White Dutch Running.	" 14	39 1	30	Healthy; pods about 8 inches long, green and flat.

LIMA AND BROAD WINDSOR BEANS.

Of the 11 varieties of Limas tested only one of them produced a paying crop. This failure was principally due to their lateness. There seemed to be insufficient summer heat to bring them to maturity. A notable exception is that of Thorburn's *Horticultural Lima.* The same variety from other seedsmen did not do as well. The yield of this variety approximated the best of the "pole" or "bush" varieties.

Of the Broad Windsor type the best podding variety was *Leviathan.*

EXPERIMENTS with LIMA BEANS all sown 17th and 18th May—TABLE III.

Beans Lima.	Ready for Table.	Total Weight of Green Pods.		Length of Row.	Remarks.
Variety.		Lbs.	Oz.	Feet.	
Burpee's Bush Lima				26	Foliage slightly rusted, late.
do				30	Healthy.
Challenger Lima	Aug. 28	8	4	18	Foliage and pods slightly rusted.
Dreer Lima					Healthy; only 4 plants germinated.
Dreer Bush Lima					Healthy; too late.
Dwarf Lima, Kumerle Strain	Aug. 24	6	5	26	Healthy; pods green, short and flat.
King of the Garden Lima	Sept. 15	0	2	10	Healthy; too late.
Henderson's Bush Lima or Dwarf Sieva	Aug. 21	2	8	30	Foliage slightly rusted, pods short, green and flat.
Horticultural Lima	July 20	35	1	30	Healthy; strong grower, with a large, broad, green pod.
do	" 25	10	6	15	Foliage very slightly rusted, pods flat, of medium size.
Large White Lima	Aug. 28	1	5	17	Healthy; late.
New Dwarf Lima, Jackson's Wonder	" 21	5	14	15	Healthy; pods green, flat.
Broad Windsor	" 6	7	8	30	Slightly rusted.
Early Mazagan	" 28	4	0	30	Foliage and pods slightly rusted.
Green Nonpareil	" 24	3	3	30	Foliage and pods considerably rusted.
Harlington Green Windsor	" 6	3	10	30	Healthy.
Leviathan	" 18	15	12	30	Healthy.
Sword Long-pod	" 6	4	14	30	Foliage slightly rusted, August 22, 1894. Foliage and pods considerably rusted.
Small Horse Bean	" 20	0	6	30	Slightly rusted, a tall grower, pods small.

SOAKING SEED PEASE AND BEANS IN DISSOLVED CHEMICAL FERTILIZERS.

Some experiments were tried last year in soaking the seed of pease and beans in nitrate of soda in solution with the object of ascertaining the effect upon germination and yield.

Nitrate of soda was used in three strengths—one, two and three ounces to the gallon of water. The seed was soaked for one hour then planted, one hundred seeds occupying a space of thirty feet in the row.

RESULTS.

Pease.—The percentage of germination did not vary to a marked extent, but there was a regular increase of yield of each variety with the strength of the fertilizer used :—Heroine excepted, the yield of this remained practically the same in each case.

Beans.—The results here were so variable as to preclude safe generalization.

CELERY.

A VARIETAL TEST.

The following table gives particulars of information gained in growing thirty varieties of celery including five of celeriac. It was arranged that 24 plants should compose the number of each variety tested. In a few instances owing to bad seed or accident it was impossible to obtain the requisite number. The plants were grown under the trench system in single rows. Rust and spot caused serious damage in early

summer (see note on leaf spot). This attack I attributed largely to the effect of spent hot-bed manure used in the bottom of the trenches. Market gardeners do not now follow the trenching system, but plant on the level and hill up. The plants should be "handled" twice before the final earthing up takes place. This means that the leaves should be drawn together by hand and sufficient soil packed about the base of the plants as will hold them compactly in an upright position. When the plants are "hilled" or "earthed" care should be taken to prevent the soil from sifting in between the leaves. If this occurs, it destroys the quality of the "heart" and causes rusting.

Among the best early varieties are the following:—*Golden Self Blanching, Paris Golden Yellow and Golden Dwarf.*

Medium Early:—*Improved White Plume, White Walnut, Pascal, Boston Market.*
Late:—*London Red, Covent Garden, Golden Heart, Schumacker, Fin de siecle.*

Celery I.

These were all sown on 9th April, transplanted on 19th May and planted out 26th June.

Celery grown in Trenches.	Seedsman.	Number Planted.	Weight when Lifted.		Condition when Taken up 30th October.
Variety			Lbs.	Oz.	
Giant Pascal	Thorburn	24	30	0	Green; solid; slight amount of rot; slightly rusted.
Covent Garden Rose	"	24	33	8	Solid; not blanched; slightly rusted.
Large Ribbed Kalamazoo	"	24	29	0	Small heads; firm; not well blanched.
Large Red Self Blanching	"	24	30	12	Dwarf; thick; solid; clean; not well blanched
Pink Plume	"	24	44	12	Solid; clean heads; not well blanched; tall.
Schumacker	"	24	51	12	Short and stout; quite green; clear of rust.
Cooper's Half Dwarf	"	24	44	4	Green; medium height; slightly rusted.
Giant White	Henderson	24	53	0	Tall; green; slightly blanched; suckers freely.
Cooper's Improved Cutting	Thorburn	24	70	4	Suckers freely; green and slightly rusted.
Golden Rose	Henderson	24	37	0	Thick; dwarf; solid; not well blanched.
Rose Ribbed Paris	Breck	24	31	12	Same as the last.
Improved White Plume	Thorburn	21	30	12	Not well blanched; slightly rusted.
London Red	Henderson	21	34	12	Small; not blanched; late.
Dwarf White	"	23	29	8	Dwarf; not well blanched.
Triumph	Ewing	23	38	0	Short; solid; not well blanched.
Fin De Siecle	Thorburn	24	44	12	Very green; none fit for table.
Paris Golden Yellow	Ewing	24	32	12	Short; not well blanched; slightly rusted.
Sandringham Dwarf White	Thorburn	24	47	9	Medium; dwarf; very green; solid heads.
Carter's Dwarf Crimson	Farquhar	24	32	2	Dwarf; not well blanched; slightly rusted.
Golden Self Blanching	Thorburn	24	51	8	Fairly blanched; solid; very good.
" (No Manure.)	"	24	24	0	Stout; green; slightly rusted; not fit for table.
White Walnut	"	24	48	3	Medium size; green; slightly rusted.
Perfection Heartwell	"	24	28	3	Medium size; slender; fairly solid; green; slightly rusted.
Boston Market	"	11	19	11	Very stout; solid; not all blanched; tendency to sucker.
Half Dwarf	Henderson	3	10	0	Short; thick; green; solid; slightly rusted.
Golden Dwarf	"	2	4	9	Medium height; blanched; clean; solid; good for market.
Parson's Russian Princess	Simmers	24	26	9	Uniform, but not well blanched; slightly rusted.
Golden Heart	Ewing	18	60	12	Medium height; very green; clean; suckers freely.
Celeriac, Thorb. Giant	Thorburn	22	30	0	Large roots; clear of rust.
Celeriac New Apple	"	23	22	0	Good size; not quite so large as the last.
Celeriac Turnip-Rooted	"	24	31	12	Fair size; roots and foliage clean.

The following varieties were tested in 1896. They are chiefly from English and French seedsmen:—

Carter's Solid Ivory.—Short and stocky; considerably rusted; well blanched; rather bitter; flavour not as good as Standard Bearer.

Carter's Incomparable Crimson.—Tall; late; red; free from rust; blanches moderately well; crisp and of good quality.

De Candolle.—White; medium grower, but late; fairly solid; very nutty and good flavour.

Evan's New Triumph.—Dwarf variety; free from rust; stalks stout; lacks crispness and flavour.

New Perle Le Grand.—Tall; strong; white: rather coarse; watery; somewhat lacking in flavour.

Perle Le Grand.—About the same as New Perle Le Grand, but rather smaller stalks; quality, medium to poor.

Rennie's Giant White.—Medium grower; rather uneven; fair sized stalks; quality fair, solid, but not high flavoured.

Standard Bearer.—Red, large, coarse stalks; fairly well blanched; brittle, very tender; good quality; late.

Vaughan's Giant Golden Dwarf.—Large; not self-blanching; fair size, but of poor quality.

White Triumph.—Medium grower; fair sized stalks; some rust; firm, brittle, good quality, nutty.

Growing Celery in "Spent" Hot-beds *vs.* Cold Frames.

After growing the annual supply of cabbage, cauliflowers and tomato plants, the farmer's hot-bed usually stands idle till the next season comes round. It is true that its phases of usefulness during this period are not numerous but there is at least one purpose which it will serve with great satisfaction to the housewife, viz.: the growing of a supply of celery for winter use. This may be done without removing the manure, by adding an inch or two of soil to the surface—setting the plants 7 x 7 inches apart and watering frequently during the fore part of the season. Of course the bed of manure beneath the covering of soil facilitates drainage so much that the plants require close watching at first in order to prevent injury from drying out. If the manure is thoroughly soaked before the plants are set less difficulty will be experienced. I have found that cold frames give better results in growing celery on the bed plan than do hot-beds.

The following table gives the results of tests of growing celery in cold frame and in hot-bed, both beds being sub-irrigated. The beds were 6 feet wide and 24 feet long. Two lines of three-inch tile were laid three feet apart the full length of the bed and 9 inches below the surface. An upturned tile at each end gave opportunity for introducing water which was done once and sometimes twice each week. In growing celery after this intensive method the labour of cultivating and earthing is largely obviated; but it must be remembered that the drain upon the moisture and fertility of the soil is very great and must be adequately met if healthy and vigorous plants are to be secured.

It will be seen by the yields set forth in the subjoined table that the gross weight of 16 plants grown in the "cold frame"—that is a frame in which no manure had been used to give bottom heat—was greater in almost every instance than 18 plants of the same variety grown in the hot-bed. With regard to quality there was little to choose. This result is probably due to the fact that the conditions of moisture in the cold frame

were more uniform throughout the season than those obtaining in the hot-bed. The results are very marked, the average weight per stalk of the "hot-bed" grown plants being 11 ounces each, while that of "cold frame" plants was over a pound each.

CELERY II.

SUB-IRRIGATION EXPERIMENTS.

Seed sown, April 9; pricked out, May 19; planted, June 30; distance apart, 7 x 7 inches; sub-irrigated as needed.

Variety.	Sub-Irrigated in Hot-bed.			Remarks.	Sub-Irrigated in Cold Frame.			Remarks.
	Number of Plants.	Weight when taken up.			Number of Plants.	Weight when taken up.		
		Lbs.	Oz.			Lbs.	Oz.	
Crawford's Half Dwarf..	18	16	14	Unblanched; fair sized heads; slightly rusted....	16	17	13	Unblanched; slightly rusted
Cooper's Imp. Cutting...	18	10	11	Unblanched; slightly rusted	16	16	13	" pithy "
Turnip-rooted Celeriac...	18	16	9	Roots medium size firm.....	16	12	12	Good size; tall; rusted.
Covent Garden Rose ...	18	14	14	Unblanched; large; rusted.	16	16	12	" " "
Giant Celeriac (Thorb.)..	18	8	12	Med. height; roots small...	16	13	4	Med. size; " healthy.
New Apple Celeriac.....	18	5	4	Heads small; rusted.....	16	8	12	Small; pithy; rusted.
Dwarf Crimson (Carter).	18	14	14	Unblanched; solid; slightly rusted.	16	18	12	Unblanched "
" White.....	18	9	12	Unblanched; solid; slightly rusted.....	16	13	12	Med. sized; blanched; rusted
Fin de Siecle..... ...	18	14	12	Fairly blanched; healthy..	16	21	8	Well blanched; healthy.
Giant Pascal	18	15	12	" " " ...	16	23	12	Unblanched; crisp; rusted.
Golden Rose..... ...	18	6	4	Small; rusted..	16	8	4	Small; farly blanched "
Giant White.....	18	17	12	Unblanched rusted				
Triumph	18	12	4	" "	16	16	12	Dwarf; late; crisp; slightly rusted.
Rose Ribbed Self Blanching.....	18	8	12	Med. size; blanched; rusted	16	10	12	Small; blanched; slightly rusted.
London Red....	18	14	12	Unblanched; rusted.....	16	15	4	Unblanched; spindling; rusted.
Paris Golden Yellow....	18	8	10	Small heads; blanched.....	16	12	12	Small; blanched; slightly rusted.
Imp. White Plume.....	18	11	4	Slender stalks; rusted.....	16	19	0	Fair sized heads; blanched; slightly rusted.
Golden Self Blanching...	18	10	0	Small " blanched...	16	16	12	Blanched; solid; slightly rusted.
Sandringham	....	.....		....	16	25	0	Unblanched; crisp; firm; slightly rusted.
Total weights.....	324	217	12	Av'ge weight of stalks, 11 oz.	288	298	6	Av'ge weight of stalks, 16½ oz.

CUCUMBERS.

The number of varieties of this vegetable now offered to the public by seedsmen, is much greater than is generally supposed. In the accompanying table the behaviour of 24 kinds, including pickling sorts, all grown under the same circumstances, is described. Important points in connection with the cultivation of the cucumber are health of vine, earliness, desirable form and productiveness. By comparing the number of fruits produced, with the yield in pounds, an idea of the individual size of the cucumber (fruit)

may be obtained, e.g., Cool and Crisp produced 204 fruits weighing 229½ pounds; in other words the average weight of each cucumber would be something over a pound, while Extra Early Seedling produced 79 fruits weighing only 35 pounds, giving less than half a pound to each cucumber. It should be stated that the seed was sown in pots in a hot-bed and the plants turned out of these when removed to the field.

VARIETIES RECOMMENDED.

EARLY.—Extra Early Seedling, Evergreen, Early Russian, Nichol's Medium Green.

MEDIUM EARLY.—Giant Pera, Peerless, White Spine, Long Green.

LATE.—Jap. Climbing, Cool and Crisp.

PICKLING.—Commercial, Boston.

CUCUMBERS—Test of Varieties.

These were all sown on 21st April and planted out 11th June, three hills being planted of each variety.

Name of Variety.	Seedsman.	Ready for use.	Number of Fruits Produced.	Yield in lbs.	Remarks.
Cool and Crisp	Simmers.	July 20	204	229·8	Medium grower; fruit medium size; green; few spines; prolific; late.
Evergreen	Thorburn.	" 10	125	103·4	Vine fairly healthy; fruit large, green, moderately smooth.
Extra Early Seedling	"	" 4	79	34·13	Very much like Nichol's Medium Green.
Early Short Green	"	" 14	41	28·6	Practically the same as Early Russian, with fewer spines.
Early Russian	"	" 12	76	28·12	Very weak grower; cucumbers small, oval or oblong.
Early White Spine	"	" 18	75	65·12	Same as Peerless.
Extra Long White Spine	"	" 18	77	82·2	Later and larger than the type.
Giant Pera (New)	Steele	" 16	29	34·7	Weak grower; troubled with mildew.
"	Thorburn.	" 16	48	66·0	More prolific than last; larger.
Improved White Spine	"	" 16	86	59·11	Medium grower; fair size.
Japanese Climbing	Dreer	" 21	69	65·0	Fair grower; medium size; bronzy-green colour; spineless.
Long Green Turkey	Thorburn.	" 17	61	68·12	Fair grower; large; oval; orange; smooth.
Long Green	"	" 18	136	110·12	More productive than White Spine; larger and longer.
Nichol's Medium Green	"	" 12	113	84·12	Moderate grower; fairly early; medium size; smooth; oblong.
Peerless	"	" 18	69	64·12	Fair grower; very prolific; medium to large; green, spined.
Tilby's Hybrid	"	" 16	51	60·9	Good grower; an early variety.
White Pearl	"	" 18	62	46·11	Fair grower; white; medium size; oval or oblong; spines very small.
Boston Pickling	"	" 4	.....	34·2	A standard variety.
Commercial Pickling	"	" 6	.....	67·13	Strong grower; fair bearer; late.
Everbearing	"	" 8	.....	7·2	Very weak growth; unproductive.
Green Prolific Pickling	"	" 8	.....	18·4	Vine weak, subject to mildew.
Milwaukee Pickling	Currie	" 4	.....	20·14	Fair grower; small size.
Siberian	Simmers.	" 4	.....	20·4	Weak grower; no fruit.
Golden	.....	.....	.....	.....	Small; uniform in size; rather a poor bearer.

EXPERIMENTS WITH ONIONS.

In growing onions this season, the percentage of "thick necks" was remarkably large. This characterized the crop from transplanted as well as untransplanted plots. The soil was well drained, sandy loam, top-dressed in the spring with rotted barn-yard manure. The following table gives the yield of 23 varieties. The yields of good onions are phenomenally small, and that of "thick necks" astonishingly heavy. This term "thick necks" is a market gardeners' name applied to onions that form an unmerchantable product with thick fleshy necks and small bulbs. I know of no satisfactory explanation of this peculiarity of the onion to revert to original types, unless it be faulty seed selection. Strasburg (yellow) was one of the best. Paris Silver Skin, Large Portugal, and Early Red Globe were a few of those most satisfactory.

ONIONS.—Test of Varieties.—All sown in rows 20 feet long.

Varieties.	Seedsman.	Date of Sowing Seed.	Yield of Good Onions.		Yield of Thicknecks.		Remarks.
White.			Lbs.	Oz.	Lbs.	Oz.	
Early Barletta	Thorburn.	May 13..	2	8	1	8	Rough and very poor.
Paris Silver Skin	" ..	" 13..	7	8	6	8	Large, flat, coarse.
Victoria, Italian	" ..	" 13..	..	..	34	..	All thicknecks.
Large Portugal	" ..	" 13..	10	..	10	..	Large, flat, solid.
" Globe	" ..	" 13 .	6	8	16	..	Large, smooth.
Bermuda	" ..	" 13..	1	8	1	8	Flat, medium to small, rough; germinated poorly.
The Queen	Ewing....	" 13..	1	8	13	8	Flat, rough; not a good onion in the row.
Oxonian Prize	"	" 13..	..	..	17	..	All thicknecks.
English Pickling	Thorburn.	" 15..	6	..	14	8	Grew too large for pickling.
Excelsior "	" ..	" 15..	2	8	13	..	" "
Welsh	" ..	" 15..	..	..	18	8	Of the leek type.
Red.							
Creole	" ..	" 13..	2	8	1	8	Bad seed.
Early Globe	" ..	" 13..	7	8	14	8	A standard.
Globe Maderia	" ..	" 13..	3	8	28	8	
Giant Rocca red	" ..	" 13..	..	..	20	8	Resembled leeks.
Flat Maderia	" ..	" 13..	4	..	18	..	Rough, pink and white, poor.
Large Globe	" .	" 13..	1	8	10	8	Large round dark red, uniform in size, quite solid.
Yellow.							
Globe Danvers	" ..	" 15..	3	8	9	8	Very small, round, rather irregular.
Globe	" ..	" 15..	..	.	18	..	
Danvers	" ..	" 15..	6	..	11	..	
Strasburg	" ..	" 15..	12	8	7	8	Smooth, globe shaped, good.
Globe Spanish	" ..	" 15..	..	..	20	8	Very large but all neck.
Giant Rocca yellow	" ..	" 15..	..	..	14	8	

TRANSPLANTING ONIONS.

Some interesting data appears in the following tables upon this subject. It may be seen (1) that three sowings were made in the hotbed at intervals of 12 days apart; (2) the plants were all set in the field on the same day; (3) that the total yield of merchantable onions is much greater for the *third sowing* than either of the other two—in fact more than the product of the two combined; (4) the yield of good and bad onions is larger for the third sowing than either of the other two series; (5) the first

sowing gave the most regular returns for each variety, White Victoria being the only one which failed to produce any merchantable bulbs—this result was the same throughout.

ONIONS—TABLE II.

SEED SOWN IN HOT-BED. TRANSPLANTED TO THE FIELD 9TH JUNE.

VARIETIES.	Seedsman.	1ST SOWING, 8TH APRIL.		2ND SOWING, 20TH APRIL.		3RD SOWING, 30TH APRIL.		Length of Rows.
		Weight of Good Onions.	Weight of Thick-necks.	Weight of Good Onions.	Weight of Thick-necks.	Weight of Good Onions.	Weight of Thick-necks.	
		Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Feet.
Large Red Wethersfield	Thorburn	19 8	3 0	9 8	13 8	32 0	0 0	20
Red Victoria	"	4 0	55 0	0 0	26 0	0 0	45 8	20
White Large Tripoli	"	4 0	4 0	7 0	14 8	12 0	5 8	20
Red Ætna	"	16 0	8 0	0 0	20 8	8 8	12 8	20
White Victoria	"	0 0	34 0	0 0	34 0	0 0	35 0	20
Red Mammoth Garganus	"	6 8	28 0	5 0	13 8	13 8	21 8	20
White "	"	7 8	15 0	8 8	8 8	15 8	11 0	20
Prizetaker	Hend	5 0	19 0	0 0	13 0	18 8	10 0	20
Total weight		62 8	116 8	30 0	143 8	100 0	141 0	

ONION SEED SOWN IN THE OPEN EARLY AND LATE.

The following table gives yields for the same varieties of onions grown by sowing the seed in the field on 13th May, 25th May and 4th June. When the plants reached the proper size they were thinned the usual distances according to size, viz., 2 to 4 inches.

Results:—It will be seen (1) that the total yields of the same varieties, are much smaller than where they have been transplanted, (2) that the yield from the first sowing of seed is larger than either of the others, (3) that there is a much larger proportion of "thick necks" to the total product of merchantable onions in all the sowings here than there is when the same varieties were transplanted. Transplanting them increases the total yield and decreases the quantity of "thick necks" or unmerchantable onions.

ONIONS—TABLE III.

SEED SOWN IN FIELD.

VARIETIES.	Seedsman.	1ST SOWING, 13TH MAY.		2ND SOWING, 25TH MAY.		3RD SOWING, 4TH JUNE.		Length of Rows.
		Weight of Good Onions.	Weight of Thick-necks.	Weight of Good Onions.	Weight of Thick-necks.	Weight of Good Onions.	Weight of Thick-necks.	
		Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Lbs. Oz.	Feet.
Large Red Wethersfield	Thorburn	8 8	14 0	5 8	13 8	2 8	20 8	20
White Giant Tripoli	"	3 8	9 8	5 8	9 8	0 0	15 8	20
Red Ætna	"	1 8	15 8	4 0	18 0	0 0	14 0	20
White Victoria	"	0 0	13 0	0 0	22 0	0 0	14 8	20
Red "	"	1 0	21 8	0 0	27 8	0 8	20 0	20
Red Mammoth Garganus	"	0 0	15 0	3 0	14 8	0 0	11 0	20
White "	"	8 0	15 0	4 0	16 8	0 0	9 0	20
Prizetaker	Hend	4 0	30 0	0 0	28 0	0 0	15 0	20
Total Weight		26 8	133 8	22 0	149 8	3 0	119 8	

TOBACCO.

The experiments of the year with this crop covered the following features (1) cultural tests; (2) trials of fertilizers; (3) "topping," the best time to do it; (4) the proper number of leaves to allow each plant.

(1.) CULTURAL—TRANSPLANTING EXPERIMENTS.

Three years ago strikingly beneficial results in growing tobacco plants were obtained by transplanting from the hot-bed to a cold frame before setting them in the field. The object of the following experiments was mainly to determine the relative advantages of cold frame and hot-beds in receiving the small plants at the first pricking out. The spring season was very unfavourable for either hot-bed or cold frame grown plants. At the time of setting out in the field, the hot-bed grown plants were stronger and larger than those from the cold frame. Both sets of plants, however, did well in the field, and at harvesting time, as shown by the yields of green leaf, the differences were not sufficiently constant to allow of reliable conclusions being drawn. It is a safe practice, however, in Eastern Ontario and the province of Quebec to prick the young plants into a second hot-bed before setting them in the field. This gives them stockiness and vigour at transplanting time. The number of plants lost in setting them in the field is much less if they have been treated in this way.

TOBACCO—TABLE I.

EXPERIMENTS IN GROWING THE PLANTS.

Variety.	Date of Sowing.	Plants—How Treated.	Planted in Field.	mber of Plants.	Date of Harvesting.	Weight of 1st Grade. Green.	Weight of 2nd Grade. Green.
						Lbs.	Lbs.
Yellow Pryor	April 9	Not transplanted	June 7	113	Sept. 18	271	29
"	" 9	Transplanted to cold frame.	" 7	111	" 18	319	25
"	" 9	" hot-bed	" 7	113	" 16	234	38
Connecticut Seed Leaf.	" 9	Not transplanted.	" 7	113	" 8	540	22
" "	" 9	Transplanted to cold frame.	" 7	113	" 8	465	32
" "	" 9	" hot bed	" 7	112	" 8	494	27
Pennsylvania "	" 9	Not transplanted.	" 7	113	" 18	481	31
" "	" 9	Transplanted to hot bed	" 7	113	" 18	425	30
Persian Rose	" 6	Not transplanted.	" 7	112	" 13	243	41
"	" 9	Transplanted to hot bed	" 7	113	" 13	223	64
White Burley	" 9	Not transplanted.	" 7	91	Aug. 31	404	69
"	" 9	Transplanted to cold frame.	" 7	331	" 31	1,565	191

FERTILIZERS.

The results of the fertilizer trials set forth in table II. Each plot contained 24 plants made up of an equal number of 6 varieties. The plants were set out on 8th June, and the fertilizers applied a few days afterwards, the results are not striking. The largest yield of green leaf was obtained from superphosphate, wood ashes and nitrate of soda (No. 4). The former two with sulphate of ammonia, also gave the second heaviest yield. Barn-yard manure applied in excessively heavy dressings gave the third largest yield. Muriate of potash, wood ashes and nitrate of soda did not give satisfactory returns as compared with the others when applied separately.

TOBACCO—TABLE II.

EXPERIMENTS WITH FERTILIZERS.

All these varieties were sown on the 9th of April, were planted out on 8th of June, and were gathered on 14th September, twenty-four plants were used of each sort.

Fertilizer.	Yellow Pryor. Weight.		Yellow Oronoka. Weight.		Penn. Seed Leaf. Weight.		White Burley. Weight.		Conn. Seed Leaf. Weight.		Persian Rose. Weight.		Total weight, 24 plants. Green.		Fertilizers used.
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	
No. I....	11	0	15	0	22	8	21	0	13	8	12	8	94	8	Superphosphate, 10 lbs.... Muriate of potash " .... Sulphate of ammonia, 10 lbs. 10 lbs. to 24 plants.
" II	15	8	13	8	17	0	20	0	15	0	13	8	104	8	Superphosphate, 15 lbs. .... Wood ashes, 10 lbs..... Sulphate of ammonia, 10 lbs.. "
" III ...	14	8	15	0	22	0	20	8	17	8	16	8	106	8	Superphosphate, 15 lbs.... Wood ashes, 15 lbs..... Nitrate of soda 5 lbs..... "
" IV....	17	0	15	8	18	8	19	8	19	0	12	0	100	8	Superphosphate 15 lbs .... Muriate of potash, 10 lbs..... Nitrate of soda, 5 lbs .... "
" V	14	8	14	8	26	8	19	8	17	8	9	0	101	8	Barn yard manure (green) 200 lbs. to 24 plants.
" VI....	15	0	13	0	26	0	19	8	16	0	11	0	95	0	Wood ashes, 24 lbs. to 24 plants.
" VII...	13	0	15	0	20	0	19	8	17	8	11	0	95	0	Nitrate of soda, 6 lbs. to 24 plants.
" VIII..	12	8	13	0	13	8	19	8	17	0	10	0	85	0	Muriate of potash, 6 lbs. to 24 plants.
" IX....	15	8	12	0	16	0	21	0	13	0	8	8	96	0	Check plot ; no fertilizer.

TOPPING AND PRIMING.

"Topping" is the operation of removing the flower stalk, with one or more of the upper and smaller leaves. The energies of the plant are thus diverted from the natural channel—the production of seed—to the artificial—the more perfect development of its leafy tissue. After the first topping, numerous suckers usually appear in the axils of the leaves; these should be promptly removed. "Priming" is the term used to designate the removal of one or two of the lower or primary leaves, which are usually inferior in size and quality, frequently becoming torn and injured by the cultivator. I have noted the fact in past years that early "topping" usually meant an abundant and persistent growth of suckers. To test this, a block containing 108 plants including 7 varieties was taken and divided into 6 equal portions. Series I contained two plots. Plants in plot 1 were cut back to 9 leaves on July 20, those in plot 2 were cut back to 11 leaves on the same date.

The number of plants in series II and III were divided and cut back respectively on July 26th and August 2nd.

RESULTS.

Field notes show that it was necessary to "sucker" plants in series I twice after topping them. This work of removing the suckers is laborious and rather expensive.

Plants in series II were "suckered" twice after "tipping" but the amount of work was much less than that required in series I.

Plants in series III were "suckered" once. This with the removal of occasional sprouts kept them in order.

Yields.—(1.) Larger yields were obtained from the later "topping" than the earlier.

(2). The greater number of leaves gave uniformly the heaviest yields.

TOBACCO—TABLE III.

EXPERIMENTS IN TOPPING.

Seed sown 9th April, planted out 7th June; 18 plants were used in each case.

Variety.	Cut back to 9 Leaves.	Weight of Green Leaf.	Cut back to 11 Leaves.	Weight of Green Leaf.	Date of Gathering
	1897.	Lbs.	1897.	Lbs.	1897.
Series I.—					
White Burley	July 20..	62	July 20..	102	Sept. 3..
Yellow Oronoko	" 20..	41	" 20..	53	" 15..
" Pryor	" 20..	47	" 20..	53	" 15..
Cannelle	" 20..	15	" 20..	17	" 15..
Connecticut Seed Leaf	" 20..	61	" 20..	78	" 15..
Persian Rose	" 20..	32	" 20..	33	" 15..
Pennsylvania Seed Leaf	" 20..	42	" 20..	53	" 15..
Total weight		300		389	
Series II.—					
White Burley	July 26 .	78	July 26..	71	Sept. 3 .
Yellow Oronoko	" 26..	43	" 26..	53	" 15..
" Pryor	" 26..	46	" 26..	52	" 15..
Cannelle		14	" 26..	14	" 15..
Connecticut Seed Leaf		66	" 26..	69	" 15..
Persian Rose		32	" 26..	30	" 15..
Pennsylvania Seed Leaf		70	" 26..	74	" 15..
Total weight		349		363	
Series III.—					
White Burley	Aug. 2..	71	Aug. 2..	104	Sept. 3..
Yellow Oronoko	" 2..	53	" 2..	55	" 15..
" Pryor	" 2..	50	" 2..	53	" 15..
Cannelle	" 2..	16	" 2..	20	" 15..
Connecticut Seed Leaf	" 2..	69	" 2..	72	" 15..
Persian Rose	" 2..	25	" 2..	27	" 15..
Pennsylvania Seed Leaf	" 2..	63	" 2..	80	" 15..
Total weight		347		411	

REPORT OF THE CHEMIST.

(Frank T. Shutt, M.A., F.I.C., F.C.S.)

Ottawa, 30th November, 1897.

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith the eleventh annual report of the Chemical Division of the Dominion Experimental Farms.

Though much of the scientific work commenced during the past year is not yet completed—notably, the investigations in the matter of the preservation of barn-yard manure, and in the feeding value of certain grasses—we are able to present for the information of our readers in the present report some new and important results bearing directly upon the practice of Canadian agriculture. As in the past, it has been our endeavour to make the Chemical Division one of practical value to the farmer, dairyman and fruit grower, and it is believed that the experiments undertaken and now reported upon are such as to commend themselves as important to those who are following agriculture in one or other of its branches. While every investigation has been undertaken from this point of view, scientific accuracy and thoroughness have not been sacrificed, believing that all true progress and material development can only come from work marked by these qualities.

The work of the Chemical Division in all its branches continues to increase. As the objects of the Experimental Farm system and the value of chemical science as applied to agriculture become better known, the requests for analyses and for information, naturally, become more and more numerous. This fact, though exceedingly encouraging as pointing to an increasing appreciation on the part of our farmers, makes it highly desirable, and indeed necessary, to add to the chemical staff and enlarge our facilities, if we are to keep pace with these demands, more especially when we remember that original investigation should have the first call on our time.

A brief résumé of the more important subjects treated of in the present report may be given as follows :—

Clovers and green manures.—This investigation, begun in 1895, to ascertain the amounts of fertilizing materials that under different conditions could be supplied to the soil by various clovers, has been during the past season further pursued. We are able to place before our readers in the present report some very interesting and important data regarding the value of soil enrichment by growing clover with the cereal crop.

Soil inoculation for the legumes with nitragin.—Our results in this new department of agricultural research will be found of special interest. They indicate the possibility of economically treating land with germ cultures to stimulate the growth of clover and assist in assimilation of free (atmospheric) nitrogen. An illustration, taken from a photograph of the pots under experiment is given. The luxuriance of the foliage in the inoculated soils, in comparison with that in the untreated pots, is apparent. The chemical data, showing the amounts of nitrogen, organic matter, and ash in the (*a*) roots, and (*b*) stems and leaves of the clovers and horse beans experimented with, are presented in tabular form.

Forage plants and fodder.—These include Awnless Brome grass, of which analyses have been made of the hay grown at the Experimental Farm, Indian Head, N.W.T., and cut at different stages of growth ; Alfilaria or Cranebill, a forage lant found in British Columbia ; and a number of milling products, *e.g.*, buckwheat bran and provender.

Soils.—For lack of the necessary time, we have been obliged to postpone our investigation upon the virgin soils of the Dominion. We have, however, continued, as far as opportunity permitted, to examine samples sent in by farmers. Such work usually consisted in a determination of the humus, nitrogen and lime and the relative proportions of clay and sand. These data do not allow us to state the amounts of available plant food present, but they have enabled us to arrive at the general character of the soils and to indicate methods for their economical improvement.

A certain number of reports upon such samples are here inserted, in order to show the practical character of the information thus afforded farmers, and also in the hope that the deductions and advice thus given will be of value to our agricultural readers.

The results of analyses of virgin soils, obtained in our laboratories during the past nine years have been collated and made strictly comparable. They were presented in the form of a paper to the Chemical Section of the British Association at their convention in Toronto in August last. Since the information this paper contains will be found useful for reference by those interested in Canadian soils, it is herewith appended.

Naturally-occurring fertilizers.—Mucks, muds and marls. We have found it quite impossible to analyse all the samples of these materials sent in during the past year. Those samples, however, as far as time allowed, have been examined which, being from new localities, &c., appeared to merit special attention. The composition of these is here given, together with deductions as to their use and fertilizing value.

Miscellaneous fertilizing materials.—In this chapter we report upon the amount of plant food, as found by analysis, in various bye-products and weeds, *e.g.*, lobster refuse from the canning factories ; ashes from lime kilns, and that difficult-to-eradicate weed, purslane or pusley.

Moss litter. The examination of two samples of moss litter from Nova Scotia has been made. The results are confirmatory of those published in the report of this Division for 1895, obtained from moss collected in New Brunswick. Both samples were of excellent quality and specially adapted for bedding purposes, possessing high absorptive capacity. A new use for this material has been found. It is said to be most satisfactory as a packing material for fruit, fish and other perishable substances. Its elasticity makes it desirable for such purposes from a mechanical standpoint, and its power to absorb moisture and noxious gases renders it valuable as a preservative.

Well waters from farm homesteads.—We append in tabular form the data obtained from the examination of 63 samples, together with a brief report as to their quality.

It should be distinctly understood that the samples from *farm homesteads only* can be examined. The printed instructions issued by the Farm should be obtained before sending a water for analysis, since the probability is that otherwise a mistake will be made respecting the quantity required or in the matter of collection and shipment.

Tuberculin.—During the twelve months ending November 30, 1897, 214,018 minims of diluted tuberculin, a quantity sufficient to test 3,567 adult cattle, have been prepared and forwarded. The greater part of this has been sent out within the past three months, interest in the question of tuberculosis in cattle, more especially in those furnishing milk for town supply, having of late been very keen. This tuberculin is furnished to veterinarians by order of the Department of Agriculture. The labour involved in this work has been very considerable and necessarily has encroached largely on the time of this Division. We have in consequence not been able to accomplish as much purely chemical work as otherwise it would have been possible to overtake.

Samples received for Analysis.—The following table gives the details of the samples received from farmers during the past year.

SAMPLES received from Farmers for Examination and Report, November 30, 1896, to November 30, 1897.

	British Columbia	North-west Territories.	Manitoba.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Total.
Soils	7	..	..	12	23	5	..	...	47
Naturally-occurring fertilizers (mucks, mud, and marls)	2	...	1	5	4	3	8	20	43
Manures and fertilizers	4	....	.....	5	2	1	4	5	21
Forage plants and fodders	1	8	....	5	..	2	1	.....	17
Well waters	4	7	.....	33	15	7	..	19	85
Miscellaneous, including dairy products	3	4	....	31	10	4	9	6	76
	21	19	1	91	63	22	22	50	289

It has been quite impossible with the present staff to submit all these to analysis, but as far as time allowed such as were deemed most important have been reported upon, as follows: Soils, 28; naturally-occurring fertilizers, 29; manures, 5; forage plants and fodders, 13; well waters, 68; miscellaneous, including dairy products, 41. The rest await an opportunity for examination. This branch of our work is evidently one that is much appreciated by farmers, and further expert assistance in the laboratory will be necessary if the privileges in this direction are to be extended in the future.

Mineral Specimens.—A very large number of mineral specimens have been received for identification and assay during the past year. The chemical work of the farms is necessarily restricted to matters relating to agriculture and we would, therefore, advise our readers that we cannot undertake to report on such samples.

Correspondence.—For the twelve months past the letters received by this Division number 1,248; those sent out, 1,402. The correspondence is principally from farmers, dairymen and fruit growers, and relates to soils, fodders, fertilizers and other matters of agricultural importance. As it becomes more widely known that questions may be sent, this branch of our work naturally increases.

Meetings attended.—Since November 30, 1896, the more important conventions attended and meetings addressed, include the following:—

The Association of Official Agricultural Chemists, at Washington, D.C.

The Farmers' and Dairymen's Association of New Brunswick, at Fredericton, N.B.

Farmers' Institute Meetings at Jeffries and Penobsquis, N.B.

The British Association for the Advancement of Science, at Toronto.

The Central Canada Agricultural Association, at Montreal.

The Fruit Growers' Association of Quebec, at Howick, Que.

Farmers' Institute Meetings at Summerside, Charlottetown, Georgetown and Alberton, P.E.I.

Two lectures, entitled "The principles of Plant feeding" and "The principles of Animal feeding," were delivered before the students of the Normal School, Ottawa.

Mr. Henry S. Marsh, Associate of the Institute of Chemistry, has continued to efficiently discharge the duties of Assistant Chemist, and to him my thanks are due for much careful work and many of the analytical data contained in this report.

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

FRANK T. SHUTT,
Chemist, Dominion Experimental Farms.

CLOVERS AS GREEN MANURES.

THE FACTORS OF SOIL FERTILITY.

A high degree of soil fertility or crop-producing power is one of the fundamental factors in profitable farming. It, therefore, becomes of the greatest, indeed of paramount, importance to understand the nature of what constitutes fertility in a soil.

First, the soil must contain at least certain minimum amounts of mineral matter, such as potash, phosphoric acid and lime, and these constituents, or rather a certain percentage of them, must be in a more or less readily assimilable condition; for in this connection it is well to point out that by far the larger proportion of the fertilizing elements present in a soil is in locked-up or insoluble combinations. Plant food from the soil is absorbed and appropriated by crops in the form of a solution, and consequently such compounds as are insoluble, or are not capable of solution by the soil water or the exudations of plant rootlets, are valueless from an agricultural standpoint.

Secondly, a soil to be fertile must be possessed of nitrogen and humus. The latter term is applied to semi-decomposed organic matter, arising from the partial decay of roots and vegetable tissues generally. The nitrogen is in combination with this organic matter and is converted into forms useful to plants (nitrates) by a process known as nitrification. This conversion is the work of certain microbes, or microscopic plants which live on humus. Their development is in a large measure regulated by the amount of humus present, the degree of soil moisture, the soil's temperature, and the percentage of salifiable bases, such as lime and potash, present to combine with the nitric acid as formed. Permeability of the soil to air is also necessary.

Thirdly, fertility depends upon a right mechanical condition of the soil. This is sometimes known as tilth. It should be such that air may readily permeate and rain easily penetrate the soil. Roots and rootlets should be able to find an easy passage in foraging for food. Drainage and good cultural methods are essential in bringing about good tilth.

Fourth, certain conditions of climate are necessary for the best results. Warmth, sunshine and rainfall are all potent influences on crop production.

GREEN MANURING FOR INCREASING SOIL FERTILITY.

The system of green manuring, as practised by turning under a green crop of clover, increases fertility in a greater or less degree by the means named in the first three counts. While it does not add to the total amount of mineral plant food in the soil, the growth of the clover converts a large portion of such into compounds which, upon decay or rotting of the crop, are more readily assimilable for future use. This is certainly of no small value.

The feature of special importance, however, is that the decay of the clover enriches the soil in nitrogen and organic matter—a distinct gain, since all the elements of the latter, and the greater portion of the former, have been appropriated by the clover plant from the atmosphere. This organic nitrogen, as it may be termed, is readily transformed, in the presence of lime or potash and under favourable conditions of climate, into nitrates, the compounds which ordinary farm crops draw upon for their supply of nitrogen. As much nitrogen can be furnished per acre by ploughing down a crop of clover as would be furnished by an application of 10 to 15 tons of barn-yard manure. Again, the addition of the large amount of humus by a crop of clover vastly improves the texture of the soil, opening up and making warmer a clay loam and rendering a sandy soil more absorptive.

There are other benefits accruing from this system of manuring, but, in addition to those just discussed, attention need now only be directed to the following:—During the hot months of summer the process of nitrification goes on rapidly. The nitrates so

formed are extremely soluble and consequently may in a large measure be lost by the leaching of autumn rains, when the crop grown has matured and been harvested early. The cereals are comparatively short-lived crops, and, therefore, the value of sowing clover with them and thus having the ground covered, after the former have been cut, with vegetation that can utilize these nitrates is apparent. The late summer and autumn rains then assist in the storing up of these valuable nitrogenous compounds rather than in their dissipation.

A further advantage in sowing the clover with the cereals is in keeping down weeds after the grain is harvested.

SOWING CLOVER WITH BARLEY.

It will be remembered that in the report for 1896 we recorded the results of an experiment carried on with various clovers as "cover" crops for orchards, stating their relative merits for this purpose and giving their analyses in detail. The figures showed that large quantities of fertilizing materials and humus can be furnished the soil by ploughing under the crop in the autumn.

In the present report we give the results of a further investigation, the clovers having been sown at various rates per acre with barley, and the roots and dead stems and leaves of the clovers being collected for analysis in the following spring. The barley employed was that known as Odessa, which was sown on all the plots under experiment at the uniform rate of $1\frac{3}{4}$ bushel per acre. The barley and clover were sown together on all the plots on 5th, May 1896, and the barley cut on 27th July. The clover residues (that is, the roots, dead stems and leaves) were collected on May 1st, 1897.

The results, therefore, indicate the amounts of organic and mineral matter and certain fertilizing constituents contained in the roots to a depth of 9 inches, and in the dead or dried stems and leaves, immediately before spring ploughing.

The data are presented in tabular form, as follows :—

ANALYSES of clover residues (roots, dead stems and leaves), 1897.

All the clovers were sown, at the respective rates mentioned below, on 5th May, 1896, with Odessa barley at the rate of $1\frac{3}{4}$ bushel per acre. The barley on all the plots was cut 27th July, 1896. The clover residues (roots, dead stems and leaves), were collected 1st May, 1897.	Composition.			Nitrogen.	Weight of Clover residue, per acre.		Amount of certain constituents, per Acre.		
	Water.	Organic Matter.	Ash.				Organic Matter.	Ash.	Nitrogen.
				p. c.	Tons.	Lbs.	Lbs.	Lbs.	Lbs.
Mammoth red clover, sown 14 lbs. per acre.	71·51	24·45	4·04	·903	3	636	1,622	268	59
" " " 12 "	69·73	25·28	4·99	1·109	3	976	1,762	349	77
" " " 10 "	59·43	33·19	7 38	1·417	2	1,955	1,978	439	81
" " " 8 "	70·00	26·18	3·82	1·123	3	976	1,783	258	76
" " " 6 "	72·00	24·00	4·00	1·041	3	806	1,634	272	70
" " " 4 "	63·34	31·74	4·92	1·260	2	594	1,458	226	58
Common red clover " 10 "	72·50	23·61	3·89	1·016	3	125	1,446	238	62
Alsike clover " 6 "	71·58	22·63	5·79	1·020	1	1,233	732	187	33
Alfalfa " 14 "	61·54	34·79	3·67	1·075	1	212	772	79	26
Crimson clover " 24 "	62 82	33·01	4·17	·827		1,322	478	60	12

Field notes regarding the growth and appearance of the clovers at certain stages of growth, are to be found on pages 37 and 38 of the Annual Report of the Farms for 1896.

MAMMOTH RED CLOVER.

Considering briefly the data of the foregoing table, we notice first that as regards nitrogen, the greatest amount was found in the residue of the Mammoth Red clover, sown at the rate of 10 pounds per acre. Above and below this rate of seeding, the quantity of nitrogen decreased. Allowing for the unavoidable errors of experiment, the trials with clover sown at the rate of 12, 8 and 6 pounds, respectively, per acre, gave approximately the same amount of this element, averaging from 5 to 10 pounds less than in the residue from 10 pounds of clover seed per acre. That sown very thickly, 14 pounds, and that very thinly, 4 pounds, are seen to contain, practically, the same amounts.

The greatest weights of organic matter and ash constituents were also contained in the residue from 10 pounds of seed per acre. The reason that it appeared to yield a smaller total weight than that of the others of this series (save that sown at 4 pounds per acre) was that on analysis, it was found to contain from 10 to 13 per cent less water than they.

On all three counts, therefore, we may conclude that the maximum benefit as a green manure was obtained by seeding this clover at the rate of 10 pounds per acre.

The fertilizing value of the residues from 14 pounds and 4 pounds are, somewhat strangely, almost identical.

Of the other clovers experimented with, the Common Red clover makes the best showing, and the Crimson clover the poorest, with Alsike and Alfalfa intermediate in the order named.

If we leave out of consideration all the advantages accruing from this system of manuring, save the accumulation of nitrogen, and suppose that Mammoth Red clover sown at the rate of 8 to 10 pounds per acre can appropriate from the atmosphere, say 50 pounds of this element (the rest being obtained from the soil), the economy and profit of this method of supplying nitrogen by sowing clover with a grain crop for increasing the fertility of soils become apparent. In this connection it may be well to remark that the growth of the clover did not, on any of the plots, diminish the yield of grain.

The question arises as to whether the clover crop, when grown solely for the purposes of enriching the soil, should be ploughed under in the autumn or the spring. Comparing the results given in last year's report with those now recorded, the conclusion must be drawn that greater benefit is derived by ploughing under in the autumn. The investigations were not on parallel lines, so that a close comparison cannot be made, but nevertheless there is such a large difference between the weights of essential constituents in the crop in the autumn and the spring—the difference being in favour of the former—that little room is left for doubt on this point. Moreover, the crop in the autumn is green and succulent, and we have, therefore, every reason to suppose that its decomposition and the subsequent setting free of its elements of plant food would proceed more rapidly than the decay of the organic matter in the dead and dried residue which is to be found the following spring.

The work so far, then, makes evident the advantage of growing a nitrogen-collector (one of the legumes) with the grain crop. The results of the past season show that the greatest benefit was obtained from sowing 8 to 10 pounds of Mammoth Red clover per acre, and favour the ploughing under of the crop at the close of the growing season —in most localities about the middle of October.

SOIL INOCULATION FOR THE GROWTH OF THE LEGUMES.

THE USE OF NITRAGIN IN AGRICULTURE.

Though not generally practised as a means of soil enrichment, it has been known for many centuries that the growth of clovers and other members of the Pulse family, now commonly termed legumes, increased rather than diminished the fertility of the soil, so that the yield of grain after a crop of clover was greater than it would have been without a previous seeding of clover. The theory generally accepted was that the clover being a deep rooted plant brought up from the sub-soil mineral matter that was out of the reach of other farm crops. This, however, appears to be but one of the causes —and that a minor one—for the fact above mentioned. The chief reason, as revealed by a recent scientific discovery, lies in the fact that the legumes can appropriate the free nitrogen of the atmosphere, assimilating and building it up into their tissues. This nitrogen, by the decay of the roots (and foliage, if the crop is ploughed under) may be utilized, after the process of nitrification, by subsequent crops. As far as we are at present aware the legumes only have this power, hence they are known as nitrogen-collectors in contradistinction to all other crops, which are known as nitrogen-consumers. The demonstration that the free, that is uncombined, nitrogen of the atmosphere can be so utilized by the legumes is due to Hellriegel, a celebrated German scientist. He, with his equally renowned colleague Wilfarth, made this announcement to the world in 1886, at the same time giving overwhelming proof of the correctness of the assertion and explaining the way in which this appropriation and assimilation takes place. The discovery was not only a brilliant scientific achievement, but one of the greatest importance to the agricultural world.

In explaining the fact of this discovery and the application to practical agriculture, it may first be pointed out that the legumes have not in themselves the power of free nitrogen assimilation ; in this respect all plants are alike. They can, however, utilize atmospheric nitrogen through the agency of certain micro-organisms present in the soil. These micro-organisms, microbes or bacteria attach themselves to the roots of the legumes upon which nodules or tubercles then form. These contain the microbes. In some way, at present not well understood, the latter can absorb the nitrogen of the air occupying the instertices between the soil particles, converting it into certain nitrogenous compounds that enter the sap circulation of the host plant and finally are stored up in the tissues. When the nodules and their inhabitants are not present in the soil, clover, pease and all other legumes must, like the rest of vegetation, obtain all their nitrogen from the supply in the soil existing there as nitrates.

Now, it is to be noted that these micro-organisms, though very widely distributed, are not found in all soils. The question, therefore, of the possibility of introducing them where absent, or present only in small numbers, becomes one of agricultural importance. Further, if soil inoculation (as such a process may be well called) is possible, can it be made an economical method for enriching the soil with nitrogen? These are questions that come well within the scope of scientific agriculture to investigate, questions well worthy of careful research, for the answers must be of the greatest importance to farmers.

It might, at the outset, be supposed that the soil of a field growing a luxuriant crop of clover, the roots of which possess nodules, would in all probability contain large numbers of these organisms. Naturally, therefore, we find the first experiments consisted in taking soil from a field upon which a legume possessing an abundance of nodules had been grown and scattering it on the field to be impregnated. This was practically soil inoculation, and though the plan in many instances proved eminently satisfactory, the carrying out of it was frequently costly and cumbersome. Dr. Nobbe, of Tharand, Saxony, was the one who first made this practical application of Hellriegal's discovery.

The next step, also taken by Dr. Nobbe, was in the isolation of the nitrogen-converting microbes from such soil and the preparation, by certain well known bacteriological methods of "pure cultures." These cultures consist of colonies of the organisms and the preparation has been named *Nitragin.*

It would appear that the members of the leguminosæ have each their own peculiar bacterium or micro-organism, for it seems that those influencing the assimilation of nitrogen in the clover plant are of no value for the pea crop, and *vice versa.* Hence, the necessity for the preparation of clover "nitragin," pea "nitragin," &c. These cultures or bacterial preparations, to the number of 17, are now manufactured on a commercial scale in Germany, and a quantity of each said to be sufficient to inoculate an acre can be procured for about $1.25.

The practical application of *Nitragin* has been made in two ways; first, by diluting the preparation with sufficient water and sprinkling the seed with the fluid, and, secondly, by treating a quantity of soil with a dilute solution of the preparation, allowing the soil to dry, and then spreading it evenly over the field to be inoculated, which is then deeply harrowed.

Following these methods, experiments have been made in Germany, England and on this continent. The results so far obtained, as gathered from the reports of these investigations, scarcely admit of any more emphatic statement than that the indications are that on soils that have not previously grown legumes, or for other reasons do not contain the nitrogen-assimilating bacteria, the practice of inoculation will be attended with profit. Some soils contain such an abundance of these microbes that a further supply is unnecessary. European field experiments seem to show that even when the growth of the foliage is not increased by *Nitragin* there is frequently a greater root development and a larger number of nodules. No great difference could be noted, in these reports, between the results of soil inoculation and seed inoculation, though such differences as there are appear to be in favour of the former.

EXPERIMENTS WITH NITRAGIN.

In the spring of the present year we obtained from Messrs. Meister, Lucius and Bruning, Höchst am Main, manufacturers of bacterial cultures, *Nitragins*, for alfalfa or lucerne, clover, horse beans and vetch. The soil used in our experiments was made from clay, sand and swamp muck and would be termed a loam of medium fertility. It was not sterilized, in order that the conditions might be comparable, as far as possible, to those on the farm. The experiments were conducted in duplicate in galvanized iron pots and the methods of inoculation above described were employed, check, or uninoculated, pots being sown at the same time. After the plants had reached the height of a few inches they were thinned out to the same number in each pot. The seed in all the trials was sown on May 20th, 1897, the plants of the clover, alfalfa and vetch showing above ground in all the pots on May 25th, and the horse beans on May 31st. The soil and seed of the inoculated tests were treated with the respective *Nitragins* on the day of sowing, May 20th.

Unfortunately, the growth of the alfalfa and vetch was very meagre and it was therefore, deemed inadvisable to weigh and analyse their crop, as the results might be misleading.

INOCULATION EXPERIMENTS WITH HORSE BEANS (FABA VULGARIS, var. EQUINA).

(Sown 20th May, collected 4th August, 1897.)

The plants were thinned out to five (5) in each pot. On August 4th, the plants being then in pod, the experiment was brought to a close. The difference in foliage in the various pots was not very marked, though the plants in the pots containing the inoculated soil (H.H.) were decidedly larger and more robust than the others. In all the pots the plants appeared healthy.

In the check, or uninoculated pots, the root systems were meagre and supplied with a few small nodules only.

In the "soil inoculated" pots there were extensive root systems, the fibres being possessed of numerous nodules of a much larger size than in the preceding series.

In the pots containing the plants grown from "inoculated seed" the root systems, though larger than in the uninoculated pots, were not equal to those in the soil inoculated pots, nor were the nodules quite so numerous.

The results showed that the *Nitragin* had a decided effect in the development of the roots, a feature that has been remarked upon by Dr. Voelcher, an English agricultural chemist, who has carried on a series of investigations with *Nitragin*.

The weight of the roots, stems and leaves on August 4th were as follows:—

	Grams.
Pots G.G., uninoculated, 10 plants, including roots	127
Pots H.H., soil inoculated, 10 plants, "	227
Pots I.I., seed inoculated, 10 plants, "	157

The following table presents the analytical data, including the amounts of certain constituents contained in the plants under experiment :—

TABLE I.

AMOUNTS OF NITROGEN, ASH CONSTITUENTS AND ORGANIC MATTER.

	Pots G.G. 10 Plants = 127 Grams. Not Inoculated.			Pots H. H. 10 Plants = 227 Grams. Soil Inoculated.			Pots I. I. 10 Plants = 157 Grams. Seed Inoculated.		
	Stems and Leaves.	Roots.	Total.	Stems and Leaves.	Roots.	Total.	Stems and Leaves.	Roots.	Total.
	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.
Weight of nitrogen	·611	·145	·756	·822	·281	1·103	·569	·267	·836
" ash or mineral matter.....	2·56	2·64	5·20	2·94	4·44	7·38	2·35	4·14	6·49
" organic matter	16·49	3·67	20·16	22·57	7·66	30·23	14·53	7·56	22·09
Total dry matter..	19·05	6·31	25·36	25·51	12·10	37·61	16·88	11·70	28·58

Deductions.—(A.) The largest yield of crop was obtained from the soil inoculated pots H.H., chiefly due to the greater weight of roots.

(B.) The amounts of nitrogen, ash or mineral matter and organic matter in the plants from pots H.H., soil inoculated, were, in most instances, considerably greater than those from the inoculated seed pots I.I.

(C.) The plants from pots I.I., "seed inoculated," furnished nitrogen, ash constituent and organic matter in amounts intermediate between those from G.G., not inoculated, and H.H., seed inoculated.

We may, therefore, conclude that in this experiment there has been a decided advantage accruing from the use of *Nitragin*, especially when employed for "soil inoculation," and that "seed inoculation," while not giving such marked results, has nevertheless been beneficial in increasing the growth. I further think we may fairly conclude that the additional nitrogen in the plants of the pots H.H. and I.I. has been obtained through the agency of the *Nitragin*.

TABLE II.

THE PERCENTAGE COMPOSITION OF THE "DRY MATTER" OF THE (*a*) STEMS AND LEAVES, AND (*b*) ROOTS OF THE PLANTS.

	From Pots G.G. Not inoculated.		From Pods H.H. Soil inoculated.		From Pots I.I. Seed inoculated.	
	Stems and Leaves.	Roots.	Stems and Leaves.	Roots.	Stems and Leaves.	Roots.
Nitrogen	3·212	2·321	3·223	2·324	2·936	2·478
Ash or mineral matter	13·46	41·91	11·52	36·76	12·33	40·49
Organic matter	86·54	58·09	88·48	63·24	87·67	59·51

The data do not allow of the deduction that the plants from inoculated soil or seed are relatively richer in nitrogen than those without *Nitragin*. The larger amount of nitrogen in the treated crop is rather due to a greater development of root or foliage, or both, under the stimulating effect of the micro-organisms furnished by the preparation.

The percentages of ash or mineral matter are not to be compared too closely, as by the method employed it was found extremely difficult to separate the last traces of sand upon the roots. The presence of a small amount of sand would materially increase the percentage of "ash."

MAMMOTH RED CLOVER.

Culture used, "Trifolium pratense." The plants were thinned to 10 plants in each pot. The experiment was closed on October 22nd, when a few of the plants were in flower. Previous to the weighing of the plants a photograph of the series was taken, a reproduction of which is here given.

		Grams.
Pots D.D., Not inoculated,	weight of plants, including roots	147·6
Pots E.E., Soil inoculated,	do	163·2
Pots F.F., Seed inoculated,	do	189·0

These data show that considerable increase in weight of crop has resulted from the action of the *Nitragin*, though it is to be remarked that, unlike the results with the horse beans, the greater yield is obtained from the experiment in which the seed was inoculated.

The nodules or tubercles were much smaller than those on the roots of the horse beans. From mere inspection of the roots it was extremely difficult to decide which series was the richest in nodules. The root systems, as regards development, were approximately in the ratio represented by the total weight of the crops.

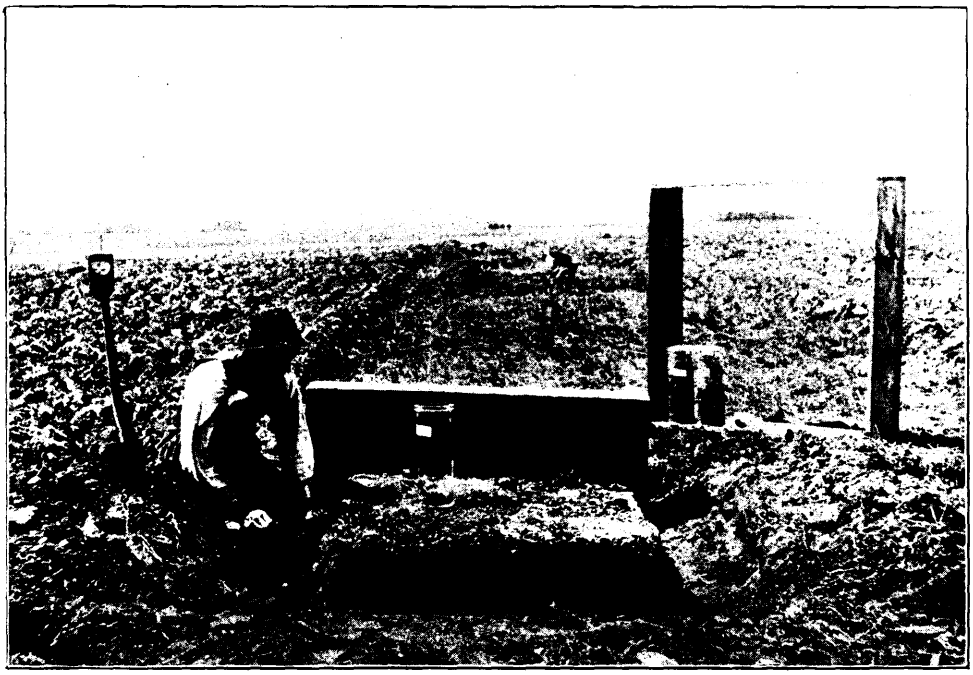
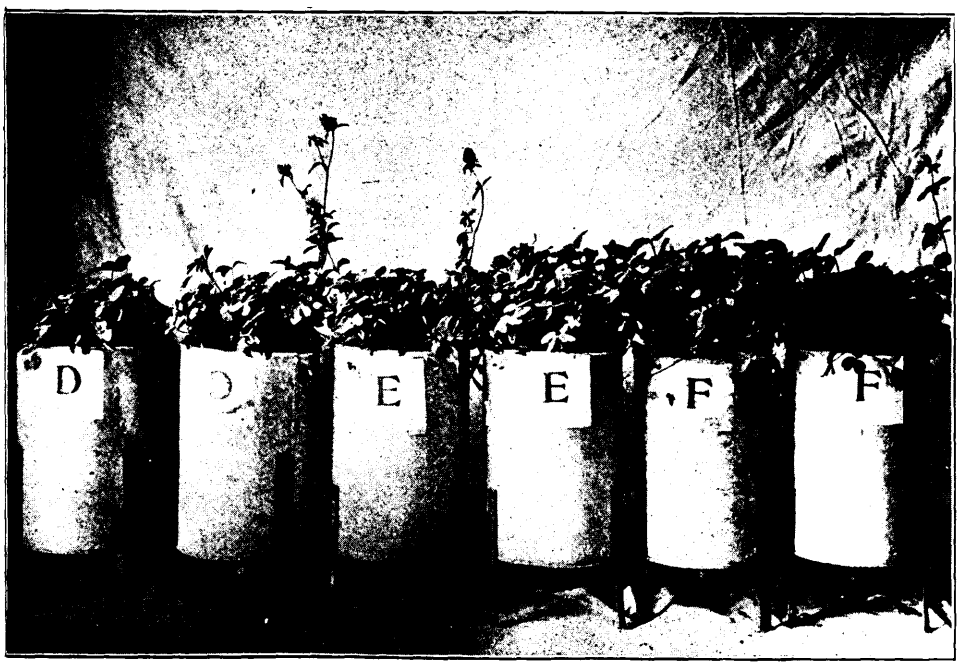


Illustration showing the method of collection of the roots, dead stems and leaves of clover for analysis. May 1st, 1897.



Inoculation experiments with *Nitragin* for Mammoth Red Clover, Sept. 17th, 1897. Pots D. D., not inoculated ; Pots E. E., soil inoculated ; Pots F. F. seed inoculated.

The analytical data of this series are given as follows :—

TABLE III.

AMOUNTS OF NITROGEN, ASH CONSTITUENTS AND ORGANIC MATTER.

—	Pots D.D. 20 plants=147·6 grams. Not inoculated.			Pots E.E. 20 plants=163·2 grams. Soil inoculated.			Pots F.F. 20 plants=189·0 grams. Seed inoculated.		
	Stems and Leaves.	Roots.	Total.	Stems and Leaves.	Roots.	Total.	Stems and Leaves.	Roots.	Total.
	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.	Grams.
Weight of nitrogen.....	·602	·469	1·071	·740	·495	1·235	·800	·745	1.545
" ash or mineral matter.....	5·18	9·76	14·94	4·98	5·14	10·12	4·66	6·84	11·50
Weight, organic matter..	21·42	10·24	31·66	26·22	14·36	40·58	27·04	20·06	47·10
" "dry matter"	26·6	20·00	46·60	31 20	19·50	50·70	31·70	26·90	58·60

Again, it is to be noticed that the amounts of nitrogen increase with the total weight of the crop; the same is also true of the organic matter. In these important constituents, larger quantities were obtained from the treated pots than from the untreated or check pots, and thus we have further testimony to the favourable action of the bacterial culture. It is worthy of note that the roots contained amounts of fertilizing constituents to the extent of at least two-thirds of those present in the foliage.

The percentage composition of the "dry matter" of the clovers under experiment is presented as follows :—

TABLE IV.

PERCENTAGE COMPOSITION OF "DRY MATTER."

	From Pots D.D. Not inoculated.		From Pots E.E. Soil inoculated.		From Pots F.F. Seed inoculated.	
	Stems and Leaves.	Roots.	Stems and Leaves.	Roots.	Stems and Leaves.	Roots.
Nitrogen.....	2·26	2·31	2·37	2·54	2·53	2·77
Ash or mineral matter.....	19·46	25·40	15·91	26·39	14·71	25·47
Organic matter.....	80·54	74·60	84·09	73·61	85·29	74·53

Slightly larger percentages of nitrogen were found in the inoculated plants, and more especially in their roots, than in those untreated, in this respect differing from the results obtained with the horse beans. The percentages of the other constituents are practically the same throughout the series.

Further experiments with *Nitragin* will be made next season. With increased data at our command we shall probably be in a position to speak more decisively as to the value of this preparation. The indications of the present investigation, however, point

strongly to its usefulness in encouraging the growth of the legumes, clover and horse beans; and it is probable that where such will not grow luxuriantly, owing to the absence of the necessary microbes in the soil, inoculation with *Nitragin* will prove effective and economical.

FORAGE PLANTS AND FODDERS.

AWNLESS BROME GRASS (*Bromus inermis.*)

In bulletin No. 19, Grasses; their uses and composition (Experimental Farm series), written by Dr. Fletcher and myself in 1893, the following statement regarding Awnless Brome Grass is to be found: "We consider this to be one of the most valuable of the introduced grasses, both from its feeding qualities, as evinced by analysis, and from its free, luxuriant habit of growth. An analysis made from grass grown on the Central Experimental Farm, afforded the following data:—

ANALYSIS of Awnless Brome Grass, taken when the seed was fully formed, the right period at which to cut for hay.

	Fresh or Green Grass.	Calculated to Water-free Substance.
Water	65·07	
Ash	1·32	3·78
Protein (albuminoids)	4·14	11·88
Fat (Ether Extract)	·84	2·41
Carbohydrates (Nitrogen-free extract)	16·90	48·03
Fibre	11·73	33·90
	100·00	100·00

These results denote that it is a grass rich in flesh-forming substances (protein) and low in fibre—the least valuable, from a feeding standpoint, of a fodder's constituents.

In the Annual Report of the Experimental Farms for 1893, on page 189, Dr. Fletcher, Botanist of the Experimental Farms, speaks very highly of this grass from trials made under his care on the Central Farm, stating that it is early and hardy, and that it is a heavy cropper, and one which produces an excellent aftermath of succulent, leafy shoots. He also quotes many favourable opinions from those who have grown it in the North-west Territories and the United States.

For several years it has been extensively sown on the Experimental Farms at Brandon and Indian Head, and reference to the reports from these farms for last year will show that great success has attended the trials on both farms (see pages 337 and 396, Report Expl. Farms, 1896). Both for hay and pasture it has already proved a most valuable grass for the North-western provinces. A feature of particular importance is the heavy aftermath of succulent grass it affords. Since the native grasses do not produce this secondary growth to any extent, Brome grass is extremely valuable in furnishing for the farmer and dairyman of these districts, during the late summer months, palatable, wholesome and nutritious feed for keeping up the milk flow.

In order to give the grass an extensive introduction, it was considered desirable to distribute seed among farmers. To obtain this, portions of the crop on the Experimental Farms at Brandon and Indian Head have been allowed to ripen, and the hay thrashed. Many farmers have also followed this practice to procure seed for themselves and their neighbours and thus, frequently, farmers have a quantity of fully ripe, thrashed hay to feed to stock. To ascertain the value of this latter, or in other words to learn what deterioration in feeding value has taken place between the period at which the grass is in prime condition for cutting and that at which the seed is fully ripe, the

following investigation was carried out, the samples being furnished from the Experimental Farm at Indian Head, N.W.T., by Mr. Mackay, the superintendent :—

The samples consisted of (1) hay cut when the seed was formed (July, 13, 1896) and considered in prime condition, (2) hay cut when seed was fully ripe (July, 24, 1896) and containing seed, (3) ripened, thrashed hay (practically straw), and (4) chaff from the thrasher, containing some seed. Samples 1, 2 and 3 were of good colour, not having been bleached in the curing, a change usually accompanied by a lessening of food value, the fibre becoming hard and indigestible. The appearance of all was that of nutritious, palatable hay.

ANALYSES of Hay and Chaff of Awnless Brome Grass.

Number.	Stage of growth, &c.	Hay.						Calculated to Water-free Substance.				
		Water.	Ash.	Protein, (albuminoids).	Fat (ether extract).	Carbo-hydrates (nitrogen-free extract).	Fibre.	Ash.	Protein (albuminoids).	Fat (ether extract).	Carbo-hydrates (nitrogen-free extract).	Fibre.
1	Seed just formed ; in prime condition for hay ; cut 13th July, 1896	6·47	7·87	7·54	4·14	42·56	31·42	8·42	8·10	4·42	45·46	33·60
2	Seed ripe ; unthrashed ; cut 24th July, 1896	8·28	7·39	5·76	3·15	43·16	32·26	8·05	6·28	3·43	47·07	35·17
3	Ripened ; thrashed ; hay (straw)	7·62	7·23	6·05	3·80	38·75	36·55	7·83	6·35	4·11	42·15	39·56
4	Chaff from thrasher, containing some seed	8·63	9·01	10·70	4·86	42·88	23·92	9·86	11·21	5·32	47·42	26·19

In the first place we notice that of the three samples of hay, No. 1 (that cut when "the seed was just formed") is the most nutritious, since it contains most protein and fat and the least fibre. This result is in accord with those already obtained from a study of other grasses (see bulletin No. 19, page 22) and emphasizes the importance of cutting for hay as soon as the seed has formed. A loss of valuable and digestible food material always occurs when a grass is allowed to fully mature before it is cut for hay.

Thus, on comparing the analysis of Nos. 1 and 2, it is evident that a certain deterioration in food value has taken place by the ripening of the grass. This depreciation in nutritive qualities, made apparent by contrasting the figures in the columns representing the composition of the water-free substances—is not, however, in this instance a very serious one ; at all events, it is not so great as to prevent the farmers from allowing the grass to mature when a supply of seed is wished.

Though the ripened, thrashed hay (No. 3) contains more fibre and somewhat less starch, &c. (carbohydrates) than the unthrashed hay (No. 2) our data do not show that there is any great difference in feeding value between these samples. Indeed it would appear that in certain respects the former is the better of the two. This is contrary to our expectation and is perhaps caused by the loss in thrashing of certain of the least valuable portions of the plant.

Sample No. 4, labelled "chaff from the thrasher," evidently contained a considerable amount of seed. Its presence in the chaff is most probably unavoidable, and may be accounted for by the extreme lightness of the seed. Our analysis shows this sample to be the richest in protein and fat and lowest in fibre of all those examined. This is undoubtedly good fodder and one that could be used to advantage as part of the daily ration.

STORKSBILL OR ALFILARIA *(Erodium cicutarium.)*

At the request of Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, a chemical examination of the feeding qualities of this forage plant has been made. Concerning its occurrence in that province, Mr. Anderson writes as follows :—

"Erodium cicutarium is common in the vicinity of Victoria and on the Gulf Islands,

but I am not prepared to state its prevalence in other parts of the province. It is generally found on rocks thinly covered with soil, as a small plant, but it readily accommodates itself to more congenial localities, where it assumes the large form I send you. It thrives best in a rich black loam. It has not been grown as a crop and its weight per acre is, therefore, unknown; from what I have seen of it however, I should think the yield would be about the same as that of red clover. Cattle, according to Mr. Munro, eat it with avidity, at any rate, during the winter months when green food is scarce."

Our analysis of the sample sent furnished the following data:—

COMPOSITION OF STORKSBILL OR ALFILARIA.

Constituents.	Green Material.	Hay (Air-dried.)
Water	89·02	10·32
Albuminoids (protein)	2·81	23·12
Ether extract (fat)	·55	4·53
Nitrogen-free extract (carbo-hydrates)	3·79	30·70
Fibre	1·34	10·97
Ash or mineral constituents	2·49	20·36
	100·00	100·00

These results show that this plant has nutritive qualities of a high order. The percentage of albuminoids (flesh formers) closely approximate that found in good grasses, though it must be remembered that in the young plant a part of the nitrogen (the essential element of albuminoids) exists in the form of amides—compounds which have not quite the same feeding value as the true albuminoids. Another feature in its favour is the particularly small amount of fibre it contains. Provided the plant is palatable to cattle, which upon good testimony it appears to be, it should prove a nutritious, wholesome fodder.

Storksbill or alfilaria evidently makes a large draft upon the mineral resources of the soil, for the ash content is high. This should not be considered as a disadvantage, if the manure from its feeding is carefully preserved and returned to the soil, for provided these precautions are observed this and similar plants may be used as agents for converting locked-up plant food into available forms for future crops.

Regarding the value of this plant, it will be of interest to make the following quotations from "The Agricultural Grasses and Forage Plants of the United States," by Dr. Geo. Vasey:—"This annual, supposed to have been introduced from Europe, does not seem to be mentioned in any work on forage plants. It occurs abundantly and is of much value for pasture over a large extent of territory in Northern California and adjoining regions; elsewhere in the United States it is sparingly introduced and usually regarded only as a weed, though it is not very troublesome. Besides the above name it is known as Storksbill, pin clover, pin grass, and filaree; it is neither a clover nor a grass, but belongs to the geranium family; it starts very early and grows rapidly, furnishing good, early pasture and ripens seed before the hottest weather. It is of little value as hay and is not worth introducing where the ordinary forage plants can be grown. The seed is seldom sown, but the plant comes spontaneously each year from self-sown seed." Prof. E. W. Hilgard, of the Experiment Station at Berkeley, California, says respecting this plant:—"Two species of cranesbill (*Erodium cicutarium* and *moschatum*) are even more common here than in Southern Europe, and the first named is esteemed as one of the most important natural pasture plants, being about the only green thing available to stock throughout the dry season, and eagerly cropped by them at all times."

Though not suitable for hay—since when dry it easily breaks into fine bits and dust—it appears, both from the above testimony and our analysis, to have a distinct value as a pasture plant, more especially for high lands and in districts subject to seasons of drought.

COMPARATIVE VALUES OF "HEAVY FEED" AND BUCKWHEAT BRAN.

These feed stuffs were examined at the request of the editor of the Co-operative Farmer, who states that these materials are being largely fed by the farmers and dairymen of New Brunswick, and that there is a widespread desire to learn their comparative feeding values.

As received, the former had much the appearance of fine bran, and under the microscope was found to consist chiefly of ground wheat and oats; the bran, as separated by sifting, being approximately 25 per cent of the whole. The buckwheat bran was somewhat coarsely ground and showed the appearance of a considerable quantity of hull. The sample is rather one of buckwheat middlings than of buckwheat bran.

The analytical data obtained are as follows:—

COMPOSITION OF "HEAVY FEED" AND BUCKWHEAT BRAN.

	Heavy feed.	Buckwheat bran.
Moisture	9·30	9·21
Albuminoids	16·12	18·62
Fat	5·95	6·45
Carbo-hydrates	58·56	57·92
Fibre	6·50	3·51
Ash	3·57	4·29
	100·00	100·00

The most important constituents of a fodder are the albuminoids, commonly known as flesh formers, and the fat. Other things being equal, we can assign relative values to fodders by taking into account the percentages of these nutrients, according to the following plan. We may assume for the purpose of comparison, the relative values of albuminoids, fat and carbo-hydrates (starch, &c.,) to be 2·5 : 2·5 : 1. The method of ascertaining the feeding value is then to add together the amounts of albuminoids and fat and multiply the sum by 2·5. To the result, the percentage of carbo-hydrates is added. This final amount represents the number of called "food units," which indicate the relative food values of the fodders under comparison.

	HEAVY FEED.	BUCKWHEAT BRAN.
Albuminoids	16·12	18·62
Fat	5·95	6·45
	22·07	25·07
	2·5	2·5
	11·035	12·535
	44·14	50·14
	55·175	62·675
Carbo-hydrates	58·56	57·92
Food units	113·73	120·60

In other words, presuming the digestibility of these products to be equal, one ton of the buckwheat middlings is equal in food value to 1 ton 120 pounds of the "heavy feed." To assign comparative money values, if buckwheat middlings were worth $16 per ton, the heavy feed would be worth $14.11 per ton.

It must not be supposed from the foregoing that the exclusive use of buckwheat bran is recommended; a mixed grain diet will always be found not only more palatable to the animals, but as resulting in more profitable returns. This investigation, however, shows that weight for weight the buckwheat product is the more nutritious of the two.

"GROUND FEED" USED FOR CATTLE IN TRANSPORTATION.

The comparative value of two samples of "ground feed" used for cattle on board ship, examined at the request of the Department of Marine and Fisheries, is reported upon as follows:

General Appearance—Both samples consisted largely of crushed or coarsely ground oats and Indian corn (maize). No. 1 contained a large quantity of the thin chaffy membrane of the maize kernel. No. 2 possessed a very considerable proportion of oat chaff—consisting of the palets and glumes of the seed. Judging from a general, as well as a microscopical examination, sample No. 1 would be considered, on the grounds of apparent richness in composition and mechanical condition, the better of the two feeds.

Chemical Composition.—The samples were submitted to the usual analysis of feed stuffs, with the following results:—

ANALYSIS OF GROUND CATTLE FEEDS.

——	No. 1.	No. 2.
Moisture	10·63	9·58
Albuminoids	12·08	9·17
Fat	5·27	4·42
Carbo-hydrates	63·72	62·86
Fibre	5·25	10·65
Ash	3·05	3·32
	100·00	100·00

As already stated, the most valuable constituents of a fodder are the albuminoids (or flesh formers) and the fat; the least valuable, the fibre. Hence, by reason of the greater percentage of the albuminoids, fat and carbo-hydrates in sample No. 1, and the larger amount of fibrous material in sample No. 2, the former must be considered the more nutritious of the two.

In order to make a comparison between these feed stuffs, or in other words to assign the relative values, it may be assumed as in the preceding chapter, that the feeding values of albuminoids, fat and carbo-hydrates are in the following proportion:—2·5: 2·5: 1.

If it then be further assumed that the digestibility of the two samples be equal—an assumption that gives a slight benefit to the poorer and more fibrous of the feeds—the following calculations will show their relative values as foods :—

	No. 1.	No. 2.
Albuminoids	12·08	9·17
Fat	5·27	4·42
	17·35	13·59
	2·5	2·5
	86·75	6·795
	347·0	27·18
	43·375	33·975
Carbo-hydrates	63·72	62·86
Food units	107·09	96·83

This shows that 1 ton of No. 1 is equal in food value to 1 ton 212 pounds of No. 2.

Supposing the value of No. 1 to be $20 per ton of 2,000 pounds, the value of 1 ton of sample No. 2 would be $18.08.

CANADIAN SOILS.

As explained in the letter of transmittal to this report, we here present the results obtained on certain samples sent by farmers for examination during the past year and a paper containing complete data on the virgin soils of the Dominion examined by us during the past nine years.

The following extracts, from reports furnished the farmers forwarding the soils, are here inserted for the purpose of informing our readers respecting the nature of the examination we make of cultivated soils and of the suggestions offered for the economical treatment of such lands :—

BRITISH COLUMBIA.

Soils from Enderby and Bear Valley, B.C., forwarded by the Department of Agriculture, Victoria, B.C.

Sample from the farm of John Bacon, near Enderby. This soil is rather of the nature of a deposit for it is reported by Mr. Palmer, Inspector of Fruit Pests for British Columbia, as issuing from a hillside. It subsequently hardens by simple exposure. From the vigorous growth of the vegetation in the immediate vicinity of the deposit, Mr. Palmer considered that it might be of importance as a fertilizer.

This sample was received in two parts, one representing the moist, fresh material; the other, indicative of its character after exposure. Both were similar in their composition, save for the larger percentage of water in the former.

A quantitative examination of the air-dried portion furnished the following data :—

Insoluble mineral matter	·09
Carbonate of lime	94·08
Moisture, oxide of iron, alumina, &c.	5·83
	100·00

It is, therefore, evident that this is a marl of excellent quality, being practically free from sand, clay and other inert matter. Judging of this sample, both from its mechanical condition and chemical composition, I am of the opinion that it would be an excellent source of lime for use in agriculture.

A brief review of the more important agricultural purposes of marl or rather, of the functions of lime, is given on pages 161-2 of our report for 1894.

Sample of sub-soil from the farm of Godfrey Rogers, Bear Valley, British Columbia. Its overlying surface soil was of a peaty character, from four to five feet in depth, and extending over some 600 acres. On account of its location and appearance, this sample was supposed to be marl, or at least to contain a considerable quantity of lime.

As received, it was somewhat grayish, quite flocculent and loose as to texture, and very light in weight.

The air-dried sample, on treatment with hot dilute hydrochloric acid, did not effervesce, showing the absence of carbonate of lime. The insoluble residue from this digestion amounted to 80·57 per cent. This material may be considered as inert and practically useless from an agricultural standpoint. Further analysis showed that this substance yielded only a trace of lime, even to strong acids. It cannot be used, therefore as a source of lime and cannot, as far as our work goes, be considered as of any value agriculturally.

Muck Soil from Chilliwack. This soil furnished on examination the following data:—

ANALYSIS OF SOIL (AIR-DRIED).

Moisture	10·55
Organic and volatile matter	70·31
Insoluble matter (clay and sand)	11·24
Mineral matter, soluble in acid	7·90
	100·00
Nitrogen	·946

This soil is in reality a muck of excellent quality, though, as received, rather sour, undoubtedly due to want of drainage and lack of lime. It is especially rich in humus and nitrogen.

The small quantity of clay and sand present would, of course, render it unsuitable for certain crops, more especially cereals, but if this could be remedied by a judicious admixture with the sub-soil or a heavy dressing of similar materials, a very good soil should be the result.

The sub-soil proved to contain 75·84 per cent of clay and sand and 1·04 per cent of lime, which shows that it would be valuable for the purpose suggested. Since, however, it is not rich in lime, its addition to the soil could scarcely be regarded as a substitute for this amendment.

The fertilizers to which this soil would respond are potash, lime and phosphoric acid. To furnish these, wood ashes are of special value, since they not only supply potash, but also lime and phosphoric acid in notable amounts. If potash is applied as kainit or as muriate of potash it would be advisable to add lime, either as such or as marl or gypsum. Phosphoric acids may be furnished as superphosphate or, still better for land of this character, as basic slag.

The soil is rich in nitrogen, so that with the favourable climatic conditions for nitrification largely prevalent in British Columbia it is very doubtful whether the application of nitrogenous fertilizers would be profitable.

Experimental Farms.

ONTARIO.

Soils from Lefaivre, Alfred Township, Prescott Co., forwarded for examination by Hon. Senator Owens.

ANALYSES OF SOILS (AIR DRIED).

	No. 1.	No. 2.	No. 3.	No. 4.
Moisture	5·31	8·35	8·20	2·67
Organic and volatile matter	7·26	51·69	36·47	8·09
Mineral matter, soluble in acid	20·91	14·51	17·02	20·45
Mineral matter, insoluble in acid	86·52	25·45	38·31	68·79
	100·00	100·00	100·00	100·00
Nitrogen	·185	1·47	1·13	·174
Lime	1·32	.....	.....	·82

No. 1.—A light gray loam, full of root fibres and containing very little sand. The percentage of humus (decomposed vegetable matter) is small. The soil is strong and retentive, but needs organic manures and lime to improve it. Of the former, barn-yard manure and clover suggest themselves as the best. A composted muck would also be found of great value in lightening the soil and adding to its store of humus and nitrogen. The method of enrichment by means of clover or some other of the legumes is usually the most economical to follow. The best time to plough under such a crop is when it is in full bloom. Useful sources of lime are: lime, slaked or unslaked, marl (carbonate of lime), and gypsum (sulphate of lime). On this kind of soil lime or marl would be the best to use. Briefly, the most economical treatment may be outlined as follows: First, thoroughly drain, then dress with lime or marl; say one ton per acre of the former or twice the quantity of the latter, to which may be added with advantage 10 to 20 bushels of wood ashes. If the seed bed has been well prepared, seed with clover, sowing buckwheat or rye as a nurse crop. The first crop might be cut and fed, the aftermath, when it had attained a good growth, should be turned under.

No. 2.—This is a muck soil containing much of its vegetable matter in an undecomposed condition. Thorough drainage, in order that it may become compact and at the same time rendered sweet, is to be recommended. This should be followed by an admixture, if possible, of the underlying subsoil. Lime, potash and phosphoric acid are the chief essentials in which the soil is lacking. Wood ashes and superphosphate supply these in available forms. When sourness is corrected and tilth improved by such a treatment as is now suggested, soils like this may be made very fertile, though they are not best suited to grain crops. A small dressing of barn-yard manure, to supply immediately available nitrogen, would undoubtedly be beneficial.

No. 3.—A good muck soil. Drainage, as in No. 2 is here to be strongly advised, in order to correct sourness and aid in improving the tilth. Lime alone, or, still better, with a certain quantity of wood ashes or some other form of potash, would undoubtedly prove of value. Oats, buckwheat, potatoes and roots generally are, perhaps, the crops best suited to this soil.

No. 4.—A stiff clay loam, containing very little sand, and in general character similar to No. 1. It, however, has not the same amount of root fibres, nor is it as rich as No. 1 in humus and nitrogen. In lime also it is very low, the amount being less than the lowest limit allowed by agricultural chemists for obtaining good returns. It is of poor tilth and very hard when dry. Like No. 1, it should never be worked when wet. In general treatment, the course suggested for No. 1 soil is here strictly applicable.

NOTE.—In the report of this Division for 1894 will be found on page 159 some remarks on the improvement of muck soils; in the report for 1895 there is a chapter on green manures, from which may be learned the value and chief features of green manuring with the legumes.

Muck Soil from near London, Ontario. In general features, this soil is similar to that from Chilliwack, B.C., previously discussed; the treatment suggested for that soil might, therefore, be followed in this case.

ANALYSIS OF AIR-DRIED SOIL.

Moisture	12·77
Organic and volatile matter	71·64
Insoluble matter (clay and sand)	5·76
Mineral matter, soluble in acid	9·83
	100·00
Nitrogen	·933

The correspondent forwarding this sample asked for information respecting the rates of application of commercial fertilizers. As doubtless there are many desirous of obtaining similar information, the following brief note is appended.

The most economical amounts to use can only be ascertained by direct trial of the soil with the crop that it is desired to feed, but much time and money can be saved by making an intelligent study of general soil characters and the special requirements of the farm crops. The subjoined table gives the limits of application between which it is usual to employ the commercial fertilizers.

	FERTILIZER.	APPLICATION PER ACRE.
Nitrogenous	Nitrate of soda	100- 200 Lbs.
	Sulphate of ammonia	75- 200 "
Phosphatic	Superphosphate	200- 400 "
	Bone meal	500-1,000 "
	Thomas or Basic Slag	400- 500 "
Potassic	Wood Ashes	25- 100 Bush.
	Kainit	300- 700 Lbs.
	Muriate of Potash	100- 300 "
	Sulphate of Potash	150- 300 "

NOTE.—Farmers, market gardeners and fruit growers are invited to correspond with this Division if wishful for information respecting fertilizers, their composition and application. The examination, however, of all brands of commercial fertilizers upon the market is made by the Inland Revenue Department, Ottawa.

QUEBEC.

Soils forwarded for Examination by L. Morin, St. Ours. No. 1.—Farm soil under cultivation, of light gray colour, in friable lumps and powder.

No. 2.—Garden soil, somewhat darker than No. 1, but otherwise very similar to it.

ANALYSES OF SOILS (air-dried).

	No. 1.	No. 2.
Moisture	3·96	2·85
Organic and volatile matter	4·23	9·52
Insoluble mineral matter (clay and sand)	74·10	75·15
Mineral matter soluble in acid	17·71	12·48
	100·00	100·00
Nitrogen	·099	·409
Lime	traces only	

Soil No. 1, is very poor, particularly in humus (semi-decomposed vegetable matter) and in nitrogen. To furnish these constituents, barn-yard manure, a compost made with swamp muck or a green crop (preferably clover or some other legume) turned under, are to be recommended.

Lime, in which this soil is deficient, may be applied as such in the form of marl or gypsum.

Wood ashes, supplying potash, lime and certain other constituents of plant food, would undoubtedly give good returns on this soil. Superphosphate is perhaps the best form for this soil in which to furnish phosphoric acid.

Soil No. 2, is much better, as shown by the higher percentages of organic matter and nitrogen. In general characteristics, however, it is similar to No. 1, and the treatment above suggested would apply for this soil equally well.

Lime may be applied every 5th year, or somewhat more frequently, at the rate of 40 bushels per acre. The usual dressing of gypsum is from 200 to 400 pounds per acre.

Wood ashes give good returns in applications of 40 to 80 bushels per acre. Other forms of potash are, kainit and muriate of potash; of the former, 400 pounds and of the latter, 100 pounds constitute the average amounts for an acre.

Superphosphate at the rate of from 200 to 400 pounds per acre will be found useful for the cereals, grass and turnips.

Considerable experience, together with the knowledge of the special requirements of the various farm crops, is necessary before the most economical amounts of these concentrated fertilizers can be applied. The above quantities are to be considered only as suggesting the limits between which in ordinary farm practice most profitable returns will be obtained.

Soil forwarded for examination by J. O. E. Forest, St. Jacques, Montcalm. A sandy soil, analysis showing but a small percentage of clay. In appearance, it is a loam of fair quality.

ANALYSIS OF SOIL (air-dried).

Moisture	2·60
Organic and volatile matter	8·92
Sand and clay	74·26
Mineral matter, soluble in acid	14·22
	100·00
Nitrogen	·323
Lime	Very small quantity.

Our results do not indicate that the soil is exhausted of those elements required by plants, but without doubt its fertility is capable of improvement. Containing, as it does, sand, clay and humus in fair proportions, it may be termed a soil of average quality, but, nevertheless, by judicious culture and the employment of fertilizers, its crop-producing powers may be increased.

The first care should be towards adding to its store of humus, that is, semi-decomposed vegetable matter. This naturally can be done by heavy applications of barn-yard manure. If such a course, however, is impossible, the practice of "green manuring" should be adopted. This is best and most economically effected by growing clovers, either as a crop or with the cereals, and turning under the aftermath. By such means both nitrogen and readily decomposable vegetable matter are furnished, supplying plant food for future crops, and permanently improving the tilth or texture of the soil.

To facilitate the growth of clover and for the purpose of increasing the soil's store of potash and lime, we would advise an application of wood ashes. These supply both potash and lime, elements required by clover in fairly large amounts, and also contain in notable quantities other plant constituents. Gypsum or land plaster is also a fertilizer of much value for clover, but, it should be remembered, does not contain any potash.

In the place of wood ashes, muriate of potash, at the rate of 100 pounds per acre, may be used. Superphosphate for supplying soluble phosporic acid may also be employed at the rate of 200–300 pounds per acre. For wheat and grass a top dressing of 100 pounds of nitrate of soda in the spring, after growth has commenced, will prove of value in encouraging the young plants.

Soil forwarded for examination by Messrs. Gervais & Frère, Lawrenceville. This is a grayish-yellow, sandy loam, very loose in texture and slightly acid. It contained a considerable quantity of undecomposed root fibres.

ANALYSIS OF SOIL (air-dried.)

Moisture	2·57
Organic and volatile matter	7·58
Insoluble mineral matter (clay and sand)	81·45
Mineral matter, soluble in acid	8·40
	100·00
Lime	·27
Nitrogen	·220
Coarse sand	72·0

This soil, underlaid by coarse sand, has according to accounts been cropped for several years without an application of manure. Its store of available plant food must thereby have been greatly diminished—a process undoubtedly assisted by the leachy character of the soil.

To improve the soil, we would advise organic manures, together with an application of lime, in which the soil is deficient. Barn-yard manure will, of course, be valuable, but if this is difficult to obtain we counsel the occasional turning under of a green crop of clover. A compost made with swamp muck will also prove of service for supplying organic matter and nitrogen.

Commercial fertilizers, such as muriate of potash and superphosphate, may be applied to such soils in the autumn, or, if necessary, in spring, being harrowed in after the ploughing and before seeding. Wood ashes will supply potash and lime and a notable quantity of phosphoric acid. Forty bushels per acre applied every fourth or fifth years should prove remunerative. Muriate of potash at the rate of 100 pounds

per acre may be used if wood ashes are not readily obtainable. Potash is required especially for leafy crops.

Superphosphate, for furnishing soluble phosphoric acid, can be used to advantage for cereals, turnips, &c., at from 200 to 400 pounds per acre.

To induce vigorous growth in the early part of the season, 100 pounds of Nitrate of Soda per acre can be used as a top dressing, applied in, say two portions at intervals of 3 or 4 weeks after the appearance of the crop.

THE COMPOSITION OF CERTAIN CANADIAN VIRGIN SOILS.*

Of the many investigations carried on by the Chemical Division of the Dominion Experimental Farms during the past ten years, not the least in scientific interest nor in agricultural value have been those which have had for their object the determination of the amounts of plant food in certain typical and virgin soils of the Dominion. The data are not as yet voluminous, for this work is one that consumes much time, and other and more pressing demands have only permitted an intermittent attention to it; nevertheless we have been able to place on record results which go far towards indicating the character of many soils representative of large untilled, or, at all events, but partially settled districts in Canada.

In all, we have submitted to complete analysis about ninety samples. These comprise surface and sub-soils taken from the Atlantic to the Pacific in the various provinces of the Dominion, and, to the best of our knowledge, from areas which had never been manured or cropped.

It is not my purpose to present in this paper all the data obtained, nor to attempt an interpretation of all the figures, chemical and physical, that have resulted from this work, for such would scarcely be possible. My intention rather is to bring before you the percentage composition of these soils as regards certain of the more important elements of fertility, and to draw such deductions as to relative richness or deficiency in plant food as may seem warranted when comparing the figures with those obtained from the examination of soils in other countries.

The Value of Ordinary Soil Analysis.—The exact value of a chemical analysis towards ascertaining the fertility of a soil is a question that probably will always be open to discussion, and doubtless all present are aware that no problem in agricultural science has excited more interest or been debated with greater warmth. We are obliged to confess that a knowledge of the amounts of nitrogen, potash, phosphoric acid, &c., as estimated by our present methods of determining "total" or maximum amounts of plant food constituents by strong solvents, is not in itself sufficient for making a diagnosis as to the crop-producing power of a soil. Why this is so, will be apparent upon reflection. In the first place, hydrochloric acid of the strength employed in the analysis dissolves from the soil the mineral constituents in much larger amounts than are present in an immediately available condition; and secondly, there are factors other than the amount of plant food present that are equally important in determining a soil's fertility. The physical condition of the soil, including retentivity of moisture, capillarity, permeability, &c., the meteorologic conditions, including rainfall, mean temperature, sunshine, &c., must all be carefully considered in conjunction with the analytical figures when endeavouring to interpret the latter with a view of ascertaining the soil's probable crop-producing ability. The case is very similar to that of water analysis, in which it is universally held that all possible information respecting the source and its environment must be in the possession of the chemist before he can intelligibly and correctly give judgment from his figures upon the quality of the water under examination.

* Read before the Chemical Section of the British Association for the Advancement of Science, at Toronto, August, 1897.

It is often urged that our usual method of soil analysis, using hot, strong hydrochloric acid as a solvent, only indicates the amounts of plant food that may become available, not the amounts that are immediately assimilable. This is true, and it is certainly a drawback, but it in nowise makes the results of no value, as some would have us believe. It gives, we may suppose, the maximum amounts of the mineral elements present which under the influence of favourable climatic and mechanical conditions may become useful to crops. It shows decisively deficiencies in any of the plant food constituents, if such exist, and consequently affords valuable information regarding the suitability of the soil for various farm crops, and, further, indicates the direction in which fertilization may be economically and profitably carried on. Soils with large stores of plant food, even if such be partially or largely in a locked-up condition, have repeatedly been shown to have a greater agricultural value than those that furnish to the same solvent less amounts. The probabilities are that, other things being equal, soils of the former class will contain, or, at all events under favourable circumstances, will yield, larger amounts of readily assimilable food than those possessing smaller "totals" or maximums. Soils showing percentages of maximums above the average invariably prove fertile, if climatic influences are favourable. We cannot argue very closely, I admit, but from such an analysis we are able to predict possibilities as to productiveness, provided agencies favourable to the unlocking of soil plant food are present.

Soil Tests for Ascertaining Available Plant Food—Pot or plot experiments are as yet, the only tests that can infallibly indicate a deficiency in available fertilizing constituents. Such methods, however, consume much time, are cumbersome, and from their very nature scarcely suited to wide application. What is needed is a laboratory method or methods, in addition to those we now use, which will furnish data in accordance with the results obtained by actual soil trial crops. This is a question that at present many agricultural chemists are engaged upon, and I venture to hope that ere long the renewed interest in this work will result in satisfactory methods being established, both for available mineral constituents and nitrogen.

Dr. Dyer's Work.—In March, 1894, Dr. Bernard Dyer's work on available plant food in soils appeared. It was the beginning of a new era in soil analysis. Since that date increased attention has been paid to this branch of research, and especially so on this continent. Every year sees new and interesting data, the results of the labours of agricultural chemists of the experimental stations of the United States. Dr. Dyer, it will be remembered, showed, among other valuable results, that the root sap and the exudation of rootlets possessed an acidity approximately equivalent to that of a one per cent solution of citric acid. From this he argued that such a solution would have a solvent action on the mineral constituents of the soil similar and equal to that exerted by growing crops. Further, he showed that results obtained by this method were strictly in line with the deductions made from the data of actual field trials. He therefore proposed that this solvent should be used to determine available potash and phosphoric acid in soils. Workers in the United States, members of the Association of Agricultural Chemists, besides using this solvent during the past few years, have proposed and worked with other solutions, such as ammonium chloride and calcium chloride. None of these, however, have had the support or corroboration of experiments to show that they were similar or comparable in their action upon the soil to the solvent action of root exudations. Consequently they do not as yet appeal to agricultural chemists with the same force as the solvent proposed by Dr. Dyer.

Solvents Employed.—The solvent used by us in the determination of "total" or maximum percentages of the mineral constituents has been hydrochloric acid, sp. gr. 1·115 (corresponding to 22·86 per cent, HCL.), 10 grms, of the air dried soil being digested with 100 c. c. of the acid at the temperature of the water bath for ten hours.

For the estimation of the "available" potash and phosphoric acid, 1 per cent, citric acid solution has been employed, digesting 100 grms. of air-dried soil with 500 c. c. of the solvent for five hours at room temperature.

Standards of Fertility.—It has been remarked that climate and the physical condition of a soil are potent factors in determining fertility. To this might be added the statement that fertility (i.e., crop-producing power) is a relative quality, depending to a large extent on the crop grown. The ability of plants to forage for and appropriate their food varies greatly, so that what might be an adequate supply of food for one might prove an insufficiency for another. Buckwheat and wheat will very well illustrate this variation in foraging and assimilating ability. For these reasons chiefly—for of course there are others—it is impossible to establish rigid standards as regards the minimum amounts of plant food that must be present in order that a soil may be classed as economically productive.

It is not impossible, however, using a large number of analyses of soils, the productive power of which is approximately known, to deduce percentages or limits of plant food, below which, under ordinary circumstances, soils may be considered as deficient or lacking, and above which they may be considered as well supplied or rich in the essential mineral elements. Professor Hilgard, of the California Experiment Station, the highest authority on American soils, considers that less than 0·09 per cent of potash indicates a deficiency in this element, and that the limits of this constituent in good soils range, approximately, from 0·8 to 0·5 per cent in heavy clays, from 0·45 to 0·30 per cent. in medium loams, and from 0·3 to 0·1 per cent in sandy loams. Regarding phosphoric acid, he says that 0·2 per cent, is sufficient when associated with a good supply of lime, though it may in certain soils reach or exceed 0·3 per cent. Respecting lime, Hilgard states 0·1 in sandy loams as the lowest limit for good crops, 0·25 per cent, in clay loams, and 0·3 per cent, in heavy clay loams.

Standards of Fertility in Canadian Virgin Soils.—Our data indicate that good agricultural soils in Canada possess usually between 0·25 per cent, and 0·5 per cent, potash; less than 0·15 per cent, in our experience, points to the necessity, or at all events to the value, of potassic fertilizers, though with good climatic and soil conditions the limit might be reduced to that suggested by Hilgard.

The phosphoric acid in Canadian virgin soils of average fertility lies usually between 0·15 and 0·25 per cent. Some good soils contain from 0·25 to 0·3 per cent, and a few exceed the latter figure. The adequacy, or otherwise, of phosphoric acid in a soil would appear to depend largely on the accompanying amount of lime. Increased crop production has usually followed the application of phosphatic fertilizers to soils containing less than 0·15 per cent, phosphoric acid.

Lime ranks next in importance to potash and phosphoric acid in a consideration of the mineral constituents of plant food. Our experience goes to show, that clay soils containing less than 0·5 per cent will have their productiveness increased by a dressing of lime in one or other of its agricultural forms. Peaty soils, and soils generally that are rich in organic matter, are frequently poor in this element. All such have been found to respond to an application of lime, and more particularly so when given in conjunction with potash and phosphoric acid. For these classes of soils, therefore, I deem it advantageous that they should contain at least 1 per cent of lime.

Richness in nitrogen may be measured to a large degree by the organic or humus content, though the condition or stage of decomposition of this organic matter is an important factor in determining the nitrogen's availability. The larger number of our good soils contain between 0·1 and 0·2 per cent, though many reach 0·5 per cent, and some exceed 1 per cent nitrogen.

In the following brief review of Canadian virgin soils I have not given any detailed data of their physical condition or composition, for the determinations in our laboratory have been confined simply to the separation of the mineral components into (*a*) clay and fine sand, and (*b*) coarse sand, according to the method of Schloesing. The results in this separation, together with remarks on the physical condition or tilth of the soils, have been indicated in general terms in discussing the samples. If it had been possible to have made a more extended physical examination I believe the data would have proved most valuable, for the degree of permeability to water and air, the relative size of the soil particles, compactness, water-holding capacity, etc., are important factors towards establishing a soil's suitability for the various agricultural crops.

BRITISH COLUMBIA.

Beginning on the west or Pacific coast, attention is first directed to the statement of the composition of certain typical British Columbian soils, as set forth in the following table.

TABLE I.

ANALYSES OF SOILS (WATER-FREE)—BRITISH COLUMBIA.

Number.	Locality.	Surface or Sub-soil.	Character of Soil.	Potash.	Phosphoric Acid.	Nitrogen.	Lime.	Loss on Ignition.
1	Victoria, Vanr. Isd..	Surface	Valley soil, black loam.	·23	·19	·594	1·29	15·69
2	" " ..	Depth, 12 to 18 in.....	.....	·23	·19	·506	1·12	13·61
3	" " ..	Depth, 18 to 24 in.....	.....	·26	·12	·146	1·01	4·63
4	Alberni " ..	Surface	Dark red clay loam....	·32	·08	·127	1·14	10·79
5	" " ..	"	" sandy loam.....	·17	·34	·163	1·00	11·32
6	Cowichan " ..	"	" " b'ch soil	·39	·32	·102	1·37	7·10
7	Ladners, N. Westr..	"	Alluvial gray blk. loam	·52	·28	·610	·50	17·25
8	Squamish " ..	"	Valley soil.....	·38	·20	·091	1·68	3·38
9	Pitt Meadows " ..	"	Alluvial black loam...	·36	·52	1·050	·32	31·14
10	" " ..	Sub-soil	Grayish yel. sandy loam	·45	·13	·995	·33	6·37
11	Agassiz " ..	Surface	First bench	·32	·24	·159	·86	6·87
12	" " ..	"	Second "	·35	·14	·101	·78	4·34
13	" " ..	"	Valley	·39	·18	·154	·96	6·92
14	" " ..	"	"	·35	·26	·155	·97	7·12
15	Chilliwack " ..	"	" soil, alluvial....	·63	·21	·166	·98	7·72
16	" " ..	Sub-soil ...	....	·51	·23	·108	·90	5·90
17	Mission, Yale. ...	Surface	Light gray clay loam..	·45	·28	·124	1·86	3·96
18	" "	Sub-soil	.....	·62	·33	·076	1·90	3·35
19	Guisichan "	Surface	Light gray sandy loam.	·32	·30	·077	1·22	2·66
20	" "	"	Dark gray "	·53	·30	·236	1·70	6·18
21	" "	"	" "	·65	·38	·255	1·76	6·59
22	" "	"	" "	·55	·34	·259	1·25	7·13
23	" "	"	Light gray " ...	·45	·27	·045	1·61	2·02
24	Quesnelle, Cariboo...	"	Dark gray "	·39	·22	·399	17·77	12·01
25	" " ...	Sub-soil	.....	·53	·19	·108	3·80	4·60
26	Cottonwood River...	Surface	Yellowish sandy loam .	·32	·34	·234	1·14	8·28
27	" " ...	Sub-soil	Very sandy.....	·16	·29	·057	·99	3·03
28	" House ..	Surface	D. gray sandy loam....	·57	·24	·412	1·07	13·04
28	" " ..	Sub-soil	Yellowish gray... ...	·47	·10	·050	1·22	3·02

These include three well marked groups :

1. DELTAIC SOILS.—These have been formed by the accumulation of detritus, as at the mouths of the Fraser, Pitt, and other rivers ; very rich in plant food.

2. VALLEY SOILS.—Largely alluvial as regards origin ; rich, as a rule, in both mineral constituents and organic matter.

3. BENCH AND PLATEAU SOILS.—At varying altitudes on the sides and summits of elevations and mountains ; variable, but usually light and sandy ; of medium fertility, though sometimes very poor.

Possibly there may be other classes of soils in the province, but our investigation has as yet only included those now referred to.

Soil No. 1.—Taken from a valley near Victoria, Island of Vancouver, and representative of a large area that is considered good farming land. When air-dried, it is a dark brown, almost black loam, of excellent texture, homogeneous throughout, and containing clay and humus in good proportions.

In nitrogen and organic matter this soil ranks very high, and, though not as rich in total potash and phosphoric acid as many of our virgin soils, it is by no means deficient in these important constituents.

Soils Nos. 2 and 3.—Represent the soil immediately beneath the preceding sample at the depth of 12 to 18 inches and 18 to 24 inches respectively. In physical appearance and condition, as well as in composition, No. 2 is very similar to sample No. 1; showing that the surface soil has practically a depth of 18 inches. While, as might be expected, the lower sample (No. 3) is considerably poorer in organic matter and nitrogen, the percentages of potash and phosphoric acid are identical with those in the overlying soil. It is of a yellowish-gray colour with streaks of black soil throughout its mass. It will be seen to be of excellent quality for a sub-soil.

It will be interesting now to consider the proportions or percentages of these elements that may be looked upon as more or less immediately available for plant use, *i. e.*, the amounts extracted by the 1 per cent citric acid solution before referred to.

TABLE II.

COMPARISON of "Available" with "Total" Amounts of Potash and Phosphoric Acid.

No.	Soil.	Potash.			Phosphoric Acid.		
		Total Potash.	Available Potash.	Percentage of total potash available for plant use.	Total Phosphoric Acid.	Available Phosphoric Acid.	Total percentage of phosphoric acid available for plant use.
1	Surface	0·23	0·00483	2·20	0·19	0.01020	5·66
2	Between 12 and 18 ins..	0·23	0 00299	1 36	0·19	0·01055	5·85
3	Between 18 and 24 ins..	0·26	0·00169	0·64	0·12	0·00588	4·90

In speaking of minimum limits of available plant food, Dr. Dyer says:—"From a careful consideration of the whole of the results, it would perhaps not be unreasonable to suggest that, when a soil is found to contain as little as about 0·01 per cent of phosphoric acid soluble in a 1 per cent solution of citric acid, it would be justifiable to assume that it stands in immediate need of phosphatic manure."

In potash he obtained results that led him to consider that an application of special potash fertilizers would prove valuable when the soluble potash fell below 005 per cent.

In available mineral plant food the surface soil now under consideration is seen to give results approximating these limits. The estimations above tabulated are, however, more particularly useful in showing that the upper or surface portions of the soil contain much larger amounts of available food than the underlying soil. We are thus furnished with data to support the view that the greater productiveness of a surface soil, compared with its sub-soil, apart from the presence of nitrogen, is due in large part to the availability rather than to the total amounts of mineral fertilizing constituents present.

Soil No. 4.—From Alberni, Island of Vancouver; a clay loam of a deep red colour which masks entirely the presence of the large amount of organic matter present. This sample is said to represent the soil to a depth of 9 inches over an approximate area of 10,000 acres. The sub-soil of this area is variable, sometimes clay, sometimes gravel and sand. In potash this soil is comparatively rich; in phosphoric acid, however, it is much below the average. As regards nitrogen it is of medium quality.

Soil No. 5.—Also from the district of Alberni, but differing from No. 4 in certain important features. It is known locally as "fern and sallal" soil, for the reason that on this virgin soil these plants grow most luxuriantly, crowding out to a great extent other vegetation. Our correspondent writes that at first this soil gives but poor returns, but after several ploughings, i.e., several seasons working, the yield increases, and good crops are obtained. An examination of the soil showed it to be distinctly acid to litmus paper. There is in this, no doubt, an indication of the cause of the unproductiveness of the land when first broken up. The effect of exposure to the air through culture would be to correct this sourness, while at the same time locked-up plant food would be set free. Lime and wood ashes have given excellent returns on this soil.

The very large percentage of oxide of iron in these soils—exceeding, frequently, 20 per cent—is a feature worthy of note. It is probable that in the virgin soil a part of this iron is in the ferrous condition, due to the presence of organic matter and to certain other factors. The oxidizing of this iron through cultural methods would free the soil of compounds injurious to the tender rootlets of agricultural crops. It is further important to point out that this soil, though yielding 1·0 per cent of lime to hydrochloric acid, sp. gr. 1·115, had a distinctly acid reaction, and was much benefited by an application of lime.

Soil No. 6.—A bench soil, deep red, of sandy character, from Cowichan, Island of Vancouver, and very similar in appearance to Nos. 4 and 5. It contains less organic matter and nitrogen than these soils, and while somewhat below the average in this respect, it is not to be regarded as deficient in these essential elements.

A determination of the amounts of available potash and phosphoric acid, ascertained by the citric acid method, afforded the following data :—

Available potash	0·0089
Available phosphoric acid.....	0·0171

While these amounts do not fall below the limits named by Dr. Dyer, they are, however, such as to suggest that both potash and phosphoric acid would prove beneficial, and give good returns in increased crop yields.

Soil No. 7.—A grayish-black soil of excellent texture, from the valley of the Fraser River near one of its mouths, and resulting from the deposition of silt brought down by this river. An area of over 30 square miles is, it is stated, covered by soil of this origin and character. Both from chemical and physical data, this soil would be judged an extremely fertile one, and practical results confirm this opinion. Of phosphoric acid, potash and nitrogen it possesses quantities considerably above the averages already discussed for fertile soils.

Soil No. 8.—From the Squamish Valley, in the district of New Westminster. The valley is said to have an area of 14,000 acres of arable land. Its sub-soil is clay, though sometimes running into sand. Though containing adequate amounts of mineral food for crop requirements, it is below the average in nitrogen and humus. The ploughing under of green crops—preferably one of the legumes—has been found to improve this soil, both as regards tilth and productive power.

Soil No. 9.—From the Pitt Meadows, New Westminster, an alluvial deposit, composed of the detritus brought down by the Pitt River. It is a black loam, in moderately fine granular condition, and possessing a large amount of vegetable organic matter. On moistening it does not become plastic or sticky, and easily crumbles when dry. The soil granules display a remarkable homogeneity, proving the very intimate incorporation of the vegetable organic matter with the inorganic basis of the soil.

Its mechanical texture seems to be such as would allow freedom for root development, for permeation of air and percolation of water, while at the same time it is sufficiently compact and heavy to prevent easy leaching and to be retentive of moisture.

In potash and phosphoric acid it is seen to be well supplied, comparing most favourably in this respect with soils of great productiveness.

In nitrogen the soil is particularly rich, possessing about 34,000 pounds per acre, estimating the weight of an acre of soil to the depth of 1 foot to be 3,500,000 pounds. The physical condition of this soil being such that nitrification would proceed satisfactorily, the value of this large amount of organic nitrogen becomes obvious.

Soil No. 10.—Is the sub-soil of the above, and is a grayish-yellow sandy loam. From its texture we should expect it to offer a very fair drainage to the surface soil.

Soils Nos. 11, 12, 13 and 14.—Are surface soils from the Experimental Farm at Agassiz. They are all of medium quality; in tilth rather light, and, though possessing a fair amount of clay, sand predominates. Though not presenting any marked differences, that of the first bench approaches closely in composition to that of the valley soil No. 14. The valley soils are, as a rule, distinctly richer than those occurring at higher elevations.

Soils Nos. 15 and 16.—Are from Chilliwack, on the Fraser River. They are valley soils, alluvial in origin. While not so rich as the delta soils of the Fraser and Pitt Rivers already discussed, they are by no means poor, possessing a good supply of potash and fair amounts of phosphoric acid and potash. They probably represent more or less truly the character of those soils of medium fertility found in British Columbia in many of her river valleys.

Soils Nos. 17 and 18.—A surface and sub-soil, respectively, from Mission, on Okanagan Lake, Yale district. Both are excellent as regards potash and phosphoric acid, but of poor tilth, caking on being dried into hard masses. The surface soil is somewhat deficient in organic matter, and might be much improved by drainage, judicious culture, and the turning under of a green crop—technically known as green manuring.

Soils Nos. 19, 20, 21, 22 and 23.—Are surface soils from the ranch of His Excellency the Governor General at Guisachan. They are sandy loams of varying shades of gray, and, with the exception of Nos. 19 and 23, might be termed, as far as composition is concerned, soils of more than average fertility. These latter are, however, somewhat deficient in humus and nitrogen.

Soils Nos. 24 to 29.—Are from plateaux and upper benches on the Fraser in the Cariboo district, a practically as yet unsettled area. Clover and indigenous grasses of good quality, it is stated, grow well upon them, and the probabilities are that much of the area here represented will be found suited for grazing purposes. Surface soils Nos. 24 and 28 are particularly rich, judging from the chemical analysis, and should prove very fertile if climatic conditions are favourable.

NORTH-WEST TERRITORIES AND MANITOBA.

The prairie soils of the North-west Territories and Manitoba are justly noted for their productiveness. They contain, as a rule, large percentages of all the essential constituents, and are characterized by percentages of humus and nitrogen far above the average. The prevailing surface soil, speaking generally, is a black or grayish black loam in which the vegetable matter is well decomposed and thoroughly incorporated with the inorganic compounds of the soil. It varies in depth from a few inches to one, two, or even more feet, and over large areas is underlaid with a heavy clay sub-soil.

Occasionally we have had sent to us soils from certain districts in the North-west Territories, in which it is stated that poor yields are obtained. On examination, these soils have been found to possess plant food in adequate quantities for crop requirements. Further, they have usually been found to be free from alkali. Investigation has shown that the trouble was, not in the lack of plant food, but rather in the meteorologic conditions; a scanty rainfall being really the cause of the poverty of growth. In districts subject to drought irrigation, if feasible, would render such soils most fertile. An illustration of this is afforded by the late irrigation trials at Calgary, which have proved so successful from an agricultural point of view. In this connection we have to add that unfortuna-

tely no means for extensive irrigation appear practicable for several of the districts here referred to in the North-west Territories.

The presence of "alkali" in the soil in patches over certain areas in Manitoba and the North-west Territories is intimately connected with the question of rainfall. An alkali area may be restricted to a few square feet, or it may cover some acres. Patches of alkali soil occur surrounded by land of great productiveness.

The formation and retention of alkali are dependent upon the amount of water the soil receives and the facility for sub-soil drainage. We need not now discuss the occurrence of alkali nor its nature, but it is important to note that, though the amounts of alkali found in samples submitted to us are often so great as to render the growth of wheat impossible, we have invariably found such soils to be rich in mineral and organic constituents. This shows that the soil proper is capable of acting as a fertile one, provided the alkali were got rid of by drainage, irrigation, or treatment with gypsum.

TABLE III.

ANALYSIS OF SOILS (WATER-FREE)—NORTH-WEST TERRITORIES AND MANITOBA.

No.	Locality.	Surface or Sub-soil.	Character of Soil.	Potash.	Phosphoric Acid.	Nitrogen.	Lime.	Loss on Ignition.
30	Yorkton, N.W.T....	Surface...	Black, sandy loam.	·49	·21	·501	·06	14·01
31	" "	Sub-soil	.....	·42	·09	·130	·75	8·18
32	Saltcoats "	Surface....	Black, sandy loam.	·34	·21	·571	2·90	13·54
33	Moosomin "	"	Black loam.....	·36	·11	·479	·95	11·79
34	Calgary " ...	"	.....	·44	·17	·447	·92	12·23
35	Tilley Tp. "	"	.....	·27	·18	·398	·37	11·13
36	Vermillion Hills,....	"	.....	·17	·17	·354	50	10·43
37	Red Riv. Valley, Man	"	.....	1·03	·29	1·005	1·89	26·29

In the foregoing table we have given analytical data of seven surface soils from the North-west Territories. Though there is a greater uniformity in the texture and composition of soils upon the prairies than among soils of the eastern provinces, no claim is made that the vast extent of the territories is represented by these samples—they are altogether too few in number. They may serve, however, to indicate the general character of the soils over certain large areas.

Without discussing these soils in detail, attention may be called to their high nitrogen content and the large amounts of organic matter that are almost invariably present. These soils also contain, as a rule, more than the average amount of potash. Our results do not show them to be noted for phosphoric acid, though they possess quantities quite equal to those in many very fertile soils. It seems more than probale to the writer that the successive cropping of the land with wheat, which has been so common a practice in Manitoba and the Territories for some years, must lead in the near future to the necessity of replacing more particularly of available phosphoric acid.

The great depth of the surface soil over large areas accentuates our deductions respecting the vast stores of plant food laid up in the plains for future crops. We are of the belief that where poor crops only are procurable the climatic conditions are rather at fault than that there is a lack of plant food. Even in soils containing injurious amounts of alkali we have found, as already pointed out, an abundance of fertilizing constituents; drainage, if there is an adequate rainfall, frequently being all that is necessary to bring them into a state of productiveness.

Soil No. 37.—Represents the unfertilized and uncropped prairie soil of the Red River Valley, Manitoba. It was taken from section 31, township 4, range 1, west. The uniformity in the character of the soil over a very large area in Manitoba makes the data here presented of more than ordinary importance.

The surface soil, which is fairly uniform throughout its depth, averages a little over two feet in thickness and merges gradually into the subsoil, which is blue clay. The latter, as tested by boring for water at this spot, extends at least to a depth of 250 feet.

The soil is a deep black loam, of a fine and peculiarly characteristic granular order. It reduces easily between the fingers in the air-dried condition to a grayish brown powder. Though there is present a considerable amount of undecomposed root-fibre, the soil proper exhibits a remarkable homogeneity, indicating a process of physical refining in its formation and a uniformity in the chemical composition. The very large amount of organic matter present is undoubtedly most intimately incorporated with the clay and sand which constitutes the basis of the soil.

Though containing a large amount of clay, laboratory experiments show that this soil does not readily "puddle" on moistening, nor on subsequent drying does it form into a hard mass, but readily granulates on slight pressure. The large amount of organic matter present has already been remarked; it exceeds 25 per cent of the water-free soil. The nitrogen is found to be practically 1 per cent, which would show that there is contained in an acre of soil to the depth of 1 foot more than 30,000 pounds of this element. Since ordinary fertile soils to a like depth contain from 3,500 to 10,000 pounds of nitrogen per acre, the vast reserve of this valuable constituent in this prairie soil is apparent.

The soil is also very rich in potash, containing an amount far in excess of that ordinarily met with in fertile soils. But two other virgin soils examined by us approach its potash content, 1·03 per cent.

Of phosphoric acid it contains 0·29 per cent. This is somewhat above the average, most of our good soils showing between 0·15 per cent and 0·25 per cent phosphoric acid.

We may safely conclude that there is here ample scientific proof of the well-nigh inexhaustible stores of plant food, and that this prairie land, as regards the elements of fertility, ranks with the richest of known soils.

Concerning the prairie soil of the Red River Valley, Dr. Geo. M. Dawson, Director of the Geological Survey of Canada, wrote some years ago as follows:—

"Of the alluvial prairie of the Red River much has already been said, and the uniform fertility of its soil cannot be exaggerated. The surface, for a depth of two or four feet, is a dark mould, composed of the same material as the subsoil, but mingled with much vegetable matter. Its dark colour is no doubt due in part to the general accumulation of the charred grasses left by the prairie fires. The soil may be said to be ready for the plough, and in turning the tough thick prairie sod, the first year a crop of potatoes may be put in, though it is not efficiently broken up till it has been subjected to a winter's frost. When the sod has rotted, the soil appears as a light friable mould, easily worked and most favourable for agriculture. The marly alluvium underlying the vegeable mould would, in most countries, be considered a soil of the best quality, and the fertility of the ground may, therefore, be considered as practically inexhaustible.

"The area of this lowest prairie has been approximately stated as 6,900 square miles but the whole is not at present suitable for agriculture. Small swamps are scattered pretty uniformly over its surface. The greater part of these swamps are, however, so situated as to be easily drained, either into the Red River or some of its tributaries, which are usually depressed 30 or 40 feet below the level of the surface.

"As a measure of the possible agricultural capacity of this great valley, take one-half of the entire area, or 3,400 square miles, equalling 2,176,000 acres, and for simplicity of calculation, let it be supposed to be sown entirely in wheat, then at the rate of 17 bushels per acre, which according to Prof. Thomas, is the average yield for Minnesota, the crop of the Red River valley would amount to 40,992,000 bushels."

ONTARIO.

The review of soils in this province will be restricted to certain surface and subsoil samples collected in the district of Muskoka a district lying somewhat more than 100 miles to the north of Toronto, and considered for the most part, more picturesque than agricultural; it is rocky and abounding in lakes, well timbered, save where destructive

fires have swept through—with stretches of fairly good, though as a rule, light soils along the river valleys and on the lower levels. Our data respecting virgin soils in other parts of the province of Ontario are too fragmentary to warrant their insertion in this paper.

TABLE IV.

ANALYSES OF SOILS, (WATER-FREE)—ONTARIO.

No.	Locality.	Surface or Subsoil.	Character of Soil.	Potash.	Phosphoric Acid.	Nitrogen.	Lime.	Loss on Ignition.
38	Sinclair Tp. Muskoka	Surface.....	Sandy loam.....	·11	·27	·186	·12	8·74
39	Chaffey Tp. "	"	"	·08	·12	·139	·40	6·79
40	" "	Subsoil. ...	Sand.....	·08	·18	·074	·20	3·53
41	Franklin Tp. "	Surface.....	L. grey loam.....	·61	·18	·103	·76	6·31
42	" "	Subsoil. ...	.....	·02	·08	Trace.	·66	3·70
43	Perry Tp. "	Surface.....	Sandy loam.....	·04	·18	·296	·08	9·40
44	" "	Subsoil.	.....	·06	·18	·119	·13	5·10
45	Brunel Tp. "	Surface.....	Clay loam.....	·46	·17	·084	1·28	2·94
46	" "	Subsoil . ..	.....	·29	·09	·064	1·07	2·39

Soil No. 38.—From Sinclair township. A shallow, very loose, sandy soil; the subsoil of hard-pan is found at a depth of from 6 to 12 inches. Though moderately rich in phosphoric acid, nitrogen and humus, it is below the average in potash and lime.

Soils Nos. 39 and 40.—Surface and subsoil from township of Chaffey. A shallow sandy loam, running into a subsoil of sand. Hard-pan exists at a depth of 15 inches. The surface soil is deficient in potash, but is otherwise of medium quality as regards plant food.

Soils Nos. 41 and 42.—From Franklin township. The surface soil is a light gray clay loam, high in potash, fair in phosphoric acid and low in nitrogen; lime is present in an amount that might be considered large for Muskoka soils.

Soils Nos. 43 and 44.—Perry township, Parry Sound district. Soil and subsoil. The country is described as level or gently sloping, with no rocky bluffs, as well as timbered with excellent hardwood.

Both samples are light and sandy in character, and exceedingly low in potash and lime. Regarding the surface soil, we may say that the percentage of phosphoric acid is fair, and that in nitrogen it is above the average soils of this district.

Soils Nos. 45 and 46.—Surface and subsoil from Brunel township. The surface soil is a clay loam of a light gray colour, from 8 to 12 inches in depth. It is a fairly strong and retentive soil, and in this respect differs from the preceding members in this series. The features in its favour are the comparatively high percentages of potash and lime. In nitrogen and humus, however, the soil is poor.

It is thus seen that the soils of this northern part of Ontario are characterized by a preponderance of sand, the larger number being such as would be classed as light or very light loams. It is further of importance to note that in lime these soils are, generally speaking, poor. They are loose in texture and very ap t to dry out in season of drought. Though not heavy enough to make good wheat soils, they grow good crops of oats and potatoes. Being responsive to manures, large yields of root and fodder crops can, under good system of culture, readily be obtained in favourable seasons. The district is better adapted for grazing and dairying than for the growth of cereals.

QUEBEC.

The following table presents the data obtained from the examination of ten soils from the province of Quebec. They, as the preceding samples, have been selected as typical average soils; not on the one hand, representing the richest; nor, on the other, the poorest lands.

TABLE V.

ANALYSES OF SOILS (WATER-FREE)—QUEBEC.

Number.	Locality.	Surface or Subsoil.	Character of Soil.	Potash.	Phosphoric Acid.	Nitrogen.	Lime.	Loss on Ignition.
47	Arthabaska County	Surface	Sandy loam	·16	·17	·296	·35	8·68
48	"	Subsoil		·17	·18	·184	·29	5·46
49	St. Adelaide de Pabos, Gaspé	Surface	Red sandy loam	·44	·07	·215	·16	7·85
50	Soulanges County	"	Gray sandy loam	·39	·33	·198	·47	7·76
51	" "	Subsoil		·47	·30	·049	·73	3·67
52	Lièvre River, Ottawa Co.	Surface	Clay loam	11	·19	·179	1·23	5·77
53	" "	Subsoil		·10	·19	·171	1·17	5·62
54	Joliette County	Surface	Black clay loam	·40	·28	·218	·82	8·06
55	" "	Subsoil		·44	·29	·030	1·05	2·09
56	Bonaventure "	Surface	Reddish yel. clay l'm	1·17	·19	.249	·10	12·37

Soil No. 47.—Surface soil from Arthabaska county. A sandy loam of fair quality; nitrogen and organic matter are present in quantities somewhat above the average, but the soil ranks rather low as regards mineral constituents.

Soil No. 48.—Subsoil to the above, and very similar in its proportion of potash and phosphoric acid. For a subsoil it may be considered high in nitrogen.

Soil No. 49.—A surface soil from Gaspé. It is a red sandy loam, containing fair quantities of potash and nitrogen, but low in phosphoric acid and lime.

Soil No. 50.—A dark gray sandy loam from Soulanges county. A light, warm, responsive soil. In all the elements of plant food it may be placed with soils of average fertility.

Soil No. 51.—Subsoil to the above, in which the mineral elements are present in fair amounts.

Soil No. 52.—A heavy clay loam from the valley of the Lièvre River, Ottawa county. A strong retentive soil. With drainage it should be well adapted to the growth of cereals. Though low in potash for a clay soil, it may be regarded as of average fertility. Drainage, the application of lime and the turning under of a green crop have vastly improved its productiveness.

Soil No. 53.—Subsoil to the above, and very similar to it, both chemically and physically.

Soil No. 54.—A clay loam from Joliette county; grayish black in colour, compact and cohesive. Both in mineral constituents and nitrogen this soil is above the average. An application of 20 bushels of lime per acre, however, resulted in almost doubling the yield.

Soil No. 55.—Subsoil to No. 54. Stiff clay, gray to reddish brown.

Soil No. 56.—A surface soil from the county of Bonaventure. A reddish yellow loam, containing a slight preponderance of sand. The large amount of iron present masks the presence of the organic matter, of which there is a notably high percentage. Not unfrequently, indeed, one may say usually, a rough estimate of the organic matter, and, incidentally, of the nitrogen, present, can be made from the colour of the air-dried soil. In soils, however, such as the one under discussion, containing high percentages of iron, the colour can no longer be used as a criterion of the soil's richness in these constituents.

Much variation, as might be expected, in character and composition is to be observed among these soils. Though several possess but small amounts of certain constituents, indicating inadequate quantities for the best returns, yet none fall below the limits of fertility previously discussed, and many are seen to compare most favourably with soils of recognized productiveness.

THE MARITIME PROVINCES.

The soils from New Brunswick and Nova Scotia examined by us have been so few in number that it would be unwise to draw from the data conclusions as to the general character of the soils of these provinces. A few examples are here given which, though representative of large areas, must not be considered as the only provincial types; the figures are inserted here to render the data somewhat more complete than they otherwise would be.

TABLE VI.

ANALYSES OF SOILS (WATER FREE)—MARITIME PROVINCES.

No.	Locality.	Surface or Subsoil.	Character of Soil.	Potash.	Phosphoric Acid.	Nitrogen.	Lime.	Loss on Ignition.
57	Sackville Marsh, N.B	Surface...	Clay loam	·16	·16	·131	·13	5·83
58	Restigouche, N.B....	" ...	Yellow sandy soil..	1·02	·10	·113	·23	5·46
59	Cumberland, N.S....	" ...	Sandy loam..... ..	·16	·09	·090	·06	3·37
60	S. W. Mabou, N.S...	" ...	"	·37	·09	·212	·05	6·97
61	Kings Co., P.E.I....	" ...	"	·47	·09	·106	·08	5·10

NEW BRUNSWICK.

Soil No. 57.—From the Sackville Marsh, at the head of the Bay of Fundy. A clay loam; of interest as an example of a soil area very uniform in character—a fact no doubt due to the origin of the soil, which is practically a tidal deposit. When thoroughly drained, an operation which frees them from salt and improves their texture, these reclaimed marsh soils are found to be exceedingly fertile. A glance at the analytical data shows that this is not altogether to be ascribed to large percentages of plant food; it is more than probable that the fine state of division and the intimate incorporation of the soil particles—due to the manner of the soil's formation and deposit—render the elements of fertility more easily obtained and assimilated by the plant.

Soil No. 58.—Balmoral settlement, Restigouche. A yellow loam, derived principally from the decomposition of felspar, through showing some quartz fragments. The percentage of potash is considerably above that found in average fertile soils—a fact undoubtedly due to the felspathic origin of the soil. With the exception of potash, however, the soil cannot be considered one equal to Canadian soils of average fertility.

NOVA SCOTIA.

Soil No. 59.—A reddish, sandy soil, from Hansford, Cumberland county. It is below the average in the more important elements, and to be regarded as a poor soil. It would probably, however, respond well to judicious culture and manuring.

Soil No. 60.—A soil from South-west Mabou, Inverness county ; very similar in appearance to No. 59, but analysis shows it to be much richer. The small percentage of lime is particularly noticeable in both these soils ; the knowledge of this fact has assisted towards the economical treatment of them with fertilizers.

PRINCE EDWARD ISLAND.

Soil No. 61.—This soil partakes of the same colour as the light red Triassic sandstone from which it has been derived, and in this respect at least this sample is representative of the characteristic soil of the province. It differs from the preceding specimens in that it is not a truly virgin soil. Some difficulty was experienced in procuring a sample which had not been cropped or manured; indeed, no guarantee of such could be obtained. The soil, however, is said to fairly represent the unmanured but cultivated soil that extends over a large area in the eastern portion of the island. It is a light sandy loam, the texture of which is fairly good. Though containing more than the average amount of potash, this soil could not be ranked, from a chemical standpoint, with our richer Canadian soils—possessing but small percentages of nitrogen, phosphoric acid and lime.

This agricultural province is justly known as a fertile one ; and we therefore presume, judging from such data as we have, that this fertility is due rather to good soil texture and favourable climatic influences than to richness of its land in plant food constituents.

The last table (Table VII) that is presented for consideration, showing the average amounts of fertilizing ingredients in the surface soils that have been examined, taken province by province, has been prepared with no little diffidence. If it were to be interpreted as placing before you data from which deductions could be made as to the average soil fertility of the yet untilled areas of the respective provinces, it must be regarded as misleading. It is not my intention that such a conclusion should be drawn. A hundred or so samples, though they are typical, and, as far as possible, thoroughly representative of large areas, taken from the thousands of square miles of uncultivated soil in the Dominion, do not afford sufficient basis for such generalizations. They are not provincial averages, they are rather averages from large untilled areas in the several provinces, and may therefore serve to indicate the general character of much of the yet unoccupied lands of Canada.

TABLE VII.

ANALYSES OF SURFACE SOILS—AVERAGES.

No. of Samples.	Province.	Potash.	Phosphoric Acid.	Nitrogen.	Lime.
21	British Columbia	·42	·27	·262	1·17
7	North-west Territories and Manitoba	·44	·19	·537	1·08
6	Ontario (Muskoka only)	·22	·15	·135	·44
6	Quebec	·44	·20	·226	·52
5	Maritime provinces	·44	·11	·130	·11
45	Average of all	·39	·18	·258	·66

When we remember that care and judgment were exercised in the selection and collection of these samples, that the analyses were carefully conducted according to modern and approved methods, that very few of the samples fall below the standards or limits fixed by agricultural chemists, and that many contained such ample stores of plant food as to warrant them in being classed among the most fertile soils, we may, I think, safely conclude that the data here set forth clearly indicate that while there are many types of soils represented in Canada, there are in all her provinces large tracts of land that, as far as plant food is concerned, compare favourably with the most productive of other countries.

Canada is fast becoming known in the markets of the world as a food-producing country. Soil rich in plant food and favourable climatic influences are the chief factors that have assisted the Canadian agriculturist in building up this reputation. These are the factors, together with intelligent, rational methods of farming, and safe and cheap means of transportation, that will continue to make agriculture here a prosperous industry. It is therefore gratifying to know that ample scientific proof is now on record to show that in our virgin soils there is such an abundance of those crude materials which crops draw upon directly, and farm animals indirectly, for their sustenance and growth.

NATURALLY-OCCURRING FERTILIZERS.

SWAMP MUCK.

We have so fully discussed in previous reports the agricultural uses of this naturally-occurring fertilizer that it will only be necessary on the present occasion to record the analytical data obtained on the samples examined during the past year, and briefly indicate their quality.

ANALYSES of Swamp Muck (air dried) 1897.

No.	Locality.	Sender.	Nitrogen.		Organic and volatile matter.	Sand and clay.	Mineral matter, soluble in acid.	Water.
			Per cent.	Pounds in one ton of air-dried muck.				
1	Chilliwack, B. C	G. M. Stuart.....	·946	18·9	70·31	11·24	7.90	10·55
2	Alberni, Vancouver I'd, B.C.	Albert E. Reeve...	2·470	49·4	71·77	·43	10·21	17·59
3	" "	" ...	1·027	20·5	32·24	36·15	21·25	10·36
4	Loch Garry, Ont.....	J. Fraser..... ...	1·767	35·3	67·04	13·18	9·07	10·71
5	Near London, Ont	G. P. Collyer.....	·933	18·6	71·64	5·76	9·83	12·77
6	St. Williams, Ont.	Andrew McCall...	1·010	2·0	31·93	55·90	6·65	5·52
7	Aitken's Ferry, P.E.I.	D. J. Stewart.....	2·54	50·8	67·89	9·91	10·36	11·84
8	" "	"	1·45	29·0	43·30	40·50	9·78	6·42
9	Egmont Bay, P.E.I	E. Arsenault	1·515	30·30	71·43	12·61	12·61	15·96

No. 1. A sample representative of an area of considerable size near Chilliwack, covered with peat or muck. It is of excellent quality, but at present rather sour, due to lack of lime and want of drainage. Owing to the small quantities of clay and sand

present this soil is unsuitable for certain crops, but if this could be remedied by a judicious admixture with the subsoil or surface dressings, a very good soil would result.

With good drainage and the addition of mineral fertilizers, nitrification would proceed satisfactorily and there would be no necessity to apply nitrogenous fertilizers. Wood ashes would be of especial value, as supplying potash and notable quantities of lime and phosphoric acid. If potash is applied as kainit or muriate of potash, it will be necessary to add lime, as such or as marl or gypsum, and to furnish phosphoric acid as superphosphate or, better still for such soils, as basic slag.

No. 2. From an area of 2,500 acres covered by swamp muck in section 7, township Alberni. The depth of muck in the centre of the swamp, it is stated, exceeds ten feet; at the edges, the subsoil of clay outcrops. It is practically all vegetable matter.

No. 3. From a swamp in section 8, Alberni township. "In times of high water it is frequently covered."

As regards nitrogen, No. 2 is much the better of the two, but both may be classed as excellent, They are, however, distinctly sour, pointing to the necessity of drainage and the application of an alkaline mineral fertilizer, such as wood ashes, lime, &c., before they could be used profitably as soils.

No. 4. Contains too much undecayed wood to be of any immediate value, but perhaps could be used, after being air-dried, to advantage as an absorbent for liquid manure and in the manure pile. It contains a considerable amount of nitrogen.

No. 5. As a muck to be used as a fertilizer, it may be considered of good quality, but as a soil it would need the admixture of clay and sand and the application of mineral fertilizers.

No. 6. This sample, owing to its large amount of clay and sand and comparatively small proportion of nitrogen, could not be recommended for absorbent purposes; nor would it pay to compost it, unless it could be handled very cheaply.

Nos. 7 and 8. These samples are from the surface and bottom of a swamp, respectively. No. 7 is loose and consists, for the greater part, of root fibres. It could be used as a coarse bedding and for composting. No. 8 is, when freshly dug, of a sticky nature, but dries to a hard, brittle mass. It would require to be subjected to the disintegration action of the winter's frost before becoming of any value.

No. 9. This sample is from a Cedar swamp. It contains a considerable quantity of undecomposed woody fibre. It requires weathering and composting with wood ashes or lime. It would probably make a fair absorbent in the barn-yard.

MARSH, CREEK AND TIDAL DEPOSITS.

These are generally known in the maritime provinces as "muds." Brief reports of those samples examined in the farm laboratories during the past year are given, but it has not been thought necessary to consider in detail their origin, composition, and their effect on soils, since such a consideration has already appeared in the reports of this Division.

The most important of the samples analysed are from large unreclaimed marshes in New Brunswick and Nova Scotia. Time has not permitted complete analyses of these, though such would have been desirable. A further question to be taken up in connection with marsh muds is the determination of the *relative availability* of their elements of plant food. We hope to be able to undertake this investigation during the coming year.

Other samples, the details of which are now given, were forwarded from the provinces of British Columbia, Quebec and Prince Edward Island.

Nos. 1 and 2. "Mud" or soil from a large, unreclaimed marsh near Nappan, N.S., sent by Wm. Blair.

ANALYSIS OF AIR-DRIED "MUD," NAPPAN, N.S.

——	*No. 1.	†No. 2.
Water	2·16	3·78
Loss on ignition, chiefly organic matter	4·12	5·86
Mineral matter, insoluble in acid	79·24	75·33
Mineral matter, soluble in acid	14·48	13·04
	100·00	100·00
Nitrogen	·137	·136
Coarse sand	37·95	16·60
Clay and fine sand	41·29	58·73

* No. 1, 4 feet below surface. † No. 2, 1 foot below surface.

When received, the samples were in a plastic, pasty, compact condition of a grayish colour and were slightly acid to litmus paper. On drying a portion at 212 degrees Fah., is was found that No. 1 contained 30·5 per cent of water, No. 2 contained 36·0 per cent of water. Root fibres were to be noticed in both samples, but curiously enough were in greater abundance in sample No. 1.

On allowing to dry spontaneously in the air, both soils became hard and somewhat difficult to break with the fingers.

Save in the relative proportion of sand and clay, there would not appear to be any marked differences in these two samples, and it may be fairly assumed that there is a great degree of uniformity in the character of the soil—at all events to the depth of four feet.

The analytical data, as far as they are complete, would go to show a strong similarity in composition between these samples and other specimens of marsh mud from the Bay of Fundy that we have previously examined in our laboratories. The percentages of organic matter and nitrogen now found are somewhat below the averages obtained from the samples just referred to, but nevertheless, they are quite equal to those found in many fertile soils. A comparison of the figures will make apparent a fact worthy of note, viz.: that the amount of nitrogen is the same in both samples. This would lead us to conclude that the percentage of this element remains constant to a depth of at least four feet. As nitrogen is one of the essential elements of fertility, and at the same time one of the most costly when purchased in commercial fertilizers, this feature is necessarily one of great importance.

The percentage of lime, as judged from a qualitative examination, is not large, probably about ·5 per cent or somewhat under.

Reviewing the facts, we conclude there is no reason to suppose that this soil, if thoroughly drained and properly worked, would fall behind in fertility any of the dyked lands of Nova Scotia and New Brunswick that have originally been formed by tidal deposits.

In conclusion it may be pointed out that drainage is necessary to bring about a better mechanical condition and also to ensure aeration of the soil. Aeration would correct the slight sourness that now exists and convert any soluble iron compounds into insoluble and innocuous forms—a desirable end to be attained in marsh muds. Drainage would also free the soil of the small quantity of common salt it contains.

No. 2. Marsh mud from an unreclaimed marsh at St. Martin's, St. John Co., N.B., forwarded by Mr. Howard Trueman, Pointe de Bute, N. B.

This soil or "mud" is from an area of 400 acres covered with a tidal deposit. At high tide it is overflowed by the waters of the Bay of Fundy. The marsh has never been properly dyked and is not under cultivation.

ANALYSIS OF AIR-DRIED "MUD," ST, MARTINS, N.B.

Moisture	7·66
Organic and volatile matter	7·61
Insoluble mineral matter (clay and sand)	71·96
Mineral matter, soluble in acid	12·77
	100·00
Lime	·42
Nitrogen	·281
Common salt	1·4

There is nothing in the results against the prediction that if properly drained and treated this would make a fertile soil.

Considering that it is not yet drained, its tilth or physical condition may be judged as good. It contains fair amounts of organic matter and nitrogen. The percentage of salt is high, too high for the best results with farm crops, but the excess could be easily removed by drainage, which would at the same time sweeten and aerate the soil.

An application of lime, say 40 to 60 bushels per acre, would, in all probability, greatly increase this soil's productiveness.

No. 3. "MUD" FROM NEAR VANCOUVER, B.C.

The correspondent forwarding the sample writes as follows :—

"The sample was taken from beneath a slaughter-house built on piles close to the salt water where a number of pigs are kept, the urine and dung flow through the flooring, but being covered and laid bare by every tide, I am doubtful as to whether there would be any fertility left."

Our data are as follows :—

ANALYSIS OF AIR-DRIED "MUD," VANCOUVER, B.C.

Moisture	4·25
Organic and volatile matter	17·45
Mineral matter, insoluble in acid	63·33
Mineral matter, soluble in acid	14·97
	100·00
Nitrogen	·548

This material has undoubtedly a fertilizing value, though it cannot be regarded as the equal of barn-yard manure. The percentage of nitrogen is very similar to that in fresh manure, but the greater part of it judging from the appearance of the material is in an unavailable condition.

No. 4. "MUD" FROM BARACHOIS DE MALBAIE, GASPÉ, QUEBEC.

This was obtained from the bed of a brook running into Barachois Bay, being forwarded by Rev. P. F. Sirois. It contained a large quantity of sand and a considerable amount of orgamic matter.

ANALYSIS OF AIR-DRIED "MUD," GASPÉ.

Moisture	1·71
Organic and volatile matter	8·35
Mineral matter, insoluble in acid	80·25
Mineral matter, soluble in acid	9·69
	100·00
Nitrogen	·274

This cannot be considered as a fertilizer of marked value, though on poor soils it might prove useful as an amendment. Both in composition and appearance it is similar to a light, though fairly good soil.

No. 5. "MUD" FROM NEAR SUMMERSIDE, P.E.I.

This sample was taken from the bed of a creek running through the farm of Wm. Lefurgey, and is very similar to the mud, the particulars of which appear on page 193 of our 1896 report. The analytical data may be tabulated as follows :—

ANALYSIS OF AIR-DRIED "MUD."

Moisture	2·37
Organic and volatile matter	9·30
Mineral matter, insoluble in acid	65·70
Mineral matter, soluble in acid	22·63
	100·00
Lime	·92
Nitrogen	·33

This deposit though not profitable for composting with barn-yard manure, is undoubtedly of some value for supplying the elements of plant food. It might be dug in the autumn and piled to dry. The winter frost will tend to disintegrate it, improving its mechanical condition. It might then be composted with lime, which will serve to set free its plant food ; or if wished, it may then be applied directly to the land, though used in this way it is not so immediately effective.

MARL.

This material is essentially carbonate of lime. The value of a sample depends upon the percentage of this constituent; marls in which the carbonate of lime is associated with much clay or sand are of inferior quality.

Marl occurs in various parts of the Dominion as an earthy gray or grayish-white deposit ; it usually shows the presence of fresh water shells. Marl frequently underlies a bed of peat or muck in a swamp or forms the bed of a dried-up lake.

In districts where it is found, marl is the cheapest of all lime fertilizers. Marl, not being of a caustic nature, is frequently known as "mild" lime. It is owing to this characteristic that an excess of marl does not injure a soil, as frequently occurs from an over application of lime.

The following samples from different parts of Canada have been examined in our laboratories :—

British Columbia.—Sample from Stanley, Cariboo District: Yellowish white, very porous and soft; contains traces only of inert matter (clay and sand) and is practically all carbonate of lime. It may be considered an excellent sample of marl.

Ontario.—This sample, collected near London, consisted of lumps and powder of a grayish-white colour, the lumps powdering under slight pressure. It contained a large number of shells, indicating its origin as a fresh-water lake or pond deposit.

ANALYSIS.

Moisture	·49
Insoluble matter (clay and sand)	·25
Carbonate of lime	95·95
Undetermined mineral matter and traces of organic matter	3·31
	100·00

This is an excellent sample of marl, both as regards composition and texture. It is practically free from inert foreign substances, and could be used with advantage on all soils deficient in lime.

Sample from Lot 34, Con. 4, Edwardsburg. Light-gray, flakey, light, easily crumbled, contains shells. Insoluble matter probably in the neighbourhood of 10 per cent. This may be regarded as a very fair sample of marl.

Quebec.—Sample from Metapedia. Grayish-white, easily crumbled and in excellent mechanical condition; contains some few shells. It is almost entirely soluble in hydrochloric acid, showing absence, or but traces only, of inert matter. A very good sample.

Samples from township of New Richmond. No. 1. From a lake bed. Wet and plastic when received. A small quantity of organic matter; very little sand or clay.

No. 2. Grayish-white, more inert matter than in preceding sample. A number of fine roots and shells present. Of medium quality.

Nova Scotia.—Sample from Antigonish. Of a dull reddish-gray colour. It has the appearance of a semi-decomposed limestone and probably is not of the same immediate benefit to land as shell marl.

THE USES OF MARL.

An application of marl has been found useful to all soils deficient in lime, and especially to such as are rich in humus, assisting greatly in the nitrification of this constituent.

For correcting the acidity of soils, a property injurious to crop growth, marl is very effective. Recent experiments have shown that soil acidity is by no means rare, even in sandy loams situated in upland districts. A dressing of lime or marl to such soils has always resulted in increased crop yields. These materials have also proved useful to old pastures and waste lands where sorrel and bracken have obtained a foothold.

Though a less active agent than lime for liberating potash from its locked up stores and for the amelioration of heavy clays, marl serves in bringing about these ends, and can be used for such with safety, since an excess will not injure the soil.

A further use of marl is in compost heaps containing vegetable and animal refuse, swamp muck and other organic matter. It here promotes nitrification, providing conditions of moisture and temperature are favourable, and thus assists in converting useless nitrogen into valuable plant food.

A chapter stating more fully the various agricultural uses of this naturally-occurring fertilizer is to be found in the report of this division for 1894.

LOBSTER REFUSE FROM THE CANNING FACTORIES.

Several inquiries being received respecting the fertilizing value of this waste product, and there being no data on record as to the composition of this material, it was deemed advisable to make an analysis and thus ascertain its agricultural worth. Through the kindness of Professor E. E. Prince, Dominion Commissioner of Fisheries, two samples of the refuse were obtained from a canning factory near Pictou, N.S. One of these consisted

of the bodies of the lobsters, the other of the tails, claws, shells, &c. Their composition as received may be tabulated as follows:—

ANALYSIS OF LOBSTER REFUSE.

Constituents.	Bodies.	Tails, &c.
Water	69·28	56·37
Organic matter	22·44	24·23
Mineral matter	8·28	19·40
	100·00	100·00
Nitrogen	1·78	1·56
Phosphoric acid	1·01	1·66
Lime	3·25	9·99
Value per ton, estimating nitrogen at 10 cents per pound and phosphoric acid at 5 cents per pound	$4.57	$4.68

The comparatively large percentage of water present in the fresh material would prevent it being used economically at any great distance from the factory, but the figures show that it has an undoubted value as a fertilizer for supplying nitrogen and phosphoric acid. Owing to the large amount of organic matter present, it may well be supposed that this material will decompose readily in the soil, setting free its plant food in available forms. It may be regarded as a quickly acting manure, and one well adapted for the making of rich compost with muck or peat.

Where this material is produced in large quantities and fuel is cheap, in would seem that a fertilizer of considerable value could be profitably made by simply drying and grinding the refuse. For if dried to 10 per cent moisture, one ton would contain the following amounts of nitrogen and phosphoric acid:—

FERTILIZING CONSTITUENTS AND VALUE PER TON OF DRIED LOBSTER REFUSE.

Fertilizing Constituents.	Pounds per ton.	
	Bodies.	Tails, &c.
Nitrogen	104.	64·
Phosphoric acid	56.	69·
Value, estimating nitrogen at 10 cents per pound and phosphoric acid at 5 cents per pound	$13.35	$9.95

Lobster refuse, it appears, is at present a frequent source of danger to the canning industry, being, in certain districts, allowed to decay in the neighbourhood of the factory. The preparation of this material as a fertilizer would not only tend to prevent the spoiling of the canned lobster,—which has occurred of late to such an extent as to threaten the industry with disaster,—but also furnish a profitable means of disposing of a product hitherto considered useless.

LIME KILN ASHES.

Several inquiries from the maritime provinces having been received respecting the amounts of fertilizing constituents in lime kiln ashes, a sample obtained from Cape Breton was submitted to analysis, with the following result :—

ANALYSIS.

Moisture	2·04
Insoluble matter (clay and sand)	9·45
Potash	2·64
Phosphoric acid	2·15

Though not so rich in potash as wood ashes, it is evident that this material has a distinct fertilizing value. The phosphoric acid is approximately equal in amount to that in wood ashes.

It is to be supposed that much variation in the composition of different samples will occur, but there can be no doubt that well preserved ashes from the kiln contain notable quantities of the more important mineral elements of plant food. Leaving out of consideration the lime and other constituents of minor value, the ashes now examined possess per ton, approximately 53 pounds potash and 43 pounds phosphoric acid. The former may be valued at 5c. per pound, the latter at 3½c. per pound. At these prices the value per ton would be in the neighbourhood of $4. It is to be remarked that the sample examined was very dry, a larger percentage of moisture present would necessarily reduce the amounts of the other constituents. The average composition of seventeen samples of lime kiln ashes as ascertained by Dr. Goessman, of the Experiment Station of Massachusetts, U.S.A., is as follows :—

Moisture	14·48	per cent.
Potash	1·28	"
Phosphoric acid	1·09	"
Lime	42·57	"

FERTILIZING CONSTITUENTS IN PURSLANE.

(Portulaca oleracea).

This common pest in gardens is frequently known as "pusley." It delights in rich soil, spreads rapidly and is exceedingly difficult to eradicate owing to its intense vitality. This quality, as laboratory experiments showed, it possesses in a most remarkable degree; cuttings half an inch in length after being exposed for five weeks to the drying atmosphere of the room, sprouted and grew readily on being placed in damp soil.

To ascertain the extent to which this troublesome weed might exhaust the land of its plant food, the following investigation was made. The plants from an area of 4 ft. by 10 ft. were collected by Mr. Craig, the horticulturist, and found to weigh 28 pounds. This would be equivalent to a crop of 15 tons 492 pounds per acre. Mr. Craig adds " the plants are about half grown (2nd August), but they nevertheless cover the ground with a fairly heavy and close 'mat' of vegetation."

On analysis, we found the green, fresh material to have the following composition :—

ANALYSIS OF PURSLANE, CUT 2ND AUGUST, 1896.

Moisture	93·54
Organic matter	4·82
Ash and mineral matter	1·64
	100·00

FERTILIZING CONSTITUENTS IN PURSLANE.

	Per cent.	Pounds per ton.
Nitrogen	·219	4·38
Potash	·661	13·22
Phosphoric acid	·079	1·58

On the assumption that the crop over an acre would weigh 15 tons, by no means an extravagant estimate, we obtain the following weights of the essential elements of fertility withdrawn from that area by this weed :—

	Pounds per acre.
Nitrogen	65
Potash	198
Phosphoric acid	24

It is apparent from these data that purslane extracts from the soil very considerable amounts of soil plant food, especially of potash. Analysis shows that forty per cent of the ash consists of this valuable element.

Besides this robbing of the growing crop, it is evident that this weed uses very large quantities of soil water, thus depriving the legitimate crop of its rightful supply at a critical time in its growth. This moisture-extraction we have come to recognize in recent years as one of the most direct and injurious results from weed growth.

FERTILIZERS FOR MAKING COMPOSTS—A WARNING.

From time to time irresponsible and fraudulent parties endeavour to sell farmers receipts and materials for making composts. These may be useless, or indeed, injurious, but more frequently the fraud consists in misrepresentation and the selling of the "manure makers" at prices far exceeding their agricultural value. On several occasions we have been appealed to for advice and chemical assistance in such matters and usually with the result that a fraud has been discovered and exposed.

In the early part of the present year, letters were received from several correspondents in Prince Edward Island directing our attention and asking for information regarding "Kay's process for making manure" and the nature of the material accompanying the receipt. For the "directions for use" sums were asked varying from $10 to $20—the price fluctuating, apparently, according to the supposed wealth of the purchaser, the cost of the compound—to be employed at the rate of one pound to one load of marsh mud, &c.—being $5 per 100 pounds.

As received, this was a whitish-gray powder, having the appearance of lime. It was strongly caustic and effervesced vigorously on the addition of acid.

The results of our examinations are as follows :—

ANALYSIS OF KAY'S COMPOUND.

Moisture	·84
Loss on ignition	2·06
Sand, clay, oxide of iron, &c	5·20
Lime, as oxide (equivalent to 78·98 per cent slacked lime or 104 per cent carbonate of lime)	58·24
Magnesia	small quantity.
Common salt	4·35
Potash	·58
Phosphoric acid	traces.
Nitrogen	none.

This material is composed practically of lime, in part slacked and carbonated by exposure to the atmosphere, together with a small quantity of salt.

The essential elements of fertility—nitrogen, potash and phosphoric acid—which alone give value to commercial fertilizers, are, with the exception of ·5 per cent potash, *conspicuous by their absence.*

A mixture of lime and salt has long been used as a material for composting with muck and substances of a like character. The lime is slaked with brine—the proportion used being about 1 part of salt to 20 parts of lime. The "fertilizer" under examination is evidently of this character.

The commercial value of the material is approximately that of lime, plus that of the small amount of salt it contains. Though no statement is made by the vendor as to the plant food it contains, we are of the opinion that asking $5 per cwt. for a mixture of lime and salt practically constitutes a fraud. Agriculturally, it may be considered useful for composting purposes (though it should not be used in conjunction with barn-yard manure in the compost heap) and for supplying lime to soils deficient in that element, but for this purpose its value would not exceed $4 to $5 per ton. It may be pointed out that wood ashes would make a much richer compost, since they contain both potash and phosphoric acid.

We may again repeat that this so-called fertilizing compound is in no sense comparable to those commercial fertilizers upon the market that supply the necessary and more costly constituents of plant food, viz., nitrogen, potash and phosphoric acid.

MOSS LITTER.

Attention was drawn to the usefulness of this material for bedding purposes in our report for 1895, Vide, pp. 212-13. It was pointed out that its high absorptive capacity for fluids and gases render it particularly valuable as a litter for use in city stables. Since the appearance of the information there conveyed, several samples from large bogs in New Brunswick and Nova Scotia have been sent for examination, in order to ascertain the absorptive value of the Canadian produced litter as compared with that exported from Holland. The results now recorded have been obtained from samples collected by Mr. W. Saxby Blair, Horticulturist, Experimental Farm, Nappan, N.S., from Big Plain Bog and Weldon Bog, N.S., in both of which the supply is said to be well nigh unlimited. They were both clean and bright specimens, consisting of fine straight fibres and free from all foreign matter. The analytical methods used were the same as those detailed in the aforementioned report.

ANALYSIS OF MOSS LITTER (AIR-DRIED).

Constituents.	Big Plain Bog.	Weldon Bog.
Moisture	15·7	16·20
Organic matter	82·5	81·75
Ash	1·8	2·05
	100·00	100·00
Nitrogen	·527	·596
Absorptive capacity	1395	1533

As regards composition, these samples are very similar, and, it may be remarked do not materially differ from the litter mosses previously reported upon. Their absorptive capacity is very satisfactory; their low "ash" shows absence of earth, and their nitrogen content indicates that the resulting manure would be materially enriched in this valuable constituent of plant food.

A further and most important use for moss litter has recently been found. It has been used with good success as a packing material for fruits and other perishable articles in transit. Its absorbent power keeps the fruit dry and thus assists in arresting or preventing that decomposition which always follows "sweating," due to imperfect ventilation and other causes. From a hygienic, as well as a mechanical standpoint, moss litter should commend itself as a packing medium.

WELL WATERS FROM FARM HOMESTEADS.

It should be realized by all farmers and dairymen that an ample supply of pure water for the use of the household and stock is a matter of the greatest importance. Careful investigations have furnished proof as to the danger to the health of human beings from drinking polluted water, and what must be injurious to man cannot be good for beast. Until quite recently all that was thought sufficient was to provide nourishing, palatable food for farm animals; but little heed has been paid in the past to the quality of the water the animals drank. It is with pleasure, therefore, that we record a deeper interest year by year on the part of our agriculturists in this question, a greater desire to know the character of the water supplied to their stock and a stronger inclination to rectify matters when it has been pointed out to them that the supply was polluted.

Water contaminated with excrementitious matter, we are, or ought to be, fully aware, has been frequently the cause of spreading typhoid fever and other serious and often fatal infectious diseases. In such water all the most favourable conditions are present for the growth and rapid development of disease germs should they find an entrance. As a people, however we have failed to recognize that the continued use of water containing the decomposing dejecta of animals has a peculiarly baneful and, at the same time be it noted, insidious effect on the general health. Undoubtedly many cases of indigestion, diarrhœa, sick headache and many similar illnesses have had their cause in the use of polluted water.

But not only is the health of the farmer and his family endangered by a bad water supply, the health and thrift of his stock must likewise be impaired. Good health and freedom from disease in stock, are dependent to a great extent upon an abundant, pure water supply. Similarly, in the dairy, creamery and cheese factory, pure water is an absolute necessity if the products are to be first class and preserve a good flavour. Several of the samples examined during the past year were sent from cheese factories in which trouble had arisen in the matter of flavour, and in all the instances the water was found to be foul and polluted. This is a significant fact and carries its lesson to those engaged in dairying.

The most common cause of well pollution has been the sinking of the well in the barn-yard or under one of the farm buildings. We object to this practice on principle and hold that only under the most exceptional circumstances can it be followed with impunity. From our experience, it would appear that in the majority of instances it is only a matter of time before such wells act as cess pits. Unless most careful provision is made to prevent the liquid manure from soaking into the ground, it sooner or later, according to the nature of the soil, finds its way into the well. If this be so it behooves all farmers and dairymen to locate their well at a safe distance from such infecting sources.

The greatest care should be taken at cheese factories and creameries that the waste water does not find its way into the water supply, and to insure this thorough and efficient drainage is necessary.

Further, there is much room for improvement in keeping the buildings and barn-yard clean. If greater care had been exercised in this matter, many wells might now be free from impurity. Apart from the questions that a dirty barn-yard means a loss of valuable plant food—a question well worthy of closer consideration—there remains the equally important fact that such is usually a menace to health through the contamination of the well water.

The analyses of the waters examined in the Central Farm laboratories during the past year are given in tabular form and condensed reports respecting the quality of the waters is to be found in the last column. A perusal of this table will show that a very many of the samples were seriously and dangerously polluted. We would not have it inferred from this that a similar percentage of Canadian farm wells are in a like

condition, for in all probability only suspected waters are sent for examination, but nevertheless, it reveals a condition of affairs that is by no means satisfactory and one that ought to receive our earnest and immediate attention. The natural waters of Canada, as found in her lakes, streams and springs, are unexcelled for purity—to prove which there are ample data—and we believe there is no insuperable barrier or insurmountable obstacle to obtaining on the majority of farms a pure supply. Once obtained, let it be carefully guarded against pollution.

The samples examined comprise one from British Columbia, six from the North-west Territories, twenty-eight from Ontario, eight from Quebec, seven from New Brunswick, and seventeen from Prince Edward Island. Of these, 50 per cent were reported dangerously polluted and unsafe for drinking purposes ; 25 per cent as suspicious and in all probability as unsafe ; 25 per cent as unpolluted and wholesome.

The examination of well waters from farms only is undertaken. These analyses are made free of charge, provided the sample is taken according to the directions furnished on application, and the express charges are prepaid. It is absolutely essential that the instructions issued should be faithfully followed in the collection and shipment of samples. Farmers and dairymen who are desirous of availing themselves of this privilege should first write to this Division for the necessary information.

ANALYSES OF

RESULTS STATED IN

Number.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrites.	Chlorine.
			1896.				
1	Elmsdale, P.E.I.	W. C. McN.	Nov. 12	·06	·082	3·603	68·0
2	Knowlton, Que.	E. G.	" 19	·11	·112	5·308	15·8
3	Nappan River, N.B.	Dr. B.	Dec. 4	·03	·43	·008	2·5
4	Ste. Thérèse de Blainville, Que.	C. D. T.	" 4	·592	·146	·132	3·0
5	St. Williams, Ont.	A. McC.	" 12	·02	·306	2·776	28·0
			1897.				
6	Sussex, N.B.	T. J. P.	Jan. 8	Free.	·02	·0313	44·0
7	"	E. L.	" 8	·036	·02	·0017	60·0
8	Fort William, Ont.	No. 1, Dr. S.	Feb. 2	·715	·047	·037	1150·0
9	" "	" 2 "	" 2	1·340	·114	·0082	3340·0
10	" "	" 3 "	" 2	1·955	·02	None.	370·0
11	Farm near Burlington Bay, Ont.	No. 22, W. G. W.	" 17	3·098	·23	·238	1670·0
12	Barton, Ont.	No. 23, F.W. per W.G.W.	" 17	·08	·068	8·843	60·0
13	" "	No. 24, W. G. W.	" 17	·03	·055	·041	6·0
14	Sussex, N.B.	W. W. H.	" 18	Free.	·03	1·170	6·6
15	Little Ridgetown, N.B.	A. B.	" 24	·026	·068	2·004	23·0
16	Lynden, Ont.	D. A. W.	March 8	3·15	·13	4·455	140·0
17	Abernethy, N.W.T.	D. G.	" 23	·01	·192	·0329	1·0
18	Kingston, N.B.	W. S.	" 27	·115	·125	·680	3·8
19	Branchton, Ont.	J. F.	" 31	·096	·032	·0527	11·5
20	Carievale, N.W.T.	J. T. C.	April 6	·08	·248	None.	1·0
21	Kneehill Creek, N.W.T.	G. B. B.	May 1	·088	·232	·207	8·0
22	Huttonville, Ont.	J. H. C., No. 1.	" 6	·02	·374	6·45	28·2
23	" "	" " 2.	" 6	Traces.	·167	3·65	4·0
24	Prescott, Ont.	T. C. per F. J.F.	" 11	·01	·07	·585	2·6
25	Hintonburgh, Ont.	J. A. O.	June 14	·016	·14	6·545	92·0
26	Kneehill Creek, N.W.T.	G. B. B.	" 15	·84	·246	·05	15·0
27	Lefaivre, Ont.	W. O.	" 17	3·198	·196	·156	29·6
28	Regina, N.W.T.	J. A. M., Ind. Sc.	" 21	1·373	·09	·533	13·2
29	Woodstock, Ont.	J. G. J., "R".	" 23	·20	·052	·715	3·6
30	" "	" "S".	" 23	·04	·02	·948	4·3
31	Harriston, Ont.	W. W. McL.	" 30	·18	·38	None.	42·0
32	Grindstone, Magdalen Isds., Q.	A. S. D. Van B.	July 7	3·60	·26	3·725	110·0
33	Aylmer, Que.	A. C. C.	" 9	·025	·09	2·36	11·5
34	Ashton, Ont.	S. McK.	Aug. 2	·04	·775	4·858	32·0
35	Gibson, N.B.	T. D. B.	" 2	Free.	Free.	None.	3·7
36	Summerberry, N.W.T.	J. S. F.	" 3	·02	·45	"	44·8
37	Rideauville, Ont.	J. B.	" 10	·52	·20	·346	32·0
38	Douglas Road, Victoria, B.C.	S. E. C.	" 13	·63	·205	·338	60·0
39	Almonte, Ont.	B. R.	" 18	·025	·029	3·782	4·5
40	Chelsea, Que.	W. R.	Sept. 13	·086	·065	·67	4·5
41	"	W. H.	" 17	·02	·31	6·992	40·0
42	Beechridge, Que.	J. C.	" 21	Trace.	·48	1·268	3·5
43	Summerside, P.E.I.	R. H., spring	Oct. 14	·05	·045	5188	9·5
44	" "	" brook.	" 14	·08	·45	·585	10·0
45	" "	"	" 14	Traces.	·05	6·465	48·0
46	Murray Harbour, South, P.E.I.	C. B.	" 16	·132	·044	4·39	62·0
47	" " "	W. H.	" 16	6·658	1·154	20·066	555·0
48	Branchton, Ont.	J. F.	" 21	·064	Traces.	·0198	11·1
49	Milton, Ont.	J. A. R.	" 26	·032	1·28	1·864	33·0
50	Summerside, P.E.I.	R. H., No. 1.	" 27	·435	·11	11·71	180·0
51	" "	" " 2.	" 27	Free.	·06	·667	9·6
52	" "	" " 3.	" 27	·04	·053	·660	8·8
53	" "	" " 4.	" 27	·025	·04	9·557	55·0
54	Longue Pointe, Que.	F. L.	" 30	1·080	·052	·089	30·6
55	Kingston, Ont.	I. S.	Nov. 11	1·920	·048	None.	1000·0

WELL WATERS, 1897.

PARTS PER MILLION.

Total Solids at 105° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.
302·8	232·8	70·0	Very heavy traces...	Polluted; use probably attended with danger.
158·8	114·0	44·8	Slight traces.....	Seriously polluted.
65·2	8·8	56·4	Very slight traces...	No contamination; pure and wholesome.
.....	.....	.....	.....	Suspicious.
430·8	294·8	136·0	Heavy traces.....	Receives soakage; not a good water.
2867·2	2295·2	572·0	Traces.....	Free from pollution; very large amount of mineral matter.
2909·2	2319·2	590·0	"	" " " " "
2078·0	1644·0	434·0	Heavy traces.....	Dangerously polluted; unfit for household purposes.
7273·6	4614·0	2659·6	Traces.....	" " " "
682·0	630·0	50·0	Very slight traces...	" " " "
3727·5	2617·5	1110·0	Heavy traces.....	A very bad water.
580·0	388·0	192·0	Traces.....	Highly suspicious.
414·0	352·0	62·0	Heavy traces.....	Unpolluted; good and wholesome.
76·0	66·0	10·0	Traces.....	Probably safe and wholesome.
143·5	97·5	46·0	Heavy traces.....	Evidence of contamination; highly suspicious.
594·0	482·0	112·0	Slight "	Excessive pollution; condemned for use.
620·0	412·0	208·0	Very slight traces...	Free from drainage pollution.
40·0	16·0	24·0	Traces.....	Decidedly suspicious; strong indications of pollution.
2200·0	1790·0	410·0	"	Of doubtful purity.
235·0	155·0	80·0	Heavy traces.....	Free from pollution; safe and wholesome.
1107·0	1033·0	74·0	Very heavy traces...	A fair water; probably safe.
792·0	552·0	240·0	" " ..	A very bad water.
252·0	162·0	90·0	Traces.....	Of doubtful purity; very suspicious.
364·0	300·0	64·0	.....	Entirely free from contamination.
991·2	519·2	472·0	Traces.....	Dangerously polluted.
1226·0	1022·0	204·0	None.....	Very suspicious; probably contaminated.
375·2	285·2	90·0	Slight traces.....	Very seriously polluted; condemned.
1180·0	928·0	252·0	Heavy "	Pollution of a most pronounced character; very bad water.
258·0	220·0	38·0	Traces.....	Impure and unfit for use.
304·0	238·0	66·0	Slight traces.....	Fairly satisfactory; probably safe.
476·0	346·0	30·0	Traces.....	Condemned for domestic use.
463·0	285·0	178·0	Very heavy traces...	Very bad water; dangerous to use.
298·0	190·0	108·0	Traces.....	Suspicious.
234·0	138·0	96·0	"	Polluted with drainage from cheese factory.
254·0	236·0	18·0	Slight traces.....	A remarkably pure water.
2782·0	2235·6	546·4	Traces.....	No pollution; of the nature of a mineral water.
496·0	384·0	112·0	Heavy traces.....	Seriously polluted.
332·0	244·0	88·0	" "	" "
372·0	284·0	88·0	Traces.....	Of somewhat doubtful quality.
216·0	186·0	30·0	Heavy traces.....	Suspicious; not first class.
348·0	240·0	108·0	Traces.....	Contaminated; dangerous.
172·0	124·0	48·0	Slight traces	Decidedly suspicious.
106·8	86·8	20·0	Traces.....	
117·2	103·2	14·0	Slight traces.....	
311·2	255·2	56·0	Heavy "	Seriously contaminated.
342·8	196·8	146·0	Traces.....	Impure; not fit for drinking purposes.
1831·2	1510·0	321·2	Heavy traces.....	An exceedingly bad water.
2336·0	1848·0	488·0	None.....	Free from pollution.
1208·0	514·3	694·7	Very heavy traces...	Decidedly suspicious.
1034·8	774·8	260·0	Traces.....	A bad water; use attended with risk to health.
129·2	72·0	57·2	Slight traces.....	Unpolluted; wholesome.
116·0	62·0	54·0	" "	" "
406·0	250·0	156·0	Traces.....	A dangerous water; receives pollution.
770·0	544·0	226·0	None.....	Seriously polluted; unsafe for household use.
2194·8	1658·8	536·0	Heavy traces.....	Unmistakably polluted; unsafe for household use.

ANALYSES OF WELL

RESULTS STATED IN

Number.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrites.	Chlorine.
			1897.				
56	Lanark, Ont.	R. R.	Nov. 16	4·618	·152	·6638	93·0
57	Hawkesbury, Ont.	R. O. B.	" 17	Free.	·056	6·917	318·0
58	" "	M. W. F.	" 17	Traces.	·092	9·035	33·4
59	" "	T. R.	" 17	·048	·090	1·472	162·0
60	" "	J. H. B. of O.	" 17	Traces.	·048	·299	23·4
61	Summerside, P.E.I.	H. S. M., No. 1.	" 26	Free.	·062	7·514	60·0
62	" "	Gr. Brk., No. 2.	" 26	"	·052	1·308	12·6
63	" "	J. McL., No. 3.	" 26	·028	·070	22·460	94·0
64	Alberton, P.E.I.	W. C. McN., No. 1.	" 27	Trace.	·075	·605	7·0
65	" "	J. L. D., No. 2	" 27	Free.	·041	5·861	47·5
66	" "	" pump, No. 3.	" 27	·0325	·025	7·274	85·0
67	" "	M. R. L., No. 4.	" 27	Traces.	012	4·550	23·5

WATERS, 1897—*Concluded.*

PART PER MILLION.

Total Solids at 105° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.
645·2	444·4	200·8	Traces.....	Dangerously polluted ; condemned for use.
948·0	604·0	344·0	Heavy traces.....	Very heavily polluted ; dangerous.
552·0	348·0	204·0	Traces..	Dangerously polluted ; unsafe.
922·0	660·0	262·0	Slight traces...	Polluted and unsafe for use.
516·0	391·6	124·4	Very heavy traces...	Not first class, but probably a safe water.
488·0	377·2	110·8	Traces.....	Seriously contaminated ; unsafe to use.
135·2	93·2	42·0	"	Not a first class water.
660·8	502·8	158·0	Heavy traces.....	Heavily polluted ; a very dangerous water.
.....	.....	.....	....	Unpolluted ; a good water.
....	.....	.....	.....	Polluted ; not a safe water.
.....	. .....	.....	. ...	Very seriously polluted ; condemned.
.....	.....	.....	.. ..	Polluted and probably unsafe.

REPORT

OF THE

ENTOMOLOGIST AND BOTANIST

(JAMES FLETCHER, LL.D., F.R.S.C., F.L.S.)

DR. W. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to hand you herewith a report on some of the most important subjects which have been brought officially under my notice during the past season.

Many other subjects which have required attention have already been treated of at sufficient length for present purposes in former reports of the Division, or are as yet incomplete. The correspondence during the year has been large and of a varied character. There were 1,920 letters received and 2,110 sent out. During the past year I have had several opportunities of attending meetings in different parts of Canada, and of studying in the field some of the important problems connected with the protection of crops from their insect and fungous enemies.

The experiments with grasses and fodder plants, native and exotic, have been continued and have proved of great interest to visitors. This part of the work of the division is in the charge of Mr. Berthold Nothnagel, who has shown great interest in his work and is untiring in his efforts to explain to all comers the value and nature of the experiments which are being carried on.

The Awnless Brome Grass having proved to be very successful in all parts of the Dominion, about 600 1-pound samples were last spring sent out to farmers in all the provinces. Such reports as have been received up to the present are, almost without exception, enthusiastic in their praises of this valuable grass. A special interest has been added to it lately by the discovery that it is particularly well suited for cultivation on alkaline patches where little else will grow.

During the year several thousands of specimens of plants and insects have been sent in for identification from naturalists in all parts of the Dominion. From these collections several valuable additions have been made to the Experimental Farm museum.

Meetings.—Whenever official duties would permit of my absence, every opportunity has been taken of attending farmers' meetings to meet farmers and to deliver addresses on the work of the Division.

In January last I attended the convention of the Eastern Dairymen's Association at Brockville, Ont., from 6th to 8th of January. The following week I went to St. Mary's, Ont., and was present at the convention of the Creameries Association, 14th to 16th of January. From 20th of January to February 2nd I was in Nova Scotia and New Brunswick, attending meetings of farmers and fruit growers. The annual meeting of the Fruit Growers' Association of Nova Scotia was held at Wolfville on 20th and 21st of January. The annual meeting of the Nova Scotia Farmers' Association was attended at Middleton on 26th, 27th and 28th. On my way back to Ottawa I stayed off at Sussex,

in New Brunswick, and held meetings with Mr. W. W. Hubbard at Hampton, N. B., on 29th of January, and at Sussex, N. B., on the following day. In passing through St. John, N. B., I met the members of the New Brunswick Natural History Society, and examined their museum on Monday, 1st of February. On 2nd and 3rd of March I was present at the annual meeting of the District of Bedford Dairymen's Association, at Cowansville, Que. On 3rd of June, by instruction of the Honourable the Minister of Agriculture, I went to Ste. Thérèse, Que., to examine some "drowned lands," representative of hundreds of acres along the Ottawa River, and to advise what grasses could be most advantageously grown on land liable to be under water during the spring freshet for two or three weeks. Some experiments are being tried and will be reported on later. The next day I started for St. Catharines and met a number of leading fruit growers, with whom I visited the orchard and beautiful grounds of Mr. Charles Thonger, near Niagara, where, unfortunately, the San José Scale has been introduced. I was commissioned by the Honourable Minister to meet these gentlemen and learn from them what their views were as to proposed measures asked for by fruit growers to prevent the spread of the San José Scale. The following morning I was driven by Mr. A. M. Smith to St. David's, to examine an orchard of Mr. Hendershott's, in which the San José Scale was said to occur. This report proved to be inaccurate, the insect in Mr. Hendershott's orchard being the Cherry Scale, *Aspidiotus Forbesi*, Jnsn., a less injurious species. Mr. Smith's nursery was also examined and no trace of the San José Scale was found.

On the following Monday, 14th of June, I left for Nova Scotia, where some meetings had been arranged by the Board of Trade of Kentville, and by the Fruit Growers' Association of Nova Scotia. Meetings were held at Kentville, Berwick and Auburn. The first meeting was largely of townspeople, but there were also several farmers and gardeners present who had been brought together by Mr. M. G. DeWolfe, the energetic President of the Board of Trade. The next day I was driven to Wolfville and had the pleasure of being shown over the School of Horticulture by Prof. Faville. The same afternoon, through the kindness of Mr. Barclay Webster, I was driven from Kentville through the luxuriant orchards of King's county to Berwick, where a good meeting had been convened by Mr. S. C. Parker, the Secretary of the Fruit Growers' Association of Nova Scotia. The morning of the 18th was devoted to examining the well-kept orchards of Mr. Parker and others at Berwick. In the afternoon I proceeded to Auburn, where I was met by Mr. J. S. Bishop, and driven through the surrounding country, visiting the cranberry bogs which have been so successfully worked for the last few years. In the evening a well attended meeting of cranberry growers was addressed and Cranberry insects were discussed. The next day I returned to Kentville and then went on to Halifax to attend the meeting of the Royal Society of Canada. I left Halifax for home on 23rd of June. On 3rd of July I proceeded to Manitoba by instruction of the Hon. Minister of Agriculture and at the request of the Manitoba Government. In company with Mr. Hugh McKellar, the Deputy Minister of Agriculture, I held a series of meetings in some of the important wheat growing districts of the province. Meetings were held at Neepawa, Gladstone, Dauphin, Glenlyon on the Gilbert Plains, Portage la Prairie. Brandon, Beresford, Blythefield and Glenboro'. The subject treated of at all these meetings was "Noxious weeds, their nature and habits and the best means to adopt for their eradication." We were accompanied at some of the-e meetings by the Rev. W. A. Burman, Mr. George Greig, of Winnipeg, and Mr. J. B. Hobson, of Guelph, who all took an active and useful part in the meetings. I returned to Ottawa again on 22nd of July. On 12th and 13th of October, I attended the annual meeting of the Entomological Society of Ontario at London, Ontario.

Acknowledgments.—As in previous years, I am under great obligations to my friends, Prof. John Macoun and Mr. W. H. Harrington, both of Ottawa, for frequent assistance in the identification of difficult plants and insects. I also take pleasure in again acknowledging the valuable assistance I have received from my many correspondents in all parts of the Dominion, who have much aided the work of the Division by making observations and by sending me prompt notice of the occurrence of injurious insects and weeds. My thanks are also particularly due to Dr. L. O. Howard, the

United States Entomologist, and his staff at Washington, as well as to Dr. C. H. Fernald, of Amherst, Massachusetts, and Lord Walsingham, F.R.S., of Merton Hall, Thetford, England, for many favours in identifying insects and for valuable publications.

I again thank my kind friend, Miss E. A. Ormerod, for her most useful publications and valuable advice. On the occasion of a short visit to England in August last I had the great pleasure of again calling on this energetic worker and of learning from her many things of great use to me in my official duties.

The following donations have been received during the year :

Prof. J. Lamson Scribner, Washington : A large collection of seeds of grasses and fodder plants.

M. G. DeWolfe, Esq., Kentville, N. S. : Several living roots of greenhouse plants, bulbs and perennials.

T. W. Ramm, Esq., Bewdley, Ont. : Insects.

Rev. G. W. Taylor, Gabriola Island, B. C. : British Columbia plants and insects.

T. N. Willing, Esq., Olds, Alta. : Rare plants and insects from Alberta.

In conclusion, I beg again to acknowledge the great help I receive continuously in all branches of the work of the division from my assistant, Mr. J. A. Guignard, B.A., who has done much by his assiduous attention to bring the Division of Entomology and Botany to such degree of efficiency as it has attained.

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

JAMES FLETCHER,
Entomologist and Botanist.

CEREALS.

The large wheat crop of the Dominion was got in for the most part in good condition. In some sections of Ontario late rains were a cause of loss, from the grain sprouting in the field. There was no serious damage from injurious insects in any of the provinces, although in Manitoba some loss resulted from an unknown cause, by which many ears of wheat turned white before the grain was mature and the stems remained standing in the field; this injury was spoken of generally as "dead heads" and was in places of much importance. It was thought by some to be due to the attacks of a fungus, but other observers spoke positively of finding insects which were actually attacking the roots. From the information given by correspondents, I judge that this was not the work of the Wheat-stem Saw-fly (*Cephus pygmæus*, L.) treated of in my last report but of a dipterous larva. During the past summer the perfect flies of *Cephus pygmæus* were reared from straws sent from Souris, Man., by Mr. Wenman, thus proving without doubt the identity of the species which injured Mr. Wenman's wheat last year. During the past summer some harm was done by the same insect near Indian Head, N.W.T.

With regard to the "dead heads," Mr. A. C. Hawkins, of Swan Lake, Man., writes —and his opinion seems well supported:—"I still think that the 'fungous disease' is an after effect and not the cause of the death of the wheat plant, the cause being, in my opinion, the larva forwarded in my last letter which you could not find, but of which, at the time that it was collected, I had no difficulty in finding many more than I wanted, one or two in the root of every plant I examined of which the heads were just beginning to dry up."

Mr. A. W. Pritchard, of the Manitoba Department of Agriculture, writes:—"Numerous reports have been received by the Department, of damage done to the wheat crop by an insect which is commonly spoken of as attacking the root, though some of our reporters call it a 'Joint-borer.' The effect of its attack is everywhere the same, to cause the plant to turn white and produce an empty head. The ravages of this insect, if insect it be, have extended over a large area. The damage done is reported is some cases as much as one-half the crop."

Arrangements have been made to study this attack more fully next year, and specimens of injured stems will be thankfully received.

The JOINT-WORM (*Isosoma*).—An attack on wheat by a joint-worm is reported from Verdun, Bruce Co., Ont., by Mr. William Welsh, who has studied the matter with some care. He writes as follows:—

"July 28.—The year before last was the first when I noticed this new pest; it was, detected in the broken straw at threshing time, the larvæ of the insect being easily seen by splitting the hard pieces of broken straw with a sharp knife. Last fall there was much more of the broken straw in the threshed grain. It seems almost impossible to get thes e pieces out with the fanning mill, and consequently many larvæ are sown with the fall wheat. I think this insect must have had much to do with the injured grain of last fall. On looking in the bins of wheat at mills or elevators, I became convinced that this insect is worthy of full inquiry and that it is rapidly spreading here.

"November 25.—Since corresponding with you I have felt much interest in this subject, and have made special observations and inquiries concerning the joint-worm. I send you by this mail specimens of infested straws which I have picked from the fall wheat stubble. The piece of ground where I had my fall wheat having been seeded to clover gave me a chance of getting some specimens nearly as good as those I sent before harvest. I also inclose some samples of the broken straw as found in threshed wheat. You will find that these short pieces are hard and woody from the action of the insect upon the growing stem. The pupæ are still alive and ready in the warm days of spring to eat their way out and go through the same routine as their parents before them. In

some of the pieces of straw, a little over an inch in length, there may be found from five to ten insects. A bushel of such straw lying loose about a barn would give enough insects to destroy many fields before the grain ripened. I think you will agree with me that every farmer should see that the cleanings from the fanning mill are either fed or burned to destroy the insect."

Remedies.—As stated by Mr. Welsh, the broken hardened pieces of straw noticed when threshing and cleaning grain should be collected and burned. The grain should also be examined for these pieces which should be picked out by hand.

Most of the galls or hardened sections of stem in which the insect passes the winter are low down near the root. The burning of stubbles and deep ploughing are therefore useful in destroying large numbers of the pupæ. The term "joint-worm" probably covers more than one species of minute hymenoptera which attack the stems of wheat and barley; but, fortunately, the attack is of rare occurrence in Canada, and there have been few opportunities of examining the mature insects.

Young plants of fall wheat sent by Mr. Welsh from Verdun in November were found to be attacked by both HESSIAN FLY and the WHEAT-STEM MAGGOT. These two pests were also somewhat abundant in Prince Edward Island. Mr. Edward Wyatt, writing from Pleasant Grove, P.E.I., September 18, says:—"The FRIT FLY for many years now has been doing considerable harm to our wheat and hay crops. The Hessian Fly I have no doubt is the principal aggressor, but the Frit Fly and Wheat-stem Maggot have been associated with it. Some of the maggots which infest the straw are of a yellowish colour, others are green. These pests have been on the island continuously for the last 17 years. The damage was slight until the last three or four years. Many who sow early have poor crops and with no knowledge of the cause. We all sow now from May 20 to 24, thus escaping the first attack which, if bad, ruins the crop. We have never grown better wheat crops than in the past two years—that is, generally; fully one-third of my wheat this year fell down two weeks before it was ripe, still the crop was a fairly good one; but should the season prove favourable to these pests, the damage might be serious."

THE GRAIN PLANT-LOUSE (*Siphonophora avenæ*, Fab.)—Specimens of wheat and oats attacked by the Grain Plant-louse have been sent in from several localities. The worst attacks were reported by Mr. John Tolmie, of Cloverdale, Victoria, B.C., on oats and by Mr. Lewis Rogers, of Cooksville, Peel Co., Ont., on fall wheat, where much damage was done to the young plants in October and early in November. In a case of this kind, if the vigorous wheat plants which have passed the winter are found to be too few in spring for a paying crop, clover may be broadcasted over the land before rolling, or the crop may be helped with a top dressing of some special fertilizer.

GRASSHOPPERS.—A noticeable feature of the correspondence of the division during the past season, as compared with last year, was the almost total absence of complaints of injury to farm crops by grasshoppers. This state of affairs was anticipated on account of the abundance of parasites of several kinds noticed last year and mentioned in my report for 1896. Hair-worms (*Gordius*) have been sent in from Ontario and Quebec more frequently than any other parasites. The account of the strange life-history as far as known, never fails to excite the interest of inquirers. The only localities from which grasshoppers have been mentioned as injurious are: Sable Island, N.S., where they destroyed Brome grass which was being experimented with as a sand binder; Manitoulin Island, Ont., where they did much harm to turnips; and parts of Peterborough County, Ont., where hay and oats suffered to a limited extent from their ravages.

Fig. 1. The Red-legged Locust.

THE PEA WEEVIL OR "PEA BUG"

(*Bruchus pisi*, L.).

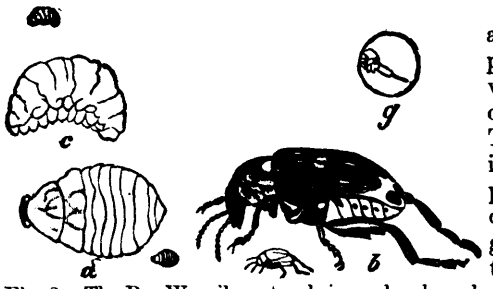


Fig. 2.—The Pea Weevil—natural size and enlarged.

Attack,—A small, brownish gray, very active beetle, $\frac{1}{5}$ of an inch long, with two conspicuous black spots on the end of the body, which emerges from seed pease in autumn or in spring, leaving a small round hole. This insect is generally spoken of under the incorrect name of "pea bug," and infested pease, as "buggy" pease. 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 chrysalis and then to the perfect beetle. Some of the beetles, the percentage varying with the season, escape from the pease in the autumn and pass the winter hidden away under rubbish or about barns and other buildings. The greater number, however, do not leave the pease until the following spring, so that they are frequently sown with the seed.

The perfect insects fly easily and resort to the pea fields about the time the blossoms appear. They have been observed feeding upon the leaves and flowers of the pea vines before the pods were formed, but the injury so done is inappreciable compared with the much greater loss from the injury to the seeds by the grubs.

From the large numbers of beetles which I once found dead, after a severe winter, beneath the shingles of a barn, I am led to believe that, in those seasons when a large percentage of the beetles issue in the autumn, many are apt to be destroyed by severe cold.

Frequent inquiries come in every year for information concerning the Pea Weevil and the best means of preventing its injuries.

During the past season, from such reports as have been received, it would appear that on the whole the Pea Weevil has not been quite so injurious as in former years. Some correspondents, however, report that the injury is still considerable.

"Picton, Prince Edward Co., Nov. 6—Our big pea houses report that the Weevil this year was not as bad as usual. Every effort is now made to destroy the Weevil by what is called "bugging" the pease as soon as they are received from the farmers."—[Wellington Boulter.]

The insect itself and its life history are now well known in the districts where it occurs; and, if more care were taken to sow only uninfested pease or those which have been properly fumigated, there would be no difficulty in reducing very considerably the numbers of this pest, which every year affects so materially the value of the pea crop of the Dominion. There are vast areas in Canada where good seed pease can be grown as a paying crop, and where the Pea Weevil does not occur at all. The advantage of obtaining seed from these districts is obvious and has already been recognized by some of the large seed firms. In addition to this, the method usually adopted of killing the weevils, either as grubs or as perfect beetles inside the seed pease, by subjecting them to the fumes of bi-sulphide of carbon, is perfectly effective. Most of the seed houses at the present time treat their seed carefully and conscientiously, and the injury to the crop is now done chiefly by grubs from eggs laid by weevils which have either left the pease in the autumn and wintered over, or else from pease saved for seed in small quantities by farmers who took no steps to destroy the weevil before sowing time.

Writing early in the present season, Mr. T. G. Raynor, of Rose Hall, Prince Edward Co., Ont., says:—"I do not think the pea weevil was nearly as bad in this county in 1896 as in previous years. Perhaps the season had something to do with it.

Still, every year for some time past, there have been fewer pease owned and sowed by the farmers themselves. The company pease, which are treated for the bug, have replaced the others. This must necessarily have its effect for good. I have no doubt that the pease had more bugs in them than was generally supposed, as the fancy pease grown here are cut and marketed early, before the weevil has developed much or can be detected, and the pease are generally treated for the bugs as soon as they are marketed."

Late sowing is sometimes recommended as a preventive remedy, but is more or less uncertain in its good effects according to the season, and has never become very popular, although the method has always a few adherents in all districts visited, the idea, of course, being to delay the development of the pease until after the season when the weevils lay their eggs. The chief danger is that late sown pease are apt to be attacked by the ordinary white mildew of the pea, which reduces considerably the crop.

I quote from my annual report for 1890, a statement by Mr. J. H. Allan, of Picton, Ont., one of the best informed authorities in the pea trade:—"Many of our farmers sow the late sorts of pease late in the season—say, the first part of June—with good results. I have seen a field of Golden Vine pease sown early in May. The crop was literally filled with bugs. The neighbour of this farmer planted his in June, and his crop had none. I would say, plant as late as possible; but this will not answer for all kinds. The extra early varieties must be put in as early as possible to insure a paying crop."—(*Report of Ent. and Bot., C. E. F. Report, 1890*, p. 173.)

"Weston, York Co., Ont., March 8:—The pea weevil, which eats out the centre of the pease in the barn, around here destroys about one-quarter of the crop. Some people sow late to escape the weevil, but they do not get half the crop as when they sow early. To sum up, if you sow early, you get a good crop of pease and weevil. Sow late, you get a poor crop of pease and few weevils. We sow about forty acres of pease on our 250 acre farm."—[J. La F. Stonehouse.]

Remedies.—Bisulphide of Carbon.—Where the crop is large, undoubtedly the wisest course to adopt in districts where the pea weevil occurs, is to fumigate the pease with bisulphide of carbon as a regular practice as soon as possible after harvesting. In this way, any weevils contained in the pease will be destroyed in the grub state before they have consumed much of the substance of the pease in which they are undergoing their transformations. This may be done by placing the infested seed, according to the quantity to be treated, in some suitable receptacle, as a tight barrel, box or bin, or, if the quantity is large, in a specially prepared building. Mr. Allan describes his method, which is practically that generally adopted, as follows: "Nearly every large grower has a building for the purpose. If properly made, it works well. The whole building must be very tight to be of any use. Some use tin, others cement and paint and paper lining, with a double floor and tarred paper between. The pan we use to put the carbon bisulphide in is about three feet across and only about four inches deep. The chemical is thus exposed to more air than it would be in a deep dish, from which it could not evaporate quickly enough to do good service. I put my pan up close to the ceiling above the pease, because the vapour, being so much heavier than air, works down through them. We fill the building with bags as close as possible up to where the pan hangs, empty the bisulphide into the pan and get out as quickly as possible, close the door up tightly and leave it for 48 hours. This must be done in warm weather, as the liquid does not vaporize well when the temperature is lower than 10 degrees above zero." (*C. E. F. Report, 1890, loc. cit.*)

Perhaps the most convenient receptacle for treating weevilly pease, for farmers, is an ordinary 45 gallon coal oil barrel, into which 5 bushels of pease may be put at a time; the quantity of bisulphide of carbon which has been found necessary is one ounce to every hundred pounds of seed; therefore, for the above quantity three ounces should be poured into some flat pan placed on the top of the seed or sprinkled over the surface, and the barrel covered closely, first with a thick cloth or canvas which has been damped in water, and then with boards. The barrel should be in an outside shed and left closed for 48 hours.

Bisulphide of carbon is a colourless liquid which volatilizes very readily at ordinary temperatures; the vapour, which is quite invisible but has a strong unpleasant

odour, is heavier than air, and therefore sinks readily to the bottom and permeates the whole contents of any closed receptacle in which it is used to free grain of infesting insects.

Great care must be taken in the use of this chemical on account of the extreme inflammability both of the liquid and its vapour. No fire, such as a flame or even a lighted pipe or cigar, must be taken near either the liquid or the bin in which the pease have been treated, for some time after it is opened and the heavy and inflammable vapour has been let out. Treating seed of any kind with bisulphide of carbon has no deleterious effect upon the vitality of the seed nor upon its wholesomeness as food.

The question sometimes arises whether pease badly infested with weevils can be used safely for feed. I find upon inquiry that it is a general practice to grind up weevilly pease and use them for feed, and no injury to stock has been reported so far. Mr. T. G. Raynor, answering this very question in the *Farmer's Advocate* for March 1, 1897, says:—"The cull pease from re-cleaning the pease at the seed houses, after being treated for the bug, are used for feeding purposes, and I have not heard of any injury." Mr. Wellington Boulter, the Mayor of Picton, Ont., one of the most important centres of the seed-pea trade in Canada, also writes as follows:—"November 26.—*In re* your inquiry as to grinding pease infested with pea-weevil for pigs, injury to stock, &c., I would most emphatically say no injury could happen. I have ground up quantities in the past. I have also fed pigs with the pease in the natural state and never heard of any injury. In grinding, the bugs would be ground to powder."

Holding over seed.—Some people may not care to have such a dangerous material as bisulphide of carbon about their premises. For such, an excellent remedy is holding over until the second year after harvesting any pease required for seed. This may be done in the case of pease without any injury to their vitality. They should be inclosed in paper or cotton bags, which will be sufficient to prevent the beetles from escaping when they emerge. At the time of sowing the pease, they should be examined and if necessary hand-picked; every grain which has been perforated should be discarded, as frequent experiments have proved that it is impossible to grow strong plants from weevilled pease, although unfortunately there is a widespread belief to the contrary.

The Pea Moth (*Semasia nigricana*, Steph.).—This enemy of the pea, which has been treated of in former reports without a specific name, has this year been identified (from specimens bred from larvæ collected last year at Ottawa) through the kindness of Prof. C. H. Fernald, of Amherst, Mass., who writes:—Your pea insect was greased and unspread, and therefore difficult to determine; but I believe it to be *Semasia nigricana*. which is now considered distinct from *nebritana*, Treits, under which it was placed as a synonym by Wocke in Staudinger's Catalogue. It is probably identical with *pisana*, Guen., and has long been placed under the genus *Semasia*, but Meyrick in his *Handbook of British Lepidoptera* puts it under the genus *Laspeyresia*, Hbn.

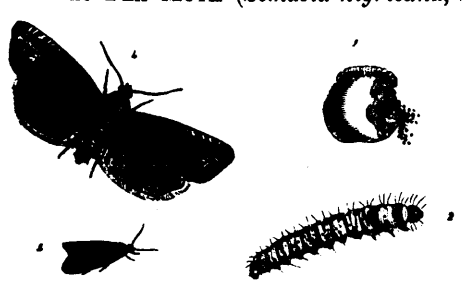


Fig. 3.—The Pea Moth—natural size and enlarged.

The accompanying figure has been kindly supplied for this report by Messrs. Blackie & Son, of Glasgow, Scotland. It is by John Curtis, and was used in his great work "*Farm Insects.*"

Six specimens of the moth were bred, and all emerged between the 12th and 15th of July. As the cocoons were kept under natural conditions this is probably the time when the moths appear in nature, which would emphasize the value of the remedy already suggested of early sowing. The moth is small and inconspicuous, ¼ of an inch long when the wings are closed, mouse-coloured, bronzed towards the tips of the wings, silvery gray beneath. The only markings are along the front margin or costa and near the apex of the upper wing. The costal marks consist of about 10 or 12 short black triangular streaks, separated from each other by similar clear white dashes all directed backwards; two of the black streaks, however, the third and fifth, which start from

about the middle of the costa, are much longer than the others and run parallel to each other diagonally one-quarter across the wing towards the apex; these are narrowly margined with bronze scales and broadly shadowed on the side towards the apex with bands of pearly gray scales. These bands run right across the wing and unite at the other margin, thus inclosing a somewhat oval or flask-shaped space, which bears in its centre 4 or 5 short longitudinal dashes and also includes in its neck the outer of the two long black diagonal streaks from the costa.

The injury from the caterpillars of the Pea Moth was not so marked in Ontario and Quebec as in previous years, but in the Maritime Provinces it has been as wide-spread as usual. Mr. J. E. Wetmore, of Clifton, King's Co., N. B., sent me on 16th of September last several pods of Stratagem and Crown peas, also of the wild Tufted Vetch, *Vicia Cracca*, with the following notes: "I find that they attack the Stratagems in all stages of growth, from the most immature to those nearly ripe. I have found but few in the green Crown pease. In this variety they are almost always among the ripe ones. Nearly every pod of Stratagem is affected, while but about one-third or one-quarter of the Crown pease are attacked. Early pease ripening in July are not liable to be attacked, but, as the season advances, their numbers increase till the tender late varieties are almost wholly destroyed. I have examined some pods to see where the attack generally occurs. I thought it was always at the upper end, but of fourteen specimens before me three are attacked at the upper end and three at the lower end, while eight are at intermediate points, so that there does not seem to be any regular spot for the egg to be laid and the young caterpillar to enter the pod."

"Berwick, King's Co., N. S., 26th November.—The Pea Moth has been very destructive to both garden and field pease."—[S. C. Parker.]

ROOT CROPS AND VEGETABLES.

Garden vegetables and root crops during the past season have been little attacked by insect pests.

CUTWORMS.—There have been the usual local occurrences of cutworms in different parts of the Dominion; but, with the exception of a severe outbreak on Vancouver Island, there was no widespread devastation complained of. No mention of cutworms was made in the provincial crop reports of Ontario, Nova Scotia, or Manitoba. Rev. Father Burke reports from Prince Edward Island: "Cutworms seem to dislike a wet season, like some other insects. We were relieved very much in this respect last spring."

"Yarmouth, N.S.—Cutworms were not as destructive as usual."—[C. E. Brown.]

"Clifton, King's Co., N.B.—Last season cutworms were very destructive here, so that it was almost impossible to raise any vegetables; this year there have been very few losses from them. 1896 was very dry; this season, 1897, has been moist and cool; would this account for the difference in their numbers?"—[J. E. Wetmore.]

"Victoria, B.C., Nov. 8.—Cutworms were numerous and destructive this spring and destroyed quantities of young garden stuff."—[R. M. Palmer.]

"Thetis Island, B.C., June 3.—I send specimens of an insect which is working havoc to the root crops here; my onions are all gone, and beets and carrots are slowly disappearing; it cuts off the young plants close by the ground."—[Peter Hunter.]

"Mattawa, Nipissing, Ont., June 21.—Inclosed find grubs which are working great havoc in crops attacking almost everything in the shape of vegetables, particularly beans, corn and cabbage."—[C. G. Hurdman.]

"Stonefield, Argenteuil Co., Que., June 25.—The farmers in this neighbourhood, who have sown feed corn, are troubled to a serious extent by a grub, which cuts off the young plant as soon as it appears above the ground."—[Reuben Wilden.]

"St. Patrick, Temiscouata Co., Que., June 26.—All the gardens in this neighbourhood are suffering from the depredations of a grub, which is devouring all the young

vegetables. It is a common grub, but is in such unusual numbers that the poor people fear that every vegetable will be destroyed."—[Mrs. D. W. Macdonell.]

No new remedies have been discovered for these troublesome pests of the garden and farm. The remedies given in my last report have been found very serviceable, particularly the poisoned bran remedy, when the material was used either dry or moistened.

Potatoes have been an uneven crop, very good in many places, but in as many others, there was loss from neglecting to use Paris green for the Colorado Potato-beetle and to spray for the potato-rot. Mr. W. W. Hubbard, of Sussex, N.B., the editor of the *Cooperative Farmer*, says:—"We had a very wet spring with considerable damp, sultry weather through the summer, and this was very favourable to spore growth. Potatoes were early struck with rust. Scarcely any one will use the Bordeaux mixture." This is a great pity, for the results of spraying to prevent the potato-rust, which later produces the potato-rot, are so marked that any one who will try a small experiment, must be soon convinced of the value of this remedy.

BLISTER-BEETLES.—The Black Blister Beetle (*Epicauta Pennsylvanica*, DeG.) appeared in large numbers at St. Denis, Kamouraska Co, Que., on potatoes. Several specimens were sent by Mr. J. C. Chapais. The Gray Blister-beetles (*Macrobasis unicolor*, Kirby) did much harm to potatoes and beans at South River, Muskoka, Ont., and Mr. J. I. Sheil, having read in previous reports of the difficulties of some of my correspondents in treating these insects without injuring the crop, tried some experiments with the insecticide "Slug shot," which he prefers very much to the ordinary mixtures of Paris green used for this insect, finding it equally effective, with no danger of injuring the foliage of the plant treated.

APHIDES or plant-lice were very abundant last season, almost everything being attacked severely. No specimens were received, but several correspondents refer to injury to carrots by a species of plant-louse which spotted the foliage and stunted the roots of the carrots. This occurred in Ontario, Quebec and Nova Scotia. Mr. C. E. Brown, of Yarmouth, N.S., reports:—"Among hardy vegetable crops there was injury and in some cases there was a total loss of carrots from the attacks of aphides. These pests were prevalent not only throughout this county, but in the adjoining counties."

THE CARROT RUST-FLY (*Psila rosæ*, Fab.).—*Attack.*—Early in the season the leaves of young carrots turn reddish and the roots will be found to be blotched with rusty patches, particularly towards the tip. These carrots when stored for winter use, although sometimes not showing much injury on the outside, may be found to be perforated in every direction by dirty brown burrows, in which are many semi-transparent yellowish maggots about ¼ of an inch long. These maggots are blunt at the tail end, but taper toward the head, where is a black hooked tip, forked at the base, by which the maggot makes its way through the the roots. The puparium is reddish-brown, and the maggots, as a rule, leave the carrots before assuming this form. The fly and its work are shown very well in the figure (Fig. 4) by John Curtis, which I am able to present herewith through the courtesy of Miss Ormerod and Messrs. Blackie & Son. The mature fly is two-winged, ¼ of an inch long, bright shiny black, with yellow legs and red eyes. The wings are beautifully iridescent. The winter is passed either as a maggot or in the puparium. Miss Ormerod, the eminent English entomologist, who has studied the insect for many years, describes the attack as follows:

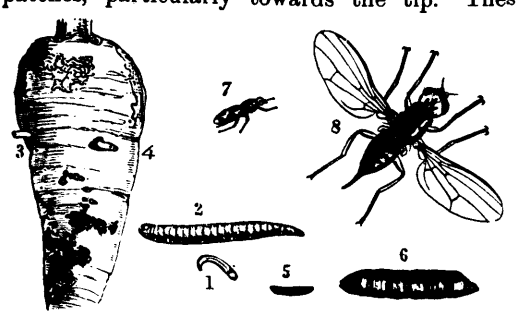


Fig. 4.—The Carrot Rust-fly—natural size (1, 5, 7), and enlarged (2, 6, 8.)

"The method of life of the Carrot Fly is to go down into the ground, where she can find a chink or cranny by the carrots. There she lays her eggs on or by the roots,

and the little yellowish or whitish maggots which hatch from these work their way into the root itself, or, if this is still very small, often destroy the lowest part. When full fed they leave the carrots and turn to the chrysalis state in the ground. The chrysalis cases are cylindrical and of a rusty or ochreous colour, and from these (in summer) the little blackish-green, two-winged flies, with rusty, ochre-coloured heads, come out in about three or four weeks." (*E. A. Ormerod. Ann. Rpt., 1898*, p. 11.)

During the last ten or twelve years occasional complaints have been received of injuries to carrots by the larvæ of the Carrot Rust-fly. These have been mostly from the province of New Brunswick, but also once or twice from Ontario and Quebec. This attack is a serious one, the carrots stored for winter use being rendered useless for the table from the discoloured burrows of the numerous maggots which sometimes occur in a single root. In 1895, Mr. J. S. Armstrong, of Rothesay, King's County, N.B., who had suffered severely from the ravages of this insect, noticed that late sown carrots were less injured than those sown at the ordinary time. This practice has since been recommended, and has been adopted with considerable success.

"Upper Sackville, Westmoreland Co., N.B., March 4, 1896.—My son William has written me that he was talking to you about the carrots we grew in our garden the past two years. He wished me to send you a sample; but they were so badly affected in the fall that we fed them to the cattle. I send you 2 small roots I found in the cellar. They will show the disease, but they do not represent the growth, as they are too small. The crop was large enough, but I think every carrot was diseased. It was in 1894 that we first noticed that something was wrong. In 1895 I planted in another place, but they were no better. Carrots had been grown on the same land previous to 1894 and were sound and good."—[John Fawcett.]

"Brookville, St. John Co., N. B, Dec. 20, 1896.—I send you carrots badly infested by some maggot which entirely destroys them, burrowing in every direction through the root. The carrots came up well, but after I weeded and thinned them they began to wither down in spots. The remainder seemed to grow pretty large, but when pulled were all full of maggots and are not fit for use."

"Feb. 15.—In reply to your letter, I sowed my carrots the first week in May. I have made inquiries of some of the farmers here and find that those who sowed later had their carrots not nearly so badly attacked as mine. Do you think cropping the same ground year after year would affect the roots?"—[Benjamin Hevenor.]

"Upper Sackville, Westmoreland Co., N.B., Jan. 5, 1897.—I sowed a much larger patch of carrots on another part of my farm later in May and had an excellent crop. No appearance of the maggot; but last year ours were so bad that we had to buy for table use. The man we bought of lives some eight miles from here. This year his carrots are affected, to all appearances as ours have been. I know of no other cases. He has been growing carrots on the same plot for some time."

"Dec. 15.—We have had no trouble with carrot-fly this year since we changed the place of cultivation. I have heard of another attack, however, on a friend's place ten miles distant. I will send you some infested roots as soon as I can get them."—[W. W. Fawcett.]

"Clifton, King's Co., N. B., Sept. 16.—I find it almost impossible of late years to get a crop of carrots on account of a small white grub which attacks the roots from the time they are very young and continues its ravages throughout the season."

"Dec. 10.—In reply to your favour inquiring about injury to my carrots this year. Last year they attacked the carrots severely. I did not harvest more than one-third of a crop. This year they attacked the young plants and cut them down very badly in my field, and in disgust I ploughed them under and sowed late turnips. From appearances, had I left them, I would not have had more than one sixth of a crop, if any at all. One of my neighbours had about one-third of a crop, and another still less. There are very few carrots raised here of late years, on account of this pest."—[J. E. Wetmore.]

Remedies.—Where remedies have been applied by my correspondents, the best results have been secured by the use of ordinary coal oil, either in the form of sand saturated in the proportion of one half a pint of coal oil to three gallons of dry sand, ashes or land plaster, which was sown at short intervals along the row, or of kerosene

emulsion, one part of the ordinary Riley-Hubbard formula to 10 of water sprayed along the rows.

Miss Ormerod gives the following advice:—"For prevention of attack generally, what is needed is a well prepared soil which will push on good growth of the plant, and also not be liable to crack, and also such management of ground and plants at thinning-time as will not allow the Carrot Fly to get down to lay its eggs by the roots. *This point is the important matter in the prevention of the Carrot-grub attack, commonly known as 'rust.'* If the fly *cannot* get to the roots to lay her eggs, obviously there will be no maggots to harm them, and the reason why carrots which have done well up to thinning-time often fail afterwards, is *because the ground is thrown open* in the operation.

"I always advise that the greatest amount of thinning that can be managed should be done as early as possible, then give good waterings after thinning, and from time to time afterwards to drive the surface soil together."

From our Canadian experience it would appear that late sowing has a particularly good effect. When carrots are grown as a farm crop, it is, of course, well to sow them as early as convenient and thus secure as heavy a crop as possible; but, for table use, I have found by experiment that this vegetable may be sown very much later than is the usual practice, and, if frequently hoed or cultivated, will give a good crop of excellent roots, while at the same time the danger of loss from the Carrot Rust-fly will be much lessened. Carrots sown as late as the third week in June produced a crop of table carrots of good size and excellent quality.

Where this fly is known to be prevalent, carrots should be sown every year as far distant as possible from land which is known to have been infested. Where carrots are stored during the winter in sand or earth, this, of course, must be treated to destroy the pupæ which leave the roots and enter the soil to pass their last preparatory stage. Miss Ormerod suggests that this earth might be put into a wet manure pit so as to prevent the hatching out of the flies. Should neither of these methods be convenient, at any rate, it might be buried in a deep hole dug in the ground for the purpose.

THE SPINACH CARRION-BEETLE (*Silpha bituberosa*, Lec.).—*Attack.*—Shiny black, very active, flattened grubs $\frac{3}{4}$ of an inch in length, shaped like wood-lice, which devour the leaves of plants belonging to the spinach or goosefoot family (*Chenopodiaceæ*) and also members of the Gourd family. In my Report as Entomologist for 1893 is given an account of injuries to crops by this carrion-beetle. During the past summer there was a new outbreak at Calgary, Alta. Mr. E. D. H. Wilkins writes:—"May 30.—A black grub is swarming in my garden this spring and devouring the leaves of the spinach and beet. I also find it on the weed commonly called lamb's quarters. Please advise me as to a remedy, for this grub is doing a great deal of damage, and I do not like to use poison on the spinach leaves."

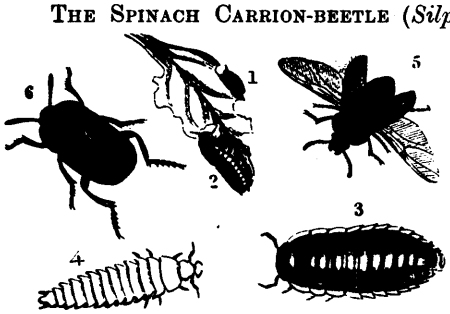


Fig. 5.—Carrion-beetle (5, 6); larvæ (1, 3, 4).

"June 13.—I sent you a few days ago some more grubs, as you wished. I have tried Paris green traps and used overgrown spinach plants. We have had only five hours' rain this year, so that it is a struggle to keep things going. There is very little succulent vegetation to use for traps such as you suggest. Your advice about keeping the place clean of all weeds is more to the point here. Last year I was careless and let lamb's quarters grow in great quantities in waste places in the garden. That is evidently why I am now plagued with these beetles. After trying the Paris green traps I counted twelve corpses in one row. I am satisfied that with these, as I have found it is the case with cutworms, the best preventive measure is to clean up everywhere and leave no weeds or lamb's quarters growing, so that the insects can have no chance to breed."

Remedy.—The only remedy which can be suggested for this insect when it attacks such plants as beetroots and mangels is to dust the young plants at the end of May and during the first part of June, when the grubs appear, with a poisonous mixture such as Paris green and some powdery diluent, *e. g.*, flour, land plaster or ashes, one part to 50. In the case of spinach, it may be necessary to cover the plants with netting or cheese cloth for a time; or a more attractive food plant such as lamb's quarters, or the native weed of the West, *Monolepis*, which is stated to be the favourite food plant of this insect, may be sown close to the spinach to draw off the attack.

FRUITS.

The fruit crop of Canada for the year 1897, although in no way comparable for quantity with that of last year, has been, on the whole, a good crop, and where spraying has been adopted good profits have been made. It is to be regretted, however, that some of our less progressive fruit growers have not yet adopted this most useful means of saving money. This is in some measure due to the ignorance of fruit buyers, who, it seems, cannot be taught that there is not the slightest danger from the use of fruit from trees which have been sprayed, and that, if sufficient poison were used to make the practice dangerous, the fruit grower would be the first to suffer, because the amount of poison necessary for that would cause both leaves and fruit to fall from the trees long before the fruit was ripe.

It would take too much space to give extracts from letters of practical business men who have learnt from experience the value of the practice of spraying against injurious insects and fungous diseases; but hundreds might be cited.

Among fruit insects of the present season the San José Scale has been the subject of extensive correspondence; but many other insects which, except for the anxiety thus aroused, would not have attracted notice, have also been inquired about. Some of those species which may be called the standard pests of the orchard and fruit garden, have been less in evidence than usual. Next to the San José Scale, TENT CATERPILLARS called for most information, and occurred in injurious numbers both in orchards and upon forest trees. In the Ottawa district basswoods (*Tilia*) were much injured and groves of aspen (*Populus tremuloides*, Michx.) for many miles along the Ottawa River were stripped perfectly bare of foliage in the month of June. At Bewdley, Northumberland Co., Ont., Mr. T. W. Ramm, says:—"I never saw so many Tent Caterpillars as there were here this spring." Mr. Ramm also bred from the cocoons several specimens of the useful "ichneumon fly" *Pimpla pedalis*, Cress. Mr. F. W. Payne sent specimens of the Forest Tent Caterpillar from Hall's Glen, Peterboro' Co., Ont.:—"July 17. As I drove along the road 2½ miles from here, I noticed that the maple trees were defoliated to the extent of ⅓ to ⅔ of their foliage, and hundreds of moths were flitting through the branches. The cocoons hung in the maples, by hundreds, one to each leaf with the edges drawn together by a web."

Fig. 6.—Forest Tent Caterpillar.

Tent Caterpillar injuries are also reported from the Annapolis Valley, Nova Scotia, by Mr. S. C. Parker, of Berwick, and Mr. M. G. DeWolfe, of Kentville, N.S.; and in Manitoba Mr. H. W. O. Boger found them unusually abundant at Brandon, attacking currant bushes, roses, choke cherries and the mountain ash.

In British Columbia these insects swarmed on every hedge and also did much harm in orchards.

"Victoria, B.C., April 28.—Tent Caterpillars are hatching and are very numerous.—[R. M. Palmer.]

"Victoria, B.C., May 18.—Tent Caterpillars swarm everywhere, but as usual a large proportion bear the eggs of parasites (*Tachina*). I am sending you a specimen of the Caterpillar with no less than 8 eggs on it; from this you will see the abundance of the parasites."—[E. A. Carew-Gibson.]

The specimens represented in Mr. Carew-Gibson's sending were *Clisiocampa Californica* and *C. Americana*.

"Agassiz, B.C.—We have this year swarms of Forest Tent Caterpillars. The hazel, willow, crab apple, birch and alder in the woods, all seem to be infested."—[Thos. A. Sharpe.]

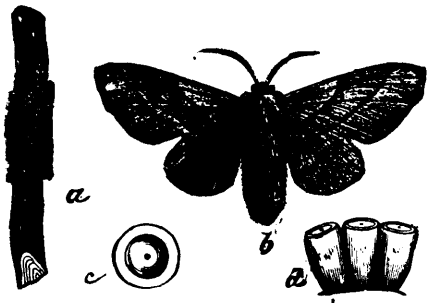


Fig. 7.—Forest Tent Caterpillar; eggs and moth.

Fig. 6 shows the Forest Tent Caterpillar and Fig. 7 the eggs (natural size and enlarged) and female moth of the same. All the Tent Caterpillars resemble each other very much and will be easily recognized from these cuts.

The remedies for Tent Caterpillars of all kinds are hand-picking of the eggs and young colonies and the spraying of the foliage of infested trees before the caterpillars get large enough to do much harm.

CANKER-WORMS (*Anisopteryx*).—Two references only to injury by Canker-worms have been made this season; but I observed while travelling through Nova Scotia in June last the abundant presence of these insects in certain localities. I was much pleased to notice the general adoption of spraying by the leading fruit growers. These caterpillars must be treated while they are young, or the ordinary spraying mixtures are not strong enough to destroy them.

"Grimsby, May 31.—Mr. Laws has handed me a box of apple boughs cut from his father's orchard near Camden, Ont., where the Canker-worm is very bad. He says he has tried Paris green faithfully without effect. The orchard looks as if fire had been through it in summer."—[L. Woolverton.]

"Berwick, N.S.—The Canker-worm still crops up in some sections; an infected district takes a long time and careful work to clear up. I do not know of any serious losses this year from its ravages."—[S. C. Parker.]

SHOT-BORER (*Xyleborus dispar*, Fab.).—This injurious enemy of the apple continues to commit serious depredations in the orchards of Nova Scotia and Prince Edward Island, where it attacks both apple and plum trees. The most extensive injury brought to my notice during the past season occurred at Grand Pré, King's County, N.S., where Mr. George Johnson, the Dominion Statistician, found the beetles working much havoc in his own orchard as well as in those of several of his neighbours. The best remedy for this insect is the wash mentioned by Mr. John S. Woodworth, of Berwick, N. S., in my Report for 1894, viz., washing the trees liable to attack three times,—early and late in June and once in July, with the following: Soft soap, 1 gallon; water, 3 gallons; carbolic acid, ½ pint. This same mixture has been used successfully against the Peach Bark-borer (*Phlœotribus liminaris*, Harris).


Fig. 8.—Shot-borer nat. size & enlarged.


Fig. 9.—Oyster-shell Bark-louse.

OYSTER-SHELL BARK-LOUSE (*Mytilaspis pomorum*, Bouché).—Every year brings numerous complaints of the deadly work of this enemy of the fruit grower, and 1897 has been pre-eminently a scale-insect year, owing to the anxiety about the San José scale having directed a more than usual amount of attention to these inconspicuous but frequently fatal enemies of fruit trees.

The best remedies for all scale-insects which, like the Oyster-shell Bark-louse, have only one brood in the year, is to spray the trees before the buds burst, and again in June when the young are moving, with the Riley-Hubbard kerosene emulsion (1 to 9), or with whale-oil soap, 1 lb. in 2 gallons of water. In addition,—and this is of great importance,—a healthy,

vigorous growth should be induced by manuring liberally, frequent cultivation of the land, and judicious pruning of the trees. On this point Mr. S. C. Parker, the Secretary of the Nova Scotia Fruit Growers' Association, writes:—"I notice in your report for 1896 many complaints from Cape Breton, Prince Edward Island, etc., of the Oyster-shell Bark-louse. I would like to wager a trifle that in four out of five cases these orchards are in grass, perhaps a cow pasture. It is of little use to try to grow trees in Nova Scotia or Prince Edward Island without thorough cultivation and annual application of fertilizers. I have yet to see a healthy tree growing vigorously that will spend any time bothering with bark-lice."

The Apple Maggot (*Trypeta pomonella*, Walsh), referred to in my last report as the cause of considerable injury in Dr. Young's orchard at Adolphustown, Lennox Co., Ont., has apparently not increased during the past season. Dr. Young writes: "September 27.—We have a few of the Apple Maggott in the fruits of the same trees as last year, but not nearly so many as there were then. We ploughed and cultivated the ground last fall, and once in the winter when there was quite a thaw, and then again gave it a deep ploughing in the spring."

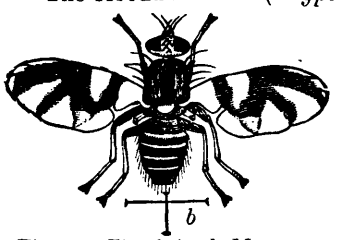


Fig. 10.—Fly of Apple Maggot.

The Apple Maggot is extremely abundant in the state of Vermont close to the borders of the province of Quebec, and Mr. J. T. Macomber, of Grand Island, Vt., writes to me that "it occurs every year and is increasing fast; in some orchards more than 50 per cent of the fruit is ruined. Numbers of the maggots are found in each apple tunnelling all through the pulp and utterly ruining it, except for stock." Fruit growers in the Eastern Townships should be on the lookout for any such injury to apples as is shown on the cut of an infested apple given herewith, or for an insect resembling Fig. 10, which shows the fly enlarged. These flies will be found after midsummer. They are dark in colour, with yellowish head and legs, with clear white bands across the abdomen. They are not very active and may be looked for on the apple trees in late summer and autumn. The remedy which is most relied on is the prompt gathering and destruction of all windfalls before the maggots leave them to go into the ground. This can be done by keeping poultry, pigs, sheep or other stock in the orchard.

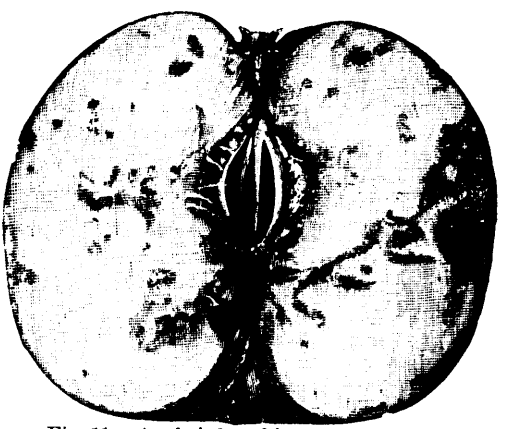


Fig. 11.—Apple infested by Apple Maggot.

The Apple Fruit-miner (*Argyresthia conjugella*, Z.).—Considerable space in my last report was devoted to a new enemy of the apple which in British Columbia caused last year great anxiety from the extent and serious nature of its injuries, which closely resemble those of the Apple Maggot. Last spring the perfect insect was successfully reared both

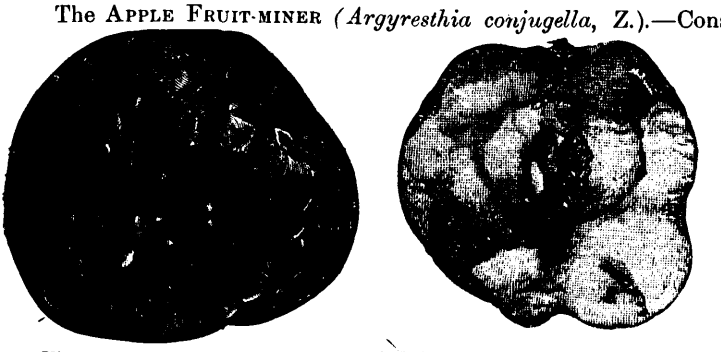


Fig. 12.—Apple injured by Apple-fruit Miner, and the same cut open.

by Mr. E. A. Carew-Gibson, in Victoria, B.C., and by myself at Ottawa. It proved to be a beautiful little Tineid moth belonging to the genus *Argyresthia*. One of the specimens was sent to Lord Walsingham, of Thetford, England, a high authority on Microlepidoptera, who reports as follows :—

"Merton Hall, Thetford, England, Dec. 13, 1897.—The moth which you have submitted for determination is *Argyresthia conjugella*, Z., which in Europe feeds in the fruit of *Pirus Aucuparia*, but has not been recorded, so far as we know, from *Pirus Malus*. Lord Walsingham has a worn specimen from Esquimalt, Vancouver Island, and he is inclined to think that his identification of the allied species *mendica*, Hw. (*Insect Life, III*, 118), as occurring at Washington, may have been erroneous, as the specimen was evidently not in good condition, and he would suggest that search should be made for the larvæ there and elsewhere."—[Jno. Hartley Durrant, Ent. Asst. to Lord Walsingham.]

The moth is a slender insect measuring $\frac{3}{8}$ inch across the expanded wings. Upper wings silvery gray, mottled with darker patches. Along the inner margin, from the base to the middle of the wing, is a broad silvery band of white ending abruptly on the inner margin but in a spur running backwards at the outer angle of the band. This is followed by a conspicuous black patch, which, widest at the inner margin, runs diagonally backwards across the wing ; next to this is an elongated triangular white patch mottled with brown, having the base on the inner margin of the wing and the apex elongated and directed backwards toward the tip of the wing, which terminates with an eye-like spot somewhat like a peacock's feather. The dark gray lower wings are heavily fringed all round with long silky gray hairs, as also is the lower apical margin of the upper wings. The frontal tuft and the thorax are of the same silvery white as the broad bands on the upper wings, which come together when the wings are closed and, joining with the thorax, form a continuous white dorsal stripe from the front to half way down the wings, where it is cut off by the dark bands which cross the wings diagonally. The two white triangular patches also come together when the wings are closed, forming a crescent-shaped saddle toward the tip of the wings. When at rest the posterior end of the body is raised up at an angle of 45 degrees and the insect is supported on four legs very widely separated. At such times the moth bears very little resemblance to an insect and may certainly be easily overlooked.

Mr. Carew-Gibson was the first to breed this moth ; one of his specimens which he kindly forwarded to me, emerged from the cocoon on May 20, and another a few days later. The single pair which I bred at Ottawa from apples collected at Agassiz, B.C., by Dr. William Saunders, emerged on June 2 and 3, the cocoon having been taken out of the cellar May 24. Although they were male and female, I failed to get them to pair ; thus no studies could be made of the eggs and the mode of oviposition. There has been little complaint of injury by the Apple Fruit-miner during the past season. Mr. R. M. Palmer, in a valuable report on the insect injuries of the year in British Columbia, with which he has favoured me, says :—"The Apple Fruit miner, as I expected, has been very little noticed this season, although I occasionally see specimens of apples injured by it ; so, it has not quite disappeared. The apple crop of the province this year has been an exceptionally good one, and the fruit better coloured and freer from scab than for many years past. The practice of spraying is now pretty general, and the season has also been favourable."

PLANT-LICE (*Aphididæ*) of all kinds and upon almost every crop cultivated have been particularly abundant during the past season in all parts of Canada except British Columbia, where, strangely enough as this province in most years suffers severely from them, there were less than usual :—

"Victoria, October 4.—Aphides of all kinds have been less numerous this summer than any year since I have been in the province. *Aphis brassicæ*, however, was an exception and was very troublesome on the islands."—[R. M. Palmer.]

"Yarmouth, N.S., November 30.—The excessive rains of April, May and the first half of June during which there was a precipitation of 18·8 inches were not propitious to insect life, except that we were visited by unprecedented swarms of Aphides that

covered all the young growth of fruit trees and were most destructive to the fruit crop. In some varieties of apples, the Gravenstein suffering most, the crop was utterly ruined, and in all it was greatly diminished. Young trees in the nursery were destroyed, or the growth for the year stopped."—[Charles E. Brown.]

"Sussex, King's Co., N.B., November 19.—On young apple trees the green aphis was in very large numbers, always with the attendant ants."—[W. W. Hubbard.]

Mr. Martin Burrell, of St. Catharines, Ont., has favoured me with the following useful observations on some Plant-lice of the orchard made by him during the past season :—

"As far as fruit-growing is concerned the different species of Plant-lice have been by far the most serious pests we have had this season. I do not recall such a scourge for many years. Every kind of fruit tree was affected, and even the weeds did not escape.

"The principal damage has been done by the Cherry Aphis (*Myzus cerasi*, Fab.), whose attacks on the sweet cherry of this peninsula were simply disastrous. I do not think I should be overshooting the mark if I said that half the crop was ruined. I saw many cases where not only the foliage was covered but even the fruit, and especially the stalks, with lice. The application of kerosene emulsion is such a "messy" business and the pressure of other work is so great at that season of the year that the pest is rarely checked on its first appearance. We shall have to din it thoroughly into our heads that the stamping out of the early generations of both the black and green aphis is the most important work of the day. The green species did an enormous amount of harm, not only to the growing shoots of young plum and pear trees, but to the foliage of the fruiting trees, thereby impairing both the size and flavour of the fruit and further depressing already congested markets by dumping on them large quantities of half-coloured, insipid and worthless plums. It is, of course, well known that the black species of lice are more resistant to insecticides than the green. I find that the kerosene emulsion should be diluted with only 6 or 7 times the quantity of water to be effective against *Myzus cerasi*, while 1 to 12 or 14 is all right for the green forms.

"Tobacco water should be on the strong side too. I did not find 1 pound to 6 gallons thoroughly effective. A closer proportion would, I think, be advisable, and the tobacco should be boiled thoroughly. The lady-birds did good work this year among the lice, as might be expected, especially *Coccinella 9-notata*, Hbst., and *Anatis 15-punctata*, Oliv. *Myzus cerasi*, which usually keeps pretty much to the sweet cherries, appeared in my orchard of Early Richmond cherries toward the end of June, and by July 1st was increasing very rapidly. During this time the larvæ of *Anatis 15-punctata* were doing good work on the lice. By July 4th most of the larvæ had pupated. The pupal period was only from 4 to 6 days, and by July 10th any quantities of the beetles could be seen, the predominant colour being a creamy white or even lavender, with the characteristic markings. The lice by this time had decidedly lessened in numbers and I felt that I could leave them safely in the hands of our coccinellid friends."—[Martin Burrell.]

The Plum Aphis (*Aphis prunifolii*, Fitch) has been unusually abundant in many parts of the Dominion, being the Plant-louse most often inquired about in correspondence. Reports of Plant-lice on plum from Manitoba, the North-west Territories and British Columbia probably referred to a different species, *Hyalopterus pruni*, Fab., which is also stated by Prof. C. P. Gillette in the Proceedings of the Ninth Annual Meeting of the Association of Economic Entomologists to have been particularly wide-spread and very injurious to plum trees in Colorado during the past summer."

"Woodville, Lot 2, P.E.I., June 10.—I send you specimens of an insect that has over-run our orchards of plums and Damsons. They cause the leaves to curl, dry up and die in a short time. Please let me know what they are and how to get rid of them."—[Michael McGrath.]

The specimens sent with this letter were *Aphis prunifolii*, Fitch.

"Nappan, Cumberland Co., N.S., July 8.—I send you specimens of *Aphis prunifolii*. These are a terrible pest on our plum trees. The kerosene emulsion is a sure cure if it

strikes the insect, but it seems almost impossible to get at the Plant-lice when they are on the underside of the leaves."—[W. S. Blair.]

Several specimens were also sent from different localities in Ontario. Mr. A. W. Donaldson found them very troublesome at Shakespeare, Oxford Co., Ont.

"Leamington, Essex Co., Ont., Nov. 24.—The most troublesome insects we had to contend with this season were Aphids on the plum and cherry trees. They were especially bad on the plum. I have never before seen them so numerous. They came in such numbers that we could do nothing with them. I sprayed, but after the leaves had curled it was hard to get at the insects. I had to make the emulsion as strong as we dared to use it; otherwise it would not kill them."—[W. W. Hilborn.]

Remedies.—Many of my correspondents, while acknowledging the efficacy of kerosene emulsion as a remedy fatal to all Plant-lice, at the same time dislike using it on account of its odour and destructive effect on India-rubber hoses. Recent experiments have shown that good work can be done with some of the other washes usually recommended. Mr. R. M. Palmer, who has had a great deal of experience in treating the Apple Plant-louse and other species in British Columbia speaks very strongly in favour of the following tobacco and soap wash: "Soak 4 pounds waste tobacco in 9 gallons hot water for 4 or 5 hours (or in the same quantity of cold water for 4 or 5 days); dissolve 1 pound whale-oil soap in one gallon hot water; strain the tobacco decoction in the dissolved soap, and apply the mixture to affected trees with a spray pump, using a fine nozzle and all the force possible."

Prof. Gillette, when speaking of the attack on plums in Colorado by Plant-lice, says:—"In our experiments whale-oil soap, in the proportion of 1 pound to 8 gallons of water has been more effectual than the ordinary kerosene emulsion in destroying the lice. The powdery excretion upon the surface of these lice interferes greatly with any successful treatment unless the application be made with much force."

THE BRONZE APPLE-TREE WEEVIL (*Magdalis œnescens*, Lec.).—Complaints have been received from time to time of injury from this weevil, the larvæ of which infest the bark of apple trees in British Columbia. Last summer a new attack was observed by Rev. G. W. Taylor on Gabriola Island, B.C., when the perfect beetles swarmed in myriads on cherry trees and devoured the foliage.

THE WESTERN STRAWBERRY CROWN-BORER (*Tyloderma foveolatum*, Say).—Specimens of this British Columbian beetle were received from Vancouver Island last summer. References have been made occasionally to injuries to the strawberry plant in British Columbia by a crown-borer. As I had never found nor received from that province specimens of the ordinary Srawberry Crown-borer I was very anxious to secure specimens of this western pest, for identification. In June last I was pleased to receive specimens of the mature beetle, from Messrs. E. A. Carew-Gibson and R. M. Palmer of Victoria. These proved to be *Tyloderma foveolatum*, Say, which had not been previously recorded as a pest of cultivated crops. Mr. Carew Gibson writes "I am sending you some weevils from a strawberry patch which they have completely wiped out this spring;" and Mr. Palmer writes on the same subject—"Thank you for the name of the strawberry weevil; the specimens were sent to me from Cowichan, where they had entirely ruined a small strawberry bed."

THE CURRANT MAGGOT, Currant Fly (*Epochra Canadensis*, Lœw.).—Another question which has been settled during the past summer, is the indentity of an insect which does an enormous amount of injury to Black Currants in British Columbia, the fruit being rendered quite unfit for use owing to the large numbers of maggots which infest it. I have for years endeavoured in vain to get specimens of the fly or infested fruit so as to breed the fly. I am now under obligation to Mr. Carew-Gibson, for an opportunity to examine some flies bred by him from these maggots.

"Victoria, May 21.—I am sending you some specimens of the flies hatched from my currant fruit worms, i.e., the insect which lives in the larval stage inside the fruit of the currant. Is this *Epochra Canadensis?* The flies hatched out yesterdy (May 20), and I now recognize them as a very common fly here at certain times." The flies received were well marked examples of *Epochra Canadensis*, Lœw., an insect which

notwithstanding its name *Canadensis*, I had never before seen in Canada, nor have I heard of its injuries in any other part of the Dominion than British Columbia.

In a very complete monograph upon this insect, published in 1896, by Prof. F. L. Harvey, of Maine, full details are given of the life history and habits. With the exception of British Columbia, this insect is certainly nowhere common in Canada, although like the Apple Maggot it is abundant in some seasons in the State of Maine close to our borders.

THE NATIVE CURRANT SAW-FLY. (*Gymnonychus appendiculatus*, Hartig).—This insect which was formerly called *Pristiphora grossulariæ*, Walsh, is by no means common in Canada, but last spring the larvæ did considerable damage on Vancouver Island. The Rev. G. W. Taylor wrote from Gabriola Island, B.C., on July 29 last:—"The saw-flies of the gooseberry and currant appeared early this season and practically spoiled the bushes for the year. A second brood appeared at the middle of June, but the larvæ were much less numerous." Several specimens of the mature insects were bred by Mr. Taylor and forwarded for examination. These were submitted to Mr. W. H. Harrington, who has made a special study of this class of insects and he has kindly provided me with the following report upon them:—

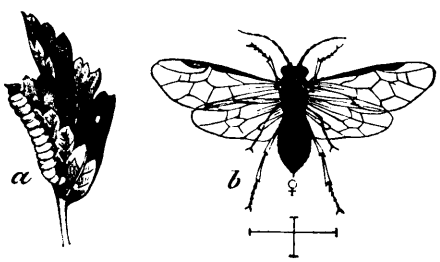


Fig. 13—The Native Currant Saw-fly—larva and adult.

"*Gymnonychus appendiculatus*, Hartig.—I have made a careful examination of the sawflies received by you from Rev. G. W. Taylor, and find them to be *Gymnonychus appendiculatus*, Hartig. On my first examination the insects were referred to the genus Pristiphora, and seemed to answer very closely to Norton's description of his *P. relativa*, the type of which was from Great Slave Lake, collected by R. Kennicott. On reference to Cameron (*Brit. Phytophagous Hymenoptera*, II., p. 66) the description of *Nematus appendiculatus* was found to apply very closely to the Vancouver Island specimens, and a microscopical examination of the claws shows that the species belongs to the new genus *Gymnonychus* erected by Marlatt (*Nematinæ of N. A.*, p. 122) for those species of Pristiphora having the claws entirely untoothed (*gumnos* = naked, and *onux* = a claw). The species, therefore, is now named as above cited and is the currant saw-fly named by Walsh as *P. grossulariæ*, and treated of under that name by Walsh, Packard, Glover, Riley, Saunders and other writers (see Marlatt, *loc. cit.*). Norton's *P. relativa* may possibly be identical.—[W. H. Harrington.]

THE SAN JOSÉ SCALE

(*Aspidiotus perniciosus*, Comstock).

"Well, how about this San José Scale we hear so much about?" is a trite question which has been very frequently put to the Entomologist during the past season.

Early in the present year undoubted specimens of the San José Scale were received for examination from orchards near Chatham, Kent Co., and from near Niagara, Lincoln Co., in western Ontario.

In 1894, in anticipation of the spread of this most injurious pest of the orchard from infested States to the south of us, and so that our fruit growers might be warned beforehand, articles were prepared and published in the report of this Division, the *Annual Report of the Entomological Society of Ontario* for the same year, and the *Farmers' Advocate* of London, Ont., an influential agricultural journal with an extensive

circulation. In these articles will be found a full account of the life history and development of the insect, characters by which it may be recognized, and what were at that time thought to be the best means of fighting against it. Ever since it became known certainly that this scourge had effected a footing in our orchards, great anxiety has been shown by fruit growers in all parts of the Dominion, to obtain reliable information about it. Numerous specimens of various kinds of insects, fungi, corky excretions on the bark, etc., have been sent in for examination. The importance of every one concerned being enabled to recognize this pest as soon as possible, so that prompt action might be taken to control it, suggested the advisability of issuing last summer a large wall poster which could be put up in conspicuous places such as post offices, railway stations, newspaper offices and public halls throughout the district, where the scale was likely to occur.

This poster (2 ft. 3 in. by 1 ft. 8 in.) was got up much in the same form as a similar poster issued by Prof. Webster, the State Entomologist of Ohio, on the same subject and gave the excellent illustrations prepared by direction of Dr. Howard, the United States Entomologist, showing an infested pear and a piece of a branch, also enlarged figures of the female insect and her scale. The object of this poster was to warn fruit growers that the scale was already in Canada and that if it were allowed to spread great loss would certainly result. The best way to recognize the pest was given, with advice as to the course to pursue, should it be discovered in an orchard.

Fig. 14—Branch infested by San José Scale.

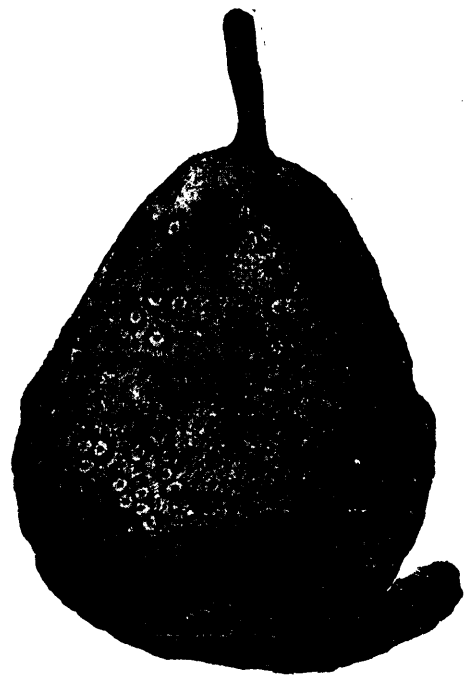


Fig. 15.—Pear infested by San José Scale.

A great deal has been written concerning the San José Scale since its unfortunate introduction into the East, and its detection as a serious enemy of fruits by Dr. Howard in August, 1893. This scale has been treated of at considerable length in previous reports of this division, and numerous articles in government publications are accessible to any one who wishes to inform himself on the subject.

For the purposes of this report, it seems more useful to give a concise account of the insect, its appearance, so that it may be recognized, its life history, occurrence in

Canada, and the most approved remedies so far tried; also to answer briefly some of the pertinent questions frequently asked by correspondents and others concerning it.

What is the San José Scale?—It is a very small (the largest specimens, not more than $\frac{1}{8}$-inch in diameter) round, flattened and inconspicuous scale-insect; that is, like the well known Oyster-shell Bark-louse and the Scurfy Bark-louse, a sucking insect covered by a waxy scale, which, as we find it on trees, is the only part visible, except in the early larval stage, when scale insects for a few days have the power of walking.

What it is not.—From the many different kinds of insects which have been sent in, it seems advisable to state that the San José Scale is not an easily seen insect resembling a beetle, a grub or a spider, nor has it well-developed wings and legs, but it is a minute creature which can only be detected by the closest examination, and even then requires some skill and experience to recognize it as an insect.

Among the objects which have been received under the supposition that they might be the San José Scale, were many things which in no way resembled scale-insects; but some, such as the small corky excrescences known as lenticels, which are found upon the young bark of some trees—apples, pears, birch, walnut, &c.—and certain minute fungi which are found on dead wood, do bear some resemblances to scale insects. Their different nature, however, may generally be easily detected by the fact that they cannot be detached from the bark without tearing the tissues, whereas all scale insects may be removed easily from the surface of plants by a gentle pressure.

How to know it.—The general appearance of the bark of infested trees is dirty, scurfy and grayish in colour, as though dusted with ashes. The scales usually are found in enormous numbers, frequently overlapping or occurring altogether on the top of other scales; they may be found throughout the summer of all sizes from the newly hatched mite-like larvæ to the fullgrown insects. In severe cases of infestation this massing of the scales produces a scurfy, dirty appearance of the bark, which when once seen is easily recognized. On young twigs, fruit and leaves, there is usually a well defined purplish ring surrounding each scale which is sometimes useful for detecting its presence when the scale itself might be overlooked; and although this purpling effect is produced by a few other scales, such as the Putnam Scale (*A. ancylus*, Put.) and the Forbes or Cherry Scale (*A. Forbesi*, Jnsn), it is particularly characteristic of the San José Scale, and even upon large branches, although invisible at the surface, may be found by cutting away some of the outer bark.

The scales of the males and females differ somewhat in shape.

Female :—Scale very thin, almost circular in outline, much flattened; size ranging from $\frac{1}{20}$ to $\frac{1}{8}$ of an inch in diameter; white at first, becoming grayish or blackish, particularly in the centre, and later much blackened by the fungus *Fumago salicina*, so common on trees attacked by many kinds of bark-lice and plant-lice. In the centre of the scale there is a small dark, or when the insect is dead or rubbed, yellow, nipple-like elevation surrounded by a distinct circular depression, which, as pointed out by Prof. Webster, is one of the best distinguishing marks between this scale and some closely allied species.

Fig. 16.—San José Scales, male and female—enlarged 6 diameters.

Male :—Scale about half the size of that of the female, rounded-oblong, with the nipple-like elevation plainly nearer to one end than the middle.

The drawing herewith shown was made by Dr. C. E. Saunders from a group of scales found upon a plum on 25th of July last. They are all, therefore, of the first brood of the season, although certainly some of them were born later than others. The first young of the year were reported from Niagara on 1st of July, so that the largest specimens would be about three weeks old. This was by Mr. Charles Thonger, a careful observer. Male insects almost ready to emerge from their scales, were found among the scales shown in the figure.

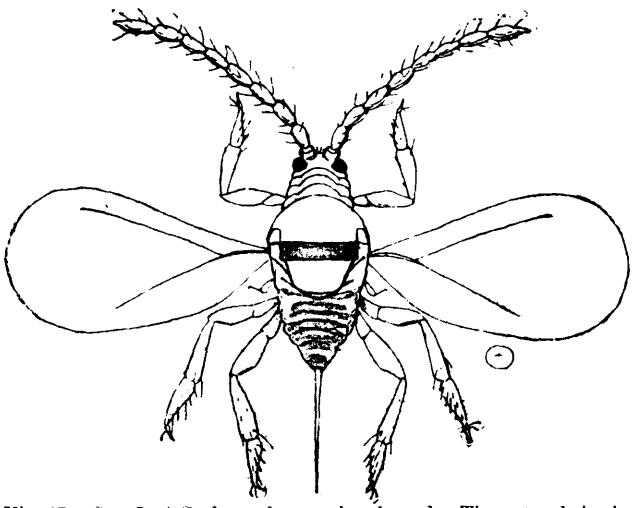


Fig. 17.—San José Scale, male—much enlarged. The natural size is shown by the line in the circle below the right wing.

Life History.—The winter is passed by the partially grown insects beneath their scales. With the return of warm weather the next spring, growth is resumed, and the males reach maturity a few days before the females. They are extremely small two-winged flies (Fig. 17) and when examined under a magnifying glass are found to have orange yellow bodies, iridescent dusky wings and black eyes. These minute creatures have no mouths, so can take no food; consequently after having fertilized the females they very soon die. The date when the females become full-grown and begin to produce young varies with locality and climate. In Arizona the young larvæ are recorded as appearing in March. At Washington it is by the middle of May; in New Jersey during the last days of May; in the state of New York, early in June. At Amherst, Mass., they were first noticed 12th June, and, as far as I can learn, in our Niagara district between the middle of June and 1st of July. Most careful observations have been made under direction of the United States Entomologist, by Mr. Theo. Pergande. The following condensed life-history is compiled chiefly from *United States Division of Entomology, Bulletin No. 3, N.S.*, in which Mr. Pergande's observations are recorded.

The adult female gives birth to living young, instead of laying eggs like most other scale insects. Ordinarily, as with the Oyster-shell Bark-louse, eggs laid beneath the scales, in the course of a longer or shorter time, hatch, and the young larvæ migrate to different parts of the plant; but in the case of the San José Scale living young are produced day and night for a period of nearly six weeks before the exhausted female perishes, and this at the rate of about nine or ten every twenty-four hours. After birth, the young larva remains motionless for a short time beneath the scale of the mother, it then forces its way out and runs over the plant, seeking a suitable place to settle. It is a microscopic creature, pale orange in colour with an oval body, six legs and two feelers. The long thread-like proboscis, with which it sucks the sap of the plant, is doubled on itself and lies in a groove of the body wall. After crawling about for a few hours, the larva settles down and works its bristle-like sucking tube through the bark and remains fixed, if it be a female, for life, and if a male, until fully developed, when it will have a few hours more active life, during which it can fly about.

The development of the scale begins even before the larva becomes fixed. The secretion of the scale starts in the form of very minute white waxy filaments, which spring from all parts of the body and rapidly become more numerous until, within two days, the insect is entirely concealed by a whitish shell or scale, which has a prominent central nipple. The scale is formed by the matting and melting together of the waxy filaments. As in the development of most insects, there are also with these scale-insects distinct periods of the larval life, divided by moults of the skin, and, in the case of the males, marked by important structural changes. The first moult takes place when the larva is twelve days old. Up to this time, the male and female scales are exactly similar in size, colour and shape; but after the moult the insects beneath the scales bear no resemblance to each other; the males are larger than the females and have large purple eyes; while the females have lost their eyes entirely. The legs and feelers have disappeared in both sexes. Eighteen days after birth the second moult occurs and the males change to the first pupal condition (pro-pupa). The male scales now assume an

elongated shape. The legs and feelers have appeared again, and there are now prominent wing pads extending along the sides of the body. About twenty days after birth the male insect changes to the true pupa, in which all the parts shown in the pro-pupa are much more developed, and a slender organ at the end of the body called the style has appeared. From four to six days later, or from twenty-four to twenty-six days after birth, the males mature and emerge by backing out from the rear ends of their scales; this is chiefly by night or in the evening.

The changes which have gone on beneath the female scale are less striking than those described above. After the first moult the body of the female is practically an almost circular, flattened sac, with indistinct segmentation and without any visible organs, except the long sucking bristle with which it draws up continuously the sap of the tree it is infesting. The female moults a second time about 20 days after birth, and the last segment now shows the important characters of the mature female, which are of so much service in the exact identification of the species. The segmentation of the body at this stage is quite distinct.

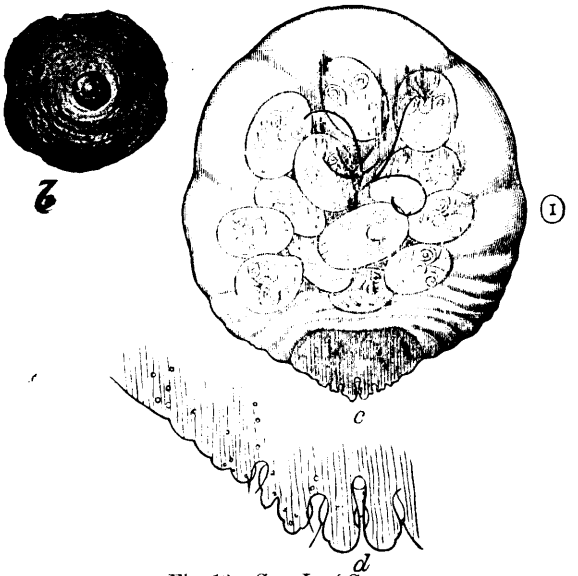


Fig. 18.—San José Scale.
(*b.*) Scale much enlarged. (*c.*) Female showing young, much enlarged. (*d.*) Anal lobes of female.

Thirty days from birth the females are full grown and the embryonic young may be seen within their bodies. The mature female, prior to the development of the young, is $\frac{1}{30}$ of an inch wide by $\frac{1}{25}$ of an inch long. The length of time necessary for the development of a generation varies somewhat; according to the Washington observations, it covers a period of from 33 to 40 days from the time a young larva appears until it develops into a mature female bearing young. The San José Scale is enormously prolific. It has been calculated that a single female may be the progenitor of 3,216 million descendants in a single season.

The exact identification of the species is of the greatest importance, for the San José Scale is now known to have many very bad characteristics not possessed by several other scales which resemble it very closely in appearance; and these make it a matter of public interest that no effort should be spared to control so dangerous a public enemy whenever it is detected in a new locality. The chief differences, in this connection, between the San José and some of these other scales are: (1) the fatal effects on the tree due to its greater rapidity of increase, and (2) certain minute but important structural characters which can be seen only with the help of a microscope.

The careful experiments at Washington, already alluded to, show that in one season from a single female an increase of 3,216 millions is possible. It is not, of course, to be expected that all of these would survive; but with the San José Scale there are many circumstances which make it less liable to diminution than many other insects. As a matter of fact, it is known that this scale does not spread from a new point of infestation with very great rapidity to contiguous trees, and also that, when once established upon a tree, it soon increases enormously in numbers—indeed, unless checked, usually spreading rapidly over the whole tree and destroying it. This rapid increase is characteristic of the species and is due, of course, to the great fecundity of the females. The fact that they bring forth their young alive throughout the season and that these are very quickly protected by a scale which is impervious to many liquids, affects very

seriously the question of remedies, making it necessary to apply several successive treatments, if it is hoped to thoroughly free a plant infested by this enemy so difficult to conquer.

The mere fact of a scale-insect occurring, even in vast numbers, upon a given plant does not necessarily prove that the species is a dangerous enemy to that kind of plant; for, although it may possibly be so and should be regarded with suspicion, this habit of occurring in great numbers on isolated trees, but on no others surrounding these, has frequently been noticed with scale-insects, and is probably due to some lack of vigour in the individual tree. In the case of the San José Scale, on the other hand, if other trees are reasonably near, it is almost certain that they will soon become infested; and, when a severe case of infestation is found, one of the first things looked for when considering whether the pest is actually the San José Scale or one of the other species which superficially resemble it very closely, is, whether surrounding trees are also infested.

This important difference of habit in spreading and the much more fatal effects upon trees from the presence of the San José Scale, make much more stringent measures necessary to secure its eradication than with many other species, even frequently rendering it advisable or imperative to destroy many trees, if not whole orchards. This being the case, the very great advantage is obvious of being perfectly sure as to the identity of an infesting scale-insect before valuable trees are condemned to destruction.

Unfortunately, as stated, there are several species of scale-insects which bear a very close superficial resemblance to the much to be dreaded San José Scale. On this point, which has been referred to by many entomologists, Mr. T. D. A Cockerell, a high authority, may be cited: "It has been a matter for dispute whether the San José Scale can be certainly recognized in the field. Its effect on the tree, killing the branches, is characteristic, but hardly in any sense diagnostic, while the reddening of the tissues of the plant adjacent to the scale is sometimes well marked with *A. ancylus*, as well as with *perniciosus*. A little experience, however, enables one to recognize the ashy gray, generally thickly massed scales of *perniciosus*, with the dot and ring of the male scale, as against the dark scale and contrasting reddish orange exuviæ of *ancylus*, or the similar scales of *ostreæformis* and *Forbesi*. At the same time, it is to be recommended that the diagnosis made in the field be in every case confirmed by examination of the insect under the compound microscope if either locality or plant is new." (*Technical Series, Bull. 6, U. S. Div. of Ent., 1897.*)

The above is from a valuable pamphlet prepared under Dr. Howard's direction for the special purpose of helping students to distinguish between these different scale-insects. Prof. F. M. Webster says: "I know of no insect the detection of which has given expert entomologists more trouble than this one. Its extreme minuteness, its close resemblance to the other species less harmful, and the frequency with which it is found concealed in cavities and about the wrinkles of the bark or under buds, render its detection, when present in limited numbers, a matter of extreme difficulty." (*Ohio Bulletin 81*, p. 183.)

For the exact separation of these closely allied species it is necessary to take the females from beneath the scales and examine them under a microscope after special preparation. The differences are then readily seen, but these are beyond the power of ordinary pocket lenses or magnifying glasses, and require compound microscopes, which are expensive instruments not in the hands of ordinary fruit growers, and for the use of which special knowledge is needed.

As, therefore, there are several kinds of scale-insects resembling each other so closely at first sight as to make it necessary for even expert entomologists to examine them with a microscope before being positive as to the identity, and as one of these, to wit the San José Scale, is extremely injurious and the others not nearly so much so, we invite all fruit growers to send for examination and report specimens of any suspicious scale-insects which they may find upon their trees before they adopt extreme measures or even decide upon what measures they will take to free their orchards. Not only does the San José Scale spread more rapidly than many other species, but it has been found much more resistant than others, to the ordinary applications used for scale-insects.

Food Plants.—The list of plants upon which the San José Scale has been found as a serious enemy is a very large one and may almost be said to include all deciduous trees and shrubs, and it has also been found in Maryland by Prof. W. G. Johnson, upon such unlikely plants as milk-weed (*Asclepias*) and crabgrass (*Panicum*). It is particularly noted, however, that the San José Scale does not attack Conifers—pines, spruces, cedars, &c.—and has not so far infested injuriously any of the citrus fruits, such as oranges, lemons, &c., although it has been found on these trees, and in the case of one species *Citrus trifoliata* was found in large numbers in New Jersey by Prof. J. B. Smith.

The botanical order to which most of the food plants belong is the Rose family. So far, I have seen specimens of this scale in Canada, upon the following trees: pear, plum, peach, black currant, apricot, apple, Russian mulberry and Japanese walnut.

So far as we know, the Forbes Scale has similar food habits, but Prof. Cockerell says that *A. ancylus*, the Putnam Scale, differs somewhat. This last is especially a maple species but will flourish on poplar, oak, etc. It does not seem to take very kindly to fruit trees as a general rule. It also does well (probably best) in the Transition faunal zone, whereas the San José Scale belongs to the more southerly Upper Austral. In Canada both the Putnam Scale and the Forbes Scale have been found on plum, pear, apple and cherry trees.

"The manner of attack is different, more or less, in the various species under discussion. *A. ancylus*, on fruit trees, will be found upon the smaller branches, but in my experience more or less scattered, rarely in any great quantity. *A. perniciosus* is found largely upon the branches, becoming very abundant, covering and killing them. On the young shoots the reddening effect is very marked, though *ancylus* will also produce reddening. *A. Forbesi*, as seen on apple trees in Mesilla (N. Mex.), occurs largely under loose bark on the trunk, wintering there in numbers, and only invades the branches in limited quantity. Thus there may be quite a lot of *Forbesi* on a tree without its being noticed."—(T. D. A. Cockerell, *Technical Series, Bull. 6, U.S. Div. of Ent., 1897.)*

"At first glance it is not easy to distinguish this species (*A. Forbesi*, the Forbes Scale), popularly known as the Cherry Scale, from the San José Scale. The purplish tinge of the bark is also quite conspicuous on some varieties of apple and pear where the Cherry Scale has established itself. The general appearance of the last segment of the female very closely resembles that of the San José Scale; but it can readily be distinguished from that species by the presence of spinnerets."—(Willis G. Johnson, *Proc. 9th Ann. Meeting, Ass'n Econ. Ent., 1897.*)

Means of Distribution.—It is thought probable that most scale-insects are distributed while in the minute larval form, chiefly by means of larger insects and of birds. Since the San José Scale has been so critically studied, this has been actually proved to be the case with that species, the young larvæ having been frequently observed crawling upon lady-bird beetles of several kinds, ants, and other insects which resort to the trees during the breeding season. Isolated colonies of scale-insects in the tops of otherwise uninfested trees and in close vicinity to the nests of small birds have doubtless originated in this way. It is stated that the larvæ are also carried by the wind; this seems difficult to understand, but has been proved by Mr. W. G. Johnson in Maryland. This insect may also undoubtedly be distributed by means of farm implements, domestic animals and workmen attending to orchards.

Much has been said about the danger of distributing the San José Scale through the sale of infested fruit; but, after considering the matter very carefully, I must still differ in opinion from many good entomologists who think that there is great danger from this cause. Fruit badly infested by the scale is generally disfigured too much to be marketed, and upon fruit which is not sufficiently injured to be condemned for the market the chances of the scale-insects surviving a long journey after the fruit is removed from the tree, packed and shipped, and then of its being peeled and the peelings thrown out in an orchard or near enough to a tree for the young larvæ to infest it, are so slight that I cannot even see the necessity of considering this danger. Further, I have failed to hear of a single instance where infestation could be attributed to such a cause, but it would, of course, be well, should any one detect the scale upon imported fruit, to be careful to burn all peelings and not throw them out in a yard or garden

where, in the event of any of the insects being alive and breeding, the young might be carried on to surrounding trees by flies or other insects attracted to the peelings during the short time that they were still moist.

Fatal effects of Infestation.—It has been noted by all observers that plants attacked by the San José Scale die with greater rapidity than from the attacks of other insects. "In the whole category of injurious insects we have not another one that is so difficult to detect, so pernicious in its effects and which breeds so rapidly as the San José Scale." —[F. M. Webster, Wooster, Ohio.]

"If the tree survives the attack, the infested wood becomes knotty and irregular, partly from the sapping of the juices by the insect and also without doubt largely from the poisoning of the sap of the cambium layer by the punctures of the insect, as indicated by the coloration. Young peach trees will ordinarily survive the scale only two of three years. Pears are sometimes killed outright, but generally maintain a feeble, sickly, existence, making little or no growth for a somewhat longer period."—(Howard & Marlatt, *Bull. 3.*)

Whether from the fact that the climate of Canada is not so well suited to the rapid increase of this scale as the warmer regions to the south of us, or from some other cause, it would appear to take a longer time in Canada for the San José Scale to produce fatal effects upon infested trees than stated above, and I only mention this as it has been several times referred to by correspondents when discussing whether or not the scale insect which has been found in Canadian orchards is really the San José Scale. Unfortunately, there is not the slightest doubt about this, and disastrous results have already attended its presence in Canadian orchards. To the credit of those fruit growers on whose grounds this scourge has been detected, it may be said that they have endeavoured to stamp out the occurrence promptly, sometimes at what seemed to those who did not understand the gravity of the case, to be a considerable and unnecessary sacrifice. The danger of heavy pecuniary losses in the various kinds of fruit trees, as well as in shade trees and ornamental shrubs, should the San José Scale be allowed to spread in Canada, must not be lost sight of, as there is hardly a deciduous shrub or tree which it will not infest. Now is the time to put forth great efforts to eradicate the pest wherever it may be found. The Federal Government and the Provincial Governments of Ontario and British Columbia are using every effort to learn of any occurrences in the country, and fruit growers will be suicidally foolish if they adopt the narrow-minded policy of trying to hide the fact if they have been so unfortunate as to accidentally introduce the pest into their orchards. A single tree neglected may be the means of infesting a whole orchard, from which the trees in every other orchard, garden, public park or cemetery in the neighbourhood may suffer irreparable injury.

Occurence in Canada.—The San José Scale is now known to occur in injurious numbers in a few Canadian orchards. These are situated in the fertile peach districts of the province of Ontario. The most western points in Ontario where infested orchards have been found are near Kingsville, Essex County, and Chatham, Kent County; others occur in the neighbourhood of Niagara and St. Catharines, probably the orchard worst infested being actually within the limits of the last named town.

In British Columbia there have been four distinct occurrences, all of which have been promptly eradicated through the energy of the active Inspector of Fruit Pests, Mr. R. M. Palmer, who saw that every infested tree and those immediately surrounding them were cut down and burnt as soon as the scale was detected. The localities where the San José Scale was found were at Kelowna, on the shore of Okanagan Lake, in 1894, at Victoria in 1896, and at Salt Spring Island and Nanaimo, on Vancouver Island, during the past summer.

The first occurrence of the San José Scale in Ontario, as far as I can learn, was on the grounds of Mr. John Van Horn, of Chatham, Ontario. This gentleman has made every effort to eradicate the pest and has kindly kept me posted during the season on the progress he was making against the scale. I have been similarly favoured with regard to the Niagara outbreaks by Mr. Charles Thonger, of Niagara, a practical and successful fruit grower and an accurate observer, moreover, possessed of the most remarkable eyesight for detecting San José Scale or any other injurious insect; also by

Mr. Martin Burrell, of St. Catharines, a trained observer and a practical fruit grower, who has studied injurious insects for many years, one, therefore, who was well calculated to observe and record any matters of value bearing upon the presence and increase of the San José Scale and the general condition of any orchards visited. All of these gentlemen, as well as Mr. M. G. Bruner, of Olinda, Essex Co., Ontario, who has observed carefully since its discovery the occurrence of the San José Scale in the orchard of Mr. John D. Wigle, at Kingsville, have favoured me with voluminous notes upon this important subject during the summer, and, as their experience and notes, both as to means by which orchards have become infested and the effect of measures adopted to control the spread of the San José Scale, are of general interest, I give herewith lengthy extracts from their letters.

Mr. Van Horn's letters:

"Chatham, Kent County, Ont., Jan. 12, 1897.—I have, unfortunately, got San José Scale on a lot of fine young plum trees. I am preparing to dose them with the California mixture mentioned in your report of 1894."

"Jan. 19.—I send you cuttings of Simoni plum and Lombard plum covered with what I think is San José Scale. Kindly give me all information at hand."

"Feb. 11.—Yours of the 9th received with thanks. Two years ago this spring I ordered a lot of plum trees from Parry's 'Pomona' Nurseries, New Jersey. Among the lot was one dozen Simoni plum trees—a fine lot of well grown and handsome trees. After putting out, they all grew finely; all made vigorous growth in spite of a very dry summer. During the summer I received a circular from the nurserymen saying that San José Scale had got into their trees, imported from California, and stating that no further danger need be feared, as they were disinfecting all stock after discovering the pest. I paid no more attention to it, as my trees were doing so well. I did not notice anything wrong till this winter, and one day while going through them I noticed four of the Simoni looking sick, the bark looking as if dusted with ashes. As the disease was new to me I sent samples to them, as well as to you. They (Parry's) like yourself, answered that it was the dreaded scale all right, and recommended digging out and burning if badly affected, and if but slightly, to wash with whale-oil soap. I cut off two trees near the ground, intending to drench the stumps and let the trees sprout again from the roots. Those only slightly affected, I cut back severely and have sprayed with the salt, sulphur and lime mixture and will go over them again shortly with the same, and then later on will give them a dose of whale-oil soap suds.

"The trees were ordered direct from the nursery and not by agents, so there may be no more in this part of the country. I have examined a number of my neighbours' orchards, but can find no trace of the scale. I am very anxious to wipe it out, so that it may not spread to my neighbours' orchards, as well as the rest of my own. If I thought it necessary, I would dig up and burn all infested trees, but with your kind assistance by way of advice, I would be delighted to master it otherwise. I am very fond of fruit growing and dislike very much to be beaten by such things as San José Scale or any other pest and will conquer it if I can."

"April 8.—I got the trees from Parry's nurseries. I gave my son-in-law, who lives a few miles from me, a nice Simoni tree. I did not see the tree again till last week, when I was helping him trim his trees. On coming to his Simoni, which he was very proud of, as it had grown so much last summer, I said, 'You had better get your spade and dig it up at once,' for it was crusted all over with scale. I took my magnifying glass and let him see for himself. I did not loose sight of the tree till it was in the fire. I could see no signs of the scale on his other trees, and I hope they are not infested."—[J. Van Horn.]

At the end of the season Mr. Van Horn wrote to me that he believed his orchard was quite clear of the scale. During the month of December, 1897, I visited his orchard and examined the trees very carefully. I found the following state of affairs. Of the two trees which were badly infested, one had been dug up and destroyed entirely, the other was cut off last winter within a few inches from the ground and thoroughly drenched with the "lime, sulphur and salt" mixture and subsequently with the whale-oil soap solution. This stump had thrown up during the summer some vigorous

young shoots upon which no trace of the scale could be found, although on the old stump many of the scales which had been killed by the treatment given them last winter were still discernible. Besides these two badly infested trees, those which were slightly affected and had been severely cut back last winter and then treated, had made vigorous growth. Upon some of these a very few living scales were found, showing that, although the treatment with whale-oil soap was extremely effective, rendering it possible to find the scales only by very close search, yet it was not absolutely so, as there were a few still alive. Mr. Van Horn had attended to this matter very carefully, being much interested in it and being also keenly solicitous for the welfare of his neighbours. Every tree in his orchard had been sprayed, and he intends to repeat the operation regularly during the coming season.

Mr. Thonger's letters :

"Niagara, May 10.—I have discovered San José Scale on several of my trees, but do not think it is in any other orchard in the neighbourhood as yet, as nobody seems to know anything about it. I have dug out several dwarf trees—the worst—and sprayed with whale-oil soap solution all those immediately surrounding the infested spot. That was on Thursday last, and I thought these looked cleaner a day or two after, and I almost regretted that I cut down the others ; but this may be fancy. I feel considerable responsibility in the matter and shall be glad of any information you can give me."

"May 11.—I send you to-day some infested twigs (pear tree). I have selected them with the object of showing the difficulty of detecting the scale when only a few are present, rather than the extreme stages, when, the whole trunk being covered with a mass of scales that hide the bark, it is obvious enough.

"I noticed only one tree last summer and was struck by its disgusting appearance. This tree was planted eight years this spring. Including this tree, I have taken out to burn seven trees as too badly infested to cure, and left about as many nearly as bad, to spray. The infested stock must have been from F. C. Young, Rochester, N.Y., and planted in May, 1894 ; or perhaps with a replace not later than 1895. This would indicate that the scale may spread one or two seasons without being observed, or even longer, or migrate from the infested stock and develop quicker in the new location. The infestation is evidently very slow in developing to such an extent as to attract attention, unless it happens to strike a pear tree or one as favourable to its growth and development. The scale appears to have started in the south-west corner of a plot and spread north and east to some 50 trees. I must spray the whole plot, and will try and keep you informed of my progress.

"My farm is well situated for isolating the attack. On the lake shore there is nothing to take the infestation to the north-east or west,—I think the wind has much to do with spreading it—and the infested area is well sheltered by woods from all quarters but south-west to south-east. I think it would be quite to the interest of the fruit growers of this country if the Department of Agriculture would send an expert here to examine into the matter on the spot, and decide what is the best thing to do and to assist in carrying it out.

"It is clearly of the utmost importance to prevent the scale from getting a foothold in the country. The Black Knot experience shows that the individual growers will not take the pains to eradicate a pest that does not kill the tree at once, but this sort of action will not do in this case. Rather than assume the responsibility, as well as the cost, of attempting to fight the pest myself, I would rather cut down and burn every infested tree ; but I do not think that course would be in the best interest of either the country or myself."

"May 27.—I have been making a tree-to-tree examination through the orchard, taking row by row and have found two peach trees much farther away from the pear trees than the dead tree of which I sent you samples. The nearer tree is one about ten years old. I think the confidence we have had in the precautions to keep the scale out of the country is largely to blame for the hold it has now among us. I cannot look at this tree without the conviction that, had I even glanced at it three years ago with scale in my eye, it must have been detected at once. Even last summer, when seen on the pear tree, I was quite unsuspicious, and only when two men who have been among fruit

trees all their lives said they had never seen it before, did I think it must be the dreaded scale.

"The most remarkable thing I observe among the peach trees is the limited area to which this scale is confined. An infested tree will have one or two limbs affected, and the others, perhaps, quite free, with only a few scales scattered about the base of last year's laterals. On the trees immediately surrounding the infested one, perhaps only a scale or two can be found, or in some instances a few small groups of six or eight. I marked the spots with red lead as I came to each tree, and on trees considered centres of infestation I drew two rings round the trunk; the others with few scales, or even one only, I marked with red spots. There is no danger of losing them and I shall know just what spraying to give when I get the material. I recognize about three centres of infestation among the peach trees, and some 50 trees that should be thoroughly sprayed, over and above the pear trees."

"July 5.—I first noticed the young on Saturday, 3rd inst., and by Monday noon they were quite plentiful on the trunks of infested trees and even a few on the fruit of the pears. They are extremely minute, nearly globular in form and, as far as I could see with a magnifying glass, without any vestige of legs or head; the colour, a light yellow verging to white. The characteristic stain is quite marked on the fruit and makes the nature of the minute spot distinct. The scale is more abundant than might be expected, even on pear trees painted with a 2-pound to the gallon whale-oil soap solution."

"July 21.—The samples I send you are from a tree treated three times with soap spray (the last time of 1 pound of soap to 5 gallons of water), and once with kerosene emulsion strong enough to nearly strip some of my peach trees of leaves. The young scale comes out freely on to the new pear wood and fruit, but I have only seen one young scale on a new peach shoot; perhaps later in the season they may work out. Probably the fuzz on the peach would protect the fruit from the inroads of the scale, so that fruit from an infested peach tree would have little, if any, effect in spreading the pest.

"It looks as if painting the trees with a 2 pound to the gallon soap solution had but little effect on the old scale. In places where they are thick I can squeeze out quite large insects."

"November 27.—I have not myself seen any more cases of infestation than my own, but a man who has been cutting back in my infested trees the last month or so and who knows the appearance of the scale well, tells me that two or three days ago he had found numerous adult scales and young on trees in his village lot, and that his neighbours have several trees as badly covered with scale as any of mine, and also a considerable quantity on another adjoining orchard of several acres, the grower of which talks of cutting out 8 rows so as to reduce the area of infestation to dimensions which he thinks he might treat with some prospect of disinfecting them.

"From the time the first brood of lice came out till September 9, I sprayed my infested pear trees with the whale-oil soap solution (1 pound to 5 gallons of water) once a week. I think it had very little, if any, effect in checking the increase of the scale on those trees, for all those slightly infested in the spring were almost covered as badly as the few I had taken out at the beginning of the season. I have since taken out and burned all the pear trees, dwarf and standard, in the small orchard that you saw near the house. Some of the trees at the north end were not affected and were doing well, but blight as well having got hold of many I did not think it worth the risk and trouble of further treatment. I intend to concentrate all my efforts on the peach trees. I am cutting them back (especially those infested) as far as I think the tree will bear, not to kill it, and hope to do something to keep the scale in check. I have very little hope whatever of getting rid of it entirely. I find infested trees through an area quite eight times as large as was infested in the spring, chiefly on trees three and four years old. These are easier to examine than those larger, but it indicates that quite half of the orchard should be treated to have even a chance of not missing any. I am considering now either to spray the whole orchard next year with kerosene and water, say from the end of April till the leaves or blossoms come out, in hopes of keeping the infes-

tation down and raising a crop; or with a scalding spray of either soap solution or pure water; but either course involves considerable outlay.

"I am really thoroughly disheartened in the matter, being convinced that we have either to destroy the infestation absolutely at once or be ruined by the expense of keeping it so far under control as not to destroy the trees or crop. It is just one of those things like a house on fire in a town, the whole force of those interested should at the beginning have been concentrated on the infested spots to smother it out.

"You ask, July 26, to note what distance young scales travel from the mother. In the summer I saw on pear shoots 18 or 20 inches long, young scales of the first brood only three or four leaves away from the extreme ends of the shoots. These were few in number, but the mother scale could not have been closer than the terminal bud of last year's growth, and most likely not as far out as that. This year, on Nov. 10, thermometer 55 degrees, cloudy day, I saw young lice crawling about. The first brood of the year did not come out till the first week of July, with a temperature of about 85 degrees in the shade.

"The man who told me he found scale three days ago said there were lots of young lice, and he thought he saw them move. The day was rather warm, south wind and about 60 in the shade."—[Chas. Thonger.]

Referring to Mr. Thonger's suggestion to spray with a scalding hot spray. I have found the application of hot spraying mixtures in the first place impossible, because the breaking up of the liquid into a spray causes it to cool before it has reached a distance of one or two feet from the nozzle, and, besides this, all hot water remedies are both extremely inconvenient to use and to make, and also very destructive to apparatus.

I have not had an opportunity of visiting this orchard myself this autumn; but I know Mr. Thonger to be a close observer, and he has reported to me from time to time on the progress made. Mr. Burrell has also visited this and some other infested orchards in the neighbourhood of St. Catharines, and his report appears herewith. I have been lately shown a letter published by Mr. Thonger in the *Rural New Yorker*, in which he speaks of treating his infested trees mechanically with a wire brush to free them of the scale. Although undoubtedly by this method a large number would be destroyed, still, this being an imperfect method, as many scales must necessarily escape the brush, I fear that it would be a dangerous practice to adopt, owing to the feeling of false security which would be created from the apparent cleanness of the trees. They might seem to be quite free from scale, but it would be impossible to treat the scales on the branches and small twigs with such a brush, and, judging from experience in other matters, I am confident that, although Mr. Thonger might follow up the brushing of the trunks with a thorough spraying of coal oil emulsion or of whale-oil soap solution, many others would not do so owing to the extra amount of labour and time necessary for two operations.

Mr. Martin Burrell's observations:

"St. Catharines, Ont., Oct. 11.—With reference to your inquiry as to the San José Scale, its spread, development, &c., I am very happy to give the results of my own observations in this district. In the two orchards where the scale is at work, there has certainly been an extension of the infested area since spring. The infestation of new trees has, however, not been nearly so marked as the extraordinary increase of the scale on trees that were only moderately attacked in the spring. In the latter case the scale has, in nearly every instance, spread over the whole tree, including leaves and fruit. On one three year old Japanese plum tree which was affected severely last year only on the trunk and the bases of the main limbs, the insects had spread to such an extent by the middle of July that out of 407 plums on one tree, 405 were attacked. One plum had on its surface upwards of 450 newly set scales, and in more than one case there were between 1,500 and 2,000 scales on a single leaf. When the breeding process is in full swing, the trees appear to have been dusted with a yellow powder. So minute and in such numbers are the insects, that on a raised piece of bark no bigger than a pea I have carefully estimated that there were more than 150 larvæ. It has been stated by some that the larvæ are not very active and move but an inch or so from the parent scale. The facts I have mentioned rather contradict this. It is true that, as far as my observations go, the larvæ do usually set within a short distance of the old scale, but,

for such an extremely small insect, it can travel fairly fast. I have timed them, when nearly an inch per minute was covered. As a matter of fact, I have found newly set scales 13 inches from the mother insect, and I see no reason why in many cases the distance should not be much greater. One can readily see, therefore, how rapid would be the spread among nursery stock. In stating that the spread, as far as new trees were concerned, was not very marked, it must, of course, be borne in mind how difficult it is —indeed almost impossible—to detect a fresh case where a few isolated scales only are on the tree. Quite recently I saw an English Damson tree some eight years old with one of the upper branches slightly atttacked, the fruit also showing scale. This tree was not contiguous to any infested trees, nor were the scales present on the trunk or lower limbs. The scale had evidently been carried by birds or other insects. This sort of thing may exist undetected in many instances, and the following season witness the usual rapid spread of the pest on all such trees. In a favourable season it is probable that four broods would occur in this latitude. They probably commenced breeding here about the middle of June, and although the cold weather of the last day or two has checked any activity on the part of the larvæ, there are any quantity of them so recently hatched as not yet to have developed the waxy scale. Only this morning I took 15 young ones in various stages of development from the body of one female. Taking June 15 as the date of the first brood's appearance, and assuming 39 days as the time for one generation (in the breeding case here, the time occupied was from 36 to 39 days) the fourth brood would commence emerging on October 10 and under favourable autumn conditions doubtless many of this last brood would develop sufficiently to winter over as half-grown females. I have watched carefully for any sign of the little lady-bird *(Pentilia misella)* which has done such good work on the San José Scale in California and even in the Eastern States, but have failed to see a single specimen. The Twice-stabbed Lady-bird *(Chilocorus bivulnerus)* I have found on infested trees, both in the larval and adult forms, but not in sufficient numbers to render it of any economic importance this season. The food plants upon which I have seen scale in this district are: the pear, the peach, the plum (both of the domestic and Japanese types) and the red currant.

"In conclusion, I may express my belief that the scale is liable to be a serious menace to Canadian horticulture, unless the most stringent measures are adopted to stamp it out of the few orchards where it exists, and the strongest precautions taken to prevent the sale and the planting of infested nursery stock.

"November 20.—I send a few additional notes on the orchard infested by San José Scale near here :—

First saw the trees on July 3. Breeding had probably been going on for some time prior to this ; scales of all ages were found and the larvæ were commencing to set on the young fruit.

July 10.—By this date some of the plums and many of the leaves were almost covered with scales.

July 26.—Some of the badly infested leaves dropping, and fruit and leaves showing marked red discoloration.

October 9.—Frost enough to shrivel a large proportion of the grape foliage.

October 13.—Warm and sunny. Breeding very active. Found from 20 to 30 *Pentilia misella* beetles on one badly infested tree, and over 30 on another. First time of observing these beetles. One *Pentilia* larva also apparently full grown.

Sprayed one badly infested tree with pure kerosene—a good soaking.

October 17.—Hard frost, quarter of an inch of ice.

October 18.—Breeding still active. Sprayed tree, apparently uninjured. Cut bark from four different parts of the tree, and a microscopic examination showed that every scale was dead.

October 28.—Breeding still going on. *Pentilia* beetles and *Chilocorus bivulnerus* both seen. (Have never found more than three or four of the latter on any one tree.)

November 19.—Cold and wet lately. No larvæ moving and no beetles.

"Now about the spread. These Abundance trees were planted in the spring of 1895. I should infer that at time of planting ten trees were infested, because there were just

ten trees in July the trunks of which were covered with scale. There are 40 or 50 of these Abundance trees together, and next to them on one side is a row of young Beurré D'Anjou pears, and on the other Lombard plums. I have pretty carefully examined the rows of Abundance and these two adjacent rows, and this is what I find at this date, November 19 :

60 infested trees (out of a total of 78 in the block) composed as follows :—

10 infested in 1895, now covered and very sickly ;

4 less severely, probably attacked last summer or early this spring ;

46 slightly, varying from a slight scattering over of the tree to a few scales on a single limb. Every one of the young pear trees is infested slightly, and nine out of the 13 trees in the row the other side of the Abundance block. I have not had time to examine all the trees in the orchard (some 300 or so), but a walk through and a hasty look round revealed one or two trees slightly infested, and I have no doubt a thorough examination would bring to light a good many more cases. The spread, therefore, has been very extensive this year."—[Martin Burrell.]

The Kingsville occurrence of the San José Scale was first reported to me by Mr. Milton G. Bruner, who also kindly showed me, in company with the owner, M. John D. Wigle, the infested spots in the orchards. Mr. Wigle has probably 6,000 trees and there are three centres of infestation, the scale occurring in different orchards, but all comparatively close together. As far as I could judge from a two hours' examination upon an extremely cold day, I should say that there were altogether about 300 trees infested more or less, most of them plum trees, the remainder being dwarf pears. Mr. Wigle is much exercised in this matter and has expressed himself as willing to do anything in his power to prevent the insect from spreading. My thanks are due to him and to Mr. Bruner for assistance in examining his orchards and also for facilities afforded for meeting the fruit growers of Essex County. While with these gentlemen, I had an opportunity of holding two meetings at Olinda and one at Kingsville. These meetings were well attended by leading fruit growers, and the matter of the San José Scale was thoroughly discussed. Mr. Bruner I found had made himself well acquainted with the subject and was able to recognize the species as well as was possible from a superficial examination. He had given much valuable information to those with whom he had been brought in contract in his official capacity as Township Inspector of Black Knot and other orchard pests.

REMEDIES.—The remedies other than total destruction of the trees which have been most successfully used towards checking injury by the San José Scale are : (1) Spraying with kerosene emulsion or pure coal oil ; (2) washing with whale-oil soap ; (3) fumigating with hydrocyanic acid gas ; and (4) spraying with the lime-sulphur-and-salt mixture.

When a tree is found to be badly infested, save under very exceptional circumstances, the cheapest plan will be to cut it down at once and burn it. If, however, a tree is only slightly infested or there are special reasons for trying to save it, the tree should be pruned back as closely as it will stand and then washed thoroughly two or three times with whale-oil soap—two pounds of soap in one gallon of water. This is an expensive treatment, but on the whole is the most effective yet discovered.

1. *Kerosene.*—Prof. John B. Smith, of New Brunswick, N.J., Mr. C. L. Marlatt of Washington, D.C., and some other experimenters, have found that a light spraying of pure kerosene oil may be applied to trees without injury, if it be done sparingly, so as only just to cover the bark, and upon a bright day, when the oil will evaporate quickly. I must acknowledge that some limited experiments of my own have not been quite satisfactory. Professor Smith's experiments, however, have been very satisfactory to him, and on 1st of September last, he publicly recommended fruit growers to "spray thoroughly in September all infested bearing apple, pear, plum and peach trees with undiluted kerosene during the middle of a clear sunshiny day. By undiluted kerosene is meant the ordinary burning fluid used in lamps, in exactly the condition in which it is purchased. It should be applied in the finest possible spray, and every part of the plant should be thoroughly wet, but no more."

At the last meeting of the Association of Economic Entomologists held at Detroit, August 12-15, 1897, Mr. Marlatt read some " Notes on Insecticides," in which he speaks

of some experiments in treating several kinds of trees early last spring with pure kerosene. His report is as follows: "Much to my astonishment, no ill effects of any moment resulted in the case of any of the trees sprayed with kerosene. In the case of all the trees, spraying was continued just long enough to moisten the plants thoroughly, but not to cause the oil to run down the trunks and collect about the base, and, with the young trees, the soil was carefully mounded up and pressed about the crown to avoid all danger of the oil collecting at that point." *(U. S. Div. of Ent., Bull. 9, N. S.)*

In view of these facts, it seems impossible to doubt but that if Prof. Smith's instructions are followed carefully we may have in kerosene (ordinary coal oil), a remedy of great value. At any rate, it is well worth the while of any one who has fruit trees infested with San José or other scale-insects to risk the losing of one or two trees if he can discover a remedy which will save his whole orchard. Care should be taken to mound up some loose soil around the base of the tree treated to catch any superfluous oil. This should be taken away again after the spraying, to prevent the oil from injuring the roots.

2. *Whale-oil soap* is the remedy which I have recommended to my correspondents to be applied, as advised by Dr. Howard, in the dilution of only one gallon of water to two pounds of the soap, the trees to be washed or sprayed with the mixture during the winter, some time after the leaves fall in the autumn, and again the following spring, before the buds open.

One of the chief difficulties with "whale-oil" or fish-oil soaps is the want of uniformity in their composition. It has been found after many experiments at Washington that what is required for spraying purposes is a caustic potash and fish-oil soap which does not contain more than 25 per cent or 30 per cent of water. Mr. Marlatt states that a brand of soap known as "Good's Caustic Potash Soap No. 3" is perhaps the best which has been recently put on the market. This is a soft soap, which is shown by analysis to be a true potash soap, containing about 27 or 28 per cent of water. Soaps made with caustic soda have been found unsuitable for spraying purposes. Mr. Marlatt concludes his account of the Washington experiments up to date as follows:—"Our examination of the soap question up to the present time seems to indicate that we shall have to insist on a potash soap made with a fair quality of fish or Menhadden oil, and that the water should be eliminated by boiling, so as not to exceed at the outside 25 per cent of the weight of soap. Such soap can be used at the rate of 2 or 2½ lbs. or more to the gallon of water, as a winter wash, without difficulty."

3. *Gas treatment*:—For thorough work in treating infested nursery stock, the fumigation with hydrocyanic acid gas seems in California to have given the best satisfaction. This method, however, is expensive and the materials used are intensely poisonous. However, for large nurseries where many young trees have to be disinfected before being sent out, this is the best method and is very generally adopted by the large American nurseries. * The plants are placed under a canvas tent made air-tight by painting it twice with linseed oil. The first coat must be quite dry before the second is applied. the size of the tent is immaterial, but it must cover the trees entirely, and its edges should be long enough to lie on the ground, so that the tent may be made perfectly air-tight by having earth thrown upon the edges to prevent the gas from escaping. The latest formula for generating the gas is as follows, for every 100 cubic feet of space to be fumigated:—

Cyanide of potassium (98 per cent) 1 ounce.
Sulphuric acid (66°) .... 1 "
Water..... ..... 2 ounces.

Put the acid and water in an earthenware vessel, large enough to prevent spattering, then place the jar under the tent, add to it the cyanide of potassium and close the opening quickly. The trees should remain exposed to the gas for at least 45 minutes, when it will be found that insects of all kinds have been destroyed. For the fumigation of nursery stock before shipping, many of the large United States nurseries

*Full details cannot be given here, but will be supplied on application to any one requiring them.

have special buildings in which all trees and shrubs are treated whether known to be infested or not. To save time, these buildings are divided into two compartments, so that one may be emptied while the stock in the other compartment is being disinfected. For treatment of a small number of trees a box may be rendered air tight by pasting paper over all cracks and openings.

4. *Lime-Salt-and-Sulphur Wash* :—This wash is one of the favourite washes on the Pacific coast and has certainly given excellent results in British Columbia. Mr. R. M. Palmer has found it most satisfactory for some years and in his last report refers to it as follows :—"Another year's experience with the No. 1 spraying mixture (lime, salt and sulphur) has added further evidence of its value as a winter wash for all kinds of fruit trees and bushes. It is generally noted that so much improvement results from its use in the health and vigour of the trees to which it is applied, as alone to justify the cost of the work."

Mr. Marlatt, when in California, noticed the same good results there in the vicinity of Pomona, Cal., where "unsprayed orchards were badly infested with San José Scale, while in adjoining sprayed orchards the scale was entirely killed and the trees were rapidly recovering and showing vigorous and healthy new growth. In contiguous orchards also of the same kinds of trees which had been cultivated in a similar manner, those trees which had been sprayed yearly were at least one third larger than the others."

The mixture which Mr. Palmer has found so valuable is as follows :—

"Lime, unslaked	30 pounds.
Sulphur, powdered	20 "
Salt, coarse	15 "
Water	60 gallons.

"Place 10 pounds of lime and 20 pounds of sulphur in a boiler with 20 gallons of water, and boil over a brisk fire for two hours, until the sulphur is thoroughly dissolved. It will then be amber-coloured. Next, place 20 pounds of lime in a cask and pour enough water over it to thoroughly slake it. Add the salt. When dissolved, add to the lime and sulphur, and boil half an hour longer. Add enough water to make 60 gallons. Apply lukewarm. Spray when the trees are dormant, or as soon as the leaves fall, and again in the spring before the buds swell. A good force pump should be used, and care must be taken to cover the infested trees thoroughly with the mixture, which should be constantly stirred when applying.

"To insure freedom from lumps, it is advisable to pass the mixture through a wire sieve or strainer."—[R. M. Palmer, *Insect Pests and Plant Diseases*, Victoria, B.C., 1897.]

Prof. J. B. Smith also speaks of the good results obtained with this wash on the Pacific coast in his Annual Report for 1896, p. 487 :—"In Yuba and Sutter counties, the lime, sulphur and salt wash is the favourite. The testimony to its efficiency is universal. Few claim that a single spraying is absolutely effective; all contend that two sprayings will kill practically all the scales. Absolutely perfect work cannot be expected, and so there is always a small amount of scale in the orchard; but, as they have found that the use of this wash is beneficial to the trees by seeming to make them more vigorous, less liable to fungus attack and, in the case of peach trees, less susceptible to leaf curl, the spraying is continued every year, whether the scale is abundant or not. A man who does not spray is considered a very poor farmer."

The above quotations are given for the benefit of British Columbia fruit growers, all of whom are urged to take the fullest advantage of the excellent work which is being done by Mr. R. M. Palmer, Inspector of Fruit Pests. His Annual Reports to the Provincial Board of Horticulture are indispensible to the farmer, fruit grower and gardener, in all parts of the province.

This valuable remedy of the West, however, it must be acknowledged, has not given satisfactory results in the East, Mr. Marlatt even going so far as to say, while acknowledging its value in the West :—"Our experience with the wash in the East had thrown doubt on its real efficiency as an insecticide, and it has been clearly demonstrated that under the climatic conditions east of the Alleghanies it is almost valueless."

Whatever the reason may be for this great difference, the value of the remedy for the West is undoubted and well attested. Similarly, the gas treatment has given less satisfaction in the East than on the Pacific coast, but this is to some extent due to the difficulty of treating deciduous trees, such as are infested by the San José Scale, which have a more spreading, open growth than the close-growing, thick-foliaged trees of the Citrus family, upon which this method is chiefly used in California for other kinds of scale-insects. For the disinfection, however, of nursery stock, the gas treatment is certainly most convenient. Probably the remedies which will be found most available for Ontario fruit-growers will be the whale oil soap wash and the kerosene emulsion. The latter should be applied as soon as the leaves drop or during the winter, made according to the Riley-Hubbard formula and diluted with only four parts of water, to be followed before the leaves expand in spring by the whale-oil soap wash, 2 pounds in 1 gallon of water.

Mention may be made of the fact that where trees are closely planted the scale has spread more quickly than where the trees are farther apart. This points to the advantage of having the trees planted as wide apart as possible without waste of land.

Since the San José Scale is already established in several centres in Ontario, it is now too late to prevent its introduction into the country; still, no effort should be relaxed which will prevent further importation from infested nurseries in the United States, and it should not be forgotten that nearly all of the Canadian outbreaks have been traced back to nurseries in the State of New Jersey. There are some precautions which common sense would seem to dictate to all fruit growers, such as: (1) Do not buy either from nurseries known to have been infested, or, as it is unnecessary, even from States where the scale is known to exist. The home-grown trees of all our Canadian nurseries are much safer to purchase than those coming from any of the usual sources in the United States. Up to the present not a single Canadian nursery has been found to be infested.

(2) Examine all trees upon your own grounds and upon your neighbours', particularly those which have been planted or grafted during the last five years.

(3) Plant no young trees without examining them carefully for any trace of the San José Scale. Should any case of infestation, or even suspected plants, be found, at once report the matter and send specimens for examination to the Government entomologists at Ottawa or Guelph for advice.

On account of the exceedingly inconspicuous nature of this enemy and its habit of hiding beneath scales of bark, buds, etc., as well as the extreme danger which attends its introduction, in those cases where it is considered necessary to purchase from American nurseries, it would be well for fruit growers not to trust to the certificates that the trees are free from scale, which are sometimes supplied by nurserymen, unless they are actually signed in writing by state entomologists of recognized standing, and also for the actual consignment of trees with which they are imported.

As an illustration of the difficulty of detecting the young scales when they are few in number, Prof. F. M. Webster has published an illustrated article in the current December number of *Entomological News*, showing a twig from a peach tree which had been submitted to him for inspection and of which he says: "The most diligent search with a lens failed to reveal any outward trace or indication of the presence of San José Scale. When one of the buds was removed it was found that there was behind it a half grown scale which had been completely covered and concealed by the bud." This showed that practically no one could be certain that a tree was absolutely free from scale without removing all the buds, which of course is out of the question.

THE APIARY.

The practical management of the Apiary, as heretofore, has been satisfactorily carried on by Mr. John Fixter, the Farm Foreman. The interest shown in the Apiary has been very encouraging ; large numbers of visitors have examined it, who have been gratified by the attention shown them and by the explanations given in all matters connected with bee-keeping. One experiment was particularly observed, namely, what has been called the "House Apiary." This is treated of by Mr. Fixter in his report appended hereto. Many of the experiments begun in former seasons have been continued ; but those on wax foundations were not taken up this year. In addition to the explanations given to visitors, two valuable addresses were delivered by Mr. Fixter to the students of the Ottawa Normal School upon the subject of bee-keeping, and he also attended two meetings of Farmers' Institutes, one at Russell Village, Russell County, Ont., and the other at Bell's Corners, Carleton County, Ont., at both of which the directors of the institutes requested that the subject of bee-keeping should be brought up.

The season at Ottawa, with reference to bee-keeping, has been a very remarkable one. Although in June there was a good amount of blossom on flowering plants, bee-keepers in the district were all surprised to find how little honey was stored by their bees.

Notes are being taken, with the dates, of the different kinds of flowers which are attractive to bees, and will be published at some future date. The Breaking Buckthorn, or, as it is more generally known, the Alder Buckthorn (*Rhamnus Frangula*), was noticed to be particularly visited and for a very long period by bees. A supply of the seed of this shrub was, therefore, collected and distributed to all bee-keepers who asked for it before the supply was exhausted.

The condition of the Apiary I consider quite satisfactory, and it is a branch of the Farm work which is growing in popularity from year to year (a fact, it must be stated, almost entirely due to Mr. Fixter's skill and good management).

Results of the Work of the Season.

On August 28th all the supers were removed from our hives, when 212 partly filled sections were found. This was all the surplus honey which had been made during the year, and the whole of this was returned to the bees for their winter sustenance. It should also be mentioned that not only has there been an entire lack of surplus honey, but the bees have also failed to swarm, so that the number of colonies was not increased. These results appear the more extraordinary when we consider the large quantities of honey made per colony during the past two years. In 1895 the average was 54 sections per colony, and in 1896 it was 50 sections, besides 16 lbs. ½ oz. of extracted honey per colony, all having been under the same management and care. There seems to have been an unusual deficiency of nectar in the flowers. The bees worked industriously, but were barely able to accumulate enough for their own subsistence. Indeed it was necessary to supplement their stores with considerable quantities of sugar in order to keep them supplied.

This discouraging condition of affairs prevailed all over the eastern parts of Ontario. In the western parts of that province better results are reported.

The following extracts from letters received will show the peculiarity of the season of 1897, in the Ottawa district :—

"Ottawa, January 7, 1898.—As you are probably aware last season was one of the most peculiar, if not the most peculiar, in the history of bee-keeping in this section of Canada.

"Soon after my bees were removed from winter quarters I noticed that although seemingly working hard every fine day, they were getting little if any honey, and were very rapidly using up the balance of their winter supply. I think I am safe in saying they got nothing from either maple, willow or fruit bloom, that is to say, early fruit bloom such as apple, plum, cherry, currant, &c. After my bees had been out about a week I began feeding systematically every evening, giving perhaps half a cupful to every hive, and by the beginning of May, even with this amount of feeding, they were still drawing heavily on the not very large amount left over from wintering, so much so that by the second week in May scarcely a colony in all my apiary had more than a very little unsealed honey and the hives were absolutely filled with brood, more so than I have ever seen them before, many of the frames having brood in the first row of cells from the top bar of the frame.

"I could not detect any honey being brought in until after the 24th of May, and then only in small quantities from the raspberry bloom. I fed steadily until the 23rd of May, and am quite satisfied that I realized handsomely by doing so. It is perhaps worth mentioning here that in the spring of 1896 all my strong colonies filled the two outside frames so full of honey that I removed them and put empty frames in the hives between the middle frames. The flow was from the willow. Swarming began on the 4th of June, and I have never had finer swarms than during the past season, the great trouble was there appeared to be no end to the swarming season, as I had several swarms in September, as late as the first week, when buckwheat honey was coming in freely.

"I took 45 hives out of winter quarters, having put away 46; the one lost was from dampness, it was touching the outside wall of the cellar. I sold two colonies just before swarming, and by the end of September I had 90 good colonies, most of them very heavy with honey, even the late swarms in September filled up well with buckwheat and goldenrod (Solidago) and required very little feeding to bring them up to the 55 pound limit. I sold 25 colonies this fall and have 65 in the cellar now. My total yield of comb honey was a little over 1,100 pounds, of which two-thirds was white clover, basswood and possibly some raspberry mixed, the balance was goldenrod and buckwheat mixed, making a quite agreeable honey.

"I have an idea that the reason of the excessive swarming was partly on account of the honey flow being very intermittent, perhaps two or three days of a heavy flow and then several days with little or none. During the idle days the working force would hang about the hives and amuse themselves building queen cells. Then in a few days out they would come. The total return for the past season by the sale of bees and honey was $325, less about $15 for honey fed in the spring."—[Percy H. Selwyn.]

"Almonte, Jan. 12, 1898.—This year I got no white honey. Last year I had between 2,500 and 3,000 pounds. This year's dark honey was about 20 per cent of last year's, and similarly, new swarms were about 20 per cent of last year's. As for feeding, I do not do much of that. Most of my colonies go into winter quarters, heavy with natural stores; but some of the old colonies had none too much, and two or three of the new ones this year did not actually gather enough to winter on."—[J. K. Darling.]

"Chard, Ont., Dec. 27.—I set out 105 colonies on April 23. I had a few colonies set out some days before that. The first pollen was seen coming in on April 22. By July 1, through robbing and starving my colonies were reduced to 70. At the end of the season these were increasod to 82. I got 500 lbs. comb honey and 1,500 lbs. extracted, all dark honey. Another bee-keeper here says he began the season with 40 colonies. He had no increase in swarms. He got 50 lbs. comb honey and 860 lbs. extracted, all dark honey."—[W. J. Brown.]

"Bearbrook, Jan. 8, 1898.—I never experienced such a hard spring and summer since I have kept bees. I carried out 22 hives. Four or five were weak, so I united four colonies into two. I ran 4 of my strongest hives for comb-honey and 16 for extracting. The spring was cold and dark, and the summer hot and dry. There was no clover until September, perhaps a little in August; but I never saw such a fall harvest. My bees never did better, even in June and July, than they did for me this year in September off the wild flowers, which grow on the low swampy land along streams. The honey was dark, but of a delicious flavour.—[A. R. McRae.]

REPORT OF MR. JOHN FIXTER.

SEASON OF 1897.

April 5.—Hives all taken out of their winter quarters and placed on their summer stands. The bees came out at once and flew well.
" 6.—Cloudy, but not cold; no flying.
" 7.—Fine but cool; flying well.
" 8.—Fine, cool toward evening; bees flying about three hours.
" 9.—Dull day; no flying.
" 10.—Warm; some flying.
" 11.—Warm; bees flying well, some bees attempting to rob; openings closed to one bee's space.
" 13.—Cold and wet; little flying.
" 16.—First pollen gathered from swamp willows.
" 17-20.—No flying.
" 21.—All bees flying and gathering pollen off different species of willows.
" 22.—All flying and working on the flowers of the Siberian squill.
" 22-May 11—Working well, gathering pollen.
May 11.—Plum trees and dandelion beginning to bloom. Bees very thick on both.
" 13.—Bees working well on wild cherry.
" 19.—Cherry and apple trees in bloom, very attractive to bees.
" 25.—Bees working on the Siberian pea tree (*Caragana*).
June 1.—Many dead drones and some worker bees were carried out to the entrance of several hives, a most unusual occurrence at this season of the year, a result probably occasioned in some instances by scarcity of new honey. A very close inspection being made, several hives were found to be short of stores and had to be fed, although there were many plants and shrubs at that time blooming.
" 9.—The Bush Honeysuckle (*Lonicera Tatarica grandiflora*) came into bloom.
" 13.—White clover coming into bloom; notwithstanding the abundance of bloom, no increase in honey was observed.
" 13-15 and later.—Bees working on white clover, alsike clover, Alder Buckthorn (*Rhamnus Frangula*), also raspberries and Mock Orange (*Philadelphus*). All hives fed on syrup, very little new honey having been gathered.
" 15-20.—Weather very fine. Bees flying well but no honey appeared to be gathered.
" 25.—All flying and working well on white clover and alsike, carrying in some pollen, no surplus honey being stored at this date. Several hives fed with syrup (made by dissolving two parts sugar in one part water, the sugar being added to the water while hot and stirred until dissolved). Bees beginning to improve, showing signs of greater vigour.
" 30.—Fine weather; bees flying freely. Some new honey was stored by the strongest colonies; it was, however, found necessary to feed some hives.
July 1-6.—Bees working well; all hives gained rapidly in weight during this period.
" 6.—Bees working well.
" 11.—Basswood just coming into bloom; flowers scarce, and, on account of the extreme heat of the weather there was but little gain in weight from this source.
" 18.—Bees working on basswood, buckthorn, Catalpa and also on asparagus.
" 24.—Bees working on horse beans. Buckwheat in bloom and bees working on it.
Aug. 1.—Buckwheat honey was gathered freely.
" 1-28.—The weather was very fine and bees were flying well, but very little surplus honey was stored. All supers were removed; 212 partly filled sections taken off, which were afterwards returned for winter stores.

EXPERIMENTS IN WINTERING (1896-97).

Experiment No. 1.—Nov. 16, 1896.—Fifteen colonies were put into winter quarters in the cellar and placed on the shelves, beginning eighteen inches from the floor. Under the back end of each hive was placed a three inch block, by which means the back of each hive was raised so as to ensure free ventilation. Each hive was raised from its own bottom board three-eighths of an inch at the back. All front entrances were left wide open, the wooden covers all removed, leaving the propolis quilt on 12 hives and placing a chaff cushion four inches thick on each. On the remaining three hives no propolis quilt was used, but the chaff cushion was laid close to the frames. No difference could be seen between the colonies having on the propolis quilt and those which had none, that is, as to dampness, &c.

Temperature was taken once a week all through the winter :—

	Highest.	Lowest.
November 16 to 30	46	40
December	44	43
January	44	43
February	45	43
March	46	42
April	46	..

The bees were quiet throughout the winter, very slight hum being noticeable.

On April 5 all hives were removed to their summer stands. The temperature was kept regular in the cellar by means of a coal stove and careful watching. The stove was placed in an adjoining room, and was lit when the temperature was low or the cellar damp. The stove and ventilators require a great deal of watching, so as not to allow sudden draughts of warm or cold air, as either disturb the bees too much.

As the advantageous use of the coal stove requires experience, at present I would not recommend it to beginners.

Since the cement floor, shelving and complete ventilation have been put in the cellar, it has given entire satisfaction.

During the past winter every colony in this experiment was perfectly dry and clean and showed no uneasiness of any kind, and all came out in excellent condition.

Average weight of each hive when put into winter quarters was 51 pounds ; when taken out on April 5, the average weight was 41 pounds 10 ounces per hive, showing that each hive had lost 9 pounds 6 ounces, which was rather less than the usual amount, owing to the comfortable cellar.

Experiment No. 2.—Colonies Nos. 14 and 20 were put into the cellar with tops and bottoms of hives left on, just as they were brought in from the bee-yard. These were to be watched for dampness. During November and December there was a slight hum in both hives, but they were quite dry.

Jan. 11.—Hive No. 14 was damp and noisy ; hive No. 20 was dry.

Feb. 1.—Both quite dry, but there were many dead bees at the entrance of hive No. 14.

Feb. 8.—Colony No. 14 very noisy and hive damp ; cover removed and ventilation given at bottom by raising the front entrance an additional two inches.

Feb. 22.—Both hives perfectly dry and quiet.

Mar. 1-29.—Hive No. 14 had some spots of fæces on the entrance, and when removed from the cellar on April 5 there was about one inch of dead bees and some mould on the bottom board, but the bees were in fair condition, as the colony was a large one.

April 5.—Hive No. 20 noisy, but dry ; very few dead bees on bottom board. Total weight of the two hives when put in, 105 pounds ; when taken out, 82 pounds. No. 14 weighed 13 pounds less, hive No. 20, 10 pounds less than when put into winter quarters.

May 24.—Hive No. 14 had 7 frames of bees and 5½ frames of brood ; hive No. 20 had 8 frames of bees and 6½ frames of brood.

Experiment No. 3.—Hives stored in a root-house. Two colonies, Nos. 4 and 6, were kept in a large root-house, which is 100 feet long, 25 feet wide and 10 feet deep. The hives were placed on a shelf nailed up against the side wall, about 3 feet from the ceiling and projecting 2 feet. A curtain was hung from the wall over the top and down in front of the hives, so as to keep out all light. The propolis quilt of hive No. 4 was taken off and a chaff cushion put on in its place. The propolis quilt was left on hive No. 6 and a chaff cushion placed above it. The fronts of both hives were raised an additional half inch to give free ventilation.

Temperature was taken every Monday of each week.

Nov. 3-6.—Bees in both hives quite dry, but making considerable hum.
December.—Temperature of root-house, highest 38, lowest 36; both colonies noisy and quite damp, scarcely any dead bees on bottom of hives.
January.—Temperature of root-house, highest 39, lowest 37; both colonies very noisy, damp and mouldy.
February.—Temperature of root-house, highest 39, lowest 37; both hives quite damp and mouldy. Colony No. 4 showed signs of dysentery.
March.—Temperature, highest 43, lowest 35; both hives showed signs of dysentery; some few bees coming out of both hives; very few dead bees around either.
April 5.—Both hives removed to bee-yard. Both colonies showed signs of dysentery, dampness and mould, but both were very strong in numbers.

Another experiment was also carried on with these two hives; the propolis quilt was left on hive No. 6 between the chaff cushion and the frames. On hive No. 4 no propolis quilt was used, the chaff cushion being placed next to the frames; the object of this was to see if the propolis quilt was liable to hold the moisture in the hives.

After careful watching all the winter, no difference could be noticed.

Weight of hive No. 4 in the autumn of 1896, 60½ pounds; in the spring of 1897, 45 pounds a loss of 15½ pounds.

Weight of hive No. 6 in the autumn of 1896, 63 pounds; in the spring of 1897, 50½ pounds, a loss of 12½ pounds.

Another examination was made on May 24. Hive No. 4 had 5 frames of bees and 4 frames of brood.

Hive No. 6 had 7 frames of bees and 6 frames of brood, so that they were in excellent condition for a honey flow.

Experiment No. 4.—Nov. 16, 1896.—Colonies Nos. 1 and 3 were put into a pit dug in the side of a hill, 3 feet deep by 3 feet in width and 10 feet long, in such a way that the ventilators at both ends might not be immediately above the hives, which were in the middle of the pit. The hives rested on two cedar poles laid the full length of the pit. A third cedar pole of the same length was laid in front of the entrance of the hives, and insured the necessary circulation of the air from the two ventilators one at each end of the pit. These ventilators, which were 3 inches by 4 inches were made of boards, three of which reached down to the bottom of the pit, the fourth only to the top of the pit, and the ventilators rose three feet above the ground. In each hive half inch strips of wood were laid under both sides and under the back end, between the brood chambers and the bottom boards, so as to provide more space at the bottom of the hive in case a quantity of dead bees should accumulate there.

The pit was filled up with loose straw up to four inches from the top, which was made of cedar poles along the length of the pit, the middle ones higher than the others, covered with a layer of straw and one foot of soil. A small shaft was also arranged between the hives, down which a thermometer could be let by means of a string, so that the temperature of the pit could be ascertained. The thermometer was examined once a week. If the temperature rose too much, some of the covering might be removed; and if the contrary, some added. Temperature was taken once each week.

Temperature for November was 42 each time it was taken, and no sound was heard at any time through the shaft or ventilators.

Temperature for the first two weeks of December was 42 ; remainder of month, 39.

On December 21, one foot of horse manure was placed over the pit to try and raise the temperature, but no difference was appreciable.

The temperature for February and March was 39, and did not vary one degree during the two months.

The temperature of the pit on April 5, was 40; the day being very fine, both colonies were removed to the bee yard

Hive No. 3, was very damp and mouldy, and had half an inch of dead bees on the bottom board, but no evidence of dysentery.

Hive No. 1 was also very damp and mouldy and the entrance had some evidence of dysentery; on the bottom board there was about half an inch of dead bees.

Mice had found their way into the pit, but had not been there long enough to do any harm.

The weight of hive No. 1, in the autumn of 1896, was 50 pounds, and in the spring of 1897, 40 pounds, a loss of 10 pounds.

The weight of hive No. 3, in the autumn of 1896, was 52 pounds, and in the spring of 1897, 44 pounds, a loss of only 8 pounds.

May 24, another examination was made as to the strength of the colonies.

No. 1 had 7 frames of bees and 6 frames with brood.

No. 3 had 8 frames of bees and 6½ frames with brood.

This experiment, therefore, is very satisfactory, and the method is one which can be adopted at small expense by any one who wishes to keep bees. Care must be taken to choose a well drained spot for the location of the pit, and to cover the ventilators with wire netting to keep out mice.

Experiment No. 5.—Wintering in wood shed (house apiary).

Two colonies, Nos. 46 and 48 were left in the wood shed with some additional packing as stated in last year's report, page 270.

The wood shed has walls which are double boarded, with an air space of four inches. The floor, which is about one foot from the ground is also double boarded and there is no draught under it. The hives were moved one foot from the wall, and placed on a double thickness of sacks laid on the floor; the wooden covers were removed and replaced by cushions. In addition to this, the hives were covered above and all round with a double thickness of the same packing. No ventilation was provided for one hive (No. 46); for the other, (No. 48), a small shaft half an inch square extended from the opening of the hive to the outside of the shed, and half-inch strips of wood were placed under both sides and under the back, and between the bottom boards and the brood chamber, so as to give more space at the bottom of the hive in case a quantity of dead bees should accumulate.

No flying took place from the time they were packed until they were opened in the spring.

No difference could be noticed as to strength of colonies.

April 5, both hives had two inches of dead bees on the bottom boards and were damp and mouldy, and both colonies were in a very weak condition.

Another examination was made on April 22, when both hives were found to be deserted.

Hive No. 46 weighed in the autumn of 1896, 63 pounds, and in the following spring it weighed 48 pounds, showing a loss of 15 pounds.

Hive No. 48 weighed in the autumn of 1896, 53 pounds, and in the following spring it weighed 37 pounds, a loss of 16 pounds.

Conclusions.—The mode of wintering that has given most satisfaction is No. 1.

No. 2. Hives put in the cellar as they came from the bee-yard had not sufficient ventilation. This result agrees with that of last year. During the winter of 1897-98 this experiment is being repeated and also two hives have been stored in the same way except that the wooden covers have been removed, leaving nothing but the propolis quilt.

No. 3. Wintering in a root-house. This experiment was fairly satisfactory, but the hives were too damp. An effort is being made this year to keep the hives drier, by having more ventilation at the bottom.

No. 4. Wintering in a pit out of doors. This experiment was satisfactory, but is being tried this year without filling up the pit with loose straw as was done last year, and two inches of space have been left both at the back and in the front of the hives for better ventilation.

No. 5. Wintering in a closed shed, the hives being merely protected with a double thickness of sacks above and all round them. This experiment was a failure. The cold of winter destroyed most of the bees, very few being alive in spring. The experiment is tried again this winter with the hives placed farther from the outside wall and with more protection against frost.

House Apiary.

An experiment was carried on in a wood-shed, a part of which was partitioned off for that purpose and is now called the House Apiary.

This house apiary opens into a yard that is 30 by 60 feet, surrounded by a close board fence 6 feet high, which gives an excellent shelter from prevailing winds. Both the south and east sides of the shed are covered with grape vines, which seem to keep the building cool during the very hot weather, and the vines are trained so as to leave the entrances perfectly clear. One part of the space in the shed devoted to this purpose faced the south-east and was 7 feet high, 6 feet long and 4 feet wide.

In this portion were placed two tiers of hives; the bottom tier was set on the floor, which is one foot from the ground and double-boarded. The second tier was set on a shelf 3 feet 6 inches from the floor.

Another portion of the shed facing the south-west 7 feet high, 4 feet wide and 32 feet long. There were here 12 hives in one row upon the floor.

From the experience of the past year gained with the part first mentioned, I would recommend two tiers on the south-west side, so that the vacant space might be profitably occupied. The entrances to the hives were 3 feet apart and were cut through the wall of the shed; they were 6 inches by 6 inches, with an alighting board projecting 7 inches by 12 inches wide and sloping so as to throw off rain. The hives are set close to the wall, so as to confine the bees to their own hives.

Conclusions.—During the past two summers the colonies in the house apiary, which is surrounded by an inclosed yard, having more shelter from the cold winds of both spring and autumn, were frequently observed to be flying, while the colonies in the exposed open apiary remained in their hives.

Another advantage of this arrangement is that there is less danger of robbing. When the hives are being inspected the examination is obviously more convenient in wet weather, being under shelter; further, if the apartment were made 6 feet wide, instead of 4 feet, and a shelf placed on the wall to hold bee appliances, this would add greatly to its convenience. The alighting board might be made to project only 6 inches and be 10 inches wide.

GRASSES.

AWNLESS BROME GRASS

(*Bromus inermis*, Leyss).

One of the most valuable pieces of work which has been accomplished by the Experimental Farms is the successful introduction into Canadian Agriculture of the Awnless Brome Grass, which, on the whole, has done better than any other introduced grass we have sent out for trial, both for hay and for pasture. The seed of this grass was imported from Russia during the first year of the institution of the Experimental Farms, and it has been grown ever since, with remarkable success. Every year small packages of the seed have been distributed free, in every province of the Dominion to such farmers as have asked for samples, and the reports received from them have been most satisfactory. On the prairies of the West, where, on account of the rapid settlement of the country and of the increase in the numbers of stock, the native grasses are now failing, the Awnless Brome grass is found to be a most useful substitute.

The seed germinates readily and the young plants soon become established. It is a perennial grass with running root-stocks, and is conspicuous for its free leafy growth and tall stems (3 to 5 feet high), which bear an abundance of seed. It flowers at Ottawa in the last week of June or the first week of July. It is very hardy and early, and produces a large crop of hay, which, although rather coarse-looking, is soft, sweet-smelling and palatable to all stock; chemical analysis also shows that it possesses great food value.

Not only does Awnless Brome grass thrive in the rich, moist soil of the eastern provinces, but its growth and productiveness are so wonderful, even it the dry plains of the West, that its cultivation, together with that of the Western Rye-grass (*Agropyrum tenerum*, Vasey),—another most valuable grass, a native of North-western America, which indeed is the well known "Bunch Grass" of the West,—may be said without exaggeration to have solved the problem of fodder production on a large scale in the arid western sections. Under irrigation on the farm of Mr. Wm. Hull, of Calgary, Brome grass has given on 200 acres of land the enormous yield of 4½ tons of grass per acre. It seems to stand a little more water than Timothy when irrigated. On good lands in the east it produces without irrigation from 1½ to 2½ tons of hay per acre.

One notable feature which distinguishes this grass, is that, while most grasses after the flowering period deteriorate rapidly while the seeds ripen, Awnless Brome grass can be left standing till the seeds are fully ripe, and yet the hay crop will be heavier, without being poorer, than if it had been cut when in flower, as should be done generally for all hay grasses in order to get the best value. This remarkable characteristic of Brome grass is due to the fact that after the seed-bearing stem has grown up, a great number of leafy sterile shoots spring up from its base. It is owing to this supplementary growth that the straw, after threshing, still makes hay of excellent quality.

A special value for this grass has lately been discovered, namely, its adaptability for alkaline soil. Mr. Mackay, having tried some experiments, reports as follows:—

"Indian Head, Assa., Nov. 12.—The Brome grass on alkaline land, which I referred to in speaking to the Committee on Agriculture while in Ottawa, was grown on two low spots in a field of about 15 acres. The spots are not very large (¾ acre in both), but, before sowing, the bottoms were white with alkali, though not so bad as low places in other districts. A good many crops had been grown on the field prior to the grass being sown, and no doubt have had some effect on the alkali. It seems to me as if alkali washes out of the soil into low spots, for we find it in varying quantities in places where water stands for a few days and then settles into the soil. Last June we had a deluge of rain, leaving us a 5-acre plot in one of the grain fields covered with water

until September. That spot is covered with alkali now, and so far as I know there has been no alkali there before.

"The crop of hay on the ¾ acre was very heavy, but the land being moist would cause a good crop in any case. Part of this year's crop of Brome hay was grown on low places, upon which alkali is observed every year we plough them; and in these places the crop was very heavy. As no record was taken of the yield on the alkaline spots, I cannot give any exact quantity per acre, but there was at least one-third more hay on them than on the ordinary land."—[Angus Mckay.]

"Urquhart, Alta., Nov.—The 1-pound bag of seed received was sown June 11, on 330 square yards of a field which had been sown with grain for the two previous years; but in this particular position little or nothing had grown, the soil being alkaline clay, which is always baked hard in summer. The ground was ploughed in May and well harrowed, and again harrowed previous to the grass being sown, in order to destroy the weeds. The grass grew to a height of 16 inches, but not vigorously over all the ground, some patches being quite bare. It was green and fresh when all the surrounding grass on field and prairie was withered and dead from the early frost. It was not cut. I feel satisfied that it will be a capital grass for hay or pasture, and I intend to sow the whole field (7 acres) with this grass."—[P. McDonald.]

The above quotations suggest a special value in this most excellent grass which was not thought of at the time it was introduced.

In certain parts of British Columbia, the two native species *Bromus Pumpellianus*, Scrib., which closely resembles *B. inermis*, and a large succulent species, *B. brevi-aristatus* Buckl., have been preferred by some growers and further experiments with these species are now being carried on.

REPORT OF THE POULTRY MANAGER.

(A. G. GILBERT.)

To Dr. WILLIAM SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

I have the honour to submit herewith the tenth annual report of the Poultry Department. The work of the year has been principally in the line of feeding reduced rations, and noting—

1. Effect in increased, or, decreased output of eggs.
2. On the general health of the laying stock.

The results were most gratifying and are given in the following pages, with full particulars of the change in quantity and value of the rations. The experience gained cannot fail to be of interest and value to all those desirous of obtaining eggs from their laying stock, in winter, at the least possible cost.

Details are also given of the experimental managing and feeding of 50 hens, as requested by the members of the Committee on Agriculture, of the House of Commons of 1896.

There is a marked increase in the correspondence of the year and no little part of it is devoted to inquiries as to the best means of artificially hatching and rearing of early chickens, ducks, &c.

Addresses on the care and management of poultry, markets for eggs and kindred subjects were delivered at the following points during the year, viz.:—

ONTARIO—Lanark, Kingston, Guelph, Monklands, Moose Creek, Maxville, Quigley, Summerstown and Smith's Falls.

QUEBEC—Montreal.

NOVA SCOTIA—Grand Pre and Cornwallis (2).

NEW BRUNSWICK—Fredericton, Upper Maugersville, Hampstead, Long Reach, Riverside, St. Joseph's College, Pointe de Butte and Sackville.

PRINCE EDWARD ISLAND—Charlottetown, Alberton, Summerside and Georgetown.

A new feature at the Smith's Falls meeting was the exhibition of poultry, killed and dressed, to suit the requirements of the British market. The poultry was killed and dressed on the Experimental Farm by an expert. The exhibition consisted of turkeys, geese, ducks and chickens and was closely examined by a large number of farmers and their wives. As an interesting and instructive object lesson it was much appreciated.

I have the pleasure of again testifying to the zeal and energy of Mr. George Deavey to whose faithful carrying out of instructions given and interest taken in the work much of the success attained is due.

I have the honour to be, Sir,
Your obedient servant,
A. G. GILBERT.

REPORT OF THE POULTRY MANAGER.

The work of the past year has been unusually important and successful. Important, because it embraced the experimental feeding, to the laying stock, of a less quantity of cheaper rations than formerly. Successful, for the reason that a greater number of eggs was obtained, during the winter period of high prices, at a lessened cost of production. It will be interesting then to the farmers and poultry breeders of the country to learn how such results were brought about.

WHAT CLOSE OBSERVATION LED TO.

The experience of former years led first to the suspicion and finally to the conviction that the great drawback to successful winter laying was the hens becoming overfat—particulary those of the Asiatic and American breeds—from overfeeding and consequent disinclination to exertion. This was more noticeable when the soft mash morning ration was fed, as was thought, in too great quantity. It was also noticed that the overfat condition was more general and disastrous about the end of February, or beginning of March. The indications of an overfat condition were:—

1. The laying of eggs with thin or soft shells.
2. Eggs laid of abnormal size and unusual shape.
3. The sickness of several of the laying fowls from an ailment at first thought to be acute indigestion, but later supposed to be enteritis or inflammation of the intestines, and which in the majority of cases resulted in death.
4. The sudden death of several two and three year old hens, of the large breeds, from apoplexy.

SIMILAR CASES ELSEWHERE.

Investigation received incentive by the reception of several letters, from persons in different parts of the country, describing an ailment which affected their fowls, and similar to that noted in the farm fowls. The following letter may be taken as a specimen of those received, and describes the symptoms:—

"DEAR SIR,—My hens are suffering from some disease. They have been laying well up to this time (end of February and early March). They seem to lose the use of their legs and lie on their sides. They seem feverish and distressed. Some get over it, others die. We give them mash in the morning and grain at other times. They have water to drink and old mortar for lime."

In the case of the farm fowls, castor oil in small doses was given with a ration of soft food, and the correspondents were advised to try the same.

The ailment was a new experience and experts consulted thought it a form of acute indigestion.

SOME LIGHT ON THE MATTER.

What was the ailment? It seemed an outcome of the overfeeding, over stimulating (and consequent overfat condition) of the laying fowls, in the attempt to procure eggs in winter. Some light was thrown on the subject by the publication, by Dr. W. Sanborn, of a book on poultry diseases, in which he describes "Enteritis," the symptoms of which so closely resembled those of the sick fowls of correspondents and farm, as to make conjecture almost a certainty. Dr. Sanborn thus writes:—"Enteritis, an inflammation of one or more of the intestines, has received much attention and investigation of late."

CAUSE OF DISEASE.—Feeding too stimulating or irritating foods; long continued feeding of one ration; eating of poisonous vegetable or mineral matter; worms or anything that tends to inflame or irritate the bowels.

SYMPTOMS.—Great general weakness. Bird gets into a corner, or lies down in a listless manner with feathers ruffled. Eyes are nearly closed. The bird is hot, in fact there is general fever. It seems to shiver and is restless. Discharges are watery with mucous, stringy matter, sometimes tinged with bile or blood. It is quite common for fatal cases to show stupor, or wildness when well advanced with the disease.

TREATMENT.—Remove cause. Give teaspoonful of castor oil. Stop feeding hard food or grit for some days. Give mash of stale bread and milk with rice water or boiled milk for drink.

The foregoing description of the ailment is given at length for the benefit of numerous inquirers and others, who are feeding for eggs in winter.

A TRYING MONTH.

The month of March seemed to be the most trying to all the laying stock. It was at that time that the Spanish breeds seemed more predisposed to egg eating and feather picking. This was attributed to the long period of artificial life and treatment, in comparatively limited quarters, and it was so stated in the annual report of 1893. But later observation, the results of which are given in this report, showed that the main cause was not such as was supposed at that time.

It was also noticed that, when the ground was free of snow in spring and the fowls had outside run, all trouble ceased.

CONCLUSIONS ARRIVED AT FROM THE FOREGOING.

The conclusions arrived at from the foregoing experience and that of correspondents are :—

1. That there had been too many and not variety enough in the rations fed during winter.
2. That the warm morning mash had been fed in too liberal quantity, if not too frequently.
3. That more exercise and more green stuff were necessary.
4. That lime for shell should be conveyed, if possible, in the form of a ration, as well as being before the layers in the shape of crushed oyster shells.
5. That it is of paramount importance to have the winter layers over moult early; of the proper age and into winter quarters neither too fat nor too lean.
6. That the handling of the winter layers, so as to have them over their moult early and into winter quarters in proper condition, must begin in summer.

THE REMEDY APPLIED AND WHEN AND HOW.

In the summer and fall of the past three years the handling of the laying stock, so as to procure an early moult, was successfully carried out, as described in the reports of those years. But it was not until the fall of 1896 that it was decided to reduce the number of rations. Accordingly, when the laying stock went into winter quarters in November, 1896, the noon ration was dropped and the morning ration slightly reduced. The rations were then two in number, viz., morning and afternoon, instead of three, a reduction of nearly one-third. The result was nearly one-third more eggs. Details are given further on.

The year is dated from the 1st of November of each year named, as winter laying usually begins in that month.

THE MODIFIED RATIONS.—HOW MADE UP.—HOW FED.

The number of layers in the fall of 1896, and to which the modified rations were fed, was 204, composed of 151 hens and 53 pullets. The reduced rations were as follows.

MORNING RATION.

Three mornings of the week, cut green bones; the other three mornings, a warm mash. The green bones were got from the butcher shops and were cut up by a bone cutting machine, run by power. The mash was composed of shorts, ground oats, ground barley, ground rye, wheat bran, steamed lawn clippings, or steamed clover hay, the latter cut into short lengths. The lawn clippings and clover hay were prepared by placing the quantity thought sufficient, into a pot, containing boiling water, the night previous and allowing it to steam all night. The mash was mixed with boiling water. Sometimes for a change boiled turnips, or small potatoes were mixed into the mash.

On Sunday morning whole grain was usually fed.

NO NOON RATION.

No noon ration was given, but mangels, turnips and cabbage were before the fowls, all the time.

AFTERNOON RATION.

Whole grain, wheat or buckwheat, principally the latter while it lasted. Sometimes oats were mixed with the buckwheat, more frequently so in late spring and early summer.

QUANTITY FED.

The cut green bones were fed in the proportion of one pound to every fifteen hens. The mash in quantities of one quart to every twenty, or twenty-five hens. This may seem a small ration, but reasons for it are given further on. The afternoon meal was 20 pounds of wheat, or buckwheat, to 204 fowls.

WHAT WAS AIMED AT.

The aim in feeding the above rations was:—

1. To avoid an overfat condition.
2. To incite the layers to greater activity.
3. To convey lime for shell in form of cut green bone ration.
4. To furnish a greater quantity of green stuff.
5. To have as much variety in rations as possible.
6. To avoid many of the ills and vicious propensities noted in former years.

HOW OVERFEEDING WAS AVOIDED.

There was no hard and fast rule, as to the frequency with which the cut green bone was fed. When the hens were laying well a little would be fed, perhaps, every morning On such times no mash was used. Immediately after the morning ration a few handsfull of grain were thrown in the litter on the floor of the pens, so as to start the hens busily searching for it. Great care was taken in feeding the mash. Experience has proved that the overfeeding of the morning mash is the rock on which many farmers and poultry keepers are wrecked, in their eagerness to obtain eggs in winter. Experience has proved that disastrous results will surely follow the overfeeding of the morning ration of whatever kind. Particular mention is made of the mash, because it is so generally fed. It must not be inferred that objection is taken to the mash. It is useful and convenient in utilizing the waste of table, kitchen and barn, but it must not be overfed. The object in reducing and limiting the quantity of the soft mash, is to prevent the possibility of gorging the laying stock, at the early meal and so have them disinclined for the exercise, so requisite.

EXERCISE AND HOW BROUGHT ABOUT.

Having had a light morning meal the layers were ready for exercise and this was incited by throwing two or three handsfull of grain—as already stated—in the straw, cut hay, dry leaves or chaff composing the all essential dry litter, to be found on the floor of all well equipped poultry houses. The aim was to keep the layers, for the remainder of the day, so busy searching for the scattered grain, that their crops would be gradually filled by the time they went to roost. Certainly, a more natural way than by rapidly filling their crops with grain thrown on a bare floor, or into a trough. The afternoon grain ration was always fed early, so as to permit of the search being kept up. Too much importance cannot be placed on the exercise part of the winter management.

A POINT TO REMEMBER.

The reason for feeding the morning ration will be at once apparent, from the above. Had the hens been gorged, at the morning ration, they would certainly not have been inclined for exertion.

VARIETY.

Variety in composition of rations and time of feeding them was found beneficial. To have such variety, the cut bones were sometimes given for afternoon ration.

Again, the mash would occasionally be fed at that time. When fed at the latter period, it was followed by a light grain ration, which was scattered in the litter on the floor, to secure the desired exercise.

ONE CONSPICUOUS RESULT.

An early and conspicuous result of the dropping of the noon and reduction of the morning ration was the greatly increased quantity of vegetables and grit eaten. As already stated, vegetables were always before the layers, as were mica chrystal grit and crushed oyster shells.

APPARENT RESULT IN INCREASED EARLY EGG YIELD.

Another apparent beneficial result from the reduced rations, coupled with the early moulting of the layers, was noted in an increased egg yield in the comparatively early winter months of November and December, as shown by the following figures :—

——	1894.	1895.	1896.
November	114	160	568
December	538	943	1,466

The number of hens in each year were :—

1894	185
1895	218
1896	204

It will be noticed that the number of fowls was less in 1894, than in the other two years, but not so great as to make the difference in the number of eggs.

The early and increased results were gratifying because new laid eggs were in great demand, as they usually are in November and December, particularly so at the Christmas season.

COMPARATIVE EGG YIELDS.

The egg yield of the whole year, as compared with that of the three previous years, will best show any beneficial results from the decrease in quantity of food. The year is dated from the beginning of November of one year to the end of October of the year fullowing, for the reason that winter laying has usually begun in November. The figures are as follows :—

November (1893)	90	114	160	568
December (1893)	250	538	943	1,466
January	777	819	1,469	1,540
February	791	1,080	1,411	1,351
March	1,644	1,387	1,569	1,668
April	1,939	1,823	1,934	2,139
May	1,650	1,603	1,699	1,846
June	1,066	1,134	897	1,190
July	941	456	682	859
August	386	438	395	736
September	236	246	143	655
October	161	23	150	339
	8,931	9,661	11,452	14,357

The figures for the months of November and December of 1893 are estimated, as the record book could not be found, but they are not much out of the way.

The table shows a large increase in the output of eggs in the past year as compared with the three previous years. It is also an object lesson to the farmers as showing :—

1. Eggs were most in supply during the period of high prices.
2. During the spring months, of comparatively low prices, there were eggs enough to sell and hatch early chickens from.
3. The male chicks would be valuable as early birds for market. The pullets would be valuable as early layers.
4. That with proper care and feeding fowls will lay well during the winter season.

EGGS LAID PER DAY IN WINTER MONTHS.

The following is the production of eggs per day in the winter months named and the price of eggs during that time :—

DECEMBER, 1896.—38, 36, 31, 39, 43, 29, 40, 41, 45, 42, 42, 42, 42, 48, 47, 46, 50, 47, 52, 54, 57, 45, 54, 55, 55, 45, 64, 60, 52, 68, 55=1466.

JANUARY, 1897.—52, 61, 53, 53, 52, 54, 45, 57, 42, 51, 48, 46, 44, 50, 46, 53, 43, 49, 50, 42, 54, 50, 53, 47, 50, 54, 44, 54, 52, 40, 51=1540.

FEBRUARY.—45, 57, 51, 42, 46, 51, 40, 52. 48, 46, 50, 43, 47, 48, 44, 44, 49, 58, 48, 45, 52, 51, 45, 52, 46, 43, 51, 56=1351.

MARCH.—45, 60, 44, 59, 47, 54, 55, 54, 58, 51, 48, 57, 64, 47, 56, 44, 50, 50, 61, 43, 59, 51, 61, 53, 59, 50, 52, 55, 65, 57, 60=1668.

WHAT THE EGGS WERE SOLD FOR.

Eggs were sold, in Ottawa, from 1st to 15th of December, at 30 cts. per dozen ; during the latter half of that month at 35 cts. per doz. In January at 35 cts. per doz. in Ottawa. A shipment of eggs to Montreal during January brought 40 cts. per doz. The express charge for the case of 18 doz. eggs was 36 cts.

During February continued mild weather brought the price down to 25 cents. March, the prevailing price was 20 cts. per doz., declining to 18 cts. per doz.

COST OF DAILY RATIONS.

The cost of the daily rations fed to the laying stock, numbering 204, was estimated at 41 cts., as follows:—

18 lbs. of cut green bone at 1 ct. per lb.	18
20 " wheat, buckwheat, &c., at 1 ct. per lb.	20
Grit and vegetables	3
	41 cts.

To this should be added the time of the man in cutting up the bones by the machine, sometimes half or three quarters of an hour. It should also be stated that buckwheat was mostly used for cut rations during the winter months. To offset this is to be considered the worth of the manure, which a bulletin from the Raleigh, North Carolina, Experimental Station values at half the cost of the feed of the hen for the year, but which we allow to go for the trouble of the farmer in looking after and feeding his fowls.

When mash was fed it was composed of ground grains, in such quantity as not to exceed the value of 18 cts.

The allowance of 1 cent per lb. for the whole grain is liberal, for buckwheat sold in the fall and early part of the winter at 22 and 25 cts. per bushel.

EGGS SOLD AT THE HIGHEST PRICES.

Having obtained the new-laid eggs in the season of highest prices, the aim was to dispose of them to the best possible advantage. With a little effort the best results were obtained. The following is an instance:—

On the 30th of December, as shown in the above table, the greatest number of eggs laid on any day, in that month, was collected, viz.: five dozen and eight (68). These eggs were disposed of at the following prices:—

5 doz. and 8 eggs at 35 cts. per doz	$1 97
Deduct cost of rations	0 41
Proceeds of that day	$1 56

But as that was the day of the greatest production, it is but fair to give the average of the month, which was 48, or four dozen per day.

4 doz. eggs at average price of 33 cts. per doz.	$1 32
Deduct cost of rations	0 41
	$0 91

The eggs were strictly fresh and were sold in the city of Ottawa. In the same month eggs of the same description were worth in Montreal from ten to fifteen cents more per dozen. Had the eggs been sent to a leading grocer of that city they would probably have made the larger figure, less express charges.

LESSONS FROM THE ABOVE.

The lesson to the farmer is to obtain the new laid eggs in the winter season of high prices and having got the eggs to sell them—while they are strictly new laid—to leading grocers, dairymen, &c., or choice customers, who will always pay the high price for a reliable article. It may be said that the high figures named are not received by the majority of farmers. Perhaps not by farmers, who, are a distance from a high price market and who have to sell to a middleman. Certainly not by those who do not bring in a strictly new laid article. But the high figures are certainly received by farmers who cater to the requirements of a high price market, with strictly fresh eggs and a superior quality of poultry.

SUMMARY OF RESULTS NOTED.

The following is a summary of beneficial results noted, as following the reduction of the rations, with the care and handling of the laying stock, as described:—

1. Better health of the laying stock.
2. Greater output of eggs.
3. No development of vicious habits of previous years.
4. Comparatively few eggs laid with thin shells and none with soft shells.
5. Much greater activity of the layers in searching for the grain scattered in litter on the floor.
6. Much better condition of the fowls, of all breeds, in February and March as compared with previous years.

EXPERIENCE REQUIRED.

The question may be asked, "Why was the disastrous results of overfeeding not discovered before?" The reply is that it requires several years of experience and careful observation before reliable data can be obtained. There were many statements made and read during the past few years but none had received confirmation by experiment. The management and feeding of his hens by the farmer, so as to obtain eggs in paying quantity from them in winter, is comparatively new and much is yet to be learned. The report of the poultry department for any year gives the experience of that year, which that of the following year may confirm or modify, and so the work goes on and all in the way of finding out cheaper and more effective rations.

BREEDING PENS MADE UP.

At the beginning of March the breeding pens were made up as follows:—

Date.	Breed.	How Mated.	Remarks.
March 2...	Barred Plymouth Rocks	1 cock 9 hens	
" 2...	White "	1 " 8 "	
" 2...	Silver Laced Wyandottes	1 cockerel 9 "	
" 2...	Light Brahmas	1 cock 7 "	
" 2...	Black Minorcas	1 " 9 "	
" 2...	White "	1 " 8 "	
" 2...	Andalusians	1 " 9 "	
" 2...	Coloured Dorkings	1 " 8 "	
" 2...	Houdans	1 " 3 "	
" 2...	Black Minorcas	1 cockerel 4 "	Second pen.
" 11...	White Leghorns	1 " 11 "	
" 11...	White Wyandottes	1 " 7 "	
" 11...	White Plymouth Rocks	1 cock 3 pullets	Second pen.
" 13...	Langshans	1 cockerel 9 hens	

The eggs most in demand for setting were those of Barred and White Plymouth Rocks, Black Minorcas, Silver Laced Wyandottes and White Javas, in the order named. There was a greater demand for eggs of the Barred Plymouth Rocks than could be filled. It is gratifying to note that the popularity of this breed is steadily increasing. It is certainly good for both egg production and flesh development. Of equal merit is the Wyandotte family with its varieties of Silver Laced, White, Black, Golden and Buff. As prolific layers of large white eggs the Black Minorcas have taken a front place, and deservedly so.

HOW THE EGGS WERE SET.

The eggs were set in specially prepared nests, placed in a portion of the poultry house set apart for the purpose. In close proximity to the sitters was their food, composed of mixed grains, grit, water and dust bath. The mixed grains were contained in a narrow trough. For early sitters Wyandottes were preferred, as being docile, easily handled and not clumsy. Some of the cross bred hens were found to make excellent sitters and mothers. On being made, the nest was dusted with carbolic disinfecting powder, and so was the body of the sitter, before being placed on the nest.

AN EARLY HATCH.

At the beginning of February a vigorous male of the same breed, which had been kept in a separate compartment, was mated with a certain number of Barred Plymouth Rock hens. The object was to test the fertility of the eggs from hens which had been laying all winter. On the 20th of the month named, 13 eggs were given to a hen which had become broody. Three weeks after 11 lively chicks hatched out. The twelfth egg contained a dead chick, fully developed. The thirteenth egg was unfertile. Such a result from Plymouth Rock hens which had laid from the previous November was most gratifying. It went to show that it was quite possible to have hens lay all winter and to have early fertile eggs from them. The subsequent care and trouble experienced in rearing the chicks, went to show that it would not be profitable for a farmer to hatch out and rear chickens at that early period, unless he had a brooder or brooding room.

That the farmers in the neighbourhood of city markets, or within easy reach, by rail, of the same, are giving greater attention to the artificial rearing and hatching of chickens, is shown by the numerous inquiries by correspondents for information on the subject. Early chickens command a high price, and the demand for them increases year by year.

Further experiments in the way of testing the early fertility of eggs, from hens which have laid steadily all winter, will be important and interesting.

Certain poultrymen keep hens to lay eggs in the latter part of December, January, February and March, for incubator use only. These men live where climatic conditions make it comparatively easy so to do. But where the laying stock are confined to limited quarters from November to the following April, artificially housed and treated meanwhile, skill and experience are necessary to ensure early fertile eggs.

EGGS SET AND CHICKENS HATCHED.

When Set.	Description of Eggs.	When Hatched.	Chickens Hatched.
Feb. 20	13 B. P. Rock	Mar. 11	11
April 12	11 Light Brahma	May 3	3
" 12	11 Andalusian	" 3	4
" 14	13 B. P. Rock (from a farmer)	" 3	10
" 14	13 Langshan	" 5	2
" 14	13 White Minorca	" 5	9
" 14	13 R. C. B. Minorca (from Nova Scotia)	" 5	5
" 14	13 W. Wyandotte	" 5	5
" 14	13 W. P. Rock (from Hazeldean)	" 5	5
" 15	13 R. C. B. Minorca (from Nova Scotia)	" 6	3
" 17	13 B. P. Rock (from a farmer)	" 8	9
" 21	13 "	" 12	13
" 23	13 Brown Leghorn	" 14	10
" 30	13 Coloured Dorking	" 21	7
" 30	13 White Leghorn	" 21	4
" 30	13 White Java	" 21	4
May 5	12 Andalusian	" 26	4
" 5	12 W. Leghorn	" 26	7
" 7	13 Light Brahma	" 28	6
" 8	13 Andalusian	" 28	2
" 10	13 B. P. Rock	" 31	10
" 12	13 Andalusian	June 2	8
" 13	13 Coloured Dorking	" 3	5
" 13	13 White Java	" 3	8
" 22	13 Buff Leghorn (from Toronto)	" 12	1
" 23	13 S. L. Wyandotte	" 13	10
" 23	13 Coloured Dorking	" 13	2
" 27	13 W. Leghorn	" 17	9
" 27	13 "	" 17	11
June 3	13 B. Minorcas	" 24	9
			196

Many of the small hatches were the result of bad sitters. The experience with sitting hens, from year to year, is a varied and not altogether a happy one. During the early part of the season the Langshan cock, a very fine bird, sickened and notwithstanding treatment died. Later in the season the Andalusian cock also died. The latter was replaced by a younger bird. In both cases the want of fertility of the Langshan and Andalusian eggs may be attributed to the lack of condition, on the part of the male birds, prior to apparent symptoms of sickness. In the case of the Andalusian death was comparatively sudden. The Dorking cock was an old, but very fine bird. Some of his progeny are of more than ordinary worth. It will be seen from the above that the eggs which gave the best hatching results were from the Barred Plymouth Rocks, Silver Wyandottes and White Leghorns, notwithstanding that the hens of these breeds were the earliest and steadiest layers. The chickens hatched were strong and vigorous.

GROWTH OF THE CHICKENS.

The progress of the chicks was most satisfactory. After remaining in their nests until thoroughly ripe, with the mother hen they were placed in coops arranged in a field of short grass and clover. Their first food was stale bread, soaked in milk and squeezed dry. A little at a time was fed. Granulated oatmeal, or rolled oats was added on the second or third day. The food was placed on clean boards and none was allowed to remain to sour. Care was taken that the chickens were not overfed, which bad practice leads to much disaster. Grain was not fed until the twelfth or fourteenth day. Milk, at times, and pure water always, furnished all the drink required. As soon as the chicks were firmly on their legs, a mash made of cornmeal, shorts, oatmeal, &c., with a small quantity of blood meal added and the whole mixed with boiling water, or milk, or both was fed in moderate quantity and much relished. As in previous years the most rapid flesh development was made by Barred Plymouth Rock, Wyandotte, Java and Brahma cockerels. Without any forcing, other than regular feeding of wholesome food, in proper quantity and constant supply of pure water, there has never been any difficulty in having chickens of the breeds named weigh 4 pounds each, or 8 pounds per pair, at end of four months. In all cases such results were not attained, but would doubtless have been secured had the chicks been penned and fattened.

For instance a Barred Plymouth Rock cockerel was caught and sent away to a purchaser on the 26th October. It was hatched on the 11th March and when shipped weighed 7 pounds 5 ounces.

A Light Brahma Cockerel, hatched on 3rd May, weighed on 2nd November when it was shipped, 6 lbs 12 ozs.

A Barred Plymouth Rock cockerel, killed on the 17th of November, weighed after being bled and plucked 6 pounds 4 ounces. A pair of such chickens would have made weight of 12 pounds 8 ounces and would have been quickly bought by any leading dealer in Montreal, at 10 cents per pound, or $1.20 per pair. The farmer should aim to breed such chickens and he can easily do so, by keeping one of the breeds which make flesh development as mentioned above. A superior quality of poultry is in great demand in our leading cities, for home consumption, and export to the British market.

BEGINNING OF WINTER LAYING.

The fowls went into winter quarters in the second week of November. Winter laying may be said to have commenced about the 20th of the month. The first hens to resume laying were Plymouth Rocks, White Leghorns, Andalusians.

WHEN THE PULLETS BEGAN TO LAY.

The Plymouth Rock pullets hatched on the 11th March, three in number, matured early. The first egg laid, by one of their number, was on 20th September. The others laid soon after and continued to do so, up to time of writing, 26th November. The

moral is obvious. The early pullets begin to lay when the price of new laid eggs is becoming high. It is therefore an object to have early hatched pullets. The White Leghorn pullets, hatched at end of May, began to lay in the beginning of November.

WILD AND TAME GEESE.

In the spring a tame gander was mated with one of the wild geese and a wild gander with a tame goose. The object was to obtain progeny from the cross. The limited quarters were evidently not suitable, for no results followed. The wild goose laid her usual quota of six eggs but hatched no offspring. The wild goose, mated with the tame gander died during the early part of the summer. At the end of the season the second wild goose died. Both birds were twelve years of age, but were apparently in fair condition prior to death. It is evident that the wild fowl of this breed must have range and congenial surroundings to ensure fertile eggs. The cross of wild and tame geese is not uncommon, but in all cases the birds have had free range. While at Summerside, P.E.I., in September last, the writer was shown a large flock of geese, crosses of the wild and tame. The wild ganders did not attempt to leave the others, although all had unlimited range. The cross birds were large and plump and were sold at $2 each, when killed and sent to the Boston market.

STOCK ON HAND.

The stock in the poultry houses at present are :—

——	Cocks.	Hens.	Cockerels.	Pullets.
Barred Plymouth Rocks	1	12	2	28
White do	1	9	.....	4
Silver Laced Wyandottes	2	13	4	5
White Wyandottes	1	11	.....	3
Light Brahmas	1	9	3	3
Langshans	.....	7	.....	.....
White Javas	1	8	7	4
Coloured Dorkings	.....	7	3	4
White Leghorns	2	20	7	17
Brown do	.....	.....	1	3
Black Minorcas	1	7	11	4
White do	1	3	5	2
Andalusians	.....	9	4	.....
Golden Polands	2	2	.....	.....
Mixed hens	.....	26	.....	.....
	13	143	47	77

DISEASES OF POULTRY.

During the year several letters were received describing symptoms of different diseases. Two of the communications came from a distance and described symptoms of diseases unknown in this country. Where diseases were recognized, the best known treament was recommended.

THE PROFITS MADE BY FIFTY HENS.

The following experiment was conducted at the request of the House of Commons Agricultural and Colonization Committee. It will no doubt be interesting to farmers who cannot keep more than fifty hens. It shows the profit made by the number of fowls named and the manner in which they were managed and fed. The experiment

began on the 1st of April, 1896, and continued for one year. The hens selected were:—

Silver Laced Wyandottes	9
White Javas	7
Mixed, or common hens	34
	50

None of the fowls selected were over two years. The object in making the above selection was to have:—

1. Stock of the age to make good winter layers.
2. To have a certain number of thoroughbreds so as to permit comparison with the mixed hens.
3. A certain number of thoroughbreds, from which male birds could be raised to sell for market or breeding purposes, the pullets being retained for layers.

EGGS LAID.

The eggs laid by the fifty hens during the year were as follows:—

April	571
May	540
June	317
July	242
August	155
September	61
October	77
November	344
December	587
January	693
February	600
March	586
Total	4,773

As stated in foregoing part of report, the object was to get the eggs when they were worth most and to sell them at the best price obtainable. Receipts and expenses were as follows:—

RECEIPTS.

Eggs sold for eating purposes at prices of from 13 to 35 cents per dozen	$	78 69
Sold for hatching purposes		41 50
11 Cockerels sold at $1 each, viz.: 9 Silver Laced Wyandottes and 2 White Javas		11 00
8 Silver Laced Wyandotte pullets on hand in the fall, at $1 each		8 00
Total		139 19

EXPENDITURE.

Deduct cost of food for the year	$	40 26
do rearing 19 chickens		5 00
		45 26
Profit	$	93 93

The cost of rearing the 19 chickens is put at the highest figure. It is based on the calculation that the food of the hen costs 75 cents per annum. In this way, 75 x 8 give $6. The half of $6 = $3, for raising 6 pullets to six months of age. $2 are allowed to raise 11 Cockerels to marketable age, viz., four months.

THE PRICES OBTAINED FOR EGGS.

April, May, June, July, 95 doz. at 12 to 15 cents a doz.	$ 11 46
August, 13 doz. at 13 cents	1 69
September, 5 doz. at 20 cents	1 00
October, 6½ doz. at 20 cents	1 30
November, 29 doz. at 25 cents	7 25
December, 49 doz. at 32 cents, average price	15 68
January, 58 doz. at 33 cents	19 14
February, 50 doz. at 25 cents	12 50
March, 48 doz. and 2 eggs at 18 cents	8 67
41½ settings sold for hatching at $1 each	41 50
11 Cockerels, viz.: 9 Silver Laced Wyandottes, and 2 White Javas, at $1 each	11 00
8 Silver Laced Wyandotte pullets, at $1 each	8 00
	$ 139 19

DEDUCT.

Feed for the year	$40 26	
Cost of raising 11 Cockerels to marketable age, and pullets to laying age	5 00	
		45 26
Net profit		$93 93

DETAILS OF FEED BILL.

The cost of feed was made up as follows:—

Wheat, 1,882 lbs. at 1c per pound	$ 18 82
Oats, 244 lbs. at 1c. per lb	2 44
Buckwheat, 281 lbs. at 1c. per lb	2 81
Barley, 10 lbs. at 1c. per lb	0 10
Mash (ground grains), 440 lbs. at 1c. per lb	4 40
Cut green bone, 244 lbs. at 1c. per lb	2 44
Cooked refuse meat, 394 lbs. at 1½c. per lb	5 91
Blood meal, 8 lbs. 7 ozs. at 4c. per lb	0 34
Vegetables and grit	3 00
Total	$40 26

The allowance of one cent per pound for all the whole grain food was a liberal one. Indeed more than it was worth to a farmer.

THE PROFIT MADE.

The calculation given in a preceding page shows the profit made as $93.93, but reducing the cost of rearing the chickens and the value of the grain to farmers figure, the profit is very nearly, if not fully, $2 per head.

COST OF DAILY RATION.

The daily ration and cost were as follows :—

3½ lbs. cut bone at 1c	3½
5 lbs. wheat or buckwheat, at 1c	5
Grit and vegetables, say	1½
Total	10

PRODUCTION PER DIEM AND PRICES OBTAINED.

The following figures show the output of eggs per day by the 50 hens for December, January, February and March, period of high prices :—

December.—18, 16, 14, 18, 21, 13, 17, 16, 19, 18, 17, 14, 18, 20, 18, 19, 16, 18, 15, 19, 17, 22, 20, 23, 24, 18, 20, 27, 21, 28, 23 = 587. In this month eggs retailed at 30 and 35 cents per dozen in Ottawa.

January.—21, 27, 25, 18, 25, 23, 18, 26, 21, 23, 24, 21, 20, 23, 23, 25, 21, 25, 23, 20, 22, 20, 22, 22, 21, 22, 21, 26, 24, 19, 22 = 693. Eggs sold at 30 and 35 cents. Eighteen dozen sent to Montreal fetched 40 cents per dozen.

February.—22, 27, 23, 20, 24, 23, 19, 23, 19, 22, 20, 15, 23, 19, 18, 15, 25, 25, 20, 22, 23, 21, 20, 25, 17, 23, 23, 24 = 600. Eggs sold at 25 cents per dozen.

March.—20, 24, 18, 25, 18, 25, 23, 21, 23, 22, 19, 26, 19, 20, 14, 18, 11, 20, 15, 13, 12, 15, 14, 18, 18, 17, 17, 20, 20, 19, 22 = 586. Eggs sold at 18 cents.

From the above it will be seen how much profit was made during the winter months named, with cost of production at no more than ten cents per diem.

EGGS LAID BY THE DIFFERENT BREEDS.

The following will show the number of eggs laid by the different breeds :—

	April.	May.	June.	November.	December.	January	February.	March.	Total.
9 Silver Laced Wyandotte hens.	87	78	63	48	172	169	154	121	892
7 White Java hens	122	112	59	14	19	(replaced on 22nd December by 11 Silver Laced Wyandotte pullets.)			326
11 Silver Laced Wyandotte pullets	...	...	...	...	51	160	134	114	459
Mixed hens	233	209	142	52	191	198	169	206	1,400
11 Plymouth Rock and Dorking Cross hens	129	141	53	59	154	166	143	145	990
(Eggs laid by all hens when running at large during months of July, August, September and October)									706
Total									4,773

COST OF PRODUCTION IN SUMMER.

Exception may be taken to the high figures obtained for the eggs sold in the winter months. The following statement made to the committee will show that fifty hens, running at large, in the summer season of low prices, should not cost the farmer more than four cents per day :—

"Not many days ago a farmer visited me, and I put the case to him in this way. I said: We reduced the cost of rations of fifty hens, during last winter, to ten cents per day. On these rations they laid well and were in perfect health. My opinion is that with the laying stock running at large—as they do in most cases—the cost of the fifty

hens per day to a farmer could be reduced to five cents, if not to four cents. I calculated, that as prices go, four cents would buy five pounds of sound grain, say buckwheat and oats mixed, or wheat and oats. I would give half of the quantity in the morning, and the remainder for evening ration. Meanwhile the hens have had opportunity to find insect life, grit and green stuff, and would return with their crops well filled, and the 2½ pounds of grain would be quite enough for them. He said that under the circumstances he did not think the cost would be any more. I further explained that my object was to show that the production of a dozen eggs, in such a case, should not cost more than four cents, and that a greater number would likely be laid by the fifty hens, during the day. Speaking on the subject to a friend who lives in the neighbourhood of the city limits, and who successfully manages a flock of Barred Plymouth Rocks, he remarked that he thought he was doing something very like what I stated. I asked him to give me his figures, and he did so in the following letter which I submit to you :—

OTTAWA, June 8, 1897.

Mr. A. G. GILBERT,
Experimental Farm.

DEAR SIR,—My answer to your question, "How much does it cost me per dozen to produce eggs in the summer months?" is—two and a half cents. I find that twenty of my hens (Barred Plymouth Rocks) will lay an average of one dozen a day from 1st of March until 1st of September, on the following rations :—

1½ pounds of shorts, mixed with cooked vegetables, in the morning, 1½ cents ;
2 pounds of buckwheat in the evening, at 25 cents per bushel, 1 cent.
Making together 2½ cents.

The vegetables used are culls, of no market value, and when not available, skimmed milk is used to moisten the meal. My hens are at liberty to forage about the pastures and yards, and the abundant supply of worms, grubs and insects make up any deficiency that I do not supply.

Yours sincerely,
S. SHORT.

I would not use skim-milk as Mr. Short does, because skim-milk with us is, to a certain extent, costly. I consider such a letter important. It goes to confirm my point and to show farmers that no matter how low prices of eggs have been, there yet remained a margin of profit.

REPORT OF THE FOREMAN OF FORESTRY.

(W. T. MACOUN.)

DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I beg to submit, herewith, my fourth annual report as Foreman of Forestry in which will be found information relating to the forest belts at the Central Experi mental Farm ; the arboretum and progress of the work there ; the planting of orna mental trees and shrubs with a list of one hundred of the hardiest and most ornamental species and varieties ; information relating to the growing of perennials, with a list of one hundred of the best species and varieties ; hints on hedge planting with a list of the hedges growing at the farm ; and notes on the condition of, and work in connection with, the ornamental grounds.

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

W. T. MACOUN.

It is not often that two such trying winters as the past have been, follow one another so closely. Both were characterized by lack of snow, very severe frosts, with intervals of mild weather, and generally unfavourable conditions for the wintering of trees, shrubs, and plants. It was feared that many losses would be discovered in the spring of 1897, especially when it was remembered what a rigorous winter the trees and shrubs had experienced, but, when growth commenced, it was found that the proportion of deaths was little above the average, and in many cases, partly tender species were not killed back so much as in former years. The early part of April was mild, but during the third week of that month the weather became quite cold, the temperature falling on the 19th and 20th to seventeen and nineteen degrees below freezing, which checked the swelling buds for a time. Very cool weather, with frost at nights during the third week of May, no doubt injured the buds on some of the earlier flowering shrubs which did not make as fine a show as in some seasons. The summer was dry and the trees and shrubs did not all have that robust appearance, nor make as vigorous a growth, as in other years. The last week of July, however, was very wet, the almost continuous downpour of warm rain causing many of the trees to make a second growth. September and October were two of the driest months recorded in Ottawa for many years. The drought coming at a time when growth had ceased, no apparent harm was done the trees and shrubs, and it is hoped that the wood of tender sorts, having had such favourable conditions for ripening, will be enabled to withstand the winter better.

TREE PLANTING.

Some of the farmers in the more thickly settled parts of Ontario are beginning to feel the need of convenient forests from which they may obtain wood for their constant needs. The timbered land remaining on their own farms has, in many cases, become so depleted through careless management that the supply available does not now meet the demands made upon it. As a result of this the farmer is often obliged to go some distance to get the material he desires. The time has now come when it behooves the owner of a farm to consider the value of the wood crop as well as that of his grain or other crops.

Where timber lands still remain on the farm they should be properly cared for so that they may continue to yield supplies of fuel. It is the custom with many farmers when grass has become scarce during the summer months to let their cattle pasture in the woods; the result is that the young seedling trees are destroyed, which, if protected, would grow up to replace those which are cut down. This practice should be avoided, if possible. Furthermore, in cutting his trees for fuel the farmer frequently takes those which are in their prime and leaves the largest and partly decayed, which are more difficult to handle. It would be wiser to fell the oldest and most matured trees first and follow with those remaining in the order of their size and age. Judicious cutting is very essential to permanency of the wood supply. Too much care cannot be taken, also, in felling the trees, for if this is done carelessly many young trees will be destroyed. A forest cover, more or less perfect, should also be encouraged, and those favourable conditions of moisture maintained which trees require to produce the most vigorous growth.

Where there is no woodland on the farm, such portions as are too poor to yield good crops, or hillsides that may be inconvenient to cultivate, may be turned with good advantage into a forest if proper measures are promptly taken to plant these areas with trees. Where all the soil is good and there are no hillsides, a belt of trees could be planted along the northern and western sides of the farm, which, while they would serve the purpose of windbreaks, would also become in time valuable for fuel or timber.

FOREST BELTS AT THE CENTRAL EXPERIMENTAL FARM.

The forest belts at the Central Experimental Farm extend along its northern and western boundaries; the belt on the western boundary is 165 feet wide, and that on the northern boundary, 65 feet; their total length being nearly $1\frac{3}{4}$ miles. The number of trees growing in these belts, including those in an evergreen clump, is about 20,500. The objects, for which these forest belts were planted, are well expressed in the report of the director for 1893 as follows:—

"There were several objects in view in planting the belts of forest trees which line the west and north sides of the farm. One was to test by actual experiment with a number of different species the comparative results in growth and development to be had by planting at different distances apart. Five feet by five, five feet by ten and ten feet by ten were the distances chosen for these tests. Another question on which information was desired was the relative growth to which trees would attain when planted in blocks of single species as compared with those planted in mixed clumps where they are associated with a number of other sorts. Further information was sought as to how far the crops on the farm located near these tree belts will be influenced by the shelter they would afford as growth progressed. In the planting, the grouping was also designed with the object of producing pleasing effects on the landscape by the intermingling and blending of varieties. The main purpose, however, was to get all the useful data possible with regard to the more important timber trees of economic value so that object lessons in tree growth might be available to any who in future might desire to study this subject or to engage in the enterprise of timber growing."

Although it is but nine years since the first trees were planted in the belts referred to, the growth already made is a useful object lesson and should encourage the more

View in Forest Belt at Central Experimental Farm, Ottawa, July, 1897, showing Black Walnut planted in spring of 1889, five by five feet apart, when two years old.

View in Forest Belt at Central Experimental Farm, Ottawa, July, 1897, showing White Pine planted in spring of 1889, when eight to ten inches high, five by five feet apart.

extensive planting of timber trees. The soil in which the trees were planted was in many instances poor, and while a number of species appear to succeed almost as well on poor as on good land, yet some kinds require good soil in order to grow them successfully. As to the distance apart at which it is desirable that trees should be planted, those which were put five by five feet apart are making, in most cases, the best trees for timber purposes, as the lower limbs are dying, leaving the trunks clean which will make the wood freer from knots than where planted ten by ten, or ten by five feet apart as at those distances there are, as yet, few instances where the lower limbs have died. The trees planted five by five feet apart, also make make more growth in height than where wider planting was adopted, but the diameter of the trunk is not so great, The closely planted trees are more protected from storms and there are fewer broken tops and crooked stems. The desirability of close planting is also very apparent in the condition of the surface of the ground where the trees are ten feet apart, which, in a number of cases, still requires cultivation although the trees have been planted for eight years, which is necessary in order to keep sod from forming and checking the growth of the trees, whereas, in most instances where the trees are planted five by five feet apart the surface soil is kept shaded and moist, and sod does not form. As the conditions of soil are different in the belts where the trees are planted in clumps of a single species and where the several kinds are mixed together, a fair comparison of these two methods of planting cannot yet be made, but the advantages derived from mixing the leafier sorts of trees with those which are not very leafy, are already apparent. Where thin foliaged trees have been planted five by five feet apart and have had eight years' growth, the sod still forms very readily unless the soil is kept cultivated, thus showing that sufficient shade is not afforded to prevent the growth of grass and weeds.

The black walnut (*Juglans nigra*) does not succeed well on all kinds of soils. Unfortunately most of that in the forest belts at the Central Experimental Farm is not very suitable for this tree, although in some places they are doing well. Those which were planted in a cold, compact, light sandy loam are almost at a standstill; in a warmer light sandy loam with gravel they are doing much better, but not making thoroughly satisfactory growth, while in the mixed belt, where the soil is a rather stiff clay loam, they are doing best. By consulting the table the growth of this tree in these different kinds of soil will be found.

The white pine (*Pinus Strobus*) has made very satisfactory growth in the belts. This is due, undoubtedly, in a large measure, to the fact that the soil chosen for this test proved suitable for them, being a warm, light, sandy, loam. On gravelly soil they have also done well. This pine makes a very rapid growth, and young trees planted in the spring of 1889, when 8 to 10 inches high, now average about 15 feet in height, with a diameter one foot from the ground of from 3 to 4 inches.

The European larch (*Larix europaea*) is also a very rapid growing tree, and seems to do equally as well on a warm sandy loam; a cold, compact, light, sandy loam, and a clay loam. The trees, in the plantation in the forest belt growing in a cold compact sandy loam, are now from 19 to 22 feet in height, with a diameter, one foot from the ground, of from 4 to 5 inches.

The white ash (*Fraxinus americana*) planted in 1889 and growing in a black loam have made very rapid growth and are now about 20 feet in height, with a diameter one foot from the ground of 3 inches. The black, green, and red ash, in the same soil, have made slower growth.

The Scotch pine (*Pinus sylvestris*) does well on a clay loam, a gravelly soil, a warm sandy loam, and a cold compact sandy loam. Planted in 1888 on a cold sandy loam when 18 inches high, they are now 16 feet in height, with a diameter one foot from the ground of 4 to 5 inches.

The canoe birch (*Betula papyrifera*) planted in 1889 in a light sandy loam soil have made rapid growth and are now from 23 to 26 feet in height and 3 to 5 inches in diameter. The branches of this tree have already died, where the trees are planted five by five feet apart, to a height of 8 feet.

GROWTH of Trees in the Forest Belts

Name of Species.	Character of Soil.	When Planted.	Distance Apart.	Age or Height when Planted.
			feet.	
Black Walnut—Juglans nigra	Low sandy loam	1888	5 x 5	1 year
do do	do	1888	10 x 10	1 do
do do	Sandy loam with small stones.	1889	5 x 5	2 do
do do	do do	1889	10 x 10	2 do
do do	Clay loam	1888	10 x 5	1 do
Butternut—Juglans cinerea	Low sandy loam	1888	5 x 5	1 do
do do	do	1888	10 x 10	1 do
Silver-leaved Maple—Acer dasycarpum	Light sandy loam	1889	5 x 5	3 do
do do	do	1889	10 x 10	3 do
European White Birch—Betula alba	do	1889	5 x 5	3 do
do do	do	1889	10 x 10	3 do
Canoe Birch—Betula papyrifera	do	1889	5 x 5	3 do
do do	do	1889	10 x 10	3 do
Yellow Birch—Betula lutea	do	1889	5 x 5	3 do
do do	do	1889	10 x 10	3 do
White Elm—Ulmus americana	Sandy loam	1889	5 x 5	3 do
do do	do	1889	10 x 10	3 do
Black Ash—Fraxinus sambucifolia	Black muck	1889	5 x 5	2 do
do do	Low sandy loam	1889	10 x 10	2 do
Green Ash—Fraxinus viridis	Black muck	1889	5 x 5	3 do
do do	Low sandy loam	1889	10 x 10	3 do
Red Ash—Fraxinus pubescens	Black muck	1889	5 x 5	2 do
do do	Light sandy loam	1889	10 x 10	2 do
White Ash—Fraxinus americana	Black muck	1889	5 x 5	3 do
do do	Light sandy loam	1889	10 x 10	3 do
Black Cherry—Prunus serotina	Light sandy loam and gravel.	1889	5 x 5	3 do
do do	do do	1889	10 x 10	3 do
Box Elder—Negundo aceroides	Light sandy loam	1889	5 x 5	2 do
Bolle's Poplar—Populus alba Bolleana	do	1890	5 x 5	1 do
do do	do	1890	10 x 10	1 do
Scotch Pine—Pinus sylvestris	Sandy loam with gravel	1888	5 x 5	18 inches
do do	do do	1888	10 x 10	18 do
do do	Low sandy loam with gravel.	1888	5 x 5	18 do
do do	Low sandy loam	1888	10 x 10	18 do
do do	Light sandy loam	1888	10 x 5	18 do
do do	Clay loam	1888	10 x 5	18 do
do do	Light sandy loam and gravel.	1888	10 x 5	18 do
do do	do do	1887	3 x 3	9 do
Austrian Pine—Pinus austriaca	Light sandy loam	1889	5 x 5	18 do
do do	do	1889	10 x 10	18 do
do do	do	1888	10 x 5	15 do
do do	Clay loam	1888	10 x 5	15 do
do do	Light sandy loam and gravel.	1888	10 x 5	15 do
do do	do do	1887	3 x 3	15 do
White Spruce—Picea alba	Light sandy loam	1889	5 x 5	15 do
do do	do	1889	10 x 10	15 do
Norway Spruce—Picea excelsa	do	1889	5 x 5	18 do
do do	do	1889	10 x 10	18 do
do do	do	1888	10 x 5	15 do
do do	Clay loam	1888	10 x 5	15 do
American Arbor-vitæ—Thuya occidentalis	Low sandy loam and black muck.	1889	5 x 5	18 do
do do	Low sandy loam	1889	10 x 10	18 do
European Larch—Larix europæa	do	1888	5 x 5	2 feet
do do	do	1888	10 x 10	2 do
White Pine—Pinus Strobus	Light sandy loam with gravel.	1889	5 x 5	8 to 10 in.
do do	do do	1889	10 x 10	8 to 10 in.

In the above table the average growth is given of most of the important timber trees growing in the measurement of average trees, and give a fairly accurate idea of the growth these make each year. Until spread so much that it was difficult to determine the leader, hence the total height is now taken. This are very divergent, or the extremities pendulous, the total height is given as less than that of the year

at the Central Experimental Farm.

Average Height, Autumn of						Average Growth in						Average Circumference 1 Foot from Ground.			
1895.		1896.		1897.		1892.	1893.	1894.	1895.	1896.	1897.	1893.	1895.	1896.	1897.
ft.	in.	ft.	in.	ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
9	11½	10	6	10	9	26	23	21	18	6	3	5⅛	7⅜	8 7/16	8⅛
5	5	5	8½	5	10½	12	17½	11	9	3½	2	3	5	5⅛	5 7/16
12	8	13	9	14	5	37½	28	36	19	13	8	.....	8⅛	9 3/16	9 1/16
8	4½	8	7½	8	12½	15	25	28	15	3	5	.....	7⅜	8⅜	8⅜
12	5	13	2	13	5	31	31	31	15½	9	3	.....	10⅜	11 1/16	12 3/16
9	11	10	7	10	10	19	24	18	10½	8	3	.....	6½	7 1/16	7½
6	2½	6	9	7	4	18	15	15	16	7	7	....	4⅜	6⅛	6⅝
23	2	24	4	25	3	37	40	33	29	14	11	.....	9¼	9½	9⅜
22	6	23	1	23	7	53	38	33	20½	7	6	.....	13	13⅜	14⅜
23	1	25	4	28	8	58	18	17	14	27	40	.....	10⅛	11 11/16	12⅝
24	11	26	7	31	1	36	32	30	30	20	54	. . .	15⅝	17 5/16	19¼
21	9	23	7	25	10	46	36	22	14	22	27	.....	9⅜	10	10 5/16
21	2	23	5	25	7	34	24	33	28	27	26	..	13	14¼	15 1/16
16	6	17	1	18	6	47	30	35½	21	7	17	6⅜	8¼	9⅛	9⅝
16	1	16	7	18	1	41	33	26	21	6	18	8	11½	12⅜	13 1/16
14	5	14	4	15	1	33	38	27½	23	0	9	5½	6⅜	7⅛	7⅜
13	9	14		14	9	44	31	25	18	3	9	6	9	9⅛	10 1/16
12		12	11	13	11	38	26	32	8	11	12	5	6¼	6 1/16	7 1/16
8	4	9	3	9	1	20	23	19	8	11	0	3½	5	5 1/16	5⅜
15		15	11	17	7	30	31	29	20	11	20	6¼	7⅜	8⅝	9 5/16
14	3	15	5	15	7	28	24	21½	21	14	3	7¼	8½	9⅛	9⅜
15	5	16	11	18	4	31	34	39	33	18	17	5	7	8 7/16	8 3/16
12	5	13	8	14	5½	26	32	27½	21	15	9	4⅛	6¼	7⅛	7 1/16
18	5	20	8	22	3	32	41	58	36	27	19	5¼	7	8 1/16	8 3/16
15	9	17	9	19	7	38	38	37	25	24	22	5¾	8⅜	9 3/16	10 3/16
16	7	17	4	18	4	29	21	22	19	9	12	.....	8½	9¼	9 1/16
18	2	19	4	21	2	40	39	32	26	17	20	.....	11⅜	11⅜	11 1/16
19	1	20	6	22	2	38	38	39	29	14	22	8¼	10½	12⅝	13⅜
24	2	26	4	27	11	46	68	63	70	26	19	....	11¼	12 1/16	12⅝
22	11	25	4	27	11	40	55	70	74	29	31	.....	12½	15⅜	17⅛
14	4	16	9	18	11	29	28	35½	31	29	26	7⅜	10	11	11⅝
11		13	3	15	7	15	22	28½	29	27	28	9 1/16	12	15 1/16	16½
13	4	15	4	17	6	26	29	32½	29	24	26	7⅜	9½	10⅜	11 3/16
11	6	13	8	15	8	20	23	29	29	26	24	8¾	13¼	15⅜	17 1/16
14	10	17	2	19	2	25	31	35	34	28	24	.....	15½	18	20⅜
11	11	14	2	16	3½	20	23	32	31	27	25½	.....	12¼	14 7/16	16 7/16
14	11	17	1	18	8	29	30	36	33	26	19	. . .	15	17 7/16	18 1/16
14	3	16	6	18	9	22	23	26	28	27	27	5½	8¼	9 3/16	9 1/16
8	1	10	2	12		12½	18	23	22½	25	22	...	9	11¼	12 1/16
7	9½	9	10½	11	11	12	16	22	24	25	24½	....	10⅜	13¼	15⅜
8	11	10	11	12	5	18	21	24	24	24	18	.....	9¼	10⅜	12¼
9	2½	10	11½	12	4½	17	19	24½	22	21	17	.....	9¼	11⅜	12 3/16
10	5	12	3	13	11	22	22	26	25	22	20	.....	10⅜	13 5/16	14 1/16
10	6	12	1	13	4	21	19	22	21	19	15	. . .	8½	9⅜	10 1/16
8	5	9	10	10	9	12	21	21½	21	17	11	....	6½	6⅜	7 5/16
7	8	8	11	9	11	10	18	22	19	15	12	.....	6½	7⅜	8⅝
10	8	11	10	13		19	29	29	18	14	14	6	8¼	9¼	10⅜
10	1	12	2	14	5	16	23	25	27	25	27	5	8¼	10 3/16	11 3/16
10	10	13	1	15	9	19	25	23	28	27	32	.....	8	9 5/16	10 5/16
11	4	13	9	16	2	18	20	31	32	29	29	....	8⅛	9 7/16	11 7/16
9	1	10	2	11	6	21	23	15	15	13	16	.....	7⅜	9½	10 1/16
8		8	10	9	10	20	18	15	15	10	12	....	7¼	9⅛	10 13/32
19	3	20	3	21	9	35	41	45	31	12	18	8	11	11½	12 19/32
17	9	19	3	20	5	33	37	42	40	18	14	7½	12	13⅝	14⅜
10	11	13	4	15	8	19½	27½	27½	27½	29	28	4½	8	10	10 11/32
10	1⅛	12	7	15	2	16	24½	24	27	29	31	5	9¼	11 7/16	13 5/16

forest belts at the Central Experimental Farm. The figures published are the average results from the last year the annual growth was taken in measuring the trees, but the crowns of many of them began to change has lessened the apparent annual growth for the year, and in some cases, where the main branches previous.

ARBORETUM.

The arboretum at the Central Experimental Farm is yearly becoming better known and a much larger proportion of the visitors now see this part of the farm. The trees and shrubs are, many of them, becoming very prominent, the evergreens being especially attractive. Nearly all the genera which are hardy are now represented, some of them by a large number of species. The perennial border which is over half a mile long is almost filled with plants, and these from early spring until late autumn produce a succession of lovely and interesting flowers. Each year valuable data on the hardiness and time of blooming of the trees, shrubs and plants is secured, and it is hoped that in the near future a list will be published of all that have been tested in the arboretum in which these notes will appear.

PROGRESS OF THE WORK.

It was feared that, on account of the unfavourable winter, the number of deaths, among the trees and shrubs would be large, but on examination it was found that there were not many killed of those which had already wintered at Ottawa, with the exception of a large collection of named varieties of lilacs grafted on the Californian privet (*Ligustrum ovalifolium*), which were almost all destroyed. These had been growing here for three years but never made satisfactory growth. Lilacs grafted on privet are very unsuitable for this part of the country and should on no account be planted. Many new species and varieties of trees and shrubs were procured during the spring and autumn and a large area of additional land which had been broken up last year was utilized for them. The surface soil in the circles about the trees and shrubs, in the parts of the arboretum seeded down, was hoed several times during the summer, and weeds destroyed.

When the mulch of manure was removed from the perennial border it was found that most of the plants had come through the winter in good condition. Large additions were made during the spring, summer, and autumn, to the number grown in 1896 and nearly all the border prepared last autumn was utilized. Throughout the summer, the surface soil was kept loose and free from weeds, with the result that strong growth was made and the plants bloomed well. Stakes were driven down beside the taller growing perennials to prevent their breaking and these proved very effective.

The grass was cut with the pony lawn mower for the first time on the 14th of May and afterwards at intervals until the 15th of September, which kept the lawns at all times in good condition. About eight acres which had been kept cultivated since 1896 were seeded down with lawn grass during the summer and by autumn a very good sod was formed.

The new road machine did splendid work in making up the roads in the arboretum and several, which had previously been only staked out, were opened for the first time. Coal ashes are now being used, spread on the surface, on several of the roads, and when this is rolled in the spring it is hoped that a good firm road-bed will be formed.

Boys proved very mischievous on Sundays in the arboretum this year, plucking flowers, disturbing labels, and destroying valuable fruits and seeds. Notices were of no avail and nothing short of a police patrol is likely to stop the annoyance in future.

DONATIONS.

We again acknowledge, with gratitude, the donations of seeds which have been kindly furnished us by the Royal Gardens, Kew; the Arnold Arboretum; the Missouri Botanic Garden; the Massachusetts Botanic Garden; and the Royal Botanic Gardens, Sapporo, Japan. Acknowledgments are also due to Prof. John Macoun and Mr. J. M. Macoun, of the Geological Survey of Canada, for very useful contributions. A large and valuable collection of seeds of trees and shrubs was received from Mr. J. Niemetz, of Winnitza, Russia, who kindly had many of these collected, especially for the Canadian

Experimental Farms, in one of the coldest districts in Northern Russia. Several private individuals have also kindly contributed useful and acceptable material towards the collection.

ORNAMENTAL TREES AND SHRUBS.

In travelling through Canada, especially in the rural districts, one is often struck by the little effort made by the inhabitants to beautify their homes. With the wealth of native trees and shrubs growing all around, it is surprising that so few people take the trouble to use them for this purpose; and when to these are added other lovely flowering shrubs from foreign countries, easily procured, one fails to understand why the farm house and surroundings, remain bare and uninviting. Lack of time is often given as the cause of this neglect, but one or two trees and shrubs planted in the spring and autumn of each year take but little time, and would soon grow up to be attractive objects around the dwelling.

To get the best results in planting ornamental trees and shrubs, it is important to give them good soil to begin with, and if that in which they are to be planted is not of this quality, it will repay the planter to procure some, but no manure should be used about the roots in any case. Trees and shrubs from one to two feet in height are the best size for planting, as at that height they transplant easier and make more shapely specimens than when larger. The holes should be made somewhat larger than the roots actually require, and the tree or shrub planted a little lower in the ground than where it had been growing in the nursery or woods, and the hole then filled with good soil, pressed firmly about the roots. Great care should be taken that the roots do not become dry from the time they are dug until they are re-planted in their permanent position. This is especially applicable to evergreens. Planting may be done either in spring or autumn, but spring is the preferable time. The surface soil about the tree should be kept loose with the hoe throughout the summer, which will ensure a more rapid growth than if weeds or grass are allowed to grow about them. By keeping the soil loose each year in this manner, the tree or shrub will soon reach a good size. A mulch of manure applied late in the autumn on the surface of the soil about the tree, will protect the roots from severe frost during winter, and enrich the soil.

The following list of one hundred species and varieties of trees and shrubs, hardy at Ottawa, is given so that the intending planter may ascertain the best kinds to plant. The names in the list are selected from nearly 2,500 species and varieties, growing in the arboretum at the Central Experimental Farm, and are all of exceptional merit. Notes are given on each species so that the reader may know whether the tree or shrub is noted for its flowers, fruit, or foliage; when it blooms, where it is native; and the height it grows. For the information of those who have not room for a large collection the best twenty-five are distinguished by a star preceding the name.

LIST OF ONE HUNDRED HARDY ORNAMENTAL TREES AND SHRUBS.

1. *Acer dasycarpum laciniatum.*—Wier's cut-leaved maple (Canada), height, 40 to 50 feet. This is a cut-leaved variety of the native silver-leaved maple, which originated in Europe, and is a very quick growing, robust tree, with large, deeply cut leaves, and pendulous branches. It requires plenty of space to appear to the best advantage.

2. *Acer platanoides.*—Norway maple (Europe). Height, 30 to 50 feet. The Norway maple is one of the hardiest of ornamental trees. The dark green leaves appear before those of our native hard maple and fall from two to three weeks later in the autumn, but do not assume such a brilliant colour, the leaves having different shades of yellow.

* 3. *Acer platanoides Schwedleri.*—Schwedler's Norway maple. One of the best ornamental trees. The leaves are large and in the early part of the summer are of a bright, purplish red becoming duller as the season advances.

4. *Acer saccharinum.*—Hard, or sugar maple (Canada). Height, 50 to 70 feet. The hard maple needs no description. Its clean, clear green leaves, almost free from insect pests, handsome form, delicately and highly tinted leaves in autumn, recommend it as one of the best of hardy trees.

5. *Acer tataricum Ginnala.*—Ginnalian maple (Amurland). Height, 10 to 20 feet. The deeply cut, pretty leaves, of this little maple, make it ornamental throughout the summer, and in the autumn it rivals all other maples in the variety and brilliancy of its colouring.

6. *Æsculus (Pavia) flava.*—Sweet buckeye (United States). Height, 20 to 25 feet. In bloom, third week of May. Flowers, pale yellow. This is the tallest growing species of buckeye and forms a very shapely little tree.

7. *Æsculus Hippocastanum.*—Horse chestnut (Mountains of South-eastern Europe). The horse chestnut is well known. At Ottawa, all specimens have not proven hardy, but if procured from northern grown stock they should do well. This tree is very ornamental when in full leaf and flower.

8. *Alnus glutinosa imperialis.*—Imperial cut-leaved alder (Europe). Height, 20 to 30 feet. The cut-leaved alder is a very distinct and graceful tree with deeply cut fern-like leaves and pendulous branches.

9. *Ampelopsis quinquefolia hirsuta.*—Self fastening Virginian creeper (Ontario). It is unfortunate that this very valuable climber is not more widely distributed. The leaves are smaller than those of the ordinary form and quite downy, but the most marked distinction is its power of clinging to brick, wood, or stone, almost as tightly as Japanese ivy. In the autumn, the leaves are highly coloured and very effective when growing on a wall, house or fence.

10. *Berberis Aquifolium.*—Oregon grape (British Columbia). Height, 1 to 2 feet. In bloom, third week of May. Flowers, bright yellow. Leaves evergreen, smooth and shiny.

*11. *Berberis Thunbergii.*—Thunberg's barberry (Japan). Height, 2 to 4 feet. The best barberry for ornamental purposes. It is a dwarf, compact shrub, with bright, green leaves in summer, changing in autumn to deep red. The scarlet fruit is borne very profusely and makes this barberry quite ornamental throughout the winter.

12. *Berberis vulgaris purpurea.*—Purple-leaved barberry (Europe). Height, 4 to 6 feet. In bloom, fourth week of May. The yellowish flowers in pendulous clusters make a fine contrast with the leaves which are bright purple, when young, becoming duller later in the autumn.

*13. *Betula alba laciniata pendula.*—European cut-leaved birch (Europe). Height, 30 to 50 feet. One of the most graceful and hardy of all ornamental trees. The pendulous branches, finely cut foliage, and elegant form of this birch make it very desirable.

14. *Caragana arborescens.*—Siberian pea-tree (Siberia). Height, 10 to 15 feet. In bloom, third week of May. Flowers, bright yellow and pea shaped. The delicate green leaves of this shrub open very early and are quite attractive throughout the summer. This is one of the hardiest shrubs grown.

*15. *Caragana frutescens.*—Woody caragana (South Russia to Japan). Height, 3 to 4 feet. In bloom, third week of May. The flowers of this species are larger than those of *Caragana arborescens*, the leaves are formed differently, and its branches are pendulous. It is a smaller shrub than the Siberian pea tree but quite as desirable.

16. *Carya alba.*—Shell bark hickory (Canada). Height, 30 to 50 feet. The hickory is a slow growing tree but in time it becomes a very handsome object on the ornamental grounds.

17. *Catalpa Kæmpferi.*—Japanese catalpa (Japan). Height, 30 feet. In bloom, second week of July. Flowers, yellow, spotted with purple and smaller than those of the hardy catalpa. The leaves are purple veined. This is the hardiest catalpa grown here.

18. *Catalpa speciosa.*—Hardy catalpa (United States.) Height, 30 to 40 feet. In bloom, fourth week of June. Flowers, large, white, spotted with purple and yellow. This tree is very handsome when the flowers are in bloom. The leaves are large and heart-shaped. The seed pods which form during the latter part of the summer become more than one foot in length. The whole tree is very tropical looking. To ensure hardiness, trees should be obtained from northern grown stock as but few specimens have proved hardy at Ottawa.

19. *Celastrus articulatus.*—Japanese climbing bitter-sweet (China and Japan). This is very distinct from *Celastrus scandens*, the native climbing bitter-sweet, with smaller and more abundant berries, which are yellow and orange in colour, in that respect especially differing from the native species. It is perfectly hardy and makes a fine climber.

20. *Celastrus scandens.*—Climbing bitter-sweet (Canada). This pretty climber, with its bright green leaves and showy scarlet and orange berries, is very desirable. It may be grown in a low compact mass by keeping the stems well cut back. Treated in this way it makes a very attractive object when covered with fruit, which remains throughout the winter.

21. *Cercidiphyllum japonicum.*—Katsura tree (Japan). Height, 30 to 50 feet. The pyramidal shape and delicate heart-shaped leaves of this tree make it very attractive and ornamental. It is closely related to the magnolia family but is quite hardy at Ottawa.

22. *Cornus alba sibirica variegata.*—Variegated Siberian dogwood. Height, 4 to 6 feet. A handsome shrub with silvery variegated leaves. Quite hardy.

23. *Cratægus coccinea.*—Scarlet fruited hawthorn (Canada). Tree. Height, 10 to 20 feet. In bloom, fourth week of May. Flowers, white, borne in great profusion. This valuable native tree is ornamental in spring, summer, and autumn. The flowers are pretty, the leaves dark and shiny, and the fruit bright red and very showy.

24. *Cratægus Crus-galli.*—Cockspur thorn (Ontario). Tree. Height, 15 to 25 feet. In bloom second week of June. Flowers, white tinged with pink. The leaves of this tree are very ornamental, being thick, smooth, and very shiny.

25. *Daphne Cneorum.*—Garland flower (Eastern Europe). Height, 1 to 1½ feet. In bloom, second week of May. Flowers, bright pink and sweet scented. A very pretty little evergreen quite suitable for flower borders. It blooms a second time in autumn.

26. *Diervilla candida.*—White flowered weigelia (China). Height, 4 feet. In bloom, first week of June. Flowers, pure white, making a charming contrast with the pink-flowered varieties.

27. *Diervilla rosea.*—Pink-flowered weigelia (China). Height, 4 to 5 feet. In bloom first week of June. Flowers, pink. The weigelias are very well known and much admired flowering shrubs. Of this species there are a number of fine varieties.

*28. *Diervilla rosea Sieboldii variegata.*—Siebold's variegated weigelia (China). Height, 4 feet. In bloom, first week of June. Flowers, pink and white. Leaves beautifully variegated with white and pale green. This is the hardiest variety of weigelia tested here.

29. *Elæagnus angustifolia.*—Russian olive (South Europe, Orient). Height, 15 to 20 feet. In bloom, third week of June. Flowers, small, yellow, very sweet scented. This is a very ornamental tree with narrow silvery leaves and is perfectly hardy.

30. *Elæagnus argentea.*—Wolf willow (Canada.) Height, 8 to 12 feet. Blooms in 4th week in May. Flowers, small, yellow, and very sweet scented. The leaves which make this shrub ornamental are large and silvery. As it suckers considerably this should be taken into account when planting.

31. *Genista tinctoria.*—Dyer's greenweed (Europe). Height, 1 to 2 feet. In bloom fourth week of June. Flowers, bright yellow, pea-shaped. A very beautiful little shrub continuing in bloom for some time.

32. *Ginkgo biloba.*—Maiden-hair tree (China). Height, 20 to 60 feet. This pretty, graceful tree is a deciduous conifer with peculiar fan-shaped leaves. It is rather a slow grower but eventually reaches a good size.

*33. *Hydrangea paniculata grandiflora.*—Large flowered Hydrangea (Japan). Height, 5 to 10 feet. In bloom, fourth week of July. Flowers, white, gradually becoming pink, in very large panicles. This is one of the finest of hardy flowering shrubs.

34. *Hypericum kalmianum.*—Kalm's St. John's wort (Ontario). Height, 2 to 4 feet. In bloom, second week of July. Flowers, large, bright yellow. A very ornamental late flowering shrub.

35. *Ilex verticillata.*—Black alder, winterberry (Ontario). Height 6 feet. This shrub is most ornamental in autumn when it is covered with bright scarlet berries.

*36. *Larix europœa.*—European larch (Europe). Height, 60 to 80 feet. This tree is more graceful than our native tamarac and will succeed on a greater diversity of soils.

37. *Ligustrum amurense.*—Amur privet (China and Japan). Shrub. Height, 4 to 6 feet. This is the only privet tested here which has proved perfectly hardy. It is a pretty little shrub.

*38. *Lonicera Alberti.*—Albert Regel's honeysuckle (Turkestan). Height, 2 to 4 feet. In bloom, fourth week of May. Flowers, bright pink. This beautiful little honeysuckle with its sweet scented flowers, pendulous branches, and narrow leaves, is one of the most hardy and desirable shrubs.

*39. *Lonicera sempervirens.*—Scarlet trumpet honeysuckle (United States). This very attractive climbing honeysuckle blooms almost continuously from the first week of June until late autumn. The profusion of bright, scarlet, trumpet-shaped flowers produce a fine effect where trained against a house or wall.

*40. *Lonicera tatarica.*—Tartarian honeysuckle, bush honeysuckle (Siberia, Tartary). Height, 5 to 10 feet. In bloom third week of May. Flowers, bright pink. This is an old favourite and one of the hardiest shrubs grown. A variety called *grandiflora* is an improvement on the ordinary type with larger flowers striped with white. There are also white flowered and yellow fruited varieties.

*41. *Neillia (spiræa) opulifolia aurea.*—Golden leaved spiræa (Canada). Height, 6 to 10 feet. A very vigorous growing, hardy shrub, with yellow leaves. Fine for contrasts on the lawn.

42. *Populus deltoidea aurea.*—Golden leaved poplar (Canada.) A very pretty, graceful, golden leaved tree, retaining its colour throughout the season. This is also known as *Populus monilifera aurea* and *Populus canadensis Van Geertii.*

*43. *Philadelphus coronarius*—Mock orange or Syringa (South Europe). Height, 5 to 10 feet. In bloom second week of June. Flowers, white, with a strong, sweet odour. A well known, popular shrub. There are several varieties, two of the most ornamental being the golden leaved and double flowered forms.

*44. *Philadelphus grandiflorus speciosissimus.*—This is a great improvement on *Philadelphus grandiflorus*, with larger, whiter, and more abundant flowers. It blooms in the third week of June. It is a smaller shrub than *P. grandiflorus.*

45. *Platanus occidentalis.*—Button-wood (Ontario). Height, 50 to 60 feet. A very handsome and striking native tree, with large, deeply cut foliage.

46. *Potentilla fruticosa.*—Shrubby cinque-foil (Canada). Height, 2 to 4 feet. In bloom, second week of June. Flowers, large, bright yellow. A very pretty shrub when in bloom.

47. *Pyrus Aucuparia*—European mountain ash, rowan tree (Europe). Height, 20 to 30 feet. In bloom, fourth week of May. Flowers, white, borne in large clusters. This is a very graceful lawn tree, remaining ornamental throughout the winter when it

is covered with its scarlet fruit. The American species is also very good. It is a smaller, more compact tree, flowering about one week later than the European.

48. *Pyrus baccata.*—Siberian crab (Siberia). Height, 15 to 20 feet. In bloom, third week of May. Flowers, white, tinged with bright pink. This compact little tree bears such a profusion of flowers in spring that it is one of the most ornamental at that time, and later in the summer, when the highly-coloured fruit hangs thickly among the leaves, it is again very handsome. This is one of the hardiest trees grown here.

49. *Pyrus (Cydonia) Maulei.*—Maule's Japanese quince (Japan). Height, 1 to 3 feet. In bloom, second week of May. Flowers, bright red. The flowers of this little shrub are very ornamental, and in the autumn, when the golden coloured, highly perfumed quinces are ripe, it makes a very interesting object. It is much hardier than *Pyrus japonica*, of which some authorities call it a variety.

50. *Quercus rubra*—Red oak (Canada). A large, handsome tree, with very glossy leaves which turn red in autumn and at that time render it very ornamental.

51. *Ribes aureum.*—Missouri currant (United States). Height, 6 to 8 feet. In bloom, fourth week of May. Flowers, yellow and very sweet scented. This currant is quite ornamental, especially when in bloom, and again in summer the fruit, which is very palatable, makes it attractive at that time.

52. *Rosa rubrifolia.*—Red-leaved rose (Europe). Height, 6 feet. In bloom, second week of June. The bright pink flowers of this species are rather small, but the purplish red leaves are very ornamental. This rose does not sucker.

53. *Rosa rugosa.*—Japanese rose (Japan). Height, 4 to 5 feet. In bloom, second week of June. Flowers, very large and deep pink. This is a beautiful rose with fine flowers and very ornamental leaves which are large, thick and shiny. There is a white-flowered variety which is also good.

54. *Robinia hispida.*—Moss or rose locust (United States). Height, 8 feet. In bloom, fourth week of June. Flowers, deep pink. The experience with this tree is yet very limited here, but it proved hardy last winter which was a severe test for all trees and shrubs. It is very beautiful and if it continues hardy will be desirable.

55. *Spiræa arguta.*—(Europe). Height, 2 to 4 feet. In bloom, third week of May. Flowers, pure white, produced very profusely in compact clusters. This is the earliest flowering spiræa grown here, and is one of the best hardy shrubs of recent introduction. It is a graceful little spiræa with pendulous branches but its chief beauty lies in the abundance of its flowers.

56. *Spiræa japonica (callosa).*—Japanese spiræa (Japan). Height, 2 to 4 feet. In bloom, fourth week of June. Flowers, bright rosy red. This is a very pretty spiræa which continues to bloom throughout the greater part of the summer. A variety called *Bumalda* is more dwarf and very ornamental. An improvement on *Bumalda* is one called Anthony Waterer which has crimson flowers.

57. *Spiræa bracteata.*—Round leaved spiræa (Japan). Shrub. Height, 3 to 4 feet. In bloom, second week of June. Flowers, pure white borne profusely in compact clusters. Very ornamental when in full bloom. This shrub is also known as *Spiræa rotundifolia alba.*

58. *Spiræa salicifolia.*—Willow-leaved spiræa (Canada). Height, 4 to 5 feet. In bloom, first week of July. Flowers pink or white, in large panicles. This is a late bloomer and is valuable on that account. It is known among some nurserymen as *Spiræa Billardii.*

59. *Spiræa sorbifolia.*—Sorbus-leaved spiræa (Himalaya to Japan). Height, 4 to 5 feet. In bloom, fourth week in June. Flowers, white, borne in very large panicles. This is a strong growing species but suckers considerably.

*60. *Spiræa Van Houttei.*—Van Houtte's spiræa (Europe). Height, 3 to 5 feet. In bloom, first week of June. Flowers, pure white, borne very profusely in small, compact clusters, on pendulous branches. This graceful shrub is very beautiful when in full bloom.

*61. *Sambucus nigra foliis aureis.*—Golden-leaved elder (Europe). Height, 5 to 10 feet. The leaves of this variety are bright golden yellow which make it an attractive shrub on the ornamental grounds.

62. *Symphoricarpus racemosus.*—Snowberry (Canada). Height, 3 to 4 feet. This shrub has small rose-coloured flowers but its chief beauty lies in the large pure white berries which render it very ornamental in autumn.

63. *Syringa chinensis (rothomagensis).*—Rouen lilac. Garden origin. Height, 5 to 10 feet. This a hybrid between *s. persica* and *s. vulgaris.* In bloom, fourth week of May. Flowers, bright violet purple. A very profuse bloomer with much the habit of *Syringa persica* but bearing more highly coloured flowers.

64. *Syringa japonica*—Japanese lilac (Japan). Height, 15 to 20 feet. In bloom, fourth week of June. Flowers, creamy white, without perfume, borne in very large panicles. This is the latest blooming lilac tested here being more than one month later than the common species.

65. *Syringa Josikæa.*—Josika's lilac (Hungary). Height, 5 to 10 feet. In bloom first week of June. Flowers, bluish purple without perfume. This lilac blooms about two weeks later than the common species. The leaves are deep green and shiny which make it quite ornamental throughout the summer.

66. *Syringa oblata.*—Heart-leaved lilac (China). Height, 10 to 15 feet. In bloom, fourth week of May. Flowers bright purple. This is a very ornamental species with heart-shaped, shiny leaves. It blooms a little later than the common species.

67. *Syringa villosa.*—Rough-leaved lilac (North China). Height, 4 to 6 feet. In bloom, first week of June. Flowers, pale purple. This is a very handsome species blooming about a week later than the common lilac.

*68. *Syringa vulgaris alba grandiflora.*—Large-flowered white lilac (Europe). This is an improvement on the common white lilac with larger flowers and panicles. It blooms during the third week of May.

*69. *Syringa vulgaris, Charles X.*—Charles X lilac (Europe). Height, 8 to 12 feet. In bloom, fourth week of May. Flowers, deep purplish lilac, very sweet scented. A profuse bloomer and one of the finest lilacs grown.

70. *Salix rosmarinifolia*—Rosemary-leaved willow (Europe). Height, 6 to 10 feet. This is a very ornamental willow with long narrow rosemary-like leaves.

71. *Salix Laurifolia.*—Laurel-leaved willow (Europe). Height, 20 to 30 feet. The leaves of this willow are deep green and very shiny. When given room to develop symmetrically, it makes a very handsome specimen on the ornamental grounds.

*72. *Viburnum Lantana.*—Way-faring tree (Europe). Height, 8 to 12 feet. In bloom, third week of May. Flowers, white in compact flat heads. The fruit is very ornamental, being scarlet, turning to dark purple when ripe.

73. *Viburnum Opulus.*—Guelder rose, high bush cranberry (Canada). Height, 6 to 8 feet. In bloom, second week of June. Flowers, white, in large clusters. This is, at all seasons of the year, an ornamental shrub, as the abundant bright scarlet fruit remains on the bush all winter.

*74. *Viburnum Opulus sterile.*—Snowball. Height, 8 to 10 feet. In bloom, second week of June. The almost round clusters of pure white flowers of this shrub are well known. This is one of the most ornamental flowering shrubs grown here.

75. *Viburnum prunifolium.*—Plum-leaved viburnum (Canada). Height, 10 to 15 feet. In bloom second week of June. Flowers, white, in compact, flat heads. The leaves of this species are very ornamental, being smooth and glossy.

EVERGREENS.

76. *Abies concolor.*—White fir (Colorado). Height, 30 to 60 feet. This is a very beautiful species with large, flat, glaucous, green leaves. Young trees of this species should be obtained from northern-grown stock, as it seems to be at its limit of hardiness here.

77. *Cupressus ericoides.*—Heath-like retinospora (Japan). Height, 2 feet. This is a very pretty dwarf evergreen, with fine, soft, delicate green foliage, which becomes of an attractive purplish tinge in winter.

78. *Cupressus pisifera (Retinospora pisifera).*—(Japan.) The retinosporas are all ornamental, and this is one of the best. It is of pendulous form with bright green leaves and a very graceful habit.

79. *Cupressus pisifera filifera.*—(Japan). This is a very distinct and beautiful variety with drooping branches and slender thread-like pendulous branchlets.

*80. *Cupressus pisifera plumosa.*—(Japan). A more compact tree than *Cupressus pisifera*, but very ornamental. Its branchlets are somewhat feathery in form.

81. *Cupressus pisifera plumosa aurea.*—(Japan). One of the most beautiful golden leaved, evergreen shrubs in cultivation. It is of compact form and holds its colour well.

82. *Juniperus communis fastigiata.*—Irish juniper (Europe). Height, 4 to 8 feet. The Irish juniper is an erect, compact form of *Juniperus communis* with light green foliage, silvery beneath. It makes a very attractive shrub on the lawn.

83. *Juniperus Sabina tamariscifolia.*—Tamarisk-leaved savin (Europe). Height, 1 to 2 feet. This is a low growing variety with widely spread trailing branches and attractive foliage.

84. *Pinus austriaca.*—Austrian pine (Austria). Height, 30 to 60 feet. A very handsome pine with dark green rigid leaves and upright branches. This is a very compact growing species and one of the most beautiful.

*85. *Pinus montana Mughus.*—Dwarf mountain pine (Mountains of Central Europe). Height, 2 to 10 feet. This is a very ornamental, dwarf, compact pine. Its height varies considerably, some specimens being quite dwarf and others attaining a height of about 10 feet.

86. *Pinus ponderosa.*—Heavy wooded or bull pine (British Columbia). Height, 50 to 80 feet. The bull pine is one of the most handsome species. The long glaucous green leaves, sometimes twisted into peculiar forms, and its upright branches, give it a very majestic appearance.

87. *Pinus resinosa.*—Red pine (Canada). Height, 40 to 60 feet. Not unlike the Austrian pine when young, but becoming less stiff in form as it becomes larger. The leaves are also much softer than those of the Austrian pine.

88. *Pinus Sylvestris.*—Scotch pine (Europe). Height, 40 to 60 feet .A very rapid growing pine with bluish green leaves. It is not so shapely as some of the other species, but grows well in nearly all kinds of thoroughly drained soils.

89. *Pinus Strobus.*—White pine (Canada). Height, 50 to 75 feet. The white pine is better known as a timber tree in Canada than as an ornamental tree, but when it branches from near the ground, and has sufficient space to develop symmetrically, it becomes one of the most graceful evergreens grown. The leaves which preserve their colour well in winter are a very lively green.

90. *Picea alba.*—White spruce (Canada). Height, 30 to 50 feet. A very beautiful native species with glaucous green leaves and rather rigid branches but making a fine ornamental tree.

*91. *Picea alcockiana.*—Alcock's spruce (Japan). Height, 40 to 60 feet. This is a very ornamental Japanese species, and quite distinct from all others. The dark green of the upper part of the leaves, and the bluish silvery green of the lower surface, make it very attractive.

*92. *Picea excelsa.*—Norway spruce (Europe). Height, 50 to 75 feet. The Norway spruce is one of the most popular evergreens planted, being a very rapid grower, of graceful form, and doing well on a great variety of soils.

*93. *Picea pungens glauca* —Rocky mountain blue spruce (Western United States). Height, 40 to 60 feet. A very beautiful species with steely blue coloured leaves. One of the most ornamental trees. It is a slow grower and takes some years before it attains much height. As this tree varies in colour from green to blue, in procuring young trees, the blue variety should be ordered.

94. *Pseudotsuga Douglasii.*—Douglas fir (British Columbia). Height, 50 to 75 feet. The Douglas fir is a very majestic and handsome tree, with foliage dark green above and silvery beneath. The seed or young trees should be obtained from as far north as possible, or high up on the mountains, as otherwise it is not likely to prove hardy.

*95. *Thuya occidentalis aurea Douglasii.*—Douglas' golden arbor-vitæ (United States). This is a very beautiful form with bright golden coloured foliage and upright habit.

96. *Thuya occidentalis compacta.*—Compact arbor-vitæ (United States). A dwarf compact variety with bright green foliage.

97. *Thuya occidentalis Ellwangeriana.*—Ellwanger's arbor-vitæ (United States). This is a fine, compact, dwarf, vigorous variety, with slender leaves and branches.

*98. *Thuya occidentalis Hoveyi.*—Hovey's arbor-vitæ (United States). This is one of the finest and most desirable varieties. The leaves are bright green and the branches flat and parallel, giving the shrub a very remarkable and attractive appearance.

99. *Thuya occidentalis pyramidalis.*—Pyramidal arbor-vitæ (United States). The pyramidal arbor-vitæ is a very compact upright grower, and its columnar form makes it one of the most conspicuous objects on the grounds.

100. *Thuya occidentalis wareana (Sibirica).*—Siberian arbor-vitæ (Europe). The Siberian arbor-vitæ is a well known compact form with deep green, blunt leaves, which keep their colour well in winter.

PERENNIALS.

No flower garden is complete without perennials. Even though the plot of ground be small, some of the precious space should be allotted to a few of the finest examples of this large and varied class of plants. Few flowers require as little care as perennials if given the proper conditions to start with. The soil should be a good loam, well drained, for thorough draining is very essential. When planted, they should be left undisturbed as long as possible, hence the soil must be well prepared by trenching, with a liberal supply of well rotted cow manure, dug under. Most perennials thrive best in full sunshine, and, where it is possible, they should be planted where they will get the most favourable conditions. A southern aspect is the most suitable, and where there is protection from the cold winds the plants do best. Planting may be done either in spring or fall but September is probably the best time to plant perennials. Throughout

the growing season the surface soil should be kept loose and free from weeds. During the summer, the taller growing sorts will need staking, as fine specimens are liable to be broken by storms if this is neglected. When the flowers have ceased blooming, the old stalks should be cut off near the ground. Just before permanent frost sets in, the border or bed should be given a liberal dressing of strawy manure. This will form a fine mulch for the protection of the plants and at the same time enrich the soil. The mulch ought not to be removed too soon in the spring, as often most of the damage done to perennials is at that season when so much thawing and freezing takes place.

The following list of one hundred of the best hardy perennials growing at the Central Experimental Farm, selected from over 1,000 species and varieties, is published for the purpose of assisting any who may desire to obtain a choice collection of these plants. In this list will be found the scientific and common name of each; its native home; when it begins to bloom; how tall it grows; the colour, size and other characteristics of the flower; also any other notes deemed advisable. For the information of those who have no room for a large collection, the best twenty-five are distinguished by a star preceding the name.

LIST OF ONE HUNDRED OF THE BEST HARDY PERENNIALS.

*1. *Achillea Ptarmica flore pleno.*—Double sneezewort (Northern Hemisphere). Height, 1 foot. In bloom fourth week of June. Flowers small, pure white, double, and borne in clusters. A fine perennial, blooming freely throughout the summer.

2. *Aconitum autumnale.*—Autumn flowering monk's hood (Europe). Height, 3 to 4 feet. Blooms in September. Flowers, bluish purple, borne in loose panicles. Valuable as a late bloomer.

3. *Aconitum Napellus.*—Common monk's hood or helmet flower (Northern Hemisphere). Height, 3 to 4 feet. Blooms in July. Flowers, deep blue, borne on a large terminal spike. A fine species, desirable for the rear of the border.

4. *Adonis vernalis.*—Ox-eye (Europe). Height, 6 to 9 inches. In bloom first week of May. Flowers, large, lemon yellow, borne singly from the ends of the stems. A very beautiful early flowering perennial.

5. *Agrostemma coronaria atropurpurea.*—Mullein pink (South Europe). Height, 1 to 2 feet. In bloom fourth week of June. Flowers, medium size, bright crimson, borne singly from the sides and ends of the stems. A very showy flower with silvery foliage, and continues to bloom throughout the summer.

6. *Anemone patens.*—Spreading pasque flower (North America). Height, 6 to 9 inches. In bloom fourth week of April. Flowers, large and deep purple. Very early. A beautiful flower.

*7. *Anthemis tinctoria Kelwayi.*—Kelway's hardy golden Marguerite (Europe). Height, 1 to 2 feet. In bloom fourth week of June. Flowers, large, deep yellow, borne singly on long stems. It continues to bloom profusely throughout the summer; is very showy and valuable for cutting.

8. *Aquilegia canadensis.*—Wild columbine (Canada). Height, 1 to 1½ feet. In bloom third week of May. Flowers, medium size, red and yellow. One of our prettiest wild flowers.

*9. *Aquilegia chrysantha.*—Golden spurred columbine (New Mexico). Height, 3 to 4 feet. In bloom fourth week of June. Flowers, large, bright lemon yellow, with long slender spurs. A very handsome perennial and much later than other columbines.

*10. *Aquilegia coerulea.*—Rocky Mountain columbine (Rocky Mountains). Height, 1 to 1½ feet. 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.

11. *Aquilegia glandulosa.*—Altaian columbine (Siberia). Height, 1 foot. In bloom third week of May. Flowers, large, deep blue, with white centre and short spurs.

12. *Aquilegia oxysepala.*—Russian columbine (Northern Asia). Height, 1 foot. In bloom second week in May. Flowers, large, deep purplish blue with blue and yellow centres, a very desirable early species, one of the best.

13. *Aquilegia Stuarti.*—Stuart's columbine (Europe). Height, 9 to 12 inches. In bloom third week of May. Flowers, large, deep blue with white centre, one of the best.

14. *Arabis alpina.*—White alyssum (Europe, North America). Height, 6 inches. In bloom first week in May. Flowers, small, pure white, in clusters. One of the earliest bloomers.

15. *Arnebia echioides.*—Prophet flower (Armenia). Height, 9 inches. In bloom third week of May. Flowers, yellow, borne in clusters, with petals spotted with purple. One of the most charming of early flowering plants.

16. *Asclepias tuberosa.*—Pleurisy root (Ontario). Height, 1½ to 2 feet. In bloom third week of July. Flowers, bright orange, borne in clusters. Very showy.

17. *Aster alpinus.*—Alpine aster (Canada, Europe). Height, 9 inches. In bloom first week of June. Flowers, large, bright purple, borne on long stems from the base of the plant. The earliest flowering of all the asters.

*18. *Aster Amellus bessarabicus.*—Bessarabian aster (Russia). Height, 1 to 1½ feet. Blooms from July to September. Flowers, large, deep purple, borne singly on long stems. Very fine. Splendid as cut flowers.

19. *Aster Novae Angliae roseus.*—Pink flowered New England aster (Ontario). Height, 5 to 7 feet. In bloom fourth week of August. Flowers, bright pink, borne profusely in large terminal clusters. Very showy. A strong growing variety.

20. *Boltonia asteroides.*—False chamomile (Canada). Height, 4 to 5 feet. Blooms in September. Flowers, smaller than the next, pale pink, borne very profusely in large panicles. Much later than the next species. Valuable as a showy, late flowering perennial.

21. *Boltonia latisquama.*—(Canada). Height, 4 feet. In bloom first week of August. Flowers, large, white, somewhat resembling asters, and borne very profusely in large panicles. A very fine perennial.

22. *Campanula carpatica*—Carpathian bellflower (Eastern Europe). Height, 6 to 9 inches. In bloom first week of July. Flowers, medium size, deep blue, borne profusely in loose panicles. It continues in bloom throughout the summer. Flowers, fine for cutting. A white variety of this is also good.

23. *Campanula Grossekii.*—Grosseck's bellflower (Eastern Europe). Height, 3 feet. In bloom first week of July. Flowers, large, deep blue borne on a long spike. A comparatively new but very handsome species.

24. *Campanula persicifolia.*—Peach-leaved bellflower (Europe). Height, 3 feet. Flowers, large, blue, borne in a raceme with long flower stems. A very desirable species. There are also white and double varieties which are good.

25. *Clematis recta.*—Erect virgin's bower (South Europe). Height, 4 feet. In bloom fourth week of June. Flowers, small, pure white, borne profusely in dense clusters. This is a very compact bushy species and desirable for the rear of the border. *Clematis Jackmanni* with large deep purple flowers and *Clematis Vitalba* with small white flowers, are excellent climbing sorts.

26. *Convallaria majalis.*—Lily of the Valley (Europe). Height, 6 to 9 inches. Blooms in the latter part of May. This charming, delicately perfumed flower, needs no description.

27. *Coreopsis delphinifolia.*—Larkspur-leaved tick-seed (Japan). Height, 2 to 3 feet. In bloom first week of July. Flowers, large, yellow with dark centres and borne singly with long stems.

28. *Coreopsis grandiflora.*—Large flowered tick-seed (Southern United States). Height, 2 to 3 feet. In bloom fourth week of June. Flowers, large, deep yellow, borne singly on long stems. It continues blooming profusely throughout the summer. Fine for cutting.

*29. *Coreopsis lanceolata.*—Lance-leaved tick-seed (Canada). Height, 2 feet. In bloom fourth week of June. Flowers, large though slightly smaller than the last, and borne on long stems. It continues blooming throughout the season, and is a very desirable perennial.

*30. *Delphinium cashmirianum.*—Cashmerian larkspur (Himalayas). Height, 1½ feet. In bloom first week of July. Flowers, pale to bright blue, in large open heads. A very beautiful low growing species.

31. *Dianthus plumarius flore pleno.*—Double-flowered garden pink (Eastern Europe). Height, 9 inches. In bloom second week of June. Flowers, large, white or pink, very sweet scented, and two or three borne on a stem. A variety called Mrs. Simkins is especially desirable being very double, white and deliciously perfumed, almost equalling a carnation. It blooms during the fourth week of June.

32. *Dicentra spectabilis.*—Bleeding heart (Japan). Height, 3 feet. In bloom second week of May. Flowers, heart-shaped, red and white and borne in pendulous racemes. An old favourite.

33. *Dictamnus albus.*—Gas plant (Europe). Height, 1½ to 2 feet. In bloom second week of June. Flowers, white with an aromatic fragrance, and borne in large terminal racemes. A well known variety, has purple flowers with darker markings. A very striking plant and well worthy of cultivation. It is generally known as *Dictamnus Fraxinella.*

34. *Doronicum caucasicum.*—Caucasian leopard's bane (Europe). Height, 1 foot. In bloom second week of May. Flowers, large, yellow, and borne singly. A fine strong growing early perennial.

*35. *Doronicum plantagineum excelsum.*—Tall plantain-like leopard's bane (Britain). Height, 2 feet. In bloom third week of May. Flowers, large and deep yellow. A fine plant with large flowers.

36. *Epimedium rubrum.*—Red barren-wort (Japan). Height, 1 foot. In bloom second week of May. Flowers, small, bright crimson and white, borne in a loose panicle. A very dainty and beautiful little flower.

37. *Erigeron speciosus.*—Showy fleabane (Western North America). Height, 1½ feet. In bloom second week of July. Flowers, large, violet-blue, with yellow centres, and borne in large clusters on long stems. Very desirable.

38. *Funkia subcordata (grandiflora).*—Large flowered plaintain lily (Japan). Height, 1½ feet. Blooms in August. Flowers, large and white, borne in racemes. The best funkia grown here. Both leaves and flowers are handsome.

*39. *Gaillardia aristata grandiflora.*—Large flowered Gaillardia or blanket flower (Western North America). Height, 1½ feet. In bloom third week of June. Flowers, large, yellow, with deep orange centres, and borne singly on long stems. The named varieties, Superba and Perfection, are more highly coloured and are of great merit. These all continue blooming profusely until late in the autumn.

40. *Gypsophila paniculata.*—Infant's breath (Europe). Height, 2 feet. In bloom second week of July. Flowers, small, white, borne profusely in large open panicles. A very graceful plant.

41. *Helenium autumnale.*—Autumn flowering sneezewort (Canada). Height, 6 to 7 feet. In bloom second week of July. Flowers, large, deep yellow, borne in large heads. Very ornamental in late summer.

42. *Helianthus doronicoides.*—(Canada). Height, 6 to 7 feet. In bloom second week of August. Flowers, large, bright yellow, and borne singly. Very fine; continues blooming for several weeks.

43. *Helianthus multiflorus.*—Soleil d'Or (United States). Height, 4 feet. Blooms in August. Flowers, large, double, bright yellow, and borne singly. A very striking late flowering perennial.

44. *Heuchera sanguinea.*—Blood-coloured alum-root (Northern Mexico). Height, 1 to 1½ feet. In bloom first week of June. Flowers, small, bright, scarlet, borne in open panicles. Continues blooming throughout the summer. Very desirable.

*45. *Hemerocallis Dumortierii.*—Dumortier's day lily (Japan). Height, 1½ feet. In bloom second week of June. Flowers, large, orange yellow, with a brownish tinge on the outside, and three or four on a stem. Very fine.

*46. *Hemerocallis flava.*—Yellow day lily (South Europe). Height, 2 to 3 feet. Blooms in the latter part of June. Flowers, bright orange yellow and fragrant. One of the best.

47. *Hemerocallis minor.*—Lesser day lily (North China and Japan). Height, 1 to 1½ feet. In bloom second week of July. Flowers, medium size and yellow. Blooms later than the two preceding species and has a smaller flower and narrower foliage.

48. *Hibiscus Moscheutos.*—Swamp rose mallow (Ontario). Height, 5 feet. In bloom third week of August. Flowers, very large varying in colour from white to deep pink. A variety called "Crimson eye" is very good. This plant makes a fine show during late summer.

49. *Hypericum pyramidatum.*—Pyramidal St. John's Wort (Ontario). Height, 3 feet. In bloom fourth week of July. Flowers, large, yellow, and borne singly. A good late flowering perennial.

*50 *Iberis sempervirens.*—Evergreen candytuft (Candia). Height, 6 to 12 inches. In bloom third week of May. Flowers, pure white, fragrant, and borne in dense flat clusters. A fine perennial for cutting.

51. *Iris Chamaeiris.*—(South Europe). Height, 6 inches. In bloom fourth week of May. Flowers, bright yellow with brown markings. A very pretty dwarf species.

52. *Iris flavescens.*—(Eastern Europe and Western Asia). Height, 1½ to 2 feet. In bloom first week of June. Flowers, lemon yellow with brown markings. This species makes a fine contrast with *Iris sibirica*, blooming about the same time.

*53. *Iris florentina.*—Oris root (Central and Southern Europe). Height, 2 feet. In bloom first week of June. Flowers, very large, pale blue or lavender, sweet scented. A splendid Iris,

*54. *Iris germanica.*—German iris (Europe). Height, 2 to 3 feet. In bloom first week of June. Flowers, very large, of elegant form; colour, deep lilac and bright purple, sweet scented. Cannot be too highly recommended. There are a large number of choice varieties of this iris.

*55. *Iris lævigata* (*Kaempferi*).—Japanese iris (Japan and Siberia). Height, 1½ to 2 feet. In bloom first week of July. Flowers, very large and distinct in colour and shape. The flowers of the type are bright purple, and purple with yellow blotches in the throat, but there are a great many exquisite varieties of this charming plant.

56. *Iris pumila.*—Dwarf iris (Europe, Asia Minor). Height, 4 to 6 inches. In bloom third week of May. Flowers, deep purple. An old favourite. There are several varieties of this pretty little iris but none that excel it.

57. *Iris sibirica.*—Siberian iris (Europe to Siberia). Height, 3 to 4 feet. In bloom fourth week of May. Flowers, deep blue, borne on long stems in clusters of two or three. This species has many varieties.

58. *Iris variegata.*—(Eastern Europe). Height 1 to 1½ feet. In bloom first week of June. Flowers, yellow and brown, veined with various shades of brown.

*59. *Lilium duratum.*—Golden rayed lily of Japan (Japan). Height, 3 to 5 feet, Blooms in July. Flowers, very large, white, with a yellow central band on each petal, and thickly spotted with purple and red. The most showy of all lilies and a splendid flower. This has proven hardy at the Central Experimental Farm, although it has been reported tender in some localities. There are many choice varieties of this lily.

60. *Lilium canadense.*—Canadian lily (Canada). Height, 2 to 3 feet. Blooms in the latter part of May. Flowers, yellow to pale red with reddish spots, pendulous. A very desirable early native species.

61. *Lilium elegans.*—Elegant lily (Japan). Height, 6 inches. In bloom first week of July. Flowers, pale red. A very pretty dwarf lily with several varieties which are better than the type.

*62. *Lilium speciosum.*—Showy japanese lily (Japan). Height, 2 to 3 feet. Blooms in July. Flowers, large, white, tinged and spotted with deep pink and red. A very desirable lily. Hardier than *Lilium auratum* and almost as fine. There are several fine varieties of this flower.

*63. *Lilium superbum.*—Superb lily (Ontario). Height, 4 to 6 feet. In bloom first week of July. Flowers, very numerous, orange red, thickly spotted with dark brown. One of the most robust lilies grown. When in bloom it is a perfect blaze of colour. An admirable lily for the rear of the border.

64. *Lilium tenuifolium.*—Narrow leaved lily (Siberia). Height, 1½ to 2 feet. In bloom third week of June. Flowers, pendulous and bright scarlet. One of the most graceful of all lilies.

65. *Lilium tigrinum.*—Common tiger lily (China). Height, 2 to 4 feet. Flowers, large, deep orange, spotted thickly with purplish black. A very popular old sort.

66. *Linum perenne.*—Perennial flax (Canada). Height, 1½ feet. In bloom first week of June. Flowers, large, deep blue, borne in loose panicles. A very profuse bloomer continuing in flower throughout the summer.

67. *Lobelia cardinalis.*—Cardinal flower (Canada). Height, 2 to 3 feet. Blooms in August. Flowers, bright scarlet, borne in terminal racemes. A very showy and desirable native plant.

68. *Lychnis chalcedonica flore pleno.*—Double flowering, London pride (Russia). Height, 2 to 3 feet. In bloom first week of July. Flowers, bright crimson, double, and borne in terminal racemes. An old favourite.

69. *Lysimachia clethroides.*—Clethra-like loose-strife (Japan). Height, 3 feet. In bloom fourth week of July. Flowers, white, borne in long spikes. A very striking late flowering perennial.

70. *Myosotis alpestris.*—Alpine forget-me-not (Mountains of Europe). Height, 6 inches. In bloom third week of May. Flowers, small, bright blue with a yellowish eye A very profuse bloomer and always popular.

71. *Œnothera missouriensis.*—Missouri evening primrose (United States). Height, 1 foot. In bloom fourth week of June. Flowers, very large, rich yellow, and borne singly. Very beautiful. Continues to bloom throughout the summer.

*72. *Paeonia officinalis.*—Common paeony (Europe). Height, 2 to 4 feet. Blooms in the early part of July. This old favourite needs no description. The double flowered varieties are the best, and can be obtained in several colours and shades.

*73. *Papaver nudicaule.*—Iceland poppy (Mountains of Northern Hemisphere). Height, 1 foot. In bloom second week of May. Flowers, medium size, orange, white, or yellow. This is a very valuable and pretty poppy, blooming almost continuously until late in the autumn.

74. *Papaver orientale.*—Oriental poppy (Asia Minor). Height, 2 to 3 feet. In bloom first week of June. Flowers, very large, scarlet, and variously marked, according to variety, there being many forms of this beautiful poppy.

75. *Pentstemon barbatus Torreyi.*—Torrey's beard tongue (Texas). Height, 2 to 3 feet. In bloom first week of July. Flowers, deep red, borne in long spikes, very ornamental.

76. *Phlox amoena.*—Lovely phlox (Virginia). Height, 6 inches. In bloom second week of May. Flowers, medium size, bright pink, in compact clusters. A fine early species.

*77. *Phlox decussata.*—Hybrid perennial phlox (United States). Height, 1 to 3 feet. In bloom third week of July. Flowers, of many beautiful shades and colours are found in the large number of named varieties of this phlox, which continues to bloom until late in the autumn.

78 *Phlox reptans.*—Creeping phlox (North America). Height, 4 inches. In bloom fourth week of May. Flowers, medium size, purple, and borne in small clusters.

79. *Phlox subulata (setacea).*—Moss pink (North America). Height, 6 inches. In bloom third week of May. Flowers, medium size, deep pink, and borne in small clusters. An old favourite for early effects in the garden.

*80. *Platycodon grandiflorum.*—Large flowered Chinese bellflower (China and Japan). Height, 1½ to 2 feet. In bloom second week of July. Flowers, very large, deep blue, borne singly or in twos. A very profuse bloomer, flowering continuously until autumn. Cannot be too highly praised.

81. *Platycodon grandiflorum album.*—This is a white flowered variety of the last and makes a fine contrast to it when they are grown together. It blooms a few days earlier than the species.

82. *Platycodon grandiflorum* Mariesii (China). Height, 1 foot. In bloom second week of July. Flowers, large and deep blue, a lower growing form of the species but equally as good.

83. *Polemonium coeruleum.*—Jacob's ladder (Northern Temperate Regions). Height, 2 feet. In bloom second week of June. Flowers, deep blue, borne in terminal spikes, very attractive.

84. *Polemonium reptans.*—Creeping Jacob's ladder (North America). Height, 6 inches. In bloom third week of May. Flowers, medium in size, blue, and borne profusely in loose clusters.

85. *Polemonium Richardsoni.*—Richardson's Jacob's ladder (Rocky Mountains). Height, 6 inches. In bloom third week of May. Flowers, medium in size, blue, borne profusely in pendulous panicles.

86. *Potentilla hybrida versicolor.*—(Europe). Height, 1 foot. In bloom fourth week of June. Flowers, large, deep orange and yellow, semi-double. Very fine and quite hardy. A hybrid variety.

87. *Primula cortusoides.*—Cortusa-like primrose (Siberia). Height, 9 inches. In bloom third week of May. Flowers, small, deep rose, in compact heads. A charming little early flowering perennial.

88. *Pyrethrum uliginosum.*—Great ox-eye (Russia). Height, 4 feet. Blooms in September. Flowers, large, white with yellow centres, and borne singly on long stems. A very profuse bloomer. Splendid for cutting.

*89. *Rudbeckia laciniata* Golden Glow (United States). Height, 5 to 6 feet. Blooms in August. Flowers, large, lemon yellow, double, and borne on long stems. Very fine. One of the best of lately introduced perennials, being a very profuse bloomer and vigorous grower.

90. *Rudbeckia maxima.*—Great cone flower (United States). Height, 5 to 6 feet. Blooms in July and August. Flowers, large with a long cone shaped centre, and bright yellow rays, and borne singly. Leaves are large and glaucous. The whole plant is very striking.

91. *Scabiosa caucasica.*—Caucasian scabious (Caucasus). Height. 1½ feet. In bloom first week of July. Flowers, large, light blue, and borne singly on long stems. Blooms very freely throughout the remainder of the summer.

92. *Solidago canadensis.*—Golden rod (Canada). Height, 3 to 5 feet. In bloom first week of August. Flowers, small, golden yellow, and borne in dense panicles. This common native perennial is well worthy of a place in any border.

93. *Spiræa astilboides.*—Astilbe-like Spiraea (Japan). Height, 2 feet. In bloom fourth week of June. Flowers, small, white, very numerous, and borne in many branched panicles. Both foliage and flowers of this species are ornamental.

*94. *Spiræa Filipendula.*—Dropwort (Europe). Height, 2 to 3 feet. In bloom third week of June. Flowers, pure white, borne profusely in loose panicles. The foliage of this species is also very fine. There is a double flowered variety which is very effective.

95. *Spiræa palmata elegans.*—(Japan). Height, 2 to 3 feet. In bloom first week of July. Flowers, whitish with crimson anthers, borne very profusely in panicles. A fine species.

96. *Spiræa Ulmaria.*—Meadow sweet (Europe). Height 3 to 4 feet. In bloom second week of July. Flowers, very numerous, dull white, borne in large compound heads, having a soft, feathery appearance. A vigorous grower and a very striking species.

*97. *Spiræa venusta.*—Queen of the prairie. Native country unknown. Height, 4 feet. In bloom second week of July. Flowers, small, bright pink, borne profusely in large panicles. A very pretty pink flowered spiraea.

98. *Statice latifolia.*—Broad-leaved sea lavender (Bulgaria). Height, 1½ feet. In bloom first week of July. Flowers, small, blue, borne very profusely in loose panicles. Very effective in the border.

99. *Thalictrum aquilegifolium.*—Columbine rue (Europe). Height, 4 to 5 feet. In bloom fourth week of June. Flowers, small, white to purplish, very numerous and borne in large panicles. Very ornamental.

100. *Trollius europæus.*—Common globe flower (Europe). Height, 1½ to 2 feet. In bloom fourth week of May. Flowers, large, bright yellow. A very pretty plant, somewhat resembling a buttercup and continuing in bloom for a long time.

ORNAMENTAL GROUNDS.

The laying out and planting of the ornamental grounds is now almost complete. The work has covered a period of ten years, during which interval all the time available both in spring and autumn has been utilized to bring about the present results. The road from the main entrance to the office building which, when the work was begun in 1889, had nothing along its margins to vary the landscape save the fields of grain, is now at all seasons of the year brightened by the clumps of trees and shrubs which are grouped and scattered along its borders. The roads leading to the other buildings have also been planted in like manner, while the intervening areas are broken by lawns, flower borders, and flower beds. Some parts of the lawns now look quite park-like where such trees as pine, spruce, birch, larch, and other quick-growing sorts have been distributed singly over the grassy sward. Many of these are now more than twenty feet in height, and are excellent examples of the rapidity with which such trees grow when properly cared for.

FLOWER BORDERS AND FLOWER BEDS.

The roses which in June are always attractive were better in 1897 than last year, being less injured by the winter. The flower borders and beds were well stocked as usual and there was a splendid display of bloom throughout the season. A new feature

this year was the hydrangea bed, where 58 specimens of this beautiful shrub were planted, and produced during the latter part of July and August a fine mass of bloom.

VISITORS.

This year the number of notable visitors to the farm was much greater than at any time during the past, among them being many representatives of both the British Association for the Advancement of Science and the British Medical Association. All seemed pleased with the general appearance of the ornamental grounds, and many expressed their surprise at the growth the trees and shrubs had made in so short a time. Many farmers and farmers' wives, who came on the special excursions which were arranged for from time to time throughout the summer, expressed much interest in the trees, shrubs, and flowers, and it is hoped that some of them will, from seeing the effects of the judicious planting near the houses, spend more time in the beautifying of their own homes. The ladies were especially interested in the flowers and the names of those they admired most were often taken with the intention of procuring some of the desirable sorts for themselves.

The splendid example which the ornamental grounds now affords to all who can visit them, will, it is hoped, bear abundant fruit by inciting a greater desire to make the homes of our people more attractive.

CARE OF THE ORNAMENTAL GROUNDS.

The work in connection with the care of the ornamental grounds is now very considerable as the trees, shrubs, hedges, flower borders, flower beds, lawns and roads must all be kept in good order. Throughout the summer the grounds at all times looked well. The first work was done with the pony lawn mower on the 10th of May and the grass was kept cut at intervals with it until the 18th of September. The weeds in the flower borders and beds were also kept well in subjection. The surface soil about the trees and shrubs was stirred at intervals throughout the summer both to kill weeds and keep the soil from baking. Some thinning of the original planting of trees and shrubs along the main avenue, was done this year as a number of them were already crowding each other. During the summer many trees and shrubs were sprayed to prevent the depredations of insects and fungous diseases. Aphides were especially troublesome.

ADDITIONS TO TREES, SHRUBS AND LAWNS.

Very little planting of trees and shrubs was required on the ornamental grounds this year. In some places, however, clumps were widened by the addition of new specimens and those replaced which had died during the winter. The piece of ground north of the poultry building which was planted last year, was seeded down this summer also that on both sides of the avenue leading from the northern entrance to the farm foreman's house.

HEDGES.

Visitors to the Central Experimental Farm are often surprised at the number and variety of the trees and shrubs used for hedge purposes, and they manifest much interest in them by asking questions regarding the best varieties to plant and the methods of growing them. Examples of 88 species and varieties are now growing side by side in hedges 50 feet in length and 10 feet apart, which present a very fine appearance in summer when in full leaf.

The methods to be adopted in growing a hedge successfully are simple, but should be followed if a compact and regular hedge is to be obtained. The young trees or shrubs should be planted in good soil, and if it is not good it should be removed and better

earth brought in its place. Young stock from one to two feet in height should be planted and all cut back to a regular height of from ten to twelve inches. Evergreens should be procured as compact as possible at the base, for if they are loose and the foliage wanting it takes them a long time to thicken. The roots should not become dry from the time the shrubs are dug until they are re-planted in the hedge-row. Planting is done by opening a trench about a foot wide and placing the hedge plants 15 inches apart in a single row. The trench should be filled with good soil pressed firmly against the roots. Afterwards the surface soil should be kept loose for about two feet on each side of the hedge throughout the summer, and every following season. If the trees or shrubs are cut back when planted they will need no further clipping the first season, but after that, hedges of most deciduous trees and shrubs require to be clipped twice a year, in the latter part of June and again in August. Regular pruning from the beginning is very essential to successful hedge growing.

The following thirteen trees and shrubs, after several years' test, have proven the most satisfactory for hedge purposes of all those yet tested at the Central Experimental Farm :—

1. *Berberis Thunbergii.*—Thunberg's barberry. This makes a beautiful dwarf compact hedge with bright green leaves in summer becoming in autumn very highly coloured with red. The scarlet fruit which is produced abundantly makes it quite ornamental throughout the winter. It is a very satisfactory shrub where a low growing hedge is desired. Planted in 1890, this hedge is now 3 feet 4 inches in height and 4 feet 3 inches in width.

2. *Caragana arborescens.*—Siberian pea-tree. One of the hardiest shrubs grown and very useful for hedge purposes in the colder parts of Canada. It is a vigorous quick growing shrub whose delicate green leaves open very early in the spring and are quite attractive throughout the summer. The bright yellow, pea-shaped blossoms also add to the beauty of this hedge. As the Siberian pea-tree makes all its growth in the early part of the summer one pruning each year is sufficient. A hedge of this shrub, planted in 1889, is now 6 feet in height and 5 feet 3 inches in width.

3. *Viburnum Opulus.*—Guelder rose. This is a native shrub which has made one of the most ornamental hedges yet tested here. The bright green leaves, large clusters of pure white flowers, and scarlet fruit make it very attractive most of the year. Planted in 1894, this hedge is now 3 feet 6 inches in height and 3 feet 3 inches in width.

4. *Syringa Josikæa.*—Josika's lilac. The firm, glossy, deep green leaves of this lilac make it more suitable for hedge purposes than the common species. It makes a very neat, compact hedge and as most of the growth is made in the early part of the season, one clipping each year is sufficient to keep it in good order. Planted in 1891, this hedge is now 4 feet 8 inches high and 4 feet 10 inches wide.

5. *Viburnum Lantana.*—Wayfaring tree. This shrub has made a very attractive hedge. It is a neat compact grower with large, rough, pale green leaves and large clusters of white flowers, succeeded by scarlet berries which turn dark purple when ripe. Planted in 1890, its present height is 4 feet 1 inch with a width of 4 feet 7 inches.

6. *Ligustrum amurense.*—Amur privet. This is the only privet yet tested at Ottawa which has proven perfectly hardy. As the privet is very largely used in Great Britain for hedge purposes, it will be especially welcomed by English people settling in Canada. It is a pretty shrub with dark green leaves and forms a very compact hedge. Planted in 1894, its present height is 3 feet 1 inch, with a width of 3 feet 3 inches.

7. *Rhamnus Frangula.*—Alder buckthorn. A rapid growing shrub which makes a firm compact hedge. Its glossy green leaves make it quite ornamental, and where a tall growing deciduous hedge is desired this is one of the best. The flowering period of this shrub extends over a period of five or six weeks, and during that time it is a favourite haunt of the honey bee. Planted in 1890, this hedge is now 5 feet 10 inches in height and 6 feet in width.

EVERGREENS.

8. *Thuya occidentalis.*—American Arbor-vitae. This is the most satisfactory evergreen tested here for hedge purposes. It is a native tree and quite common in many parts of Canada, growing in a great variety of soils which render it very suitable for hedges. Its neat, compact appearance and bright green leaves make it very ornamental in summer, while in winter, although the leaves are duller, it yet remains quite attractive. In 1888 and 1889 more than one mile of this tree was planted at the Central Experimental Farm, as a hedge, which is now very compact and about 6 feet in height. The sample hedge planted in 1890 is now 4 feet in height and 4 feet 7 inches in width. The American arbor-vitae requires only one clipping each year which is best done in August.

9. *Thuya occidentalis aurea Douglasii.*—Douglas' Golden Arbor-vitae. This beautiful golden leaved evergreen is highly recommended for those who desire a golden tinted species for hedge purposes. It has formed one of the most beautiful hedges tested here, being of a bright yellow colour which makes a fine contrast with the green of other hedges. Planted in 1894, this hedge is now 2 feet 4 inches in height and 2 feet in width.

10. *Picea excelsa.*—Norway spruce. The Norway spruce makes a compact, firm, handsome hedge, and is ornamental at all seasons of the year but as it is a very vigorous grower it requires severer clipping than some others to keep it from growing too large; planted in 1889 this hedge is now 5 feet 3 inches in height, and six feet 8 inches in width.

11. *Picea alba.*—White spruce. This native evergreen is not so rapid a grower as the Norway spruce, and does not require as much clipping. It makes a very handsome compact hedge with a better colour than the Norway spruce. Planted in 1889, this hedge is 4 feet in height, and 5 feet 1 inch in width.

12. *Pinus Strobus.*—White pine. Although a little irregular and loose when planted, this native tree has made a beautiful compact hedge. It is soft and yielding to the touch and would not be valuable where a firm hedge is desired. The leaves remain a lively green throughout the winter making it very ornamental all the year.

13. *Picea pungens glauca.*—Rocky Mountain blue spruce. The blue spruce makes one of the most beautiful evergreen hedges grown. Its colour is pale steely blue which produces a fine contrast with a green lawn. It is a slow growing tree and makes a very neat compact hedge, requiring little clipping. Planted in 1891, it is now 3 feet in height and 3 feet 3 inches in width. As this tree varies in colour from green to blue, in procuring hedge plants, the blue variety should be ordered.

A word of caution in regard to the honey locust (Gleditschia triacanthos) is here given to intending hedge planters. While this tree, undoubtedly, makes a very ornamental and useful farm hedge in certain parts of Ontario; at Ottawa, all specimens have not proven hardy; the result being that the hedge is broken and uneven. Furthermore as this is a very vigorous tree making strong growth throughout most of the summer it is difficult to keep it looking well without frequent clipping and if not kept well cut back will soon become quite tree like. The hawthorns which grow in eastern Ontario and Quebec are much hardier, will hold cattle nearly as well and require much less pruning. A hedge of the downy leaved hawthorn (Crataegus tomentosa) planted here in 1891 is now 5 feet 4 inches in height and 4 feet in width. The scarlet fruited hawthorn (Crataegus coccinea) should make a very handsome hedge, as the leaves are glossy and ornamental.

LIST OF HEDGES AT THE CENTRAL EXPERIMENTAL FARM.

Name.	When Planted.	Height, 1897.	Greatest Width, 1897.
		Ft. In.	Ft. In.
Abies balsamea—Balsam fir	1897	0 11	1 0
Acer glabrum—Smooth maple	1895	1 11	1 4
Acer pensylvanicum—Striped maple	1897	1 0	Has not branched.
Acer tataricum Ginnala—Ginnalian maple	1894	3 3	3 9
Alnus viridis—Green alder	1896	1 6	1 6
Artemisia Abrotanum—Southern wood	1896	3 4	3 0
Artemisia Abrotanum tobolskianum—Russian Southern wood	1896	3 0	3 5
Berberis Thunbergii—Thunberg's barberry	1890	3 4	4 3
Berberis vulgaris—Common barberry	1889	5 5	6 1
Berberis vulgaris purpurea—Purple-leaved barberry	1889	5 2	5 10
Betula lutea—Yellow birch	1895	3 2	2 6
Betula papyrifera—Canoe birch	1895	3 0	2 7
Betula populifolia—White birch	1897	2 0	1 2
Betula nigra—Black birch	1897	1 1	1 0
Calycanthus floridus—Carolina allspice	1895	1 3	0 6
Caragana arborescens—Siberian pea-tree	1889	6 0	5 3
Caragana frutescens—Woody caragana	1896	1 4	0 6
Celtis occidentalis—Nettle tree	1891	4 0	4 9
Cornus alba—White dog-wood	1897	1 0	0 6
Cornus Amomum	1897	1 5	0 8
Cornus alba sibirica variegata—Variegated Siberian dog-wood	1895	1 8	1 10
" " " "	1896	2 0	1 7
Cotoneaster acutifolia—Sharp-leaved cotoneaster	1896	1 8	1 8
Cotoneaster vulgaris—Common cotoneaster	1896	1 6	1 4
Crataegus tomentosa—Downy leaved hawthorn	1890	5 4	4 0
Cupressus ericoides—Heath-like retinospora	1896	1 5	1 6
Cytisus biflorus—Twin-flowered cytisus	1891	3 3	3 0
Diervilla Sieboldii variegata—Variegated weigelia	1896	1 8	1 8
Elæagnus angustifolia—Russian olive	1894	4 0	4 9
Euonymus americanus	1897	1 0	0 3
Fagus ferruginea—American beech	1897	0 6	0 3
Fagus sylvatica—European beech	1895	1 10	...
Gleditschia triacanthos—Honey locust	1889	4 6	4 7
Hippophae rhamnoides—Sea buckthorn	1895	2 10	2 6
Juniperus communis suecica compacta	1897	0 6	0 6
Juniperus communis fastigiata—Irish juniper	1891	3 10	3 7
Larix americana—Tamarac	1895	2 9	2 10
Larix europea—European larch	1897	1 1	0 8
Ligustrum amurense—Amur privet	1894	3 1	3 3
Lonicera tatarica—Tartarian honeysuckle	1896	2 0	1 4
Lonicera tatarica elegans—Elegant tartarian honeysuckle	1896	1 11	1 10
Morus tatarica—Russian mulberry	1889	6 8	6 11
Neillia aubifolia	1896	2 5	2 10
Neillia opulifolia aurea—Golden-leaved spiræa	1890	5 8	5 10
Negundo aceroides—Box elder	1891	5 7	6 4
Philadelphus coronarius aureus—Golden-leaved mock orange	1894	2 9	2 7
Philadelphus coronarius primulæflorus—Double-flowered mock orange	1894	1 8	1 9
Picea alba—White spruce	1889	4 0	5 1
Picea excelsa—Norway spruce	1889	5 3	6 8
Picea pungens—Rocky Mountain blue spruce	1891	3 0	3 3
Pinus Cembra—Swiss stone pine	1894	1 7	1 0
Pinus ponderosa—Bull pine	1895	2 7	2 6
Pinus Strobus—White pine	1890	4 0	4 4
Populus pyramidalis	1896	2 8	2 2
Populus nigra fastigiata—Lombardy poplar	1897	2 3	1 0
Prunus americana—Wild plum	1894	4 2	4 0
Prunus Mahaleb—Mahaleb cherry	1897	1 6	0 8
Prunus serotina—Wild black cherry	1897	2 0	0 10
Pseudotsuga Douglasii—Douglas fir	1894	2 3	2 5
Pyrus baccata aurantiaca—Yellow Siberian crab	1897	1 8	0 6
Pyrus Maulei—Maule's Japanese quince	1894	1 0	1 7
Pyrus communis—Wild pear	1897	1 1	0 4
Quercus Robur—Common European oak	1895	2 3	2 4
Rhamnus catharticus—Cathartic buckthorn	1895	3 6	2 6
Rhamnus Frangula—Alder buckthorn	1890	5 10	6 0
Rhamnus Frangula—(Dense form)—Dense alder buckthorn	1895	3 0	3 3
Rosa rubrifolia—Red-leaved rose	1890	5 5	4 5
Rosa rugosa—Japan rose	1890	4 5	5 3

LIST OF HEDGES AT THE CENTRAL EXPERIMENTAL FARM—*Continued.*

Name.	When Planted.	Height, 1897.	Greatest Width, 1897.
		Ft. in.	Ft. in.
Salix acutifolia—Sharp-leaved willow	1896	1 11	2 0
Shepherdia canadensis—Buffalo berry	1897	1 2	0 6
Spiræa chamædrifolia—Germander-leaved spiræa	1896	2 5	1 3
Spiræa Douglasii—Douglas' spiræa	1891	3 10	2 7
Spiræa bracteata (media rotundifolia)—Round-leaved spiræa	1894	2 6	2 7
Spiræa Van Houttei—Van Houtte's spiræa	1891	2 2	1 10
Symphoricarpus racemosus—Snowberry	1890	3 0	3 8
Syringa chinensis—Rouen lilac	1890	3 3	3 7
Syringa Josikæa—Josika's lilac	1891	4 8	4 10
Syringa vulgaris—Common lilac	1890	6 6	6 3
Thuya occidentalis—American arbor-vitæ	1890	4 0	4 7
Thuya occidentalis aurea Douglasii—Douglas' golden arbor-vitæ	1894	2 4	2 0
Thuya occidentalis aurea Hoveyi—Hovey's golden arbor-vitæ	1897	1 1	0 6
Thuya occidentalis globosa—Globose arbor-vitæ	1895	1 6	1 8
Thuya occidentalis wareana—Siberian arbor-vitæ	1895	2 5	2 5
Tsuga canadensis—Hemlock	1889	3 0	3 8
Ulmus americana—American elm	1889	6 1	5 4
Viburnum Lantana—Wayfaring tree	1890	4 1	4 7
Viburnum Opulus—High bush cranberry	1894	3 6	3 3
Xanthoxylum americanum—Prickly ash	1889	4 6	4 2

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES

(Report of G. W. Forrest, Superintendent.)

Nappan, N.S., November 30, 1897.

To Dr. Wm. Saunders,
Director Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith the following report of the operations on the Experimental Farm for the Maritime Provinces, at Nappan, N.S, during the year 1897.

WEATHER.

December, 1896, opened rainy, followed by cold on the 2nd. The thermometer registered 12° of frost on the morning of the 3rd, this weather continued with one exception until the 21st, when the thermometer registered 22° of frost, and on the morning of the 22nd the mercury had fallen to 4° below zero; this weather continued for a few days. Some snow fell on the 8th, and about five inches on the 17th, but not sufficient to make sleighing.

January opened cold, the thermometer registered 13° of frost; on the 4th open weather set in with rain, which continued until the 8th, when we had 22° of frost. On the 14th the mercury fell to 17° below zero, and on the 15th 10° below. On the 17th and 18th we had open weather without any frost, and on the 19th the register showed 14° below zero, continuing cold during the remainder of the month. A slight amount of snow fell on the 9th, with a heavy fall and high winds on the 12th. Again on the 29th we had a heavy fall of snow, accompanied by high winds.

February was an unusually fine, open month, having no very cold weather. On the 15th and 16th of March the thermometer registered 24 and 30° of frost, with this exception March weather was rather pleasant. April was rather fine with the exception of rain on the 14th, 24th and 27th. The month was, however, rather cold, making the spring backward.

May opened with cold, east winds, and rain on the 3rd. The whole month continued more or less cold and wet. The first seed was sown on the 8th.

From the 12th to the 20th of May we had almost continuous rain. Rain to the depth of 4·01 inches fell between the 27th of April and 1st June; 3·78 inches rain fell in June; 3·35 inches in July; 3·67 inches in August and 2·05 inches in September.

The whole season was unusually dark and wet until the 20th of September, since then the weather has been exceptionally fine. The first frost this fall was on the 18th of September, it was only light, followed by a heavy one on the 29th.

HAY.

Hay was over an average crop on both upland and marsh. Some 20 acres of upland was in hay, giving a yield of 50 tons. Forty acres of the marsh lands produced 70 tons of English and 12 tons of broad-leaf hay, making a total of 120 tons of mixed hay and 12 tons of broad-leaf. Although the season was unfavourable for making hay, on account of considerable rain and very little sunshine, the hay was all gathered in a fair condition.

In addition to the hay crop the straw harvested amounted to 49 tons 805 pounds.

EXPERIMENTS WITH SPRING WHEAT.

The experimental plots of spring wheat consisted of forty varieties. The yield was hardly up to the average, the straw was all more or less rusted. The soil used for the experiment was a clayey loam, the previous crop being roots. Fertilizer at the rate of 250 pounds per acre was used, it was made up of 125 pounds complete fertilizer and 125 pounds of bone meal mixed together. This was drilled in with the seed. In addition to this, 100 pounds of nitrate of soda was used per acre, 50 pounds sown broadcast when the grain was 3 inches high, and 50 pounds when 6 inches high. No beneficial results were noticeable from the use of nitrate of soda; this was probably due to the wet season. The straw making an abnormal growth consequently lodged badly, and the seed did not fill out well.

The plots were one-twentieth acre each. The seed was sown on the 10th and 11th of May, at the rate of 1¾ bushels per acre. The results obtained are given in the following table:—

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.
Wellman's Fife	Aug. 28	108	48	Very stiff	5	Beardless	5,850	30 20	60
White Connell	" 30	111	44	Medium	4	"	5,200	28 20	61
Rio Grande	Sept. 1	113	46	"	4	Bearded	5,000	27 40	60
Advance	Aug. 24	106	44	Stiff	3	"	5,700	26 40	60
Goose	" 25	107	41	Medium	2½	"	5,000	26 40	62
Red Fern	" 25	107	45	Weak	4	"	4,700	26 40	61
White Russian	Sept. 1	113	46	Medium	4	"	5,200	26 40	58
Preston	Aug. 24	106	43	"	3½	"	5,200	26 20	61
Dion's	" 30	111	45	Stiff	3½	"	4,800	26 00	58
Stanley	" 24	106	44	Medium	3	Beardless	4,500	25 40	61
Admiral	" 28	110	47	Stiff	4	"	4,000	25 00	59
Vernon	" 28	109	44	Weak	3	Bearded	5,000	23 20	60
Green Mountain	Sept. 1	113	48	Medium	4	Beardless	4,600	23 20	58
Huron	Aug. 30	111	44	Stiff	3¾	Bearded	4,400	23 20	61
Monarch	" 30	111	48	"	4½	Beardless	5,800	23 20	58
Alpha	" 26	106	47	"	3	Bearded	4,200	23 20	61
Colorado	" 25	107	44	Weak	3	"	4,700	23 20	62
Beauty	Sept. 1	113	45	Stiff	3½	Beardless	5,000	23 20	60
Dufferin	Aug. 27	109	46	Weak	3	Bearded	3,800	22 40	62
Emporium	" 30	111	43	Stiff	3½	"	4,500	22 40	58
Crown	" 30	111	42	Medium	3½	"	4,000	22 00	62
Captor	Sept. 1	113	48	Stiff	3½	Beardless	4,400	22 00	62
Herisson Bearded	Aug. 28	109	48	Weak	2	Bearded	4,600	22 00	60
Golden Drop	" 24	106	44	Stiff	3¾	"	5,000	22 00	61
Dawn	" 27	109	47	"	3	Beardless	4,000	22 00	60
Black Sea	" 27	109	50	"	3	Bearded	4,300	21 40	62
Blenheim	Sept. 1	113	48	Very stiff	3½	"	4,400	21 00	60
Old Red River	Aug. 30	111	48	Medium	4	Beardless	5,000	21 00	60
Red Fife	Sept. 1	113	38	Very stiff	3½	"	4,300	21 00	60
Hungarian	" 1	113	42	Medium	4	Bearded	4,900	20 40	59
Beaudry	Aug. 30	111	37	Weak	3	"	3,900	20 20	58
Campbell's White Chaff	" 25	107	43	Stiff	3	Beardless	4,500	20 20	61
Pringle's Champlain	" 30	111	48	"	4	Bearded	4,900	19 00	59
Gehun	" 27	107	38	Medium	3½	Beardless	4,000	18 40	58
Rideau	" 27	109	42	"	3	"	4,000	18 40	56
Progress	Sept. 1	113	48	"	4½	"	5,600	18 40	61
White Fife	" 1	113	46	Stiff	3¾	"	4,500	18 20	60
Ladoga	Aug. 23	105	40	"	3	Bearded	4,000	18 00	61
Percy	" 30	111	48	Medium	3½	Beardless	4,300	17 40	60
Countess	Sept. 1	113	46	Stiff	3	"	3,700	17 00	61

NOTE.—The weights given here, and also in all other grain tables in this report, were taken as the grain came from the threshing mill, and are not the maximum weights that the grain could be brought to by leaning.

EXPERIMENTS WITH BARLEY.

The test plots of barley included twenty-one varieties of six-rowed and sixteen of two-rowed.

The grain was up to the average in yield. The land used for these plots was a sandy loam, the previous crop being beans and corn. Fertilizer of similar composition to that used on the wheat plots was applied in the same manner, an equal amount per acre being used. In addition to this 500 pounds per acre of common salt was used for the purpose of checking the growth of weeds. On the six-rowed sorts the salt was sown broadcast and harrowed in before seeding; on the two-rowed varieties it was sown broadcast when the grain was two inches high. There was no noticable difference in its value as a preventive of weeds between the two modes of application. The straw was all unusually bright and free from smut. The salt to all appearances was very beneficial in this respect.

The seed was sown on May 25th and 26th in one-twentieth acre plots, at the rate of two bushels per acre. The following results were obtained:—

SIX-ROWED BARLEY—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.
			In.		In.		Bush.	Lbs.	Lbs.
Mensury	Aug. 23	90	39	Weak	2¾	7,800	52	4	50
Oderbruch	" 23	90	36	Medium	2½	7,600	50	20	50
Royal	" 18	85	36	"	3	6,100	48	16	48
Vanguard	" 18	42	42	Stiff	2½	6,700	46	32	48
Odessa	" 19	86	43	Medium	3	4,500	46	12	48
Petschora	" 17	84	43	Stiff	2½	4,700	45	20	44
Pioneer	" 19	86	38	"	2½	4,500	44	8	50
Common Six-Rowed	" 23	90	36	Medium	2¼	7,600	42	24	50
Blue	" 21	88	36	"	3	5,000	42	24	43
Rennie's Improved	" 19	86	38	Very stiff	2	5,000	40	40	51
Phœnix	" 18	85	42	"	2	5,000	40	20	49
Surprise	" 27	94	36	Stiff	2½	5,100	40	00	51
Trooper	" 27	94	40	Medium	2¾	5,000	40	00	51
Nugent	" 27	94	35	Stiff	2¼	4,600	39	28	51
Summit	" 27	94	42	Medium	4	5,300	38	36	51
Stella	" 27	94	36	"	3	5,400	38	36	48
Champion	" 18	85	48	Stiff	3	6,500	37	44	43
Baxter's Six-Rowed	" 19	86	42	Very stiff	2½	4,500	37	20	50
Excelsior	" 23	90	48	Stiff	2	6,500	37	20	42
Success	" 13	80	46	"	2½	6,000	34	28	45
Silver King (Four-Rowed)	" 20	87	36	Medium	3½	6,500	41	32	48

TWO-ROWED BARLEY—Test of Varieties.

Duck-bill	Sept. 6	103	39	Stiff	3	5,900	41	32	51
Canadian Thorpe	" 6	103	42	Very stiff	3	5,600	40	40	49
Newton	" 7	104	43	Medium	3½	5,500	40	40	51
Nepean	" 7	104	43	"	3½	5,400	40	40	51
Danish Chevalier	" 7	104	36	Stiff	4½	5,200	39	28	47
Sidney	" 7	104	42	Medium	4	5,600	38	16	50
Bolton	" 7	104	36	Weak	3	4,700	37	24	49
Pacer	" 7	104	38	Stiff	3	5,200	37	4	51
Victor	" 7	104	36	"	4½	6,000	35	40	50
French Chevalier	" 7	104	29	Medium	4½	5,100	35	40	50
Beaver	" 7	104	38	Weak	4	4,500	34	28	51
Prize Prolific	" 7	104	39	Stiff	4	5,000	34	8	50
Kinver Chevalier	" 7	104	29	"	4½	4,900	32	44	50
Thanet	" 7	104	36	Medium	5	3,500	29	8	49
Monck	" 7	104	42	Stiff	3½	6,800	23	36	5
Rigid	" 7	104	38	"	4	5,500	21	32	51

EXPERIMENTS WITH OATS.

The soil used for these experiments was a clayey loam, the previous crop being corn. The application, quantity per acre, and quality of the fertilizer used was similar to that of the wheat and barley plots. The straw was all more or less rusted, and of a very heavy growth, due no doubt to the stimulating effect of the nitrate of soda. The seed, however, filled out well.

Some of the varieties which were affected with smut the previous year were treated, by putting the seed to be sown in water raised to the temperature of 142° F., allowing it to remain submerged for two minutes, then cooling it off rapidly and drying. Those plots so treated were entirely free from smut. Some smut was noticeable in many of the other plots.

Sixty-four varieties of oats were sown on May 12th and 20th in plots of one-twentieth acre each. The following table gives the results obtained :—

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.
Wallis	Aug. 26	98	46	Stiff	10	Branching	1,600	87	22	39
Siberian O. A. C	Sept. 6	109	42	Medium	8	"	5,100	82	12	33
Flying Scotchman	Aug. 21	93	44	Very stiff	5	"	6,800	82	12	40
Hazletts Seizure	" 21	93	46	Stiff	13	"	6,600	78	22	37
White Wonder	" 21	93	42	Medium	10	"	6,000	76	16	42
White Russian	" 26	106	40	Weak	9	"	6,800	73	18	37
Bavarian	" 27	99	40	Stiff	8	"	6,800	72	12	36
Golden Tartarian	Sept. 13	116	42	"	12	Sided	7,000	72	12	32
Improved American	" 6	109	45	"	11	"	6,800	72	12	32
Mortgage Lifter	" 2	105	40	Medium	13	Branching	6,100	69	14	38
California Prolific (Blk)	Aug. 30	102	44	Stiff	9	Sided	5,800	67	22	39
Columbus	Sept. 4	107	42	"	12	Branching	4,900	67	2	36
Mennonite	" 1	104	36	"	9	"	6,400	67	2	32
Early Etampes	" 4	115	39	Medium	8	"	5,000	67	2	35
Doncaster Prize	Aug. 26	98	46	Stiff	12	"	7,900	65	30	39
White Monarch	" 26	98	46	"	9	"	7,700	64	24	40
Early Racehorse	" 25	97	41	Medium	10	"	6,500	64	24	41
Lincoln	" 26	98	39	"	9	"	5,000	64	24	36
American Beauty	Sept. 2	105	40	"	8	"	5,100	64	24	32
Rosedale	Aug. 27	107	37	Stiff	9	Sided	5,300	64	4	41
Early Gothland	" 27	99	36	"	9	"	5,300	64	4	40
Cream Egyptian	" 26	98	41	Medium	10	"	6,700	62	32	39
Oderbruch	Sept. 4	107	40	"	11	Half-sided	5,600	62	32	35
Abyssinia	Aug. 30	102	45	Stiff	10	Sided	4,900	62	32	38
Golden Beauty	Sept. 4	107	40	Medium	11	Branching	5,100	61	26	32
Wide Awake	Aug. 30	110	42	Stiff	9	"	5,800	61	26	32
Prize Cluster	" 26	106	41	"	11	"	4,800	61	26	42
Welcome	" 26	106	46	"	13	"	4,700	61	26	41
Newmarket	Sept. 2	105	42	"	10	"	4,800	61	26	33
Banner	Aug. 27	107	38	"	8	"	4,200	60	30	38
Olive	" 27	107	42	Medium	12	Sided	3,500	60	00	37
Master	" 26	98	44	Stiff	13	Branching	4,600	59	14	38
Early Blossom	" 30	110	40	"	10	Sided	4,800	59	14	36
Winter Grey	Sept. 1	104	42	Medium	12	Branching	4,700	58	38	38
Black Beauty	Sept. 2	105	32	Weak	13	Branching	6,100	57	22	33
Improved Ligowo	Aug. 27	107	35	Stiff	8	"	4,200	57	22	34
Coulommiers	Sept. 4	115	40	"	10	"	7,500	56	16	35
Holstein Prolific	Aug. 27	107	35	"	8	"	4,000	55	30	35
Prolific Black Tartarian	" 30	110	42	"	10	Sided	5,700	55	10	34
$1,000	Sept. 1	104	42	Medium	8	Branching	3,800	55	10	33
Pense	Aug. 27	107	40	"	12	Sided	3,500	55	10	34
Golden Giant	Sept. 13	117	42	Stiff	12	"	6,400	53	18	35
Abundance	Aug. 27	99	42	"	8	Branching	4,100	53	18	35
Scotch Hopetoun	Sept. 4	107	47	"	10	"	7,000	53	18	35

OATS—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.
Medal	Sept. 4	107	38	Medium	10	Branching	4,900	52	32	35
Bonanza	Aug. 27	107	43	Stiff	11	"	4,000	52	32	41
Siberian	Sept. 6	109	44	Very stiff	10	Sided	6,500	52	32	34
Rennie's Prize	Aug. 26	98	42	Stiff	10	Branching	5,100	51	26	42
Poland White	" 21	93	46	Medium	12	"	4,800	51	26	42
Early Golden Prolific	" 27	107	37	"	7	"	5,100	51	26	40
Cromwell	Sept. 4	107	46	Stiff	10	"	5,000	50	00	34
Joanette	" 4	115	38	Medium	7	"	5,200	50	00	40
White Schonen	Aug. 26	106	37	Weak	7	"	6,500	50	00	42
Early Maine	" 30	102	40	"	11	Half-sided	3,300	50	00	38
Imported Irish	" 26	98	46	"	10	Branching	4,800	49	14	42
Brandon	Sept. 1	103	37	Stiff	9	Half-sided	5,700	48	28	36
Russell	Aug. 27	99	39	"	8	Branching	4,800	48	28	40
Scottish Chief	" 27	107	38	"	11	"	2,900	47	22	40
Miller	Sept. 4	107	49	Very stiff	12	"	7,400	45	30	34
Buckbee's Illinois	" 7	110	48	Medium	8	"	6,400	44	4	34
American Triumph	" 4	107	48	Very stiff	14	"	6,000	44	4	37
Victoria Prize	Aug. 30	110	38	Medium	10	"	2,800	44	4	42
Oxford	Sept. 7	110	48	Stiff	9	"	5,500	40	00	35
Early Archangel	" 1	104	42	Medium	13	"	4,500	40	00	36
King	Aug. 27	107	42	"	12	"	5,400	40	00	42

RESULTS OF EARLY, MEDIUM AND LATE SOWINGS.

Experiments to test the relative value of early, medium and late sowings of grain were again carried on this year. The first set of these plots was sown 19th May, and the sowings were continued until six had been made, one week apart. One variety each of wheat, barley and oats were used in this test. The soil on which these experiments were conducted was a clayey loam. Fertilizer at the rate of 250 pounds per acre, made up of 125 pounds of complete fertilizer and 125 pounds of bone meal, mixed together, was drilled in with the seed when sown.

Owing to the lateness of the season when the last set of plots were sown, and the early frost this fall, the three last sowings of wheat, and the last plot of oats and barley, did not mature. The first plots sown were slightly rusted, the later sown ones were all badly rusted. The plots were one-twentieth acre each. The results are as follows :—

OATS—Results of Early, Medium and Late Sowings.

Name of Variety.	Date of Sowing.	Yield per Acre.		Weight per Bushel
		Bus.	Lbs.	Lbs.
No. 1—Abundance	May 19	61	26	32
No. 2— "	" 26	48	8	35
No. 3— "	June 2	54	4	35
No. 4— "	" 9	59	12	32
No. 5— "	" 16	56	8	32
No. 6— "	" 23	44	24	29

BARLEY—Results of Early, Medium and Late Sowings.

Name of Variety.	Date of Sowing.	Yield per Acre.		Weight per Bushel
		Bus.	Lbs.	Lbs.
No. 1—Canadian Thorpe	May 19....	52	44	48
No. 2— "	" 26....	34	28	47
No. 3— "	June 2....	46	12	51
No. 4— "	" 9....	55	25	46
No. 5— "	" 16...	53	35	47
No. 6— "	" 23....	40	40	45

WHEAT—Results of Early, Medium and Late Sowings.

Name of Variety.	Date of Sowing.	Yield per Acre.		Weight per Bushel
		Bus.	Lbs.	Lbs.
No. 1—Stanley	May 19....	19	20	60
No. 2— "	" 26....	18		57
No. 3— "	June 2....	18	20	55
No. 4— "	" 9....	18	20	52
No. 5— "	" 16....	16	40	47
No. 6— "	" 23....	15	20	45

EXPERIMENTS WITH PEASE.

Forty varieties of pease were sown 16th May, on one-twentieth acre plots. The same land devoted to the experimental plots of pease last year was again used. It was of a rather light clay loam and very poor.

The cut worm did a great amount of damage to these plots in some cases fully one-half the plants were cut off when about 3 inches high.

Fertilizers at the rate of 250 pounds per acre was used, this was made up of 125 pounds of complete fertilizer and 125 pounds of bone meal mixed together, and sown with the seed. The results obtained are as follows :—

PEASE—Test of Varieties.

Name of Variety.	Date of Ripening.	Number of days maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				In.	Lbs.	In.		Bush.	Lbs.	Lbs.
Early Britain	Sept. 2	109	Weak	78	4,800	2½		50	00	59
Crown	Aug. 28	104	"	60	4,200	3	Small	35	00	61
Perth	Sept. 2	109	"	72	4,000	2		31	40	61
Centennial	" 16	123	Medium	84	4,200	2½	Medium	31	40	59
King	" 9	116	Stiff	78	3,900	2		31	40	60
Chancellor	" 2	109	Medium	72	3,900	2		30	00	61
Prussian Blue	" 13	120	Strong	60	4,300	2		30	00	62
Oddfellow	" 9	116	Medium	48	3,900	1½		28	40	64
Bright	" 20	127	"	50	3,100	2⅜		26	40	62
Duke	" 16	123	"	70	3,500	2¼	Medium	26	40	58
Vincent	" 9	116	"	54	4,000	3		26	40	60
Elephant Blue	" 4	111	Weak	60	2,400	2½		24	40	61
Archer	" 20	127	Strong	55	2,600	2		24	00	61
White Wonder	" 2	109	Very weak	38	2,000	2		23	20	61
Nelson	" 4	111	Medium	45	3,400	2		23	20	60
Creeper	" 9	116	Weak	66	3,900	2½	Small	22	40	59
Bruce	" 13	120	Strong	75	3,600	2⅜	Medium	22	20	60
Prince Albert	" 16	123	"	96	3,500	2½	Small	22	20	63
Trilby	" 16	123	Medium	72	4,200	2¼	"	22	20	60
Victoria	" 16	123	Strong	55	3,400	2		22	00	60
Alma	Aug. 28	104	Weak	32	3,300	2		22	00	62
New Potter	Sept. 9	116	Medium	72	4,500	2½	Medium	22	00	60
Pride	" 13	120	"	60	3,300	3	Large	21	40	63
Carleton	" 2	109	"	72	3,900	2	Medium	20	40	59
Large White Marrowfat	" 13	120	"	98	3,600	2½	"	20	40	57
Harrison's Glory	" 4	111	Weak	45	2,600	2		19	20	61
Prince	" 13	120	Strong	48	3,200	2½	Medium	19	20	60
Multiplier	" 13	120	Weak	60	2,600	2	Small	18	40	60
Mackay	" 13	120	Strong	65	3,000	2½	Medium	18	20	58
Bedford	" 20	127	"	55	2,600	2	"	17	20	62
Blackeyed Marrowfat	" 4	111	Weak	66	2,700	2½	Large	16	40	60
Mummy	" 28	104	"	36	1,000	1½	Medium	16	40	62
Macoun	" 16	123	Strong	72	3,500	2	Large	16	40	60
Paragon	" 13	120	Medium	55	3,100	2½	Small	16	40	58
Golden Vine	" 9	116	Weak	48	4,000	1½	"	16	00	60
Canadian Beauty	" 9	116	"	44	3,100	2⅝	Large	16	00	61
Kent	" 13	120	"	70	2,500	2½	Medium	15	00	58
Arthur	Aug. 28	104	"	32	1,000	2	Small	13	20	61
Daniel O'Rourke	" 28	104	"	39	1,100	2	"	11	20	61
Agnes	Sept. 4	111	"	48	1,100	2½	Medium	11	20	60

GENERAL STATEMENT OF GRAIN CROPS.

The grain plots yielded 412 bushels, 1¼ acre of oats on the marsh yielded 55 bush. 11 acres of oats on the upland yielded 330 bush. Corner lots of different areas sown to barley produced 83 bushels. Also corner lots of oats in different fields produced 22 bushels, 6 acres of buckwheat yielded 85 bushels. This makes a total of 987 bushels of grain harvested.

FERTILIZERS USED ON THE FIELD GRAIN.

The field oats were fertilized with 8 barrels of soft wood ashes and 1 barrel of complete fertilizer per acre. The grain fields were at the same time seeded to clover and it was noticed that the fields in which wood ashes were used gave the best crop of clover, as well as an apparent better crop of oats.

Part of the land used for buckwheat was fertilized with 8 barrels of soft wood ashes per acre. This was sown broadcast and harrowed in, and the other part with 250 pounds of mixed fertilizer (125 pounds bone meal and 125 pounds of complete fertilizer) per acre. The part on which the wood ashes were sown made the best growth and gave apparently the best yield.

EXPERIMENTS WITH TURNIPS.

Eighteen varieties of turnips were used in this experiment. The land was a sandy loam, the previous crop was potatoes. The land was ploughed in the fall.

Thirty 20-bushel cart loads of barn-yard manure, and 100 pounds of complete fertilizer were used per acre. After the rows were run up for seeding a small drill was made by hand into which the fertilizer was also sown by hand, the seed was then sown and covered. All the seed sowing is done by hand for the root plots.

Two sowings were made of each variety. The first set of plots were sown 4th June, the second two weeks later, 18th June. The yield of all the root plots per acre has been calculated from the quantity obtained from two rows each 66 feet long and 26 inches apart. The following results were obtained :—

TURNIPS.—Test of Varieties.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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.
Shamrock Purple Top	June 4.	June 18.	Oct. 14.	Oct. 18.	37	480	1,241	20	33	120	1,102	00
Halewood's Bronze Top	" 4.	" 18.	" 14.	" 18.	36	200	1,203	20	25	1,820	863	40
Hartley's Bronze	" 4.	" 18.	" 14.	" 18.	32	600	1,076	40	28	1,760	962	40
Perfection Swede	" 4.	" 18.	" 14.	" 18.	31	1,080	1,051	20	31	1,840	1,064	00
Skirving's	" 4.	" 18.	" 14.	" 18.	31	320	1,038	40	20	1,180	686	20
East Lothian	" 4.	" 18.	" 14.	" 18.	30	800	1,013	20	24	360	806	00
Selected Purple Top	" 4.	" 18.	" 14.	" 18.	29	520	975	20	25	1,060	851	00
Bangholm Selected	" 4.	" 18.	" 14.	" 18.	28	1,760	962	40	24	780	813	00
Selected Champion	" 4.	" 18.	" 14.	" 18.	28	240	937	20	24	1,540	825	40
Carter's Elephant	" 4.	" 18.	" 14.	" 18.	27	1,380	923	00	19	1,520	658	40
Marquis of Lorne	" 4.	" 18.	" 14.	" 18.	26	1,960	899	20	24	360	806	00
Prize Purple Top	" 4.	" 18.	" 14.	" 18.	26	1,960	899	20	22	840	747	20
Mammoth Clyde	" 4.	" 18.	" 14.	" 18.	25	1,820	863	40	24	780	813	00
Sutton's Champion	" 4.	" 18.	" 14.	" 18.	25	1,820	863	40	24	1,540	825	40
Hall's Westbury	" 4.	" 18.	" 14.	" 18.	25	1,060	851	00	26	1,960	899	20
Prize Winner	" 4.	" 18.	" 14.	" 18.	25	1,060	851	00	23	1,880	798	00
Jumbo or Monarch	" 4.	" 18.	" 14.	" 18.	24	360	806	00	19	760	646	00
Giant King	" 4.	" 18.	" 14.	" 18.	24	640	810	40	21	560	709	20

EXPERIMENTS WITH MANGELS.

Sixteen varieties of mangels were sown in this test. The soil and its preparation was similar to that of the turnip plots. Two sowings were made of each variety. Results as follows were obtained :—

MANGELS—Test of Varieties.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	Yield per acre. 1st Plot.		Yield per acre. 1st Plot.		Yield per acre. 2nd Plot.		Yield per acre. 2nd Plot.	
					Ton.	lbs.	Bush.	lb.	Ton.	lbs.	Bush.	lbs.
Giant Yellow Intermediate	June 4	June 18.	Oct. 14.	Oct. 15.	34	400	1,140	..	23	1,880	798	..
Norbitan Giant	" 4.	" 18.	" 14.	" 15.	34	400	1,140	..	23	340	772	40
Giant Yellow Half Long	" 4.	" 18.	" 14.	" 15.	33	840	1,114	..	25	300	838	20
Ward's Large Oval Shaped	" 4.	" 18.	" 14.	" 15.	30	....	1,000	..	19	1,520	658	40
Yellow Intermediate	" 4.	" 18.	" 14.	" 15.	29	1,280	988	..	21	1,320	722	..
Giant Yellow Globe	" 4.	" 18.	" 14.	" 15.	29	1,280	988	..	23	340	772	20
Canadian Giant	" 4.	" 18.	" 14.	" 15.	28	1,000	950	..	20	1,040	684	..
Mammoth Long Red (Evans)	" 4.	" 18.	" 14.	" 15.	27	1,480	924	40	23	1,100	785	..
Prize Mammoth Long Red	" 4.	" 18.	" 14.	" 15.	27	720	912	..	21	1,320	722	..
Champion Yellow Globe	" 4.	" 18.	" 14.	" 15.	26	1,200	886	40	23	1,100	785	..
Gate Post	" 4.	" 18.	" 14.	" 15.	26	1,200	886	40	17	960	582	40
Golden Fleshed Tankard	" 4.	" 18.	" 14.	" 15.	26	1,200	886	40	18	1,220	620	40
Golden Tankard	" 4.	" 18.	" 14.	" 15.	25	1,060	851	..	19	1,520	658	40
Red Fleshed Tankard	" 4.	" 18.	" 14.	" 15.	25	300	838	20	14	880	481	20
Warden Orange Globe	" 4.	" 18.	" 14.	" 15.	24	1,540	825	40	23	340	772	20
Red Fleshed Globe	" 4.	" 18.	" 14.	" 15.	21	560	709	20	22	80	734	40

EXPERIMENTS WITH CARROTS.

Fifteen varieties of carrots were experimented with. These plots were on soil similar in character and preparation to that used for the mangel and turnip plots. Two sowings were made of each variety, and the following results were obtained :—

CARROTS—Test of Varieties.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	Yield per acre. 1st Plot.		Yield per acre. 1st Plot.		Yield per acre. 2nd Plot.		Yield per acre. 2nd Plot.	
					Ton.	lbs.	Bush.	lb.	Ton.	lbs.	Bush.	lb.
Iverson's Champion	June 4.	June 18.	Oct. 14.	Oct. 15.	21	1,320	722	00	13	580	443	00
Giant White Vosges	" 4.	" 18.	" 14.	" 15.	21	560	709	20	16	680	544	40
Green Top White Orthe	" 4.	" 18.	" 14.	" 15.	18	1,220	620	40	12	320	405	20
Half-long Chantenay	" 4.	" 18.	" 14.	" 15.	17	960	582	40	12	320	405	20
Improved Short White	" 4.	" 18.	" 14.	" 15.	17	960	582	40	16	680	544	40
Yellow Intermediate	" 4.	" 18.	" 14.	" 15.	16	1,440	557	20	8	1,280	288	00
Guerande or Ox Heart	" 4.	" 18.	" 14.	" 15.	16	1,440	557	20	11	40	367	20
Mammoth White Intermediate	" 4.	" 18.	" 14.	" 15.	16	1,440	557	20	14	100	468	20
Half-long White	" 4.	" 18.	" 14.	" 15.	16	680	544	40	12	1,840	430	40
White Belgian	" 4.	" 18.	" 14.	" 15	13	1,360	456	00	10	1,280	354	40
Early Gem	" 4.	" 18.	" 14.	" 15.	13	1,360	456	00	14	100	468	20
Scarlet Intermediate	" 4.	" 18.	" 14.	" 15.	11	800	380	00	7	1,000	250	00
Carter's Orange Giant	" 4.	" 18.	" 14.	" 15.	9	1,000	316	40	7	1,760	262	40
Long Scarlet Altringham	" 4.	" 18.	" 14.	" 15.	9	1,000	316	40	8	520	275	20
Long Orange or Surrey	" 4.	" 18.	" 14.	" 15.	9	240	304	00	7	1,760	262	40

EXPERIMENTS WITH SUGAR BEETS.

Six varieties of sugar beets were sown. These were on soil of similar character and prepared in the same manner as that used for the turnip, mangel and carrot plots. Two sowings were made of each variety. The following results were obtained:—

SUGAR-BEETS—Test of Varieties.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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.
French White Red Top	June 4.	June 18.	Oct. 14.	Oct. 15.	23	1,880	798	00	19	760	646	00
Danish Improved	" 4.	" 18.	" 14.	" 15.	22	1,600	760	00	15	1,920	532	00
Red Top Sugar	" 4.	" 18.	" 14.	" 15.	22	1,600	760	00	16	1,440	557	20
Wanzleben	" 4.	" 18.	" 14.	" 15.	22	840	747	20	14	1,640	494	00
Improved Imperial	" 4.	" 18.	" 14	" 15.	20	1,040	684	00	15	400	506	40
Vilmorin's Improved	" 4.	" 18.	" 14.	" 15.	15	1,160	519	20	14	120	468	40

EXPERIMENTS WITH POTATOES.

One hundred and two varieties of potatoes were planted on the 25th of May. They were on a loamy soil, the previous crop was sunflowers. The land was manured in the fall of 1896 with thirty 20-bushel cart loads of barn-yard manure per acre, which was ploughed in. The land was again ploughed this spring and 200 pounds of bone meal was sown broadcast per acre and harrowed in. The plots consisted of two rows each 66 feet long and 26 inches apart.

All the plots were treated during the season with the Bordeaux mixture and very few rotten potatoes were found. The following results were obtained:—

POTATOES—Test of Varieties.

Name of Variety.	Dug.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.	
		Bus.	lbs.	Bus.	lbs.	Bus.	lbs.
Early Puritan	Oct. 1	460	..	450	..	10	..
Clarke's No. 1	" 1	412	30	385	..	27	30
Lee's Favourite	" 9	412	30	385	..	27	30
Holborn Abundance	" 12	412	30	387	30	25	..
I. X. L.	" 9	400	..	377	30	22	30
Seedling No. 7	" 11	400	..	372	30	27	30
Pearce's Prize Winner	" 11	400	..	337	30	62	30
Seedling No. 230	" 1	390	..	325	..	65	..
Early Rose	" 9	380	..	250	..	130	..
Freeman	" 9	377	30	315	..	62	30
Seattle	" 12	377	30	317	30	60	..
Burpee's Extra Early	" 11	370	..	310	..	60	..
Troy Seedling	" 11	362	30	330	..	32	30
Dakota Red	" 9	360	..	307	30	52	30
Carman No. 3	" 1	360	..	287	30	72	30
Peerless Junior	" 1	352	..	325	..	27	30
Ideal	" 1	350	..	300	..	50	..
State of Maine	" 1	347	30	277	30	70	..
Good News	" 11	345	..	275	..	70	..
General Gordon	" 9	345	..	260	..	85	..
McKenzie	" 1	345	..	320	..	25	..
Maule's Thoroughbred	" 11	337	30	272	30	65	..

POTATOES—Test of Varieties.—*Continued.*

Name of Variety.	Dug.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.	
		Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Carman No. 1	Oct. 9...	335	..	305	..	30	..
Rural No. 2	" 11...	335	..	297	30	37	30
Quaker City	" 11...	327	30	270	..	57	30
Early Ohio	" 1...	325	..	290	..	35	..
Lizzie's Pride	" 1...	325	..	300	..	25	..
Record	" 1...	325	..	235	..	90	..
Burnaby Seedling	" 9...	322	30	265	..	57	30
Everett	" 11...	320	..	282	30	37	30
Lightning Express	" 11...	320	..	300	..	20	..
Great Divide	" 9...	320	..	297	30	22	30
Irish Cobbler	" 11 ..	317	30	252	30	65	..
Queen of the Valley	" 9...	317	30	255	..	62	30
Rochester Rose	" 1...	312	30	290	..	22	30
Green Mountain	" 9...	315	..	237	30	77	30
Maggie Murphy	" 9...	315	..	225	..	90	..
Reeve's Rose	" 9...	315	..	250	..	65	..
Brownell's Winner	" 1...	312	30	287	30	25	..
Early Gem	" 1..	310	..	277	30	32	30
Early Harvest	" 1...	307	30	207	30	100	..
Russell's Seedling	" 9...	307	30	145	..	162	30
Money Maker	" 11...	305	..	267	30	37	30
Fill-Basket	" 11...	300	..	200	..	100	..
Northern Spy	" 1...	300	..	270	..	30	..
Henderson's Late Puritan	" 9...	295	..	242	30	52	30
Hopeful	" 1...	295	..	252	30	42	30
Sharpe's Seedling	" 1...	295	..	227	30	67	30
Bill Nye	" 9...	295	..	270	..	25	..
Brown's Rot Proof	" 11...	295	..	212	30	82	30
Wonder of the World	" 11...	295	..	270	..	25	..
Hale's Champion	" 9...	292	30	250	..	42	30
Columbus	" 11...	292	30	255	..	37	30
Charles Downing	" 11...	290	..	175	..	115	..
Dreer's Standard	" 1...	290	..	207	30	82	30
Reading Giant	" 1...	287	30	187	30	100	..
Vick's Extra Early	" 1...	287	30	192	30	95	..
Early Six Weeks	" 1...	285	..	232	30	52	30
Munro County	" 9...	285	..	257	30	27	30
Kidney	" 11...	280	..	262	30	17	30
Early Sunrise	" 1...	280	..	250	..	30	30
Irish Beauty	" 9...	277	30	180	..	97	..
American Wonder	" 11...	275	..	225	..	50	..
Pride of the Table	" 11...	275	..	250	..	25	..
Daisy	" 11...	275	..	250	..	25	..
New Variety No. 1	" 11...	275	..	262	30	12	30
Algoma No. 1	" 1...	275	..	250	..	25	..
Crown Jewel	" 9...	272	30	250	..	22	30
Rural Blush	" 9...	272	30	202	30	70	..
World's Fair	" 9...	270	..	237	30	32	30
Harbinger	" 1...	267	30	167	30	100	..
London	" 11...	265	..	187	30	77	30
Thorburn	" 11...	265	..	197	30	67	30
New Queen	" 9...	265	..	250	..	15	..
Pride of the Market	" 9...	262	30	250	..	12	30
Orphans	" 9...	257	30	217	30	40	..
Vanier	" 11...	255	..	205	..	50	..
Empire State	" 1...	252	30	225	..	27	30
Early White Prize	" 1...	252	30	200	..	52	30
Victor Rose	" 9...	250	..	205	..	45	..
Uncle Sam	" 9...	250	..	220	..	30	..
Honeoye Rose	" 11...	250	..	187	30	62	30
Delaware	" 11...	245	..	185	..	60	..
Chicago Market	" 11...	245	..	220	..	25	..
King of the Roses	" 11...	240	..	145	..	95	..
Earliest of All	" 1...	240	..	187	30	52	30
Stourbridge Glory	" 9...	235	..	170	..	65	..
Satisfaction	" 1...	225	..	175	..	50	..
Beauty of Hebron	" 1..	222	30	182	30	40	..
Houlton Rose	" 11...	220	..	175	..	45	..
Early Norther	" 9...	217	30	162	30	55	..
Bruce's White Beauty	" 11...	215	..	150	..	65	..

POTATOES—Test of Varieties—*Concluded.*

Name of Variety.	Dug.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.	
		Bush.	lbs.	Bus.	lbs.	Bus.	lbs.
Table King	Oct. 11	215	..	167	30	47	30
Seedling No. 214	" 9	200	..	87	30	112	30
Prize Taker	" 11	195	..	125	..	70	..
Clay Rose	" 9	192	30	140	..	52	30
Polaris	" 11	182	30	157	30	25	..
Flemish Beauty Seedling	" 11	177	30	140	..	37	30
Ohio Junior	" 9	175	..	137	30	37	30
Pearce's Extra Early	" 1	170	..	100	..	70	..
Sir Walter Raleigh	" 11	165	.	150	..	15	..

EXPERIMENTS WITH INDIAN CORN.

Twenty-five varieties of Indian Corn for ensilage were sown on 4th June. The land used for this experiment was a sandy loam, the previous crop was wheat, barley, and oats; it being the land used for the early, medium and late sown plots of grain last year. This was ploughed in the spring.—It was fertilized with 5 barrels of hardwood ashes and 200 pounds of bone meal per acre, which was sown broadcast and harrowed in.

Owing to the limited amount of barn-yard manure there was none of this available for the corn land, with result that a smaller yield than usual was obtained.

One set of plots were sown in rows 3 feet apart, and a duplicate set were planted alongside in hills 3 feet apart each way. The following table gives the results obtained:—

INDIAN CORN—Test of Varieties.

Name of Variety.	Character of Growth.	Height.	When Tasselled.	In Silk.	Early Milk.	Late Milk	Condition when Cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
		In.						Tons.	Lbs.	Tons.	Lbs.
Comptons Early	Very strong.	84	Aug. 20	Aug. 30	Sept. 16	Sept. 30	2nd milk	11	1,100	10	460
Longfellow	Strong	83	" 20	" 31	" 14	" 30	"	11	000	11	550
Sanford	"	60	" 20	Sept. 1	" 15	" 30	"	11	000	11	440
Early Butler	"	60	" 31	" 10	" 20	Oct. 1	"	10	1,670	6	1,970
Angel of Midnight	Very strong.	84	" 18	Aug. 31	" 16	Sept. 30	"	10	1,450	10	240
Cloud's Early Yellow	Strong	64	Sept. 10	Sept. 16	" 25	.....	"	10	1,340	9	1,470
New White Cap, Yellow Dent	"	80	Aug. 30	" 16	" 20	.....	1st "	10	130	9	150
King of the Earliest	Medium	70	" 25	Aug. 31	" 14	Sept. 22	2nd "	9	370	9	700
Mamm. 8-Rowed Flint	"	60	" 20	Sept. 6	" 20	.....	1st "	8	1,270	13	400
North Dakota, White	Weak	65	" 20	" 8	" 20	.....	"	8	850	7	1,400
Mitchell's Extra Early	"	50	" 15	Aug. 28	" 6	Sept. 15	Glazed	8	170	4	800
Red Cob Ensilage	Medium	40	Sept. 16	.....	.....	.....	Tassel'g.	7	1,400	13	500
Champion White Pearl	"	60	" 16	.....	.....	.....	"	7	630	11	000
Extra Early Huron Dent	"	60	Aug. 31	Sept. 10	Sept. 20	Oct. 1	2nd milk	7	300	6	870
Pearce's Prolific	Weak	84	" 18	Aug. 31	" 15	Sept. 28	"	7	300	6	870
Selected Leaming	Medium	60	Sept. 16	Sept. 22	" 28	.....	1st "	6	1,200	13	400
Thoroughbred White Flint	"	60	Aug. 28	" 15	" 28	.....	"	5	1,550	6	870
Pride of the North	Weak	65	" 27	" 10	" 20	Sept. 28	2nd "	5	1,550	6	870
Canada White Flint	Medium	60	" 24	" 8	" 21	" 28	"	5	1,000	9	1,800
Cuban Giant	"	60	Sept. 16	" 30	.....	.....	Silk	5	1,000	8	1,270
Kendall's Giant	Weak	40	Aug. 20	" 5	Sept. 20	Oct. 1	2nd milk	4	1,900	6	1,200
Giant Prolific, Ensilage	"	45	Sept. 16	" 28	.....	.....	Silk	4	1,200	4	250
North Dakota, Yellow	"	50	Aug. 25	" 1	Sept. 20	Oct. 3	2nd milk	4	800	5	1,000
Mammoth Sweet Fodder	"	40	" 25	" 5	" 20	" 2	"	4	800	4	250
Ninety Day	Very weak.	35	Sept. 6	" 25	Oct. 5	.....	1st "	2	1170	5	340

GENERAL STATEMENT OF FODDER CROPS.

In addition to the turnip plots which yielded 299 bushels; 3 acres of turnips yielded 800 bushels per acre, and one-third acre plot produced 360 bushels, making a total of 3,059 bushels.

The mangel plots yielded 227 bushels, and $\frac{2}{3}$ of an acre yielded 360 bushels, making a total of 587 bushels of mangels. To this may be added the yield from the carrot plots, 108 bushels and also that from the plots of sugar beets, 71 bushels. This makes 3,825 bushels as the total amount of roots harvested.

One and one-quarter acre of horse beans produced 11 tons 250 pounds, equal to 9 tons per acre; $\frac{1}{2}$ acre of sunflowers, 2 tons 712 pounds; $2\frac{1}{2}$ acres of corn yielded 7 tons per acre, and $\frac{1}{8}$ acre 1 ton 1,250 pounds, equal to 13 tons per acre. This together with the product of corn plots of 10 tons 360 pounds, makes a total of 42 tons 1,572 pounds, all of which was put into the silo.

PREPARATION OF THE LAND FOR THE FIELD TURNIPS.

The field turnips were grown on land the previous crop of which was oats. The land was ploughed in the fall. In the spring it was again ploughed, worked up and drilled into rows 28 inches apart. Into these drills barn-yard manure at the rate of thirty 20-bushel cart loads per acre was put, and a fertilizer at the rate of 300 pounds per acre, made of 150 pounds of complete fertilizer, and 150 pounds of bone meal mixed together, which was sown along on top of the manure, and the whole covered.

PREPARATION OF LAND FOR THE FIELD CORN.

The land on which the field corn was planted was in timothy and clover hay the two previous seasons. This was ploughed in the spring and fertilizer at the rate of 250 pounds per acre used. This fertilizer consisted of 125 pounds of bone meal and 125 pounds of complete fertilizer mixed together. The corn was sown with the grain drill, in rows 3 feet apart. The fertilizer was applied at the same time by allowing all the pipes of the fertilizer attachment of the seed drill to run; thus the fertilizer was sown over the whole ground, being drilled in, as when sowing grain, in rows 6 inches apart.

One strip of this land of $\frac{1}{8}$ acre was manured on the sod, the previous fall at the rate of thirty 20-bushel cartloads of barn-yard manure per acre. On the land so treated the yield of corn per acre was 13 tons, and that which received no barn-yard manure bnt treated similar in every other respect, yielded only 7 tons per acre.

PREPARATION OF THE LAND FOR THE HORSE BEANS AND SUNFLOWERS.

The land on which the English horse beans were sown was in timothy and clover the two previous years. Barn-yard manure at the rate of forty 20-bushel cart loads per acre, was ploughed under in the fall of 1896. This was worked up in the spring, and the beans sown in rows 3 feet apart.

The sunflowers were also sown, in rows 3 feet apart, on land adjoining that used for the beans, which received similar treatment.

MILLET.

Four varieties of millet were sown 12th June in one-fortieth acre plots. The land was in timothy and clover the previous year. It was ploughed in the fall of 1896. The millet made a good strong growth and was cut for feed 30th August. The stock did not eat it readily. I do not consider it as valuable as oats, pease and vetches for feeding stock.

The weight of green fodder per acre as calculated from these plots was as follows :—

	Tons.	Lbs.
Japan	22	1,980
New Manitoba	12	200
Golden Millet	9	1,360
New Siberian	8	940

GRAIN CROPS WITH AND WITHOUT CLOVER.

In order to further test the value of sowing Mammoth Red Clover with grain crops, for the purpose of ploughing under a similar experiment to the one conducted last year was carried out this season. The plots used for this purpose last year were again utilized. The whole set of plots were, however, sown with oats. Clover at the rate of ten pounds per acre was sown on the plots which had clover on them last year; the check plots were left as before without seeding to clover. Fertilizer at the rate of 250 pounds per acre was used. It was made of 125 pounds of bone meal and 125 pounds of complete fertilizer mixd together.

No difference was noticed in the growth of grain on the plots which were seeded to clover last year and those which were not. This was, no doubt, due to the very poor growth made by the clover on these plots last season. The clover this season has made a strong growth and an after-math of from 6 to eight inches has been ploughed under.

RATION FED MILCH COWS.

During the winter months the cows were fed the following ration night and morning, with a feed of long hay at noon :—

	Lbs.
Hay	4
Straw	2
Roots (Turnips and Mangels)	15
Meal	2½

The straw and hay being cut and the roots pulped, the whole was mixed together and sprinkled with water till quite damp. For the month of May 30 pounds of ensilage per day was substituted for 30 pounds of roots, with this change there was no noticeable difference in the flow of milk. The ration of meal was continued when the cows were turned out to grass in the spring. The following table gives the total yield of milk from the cows for the season :—

MILK produced from Seven Cows during the past year.

Name.	Date of Calving.	When due to Calve again.	Condition Nov. 1st.	No. of Days Milking.	Total Pounds of Milk for the Period.	Average Yield per Day.
Piggott	Jan. 6, 1897.	Jan. 30, 1898.	10 lbs. per day	286	6,913	24
Eva Rooker	Nov. 1, 1896.	Oct. 11, 1897.	Milking	288	4,176	14½
Smith	Sept. 28, 1896.	April 16, 1898.	15 lbs. per day	397	7,213	18
Tingley	Dec. 6, 1896.	Nov. 15, 1897.	Dry.	289	7,225	25
Jennie	Feb. 6, 1897.	Mar. 19, 1898.	19 lbs. per day	233	6,281	27
Reid	May 5, 1897.	Not in calf	24 "	148	5,152	34¾
Brindle	Oct. 31, 1896.	Dec. 17, 1897.	Dry	306	5,118	13½

STOCK SOLD.

On the 4th of November I received instructions to sell a part of the farm stock. The animals disposed of included 12 cows and 2 bulls, as follows:—

4 Holstein cows, 1 Ayrshire cow, 2 Durham cows, 1 Grade cow, 1 Holstein bull, 1 Ayrshire bull.

As a result of the sale of this stock in November, and no purchases to replace them a large quantity of bran and ensilage were left over. As many roots as could be fed to the remaining animals were used, and all that could be sold in the neighbourhood were so disposed of, but a portion was unavoidably spoilt.

MANURE AND FERTILIZERS USED.

Owing to the limited amount of stock kept last winter only 150 tons of barn-yard manure was made, this together with $275 worth of fertilizers; including 100 barrels of soft wood ashes, bone meal and complete fertilizers, was not sufficient to manure much more than the extensive area devoted to plot work; consequently the large field crops did not receive the manure they should, with the result that small crops were harvested.

DRAINING.

On the marsh 1,000 feet of wooden 14 x 20 inch sluice drain was laid, and 1,000 feet of open ditch 2½ feet wide by 2 feet deep. On the upland 1,500 feet of 2 inch tile drain was laid.

DISTRIBUTION OF SEED GRAIN AND POTATOES.

In all 543 applicants have been supplied during the past year with 3 pound samples of potatoes, oats, wheat, barley, pease and rye.

The number of packages sent out was as follows:—

Potatoes	302
Oats	345
Barley	183
Wheat	91
Pease	83
Rye	6
Total	1,010

MEETINGS ATTENDED.

I have addressed meetings during the past year at Fredericton, N.B., Annapolis, N.S.; Musquodoboit, N.S.; and in Prince Edward Island.

EXHIBITIONS ATTENDED.

An exhibit of the farm produce was made at Charlottetown, P.E.I., from September 21st to the 24; at Halifax, N.S., 27th September to 5th October, and at the Westmoreland County Exhibition, Sackville, N.B., 14th October.

I have the honour to be,
Your obedient servant,

GEO. W. FORREST,
Superintendent.

REPORT OF THE HORTICULTURIST.

(W. S. BLAIR.)

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 Division of the Experimental Farm for the maritime provinces for the year 1897.

The apple crop during the past year has been small; the pear, plum and cherry crops were a failure. The strawberries yielded well, and the new plantation of 36 varieties has made good growth. The raspberries were a fair crop. The raspberry canes as well as those of the blackberries were badly diseased with the raspberry anthracnose *Glæosporium venetum*; as a result the present growth is only fair. New varieties of small fruits have been planted, many of which are making strong growth.

The balance of orchard No. 2 was this year planted with trees; some of which were taken from the nursery here, where they had been set in the spring of 1895, when received from the Central Experimental Farm; the remainder were from the Ellwanger and Barry, nurseries, Rochester, N.Y. The former have not made very promising growth; the latter were very thrifty looking trees which arrived in good condition, and have made good growth.

The shrubs, trees and hedges have made fair growth and each year are becoming more of a source of interest. The new varieties received from the Central Experimental Farm in the spring will, no doubt, be a valuable addition.

The flower garden was continued as usual. The bulbs planted in the fall of 1896 were much admired in the early spring. Many new varieties of tulips, hyacinths, narcissus and lillies were this fall added to this interesting collection. A collection of 28 varieties of Japanese Paeonies, and 48 varieties of Japanese Irises were received this autumn and planted.

Experiments were again carried on with different varieties of vegetables, and a summary, of the relative value of those tested, is given in this report.

Data on the blossoming period of the different varieties of fruit trees grown on the farm were again furnished the horticulturist of the Central Experimental Farm.

Few particulars of immediate value were gathered from the experimental grass plots. The plots of crimson clover sown on the 18th of August and 1st September, did not stand the winter. The plot of Tussock grass reported upon last year has turned out to be *Bromus inermis*. The land on which this was sown was previously in Brome grass and quite probably was not well enough worked up; at any rate the growth made proved to be largely made up of the grass named.

APPLE ORCHARD, NO. 1.

In this orchard there are now growing 176 trees of 82 varieties. In the annual report for 1895, particulars relating to the planting and growth of the trees from this orchard were given from the time of the first planting in 1889, to, and including, 1894. Since then there has been lost from various causes 29 trees of the following varieties: 2 Baldwin, 1 Baxter, 2 Coopers Market, 1 Early Prolific, 1 Fallawater, 1 Gipsy Girl, 2 Grimes's Golden, 1 Nonpareil, 2 Newtown Pippin, 1 Pryor's Red, 2 Ribston Pippin, 1 Roxbury Russet, 1 Spitzenburg, 2 St. Lawrence, 1 Scott's Winter, 1 Talman's Sweet, 1 Twenty-ounce Pippin, 1 Wagener, 2 White Pippin, 2 Wealthy, 1 Walbridge. Part of these have been winter-killed while some others have died from the effects of a disease

in the bark and a few from being received in bad order, having been heated in the package during transportation.

Some of the trees now growing present a stunted and unthrifty appearance, and I find in most cases such trees have unhealthy heart-wood.

The following tabular arrangement gives the names of the varieties planted and their present condition:

APPLE ORCHARD No. 1.

Name of Variety.	When Planted.	Number of Trees.	Fruited.	Character of Growth.
Anisovka	1889	1	Yes	Strong.
Aport	1889	2	"	"
Ananasnoe	1889	2	"	"
Anis	1890	2	"	1 fair, 1 strong.
Alexander	1890	3	"	Strong.
Autumn Strawberry	1895	2	No	1 fair, 1 weak.
Benoni	1890	2	Yes	1 strong, 1 fair.
Blue Pearmain	1890	1	"	Strong.
Blackwood	1889	2	"	"
Bank's	1895	1	No	1 weak.
Borovinka	1889	1	Yes	Strong.
Bellflower	1889	1	"	"
"	1892	2	No	"
Bottle Greening	1891	1	"	"
Blushed Calville	1895	1	"	"
Buckingham	1895	2	"	1 strong, 1 fair.
Belle de Boskoop	1897	1	"	Weak.
Ben Davis	1893	2	Yes	Strong.
Canada Baldwin	1890	3	"	"
Canada Red	1890	2	"	1 fair, 1 weak.
Chenango Strawberry	1892	2	"	Fair.
Crimean Bogdanoff	1895	1	No	Strong.
Carolina Red June	1895	2	"	Fair.
Colvert	1890	2	Yes	"
Duchess	1890	3	"	2 strong, 1 fair.
"	1892	4	"	1 " 3 "
Dominie	1895	2	No	Strong.
Fameuse	1890	4	Yes	Fair.
Flory Belle	1897	1	No	Weak.
Fallawater	1895	1	"	1 weak.
Gravenstein	1889	1	"	Fair.
"	1895	2	"	1 strong, 1 fair.
Golden Reinette	1895	1	"	Strong.
Golden Russet	1890	3	Yes	"
"	1892	1	"	"
Grimes' Golden	1890	3	"	1 strong, 2 fair.
Golden White	1895	2	No	Fair.
Haas	1890	3	Yes	Strong.
Hibernal	1894	1	No	"
"	1895	1	"	"
Hyde's King	1897	1	"	Weak.
Jonathan	1890	3	Yes	2 fair, 1 strong.
Keswick Codlin	1890	3	"	Fair.
King	1893	3	No	1 fair, 2 strong.
Kara Synap	1895	2	"	Weak.
Longfield	1890	3	Yes	Strong.
Mann	1890	3	No	Fair.
Maidens Blush	1890	3	Yes	1 strong, 2 fair.
Milding	1893	1	No	Strong.
McIntosh Red	1890	3	Yes	Fair.
McMahan White	1895	1	No	Strong.
Northern Spy	1890	3	"	1 strong, 1 fair, 1 weak.
Ostrakoff	1889	3	Yes	Strong.
Ontario	1890	2	"	1 fair, 1 weak.
Peach	1893	3	"	Weak.
"	1894	1	No	Strong.
"	1895	1	"	"
Pewaukee	1890	3	Yes	"
"	1892	2	"	"

APPLE ORCHARD No. 2—*Concluded.*

Name of Variety.	When Planted.	Number of Trees.	Fruited.	Character of Growth.
Princess Louise	1892	2	Yes	Fair.
Pewaukee Russet	1895	1	No	Strong.
Peck's Pleasant	1895	1	"	"
Peter	1893	1	"	Weak.
Rambo	1890	2	Yes	Fair.
Ribston Pippin	1894	2	"	"
R. I. Greening	1890	3	"	"
Rome Beauty	1895	2	"	Strong.
Red Astrachan	1890	5	Yes	3 strong, 2 fair.
Royal Table	1895	2	No	1 " 1 "
Red Bietigheimer	1893	2	"	1 " 1 "
Roxbury Russet	1893	1	"	1 "
Stark	1894	1	"	Fair.
Serinkia	1889	2	"	"
Spitzenburg	1894	1	"	1 strong.
Sultan	1890	2	Yes	1 strong, 1 fair.
Seek-No-Further	1895	2	No	Strong.
St. Lawrence	1890	3	"	1 strong, 2 fair.
Sop of Wine	1897	1	"	Weak.
Scott's Winter	1890	2	Yes	2 strong,
Shannon	1897	1	No	Fair.
Tetofsky	1889	1	Yes	"
Titovka	1889	2	"	Strong.
Trenton	1893	1	"	"
Talman's Sweet	1890	2	"	2 strong.
Twenty-ounce Pippin	1893	1	No	Weak.
Wellington	1893	2	Yes	1 strong, 1 fair.
Wagener	1890	1	"	Fair.
Wealthy	1890	1	"	"
"	1897	2	No	"
Walbridge	1893	1	"	Strong.
Yellow Transparent	1890	5	Yes	2 strong, 3 fair.

APPLE ORCHARD No. 2.

This orchard is situated on a somewhat higher piece of land than orchard No. 1, and is protected on all sides by a windbreak of a natural growth of spruce.

The land was cut and cleared in 1890 and some 39 apple trees were planted amongst the stumps at that time. Some of the trees then planted have made good growth, with others the growth has not been so satisfactory. The land has since been broken up and was this year all planted with apple trees. Part of this land was underdrained in the fall of 1896; the other part was drained this autumn. The very wet season was very unfavourable for the trees planted in the undrained land and they have made weak growth, and some few have died. The trees planted on the underdrained part have all made strong growth.

Between the growth of the trees in this orchard, and those in orchard No. 1, there is a decided difference in favour of the latter.

Two trees planted have died from the effects of "sun scald;" 12 were so badly girdled by mice in the winter of 1894–95, that they had to be replaced.

This orchard now contains 160 living trees of 90 varieties—67 of which are not represented in orchard No. 1. This gives us in the two orchards a total of 336 apple trees including 149 varieties.

The following table gives the present condition of the orchard :—

APPLE ORCHARD No. 2.

Name of Variety.	Planted.	Number of trees planted.	Number of trees living.	Fruited.	Character of Growth.
Arabskoe	1897	2	2	No	Strong.
Antonovka	1897	2	2	"	Weak.
Atkison	1897	2	2	"	"
Arabka, Winter	1897	2	2	"	"
Avenarius No. 15	1897	2	2	"	"
Blue Pearmain	1890	2	1	Yes	1 strong ; 1 dead, 1895.
Bell Pippin	1897	3	3	No	2 fair, 1 strong.
Blushed Calville	1897	1	1	"	Fair.
Blenheim Pippin	1897	2	2	"	1 fair, 1 weak.
Brownlee's Russet	1897	2	2	"	Weak.
Ben Davis	1897	2	2	"	Strong.
Belle de Boskoop	1897	1	1	"	Fair.
Babbit	1897	2	2	"	Weak.
Basil The Great	1897	2	2	"	"
Beautiful Arcad	1897	2	2	"	"
Cinnamon Pine	1895	1	1	"	Strong.
" "	1897	1	1	"	Weak.
Charlotten Thaler	1897	1	1	"	"
Canada Reinette	1897	2	2	"	1 fair, 1 weak.
Cox's Pomona	1897	2	2	"	Strong.
Cross 15.M	1897	2	2	"	Weak.
Derby	1890	3	2	Yes	2 strong, 1 dead, 1894.
Duchess	1893	2	2	"	Strong.
Danver's Winter Sweet	1897	2	2	No	Weak.
Early Strawberry	1897	2	2	"	Strong.
Early Colton	1897	2	2	"	Weak.
Enormous	1897	1	1	"	"
Fameuse	1893	2	2	"	Strong.
Fanny	1897	2	2	"	"
Grimes' Golden	1891	2	1	Yes	1 strong, 1 dead, 1895.
Golden Russet	1892	2	2	"	Strong.
Gravenstein	1893	3	1	No	1 strong, 1 dead, 1895.
Grandmother	1897	2	2	"	Weak.
Golden Reinette	1897	1	1	"	"
Gano	1897	2	2	"	Fair.
Golden Sweet	1897	1	1	"	"
Hastings	1892	2	1	"	1 strong, 1 dead, 1893.
Hurlbut	1897	2	2	"	Strong.
Hibernal (Fisk)	1897	2	1	"	1 weak, 1 dead, 1897.
Headley	1897	2	2	"	Weak.
Jeffries	1897	2	2	"	Strong.
John A	1897	2	0	.....	Dead, 1897.
King	1897	1	1	No	Strong.
Little Hat	1897	2	1	"	1 weak, 1 dead, 1897.
Lord Suffield	1897	2	2	"	Fair.
Long Arcad	1897	2	2	"	Weak.
Missouri Pippin	1897	2	2	"	Strong.
Mother	1897	2	2	"	1 strong, 1 weak.
Melonen	1897	1	1	"	Weak.
Munson's Sweet	1897	2	0	.....	Dead, 1897.
Nothern Spy	1892	3	2	No	2 strong, 1 dead, 1895.
Newtown Pippin	1897	2	2	"	Strong.
Worth-western Greening	1897	2	2	"	Weak.
Newell's Winter	1897	2	2	"	"
Occident	1897	2	2	"	Strong.
Ontario	1897	1	1	"	"
Pointed Pipka	1896	4	4	"	"
Pewaukee	1891	2	2	"	"
Pryor's Red	1896	1	1	"	Weak.
Palmer Greening	1897	2	2	"	Strong.
Primate	1897	2	2	"	Fair.
Porter	1897	2	2	"	Strong.
Pomme Grise	1897	2	2	"	"
Pipka Winter Bogdanoff	1897	2	1	"	1 weak, 1 dead, 1897.

APPLE ORCHARD No. 2—*Concluded.*

Name of Variety.	Planted.	Number of trees planted.	Number of trees living.	Fruited.	Character of Growth.
Patten's Greening	1897	2	2	No.	Weak.
Peck's Pleasant	1897	1	0	.....	Dead, 1897.
Russian Tyrol	1895	1	1	No.	Strong.
Red Astrachan	1893	3	1	"	1 fair, 2 dead, 1895.
Red Russet	1897	2	2	"	1 fair, 1 weak.
Red Canada	1897	2	2	"	" "
Rome Beauty	1897	2	2	"	1 strong, 1 weak.
Renand Seedling	1897	2	2	"	Weak.
Ribston Pippin	1897	2	2	"	1 weak, 1 fair.
Silken Leaf	1897	2	2	"	Weak.
Smith's Cider	1897	2	2	"	Strong.
Sutton's Beauty	1897	2	2	"	"
Stump	1897	2	2	"	"
Summer Rose	1897	2	2	"	1 strong, 1 fair.
Swaar	1897	2	2	"	Weak.
Sunbeam	1897	1	1	"	"
Snelling Seedling	1897	2	0	.....	Dead, 1897.
Shannon	1897	1	1	No.	Weak.
Sops of Wine	1897	1	1	"	Fair.
Tuft's Baldwin	1897	2	2	"	Strong.
Uncle Sam	1897	2	1	"	1 weak, 1 dead, 1897
Winter Bough	1890	3	3	Yes.	Strong
White Astrachan	1891	3	2	"	Fair, 1 dead, 1892.
Wine Sap	1897	2	2	No.	Weak.
William's Favourite	1897	2	2	"	1 strong, 1 weak.
White Pigeon	1897	2	2	"	Weak.
Watterson	1897	2	2	"	1 weak, 1 fair.
Western Beauty	1897	2	2	"	Weak.
Windsor Chief	1897	2	2	"	"
Wagener	1891	1	0	.....	Dead, 1895.
Yellow Transparent	1892	2	1	Yes.	Strong, 1 dead, 1895.
York Imperal	1897	2	2	No.	Strong.

CRAB APPLES.

Most of the varieties of crab apples have made excellent growth. The variety Whitney, planted in 1890, made a strong growth for a few years, fruited well but has since been gradually dying out. Those planted in 1893 have made only fair growth.

This collection consists of 31 trees of ten varieties as shown in the following table.

Name of Variety.	Planted.	Number of trees planted.	Number of trees living.	Fruited.	Character of Growth.
General Grant	1892	2	2	Yes.	Strong.
Hyslop	1890	3	3	"	"
"	1893	2	2	"	Fair.
Leslie's Sweet	1897	2	2	No.	"
Montreal Beauty	1890	3	3	Yes.	Strong.
"	1893	1	1	"	Fair.
"	1894	1	1	"	"
Martha	1893	2	2	"	Strong.
Soulard	1895	2	2	"	"
Siberian	1890	4	4	"	3 strong, 1 weak.
Transcendent	1890	3	3	"	Strong.
"	1893	2	2	"	"
Van Wycke	1895	1	1	No.	"
Whitney	1890	3	1	Yes.	1 weak, 2 dead, 1895.
"	1893	2	2	"	Fair.

PEARS.

Some of the pear trees have made very good growth. The varieties Seckel and Doyenne Boussock have been winter-killed.

Particulars regarding this orchard from 1892 to 1894 will also be found in the Annual Report for 1895. The collection of pears now consists of 68 trees including 30 varieties.

The following table shows the present state of the pear orchard :—

Name of Variety.	When planted.	No. of Trees.	Fruited.	Condition of Growth.
Bezi de la Motte	1897	2	No.	1 fair, 1 strong.
Bessemianka Budd, 108	1897	2	"	Fair.
" Budd and Gibb	1897	1	"	Strong.
" Var. 102	1895	2	"	"
" Var. 102	1897	1	"	Fair.
Bartlett	1892	3	"	2 strong, 1 fair.
Beurré Hardy	1893	2	Yes	1 fair, 1 dead, 1897.
Beurré Superfin	1892	2	No.	1 strong, 1 fair.
Beurré Clairgeau	1892	1	"	1 fair.
Beurré d'Anjou	1892	5	"	2 strong, 2 fair, 1 weak.
Clapp's Favourite	1892	3	"	1 strong, 2 weak.
" "	1893	1	"	1 "
Doyenne Boussock	1897	2	"	Weak.
Dempsey	1893	1	"	Strong.
Dr. Reeder	1892	1	"	"
"	1897	1	"	"
Duchess	1892	1	Yes	"
Flemish Beauty	1892	5	"	4 strong, 1 fair.
Frederick Clapp	1893	1	No.	Fair.
Goodale	1893	1	"	1 dead, 1894.
Howell	1893	2	"	1 fair, 1 strong.
Helen	1897	2	"	2 dead, 1897.
Idaho	1895	2	"	Fair.
Justine	1897	2	"	Strong.
Josephine	1897	2	"	1 fair, 1 weak.
Keiffer	1895	2	"	Fair.
Longworth	1897	2	"	1 weak, 1 dead, 1897.
Lawson	1895	2	"	Strong.
Lawrence	1892	2	Yes	"
Louise Bonne	1897	2	No.	1 weak, 1 dead, 1897.
Matilda	1897	2	"	1 strong, 1 weak.
Mount Vernon	1893	3	"	2 weak, 1 strong.
Margaret	1895	2	"	Dead, 1897.
Osband's Summer	1895	2	"	Strong.
Seckel	1895	2	"	Both dead, 1896.
Sheldon	1892	1	"	Strong.
"	1893	2	"	1 strong, 1 weak.
Tyson	1892	2	"	Strong.
"	1895	1	"	"
Vermont Beauty	1895	2	"	"
Wilder	1895	2	"	1 strong, 1 dead, 1896.

CHERRIES.

Last winter was so severe that the fruit buds of the cherry trees were killed. The variety Dyehouse, planted in 1892, was completely winter killed. This tree was a strong vigorous grower and had fruited well. Gov. Wood, also a very strong grower and excellent fruiter, was badly injured by winter. Two-thirds of the branches of this variety including all on the south side, were killed. Leib fruited very young but killed out last winter. Particulars of the history of this orchard from 1891 to 1894 inclusive. will be found in the annual report for 1894.

The cherry orchard now contains 68 trees including 36 varieties. The following table gives years when the trees were planted and the deaths which have occurred since 1894.

Name of Variety.	When Planted.	Number of Trees.	Fruited.	Condition of Growth.
Archduke	1897	2	No.	Strong.
Black Tartarian	1892	2	"	1 fair, 1 strong.
Black Eagle	1893	1	"	Fair.
Belle Magnifique	1895	2	"	1 strong, 1 fair.
Black Heart	1892	2	"	1 fair, 1 strong.
Centennial	1895	2	"	Both dead, 1895.
Coe's Transparent	1892	1	Yes	Weak.
Carnation	1897	2	No.	1 fair, 1 weak.
Dyehouse	1892	1	Yes	Dead, 1897.
" "	1895	2	No.	Strong.
English Morello	1892	3	Yes	2 strong, 1 fair.
" "	1893	2	"	Strong.
Early Richmond	1891	5	"	"
" "	1892	4	"	"
Elton	1893	1		1 dead, 1897.
Governor Wood	1892	3	Yes	Badly winter-killed.
Gruner Glass	1895	2	"	Strong.
Knight's Early Black	1893	2		Dead, 1896-7.
Leib	1893	2	Yes	" 1897.
Late Duke	1892	2	No.	1 fair, 1 dead, 1895.
"	1897	2	"	1 strong, 1 weak.
Lithauer	1895	2	"	1 fair, 1 dead, 1897.
Love Apple	1895	2	"	1 strong, 1 dead, 1897.
Louis Philippe	1892	1	Yes	Strong.
" "	1893	1		Dead, 1894.
May Duke	1895	2	No.	1 strong, 1 fair.
Montmorency	1892	2	Yes	Strong.
"	1893	2	"	"
Napoleon	1892	1	"	"
"	1893	1	No.	Fair.
Ostheim	1892	2	Yes	Strong.
Olivet	1892	2	"	1 fair, 1 strong.
Orel	1893	1	"	Strong.
"	1895	4	"	2 dead, 1896, 2 strong.
Ohio Beauty	1895	2	No.	Strong.
Plymouth Rock	1895	2	"	1 weak, 1 dead, 1895.
Rockport	1895	2	"	1 strong, 1 dead, 1897.
Royal Duke	1897	2	"	1 fair, 1 weak.
Reine Hortense	1895	2	"	1 fair, 1 dead, 1896.
" "	1897	1	"	Weak.
Shadow Amarelle	1893	3	Yes	2 strong, 1 dead, 1896.
Späte Amarelle	1895	2	"	1 strong, 1 dead, 1895.
Sparhawk's Honey	1897	1	No.	Strong.
Schmidt	1897	2	"	1 fair, 1 strong.
Tradescant's	1897	1	"	Fair.
Vladimer	1895	2	"	1 strong, 1 fair
Wragg	1892	2	Yes	" "
Windsor	1892	3	"	2 strong, 1 dead, 1896.
"	1893	1	No.	Strong.
Yellow Spanish	1892	2	Yes	"

PLUMS.

Some of the plum trees are making strong and many only fair growth. They have so far fruited but little.

The plant louse which affects the plum, *Aphis prunifolii*, has been very troublesome, and the vigorous use of tobacco water is found to be the best remedy. The use of kerosene emulsion is also effective ; but great care is necessary as the foliage is apt to be injured if the mixture is improperly made.

The following table gives the names of the varieties planted, and their present condition :—

Particulars relating to this orchard from 1892 to 1894, inclusive, are also given in the annual report for 1895. The plum orchard now contains 122 trees, including 51 varieties.

Name of Variety.	When Planted.	Number of Trees.	Fruited.	Condition of Growth.
Arch Duke	1895	2	No.	1 fair, 1 weak.
Abundance	1895	2	"	1 strong, 1 fair.
Bryanston's Gage	1897	2	"	Strong.
Burbank	1895	2	"	1 strong, 1 dead, 1896.
"	1897	1	"	Weak.
Beauty of Naples	1895	2	....	Dead, 1896.
Botan	1897	3	No.	2 fair, 1 weak.
Bradshaw	1892	3	"	2 fair, 1 strong.
Copper	1897	1	"	Weak.
Cheney	1897	2	"	Fair.
Czar	1895	2	"	Weak.
Coe's Golden Drop	1892	2	Yes.	1 strong, 1 fair.
Duane's Purple	1892	2	No.	" "
"	1897	2	"	" "
De Soto	1897	2	"	Fair.
Field	1897	2	....	Dead, 1897.
Fellenburg	1892	1	....	Dead, 1896.
"	1893	2	No.	Strong.
Goliath	1897	2	"	1 weak, 1 strong.
Gueii	1892	2	Yes.	Strong.
"	1893	2	No.	1 strong, 1 fair.
Golden Prolific	1893	2	"	1 weak, 1 dead, 1896.
Grand Duke	1895	2	"	1 strong, 1 fair.
Gen Hand	1897	2	"	Weak.
German Prune	1892	3	"	Strong.
Hawkeye	1895	2	....	Dead, 1897.
Hudson River Purple Egg	1893	1	No.	Weak.
" "	1897	1	"	"
Italian Prune	1895	2	"	1 fair, 1 dead, 1896.
Imperial Gage	1892	5	Yes.	4 strong, 1 fair.
" "	1893	2	"	Fair.
Jefferson	1897	2	No.	1 fair, 1 weak.
Kingston	1897	1	"	Fair.
Luscombe's Nonesuch	1897	2	"	Strong.
Lombard	1892	6	Yes.	"
"	1893	1	"	"
Lawrence's Favourite	1892	1	"	Fair.
Moore's Arctic	1892	3	"	Strong.
" "	1893	2	"	"
McLaughlin	1892	1	....	1 dead, 1895
"	1897	1	No.	Weak.
Niagara	1892	2	"	1 fair, 1 dead, 1895.
"	1893	2	"	Fair.
Ouellin's Golden	1897	2	"	Strong.
Orange	1897	2	"	1 strong, 1 fair.
Ogon	1897	2	"	1 fair, 1 weak.
Prince of Agen	1897	2	"	Strong.
Prince Englebert	1897	2	"	"
Prince of Wales	1895	2	....	Dead, 1896.
Pond's Seedling	1892	3	Yes.	2 fair, 1 dead, 1896.
Prince's Yellow Gage	1892	6	"	Strong.
Prunus Simonii	1893	1	....	Dead, 1896.
Quackenboss	1897	2	No.	Strong.
Reine Claude	1892	2	Yes.	"
" "	1893	2	No.	Fair.
St. Lawrence	1897	2	"	"
Shipper's Pride	1892	3	Yes.	"
" "	1893	2	"	Strong.
Satsuma	1895	2	....	Dead, 1896.
Smith's Orleans	1895	2	....	Dead, 1895-96.
" "	1897	1	No.	Fair.
Saunders	1893	1	"	Weak.

PLUMS—*Concluded.*

Name of Variety.	When Planted.	Number of Trees.	Fruited.	Condition of Growth.
Shropshire Damson	1892	1	Yes	Fair.
Stanton	1892	2	No.	Strong.
Victoria	1897	2	"	1 weak, 1 fair.
Weaver	1895	1	....	Dead, 1897.
"	1897	2	No.	1 fair, 1 dead, 1897.
Washington	1892	2	"	Strong.
"	1893	1	"	"
Wangenheim	1897	2	"	Fair.
Willard	1895	2	"	Strong.
Yellow Egg	1895	2	"	1 strong, 1 dead, 1896.
Yellow Gage	1892	2	....	Dead, 1895.

PEACHES.

These two varieties of peaches were planted in 1897 in Orchard No. 2, where protection is afforded :—

Name of Variety.	Planted.	No. of Trees Planted.	No. of Trees Living.	Condition of Growth.
Alexander	1897	2	2	Strong.
Hale's Early	1897	2	2	"

APRICOTS.

These varieties are on peach stocks. Only the variety Gibb has made very promising growth. The branches kill back badly in winter, and in some cases, as will be seen from the following table the trees have killed out completely :—

Name of Variety.	Planted.	No. of Trees Planted.	No. of Trees Living.	Condition of Growth.
Acme	1897	2	1	1 dead, 1897; 1 weak.
Beckland	1895	2	1	" 1896; "
Gibb	1895	2	2	Strong.
Harris	1895	2	1	1 dead, 1896; 1 fair.

NUTS.

The following table will show the varieties of nuts grown and their condition of growth :—

Name of Variety.	Planted.	Number of Trees Planted.	Number of Trees Living.	Condition of Growth.
American Chestnut	1895	2	1	1 dead 1896 ; 1 fair.
Black Walnut	1895	2	2	Strong.
Filberts, Kentish Cob	1895	2	2	"
" Cosford Cob	1895	2	2	1 fair ; 1 weak.
Japanese Walnuts, Juglans Max	1895	2	2	Strong.
" " " Sieboldi	1895	2	2	"
Japanese Chestnut	1895	2	.....	Dead 1896.

NUMBER and Varieties of Fruit Trees now growing in Orchards.

Name.	Number of Trees.	Number of Varieties.
Apples	336	149
Crab Apples	31	10
Pears	68	30
Cherries	78	36
Plums	122	51
Peaches	4	2
Apricots	5	4
Nuts	11	6
Total	655	288

SMALL FRUIT PLANTATION.

It seems to be a common practice for many of our farmers to order those varieties of small fruits which the agent recommends. In many cases the variety ordered is not the best, and too often failure is a result. It is not necessary when buying small fruits such as raspberries to get 50 or 100 plants, for by beginning with one dozen plants in a few years there will be plants enough to start a large plantation. The same can be said of strawberries, and 25 or 50 plants of two or three good varieties will enable one to make a start from which he can soon increase his plantation to any size he may wish.

The following chart gives the names of some of the most desirable varieties of small fruits to order, also the distances at which they may be planted. Should only one variety of each kind be wanted I would advise the first named :—

Name of Variety.	No. of Plants.	Rows distance apart.	Distance apart in the row.
		Feet.	Feet.
Strawberries :—			
Beder Wood. B	25 to 50	4	1
Crescent. P	25 " 50	4	1
Wilson, B	25 " 50	4	1
Warfield, P	25 " 50	4	1
Raspberries :—			
Red, Cuthbert	12 " 24	6	1
Red, Heebner	12 " 24	6	1
White, Golden Queen	12 " 24	6	1
Black, Gregg	12 " 24	6	1
Blackberries :—			
Agawam	12 " 15	7	3
Ancient Briton	12 " 15	7	3
Currants :—			
Black, Lee's Prolific	6 " 12	5	4
Red, Cherry	3 " 6	5	4
White, White Grape	3 " 6	5	4
Gooseberries :—			
Downing	6 " 12	5	4
*Industry	6 " 12	5	4
*Whitesmith	6 " 12	5	4

* English varieties.

ORNAMENTAL TREES AND SHRUBS.

The ornamental trees and shrubs now include 236 species and varieties, making a total of 448 individual specimens, many of which are making strong growth, some only fair, and others poor growth. In addition to the varieties planted in previous years and which were reported on in 1894 and in 1896, the following were planted this year :—

Betula pumila, Dwarf Birch.
Carya olivæformis, Pecan Nut.
Carpinus Caroliniana, American Hornbeam.
Cornus sericea, Dogwood.
Celtis occidentalis, American Hackberry.
Caryopteris Mastacanthus.
Comptonia asplenifolia, Sweet Fern.
Callicarpa purpurea.
Cornus sanguinea variegata, English Variegated Dogwood.
Cerasus serotina, Wild Black Cherry.
Euonymus Americanus. Strawberry Bush.
Halesia tetraptera. Snowdrop Tree.
Ilex opaca, American Holly.
Itea Virginica.
Juniperus Suecica, Swedish Juniper.
Ligustrum Stauntoni, Staunton's Privet.
Magnolia acuminata, Cucumber tree.
Nyssa multiflora, Sour Gum tree.
Neviusa Alabamensis.
Populus fastigiata, Lombardy Poplar.
" Van Geerti.
Paliurus aculeatus, Christ's Thorn.
Philadelphus coronarius semiplenus.
Pyrus rosea alba.
Robinia hispida, Rose Acacia.
Salix aurea pendula.
" Villarsiana.
" purpurea pendula.
" regalis.
" Salamoni.
" capraea.
" alba, White Willow.
Spiræa vaccinifolia.
Tamarix Indica.
Thuya occidentalis Meehan's Golden, Meehan's Golden Arbor-vitæ.
Thuya occidentalis Hoveyi Golden.
" " pumila.

DESIRABLE VARIETIES OF ORNAMENTAL TREES AND SHRUBS.

The following list of shrubs and trees can be safely recommended as good sorts for lawn planting, or for other ornamental purposes. These are all hardy varieties and have made a vigorous growth here :—

Deciduous Trees.

Acer platanoides, Norway Maple.
" rubrum, Red Maple.
" saccharinum, Sugar Maple.
Betula alba, European White Birch.
" purpurea, Purple Birch.
Fraxinus Americana, American Ash.
Larix Europea, European Larch.
Negundo aceroides, Box Elder.
Pyrus Aucuparia, European Mountain Ash.
Quercus Robur, English Oak.
Sophora Japonica, Japan Sophora.
Tilia Europæa, European Linden.
Ulmus Americana, American Elm.
" campestris, European Elm.
" racemosa, Cork Elm.

Evergreen Trees.

Abies balsamea, Balsam fir.
Picea pungens, Colorado Blue Spruce.
" Douglasii, Douglas Spruce.
" excelsa, Norway Spruce.
Pinus Austriaca, Austrian Pine.
" sylvestris, Scotch Pine.
Thuya occidentalis pyramidalis, Pyramidal Arbor-vitæ.

Deciduous Shrubs.

Artemisia Abrotanum, Southern wood.
Berberis Thunbergii, Japanese Barberry.
" vulgaris, Common Barberry.
" " purpurea, Purple Barberry.
Caragana arborescens, Siberian Pea-Tree.
Cornus alba, Red-twigged Dogwood.
Cotoneaster vulgaris, Common Cotoneaster.
Deutzia gracilis,
Diervilla (Weigelia) rosea, Rose flowered Weigelia.
Diervilla (Weigelia) candida, white flowered Weigelia.
Diervilla (Weigelia) Lonerii, Dark red Weigelia.
Elæagnus angustifolia, Russian Olive.
Hydrangea paniculata grandiflora, Japanese Hydrangea.
Lonicera, Tatarica, White flowered Bush Honeysuckle.
Lonicera Tatarica, Red flowered Bush Honeysuckle.
Lonicera chrysantha, Bush Honeysuckle.
Philadelphus coronarius, Mock Orange.
Potentilla fruticosa, Shrubby Cinquefoil.
Rhamnus catharticus, Common buckthorn.
Ribes aureum, Yellow Flowering Currant.
Rosa rubrifolia, Red-leaved Rose.
Sambucus Canadensis, Common Elder.
Sambucus Canadensis aurea, Golden-leaved Elder.
Spiræa opulifolia aurea, Golden-leaved Spiræa.
Spiræa van Houttei, van Houtte's Spiræa.
" callosa.
" " alba.
" Billardi.
Syringa Emodi.
" Josikæa, Josika's Lilac.
" Charles X, Charles X Lilac.
" vulgaris alba, White Lilac.
" " purpurea, Purple Lilac.
Viburnum Opulus, High bush Cranberry.
" sterilis, Common Snowball.
" Lantana, Pliant Viburnum.

Evergreen shrubs.

Juniperus Virginiana, Red cedar.
" communis, Common Juniper.
Pinus montana, Dwarf mountain pine.
Retinospora plumosa, Plumose retinospora.
" " Aurea, Golden pl."
" filifera, Thread-like "
Thuya occidentalis globosa, Globose Arbor-vitæ.
Thuya occidentalis Hoveyi.
" " variegata.
Mahonia Aquifolium, Holly Barberry.

VEGETABLE GARDEN.

Generally speaking, our farmers do not pay the attention they should to the growing of vegetables, to supply at least their own tables during the greater part of the year. It is generally the case that only a small percentage of those that might be cultivated are grown, and those varieties which require much care and attention are not usually included in the average kitchen garden. It is too often the case that more expensive foods take the place of those which the farmer might grow for himself.

There is nothing more conducive to the general health than a good free use of garden vegetables; not only that but from an economical standpoint their growth to supply a part of our daily food is worthy of our consideration.

The work of keeping a well laid out kitchen garden properly cared for is not great if done at the proper time. There is probably more thought required than actual time, and the result of good planning are more marked in this department of farm work than almost any other. To have the very earliest and best varieties of vegetables it is quite necessary that we bring to our aid the hot-bed and the cold-frame. These are within the reach of almost every farmer, and should form a part of every farm's equipment.

During the past four years experiments have been carried on with some of the different varieties of vegetables and in this report a summary is given of the results obtained, and at the same time some hints given on the management of a kitchen garden. The kitchen garden well furnished is a desirable adjunct to the farm not only for supplying the table with wholesome food, but also that the young may be interested in garden work and see something in farm life beyond the routine of general field work. The seed required for a kitchen garden can be divided into two groups those to be started under glass and those for the open ground. Of the former the most important are: cabbage, cauliflower, tomatoes, lettuce, onions and celery. The following observations may be of help to those who have never had any experience in the construction of a hot-bed or cold frame.

THE HOT-BED.

A hot-bed should be located where protection can be had from the cold north and westerly winds. A southern exposure protected on the north by a building, tight fence or a hedge will furnish a desirable spot.

Horse-stable manure is the best to produce a good reliable steady heat, this should not be "fire-fanged" nor should it contain too much straw. Sufficient to make a bed 7 feet square and 18 inches deep is taken to the spot selected and put in a good square pile. Any dry parts of this manure should be mixed with the wet, and in some cases it is advisable to use water to make all parts of as even a dampness as possible. All parts of this pile should be firmed alike, if this is neglected the less firm parts will be liable to burn out while the more compact will just begin to generate a heat. This pile should be left for 6 or 8 days, or until its steaming indicates that fermentation is well under way, when it should be forked over again and made into a similar pile. In 3 or 4 days the manure will be ready for the permanent bed. When placing the manure in the bed see that all the parts are firmed alike in order that the heat may be generated evenly and thus uniformity of temperature secured.

The frame to place upon the bed to support the sashes should be 6 feet square. Boards 1½ inches thick are good material for the construction of a frame. Make the front 12 inches high and the back 18 inches, thus giving 6 inches for a southern slope to the sash. Bank the frame well around the outside with strawy manure, and inside put 5 inches of earth. The soil used should be a light loam of good quality. A good plan is to make a pile for this purpose the previous fall and cover it with strawy manure to keep it from freezing.

The above frame would support 2 sashes 3 x 6 feet in size. These would hold 3 rows of 10 x 12 inch glass. No cross bars are used, but bars running the length of the sash hold the glass. The lights are lapped like shingles about ½ inch.

After the bed is finished allow it to stand for a few days ventilating it occasionally to allow the rank steam to go off. Often the temperature in a newly made bed will

run up to 100° making it desirable that we have a thermometer to determine the temperature. Seed should not be sown when the temperature is higher than 80°. From 45 to 50° Fahrenheit at night, and 75 to 80° during the day, have given good results here. In order to keep up such a temperature during very cold nights, the glass will have to be covered with mats, bags or straw. If such are used, they should be removed as soon in the morning as possible, as the early morning sun materially advances the growth of young plants.

During the day care and judgment must be exercised to ventilate according to the condition of the weather. A few hour's sun with no ventilation towards the middle of the day will sometimes do a great amount of damage. When water collects on the inside of the glass it shows that ventilation is required. In any case the frame should be closed about the middle of the afternoon thus preventing the bed from cooling too much before night.

Watering should not be neglected, but it should be done judiciously. Too much water should not be used especially if the weather is dark and cold, as the soil is liable to become soggy and sour, and the seeds, if not germinated, are liable to rot. Never water when the sun is shining brightly, for in doing so the foliage of the plant is liable to be injured. Keep in mind that success depends upon the bottom heat supplied from manure, the top heat from the sun, the giving of sufficient water and the necessary ventilation.

THE COLD-FRAMES.

Cold-frames are simply frames and sashes the same as those used on the hot-bed, the pit being filled with soil and no heat below. As soon as the plants started in the hot-bed are large enough, they are transplanted into cold-frames where they grow stronger and stouter, and being gradually hardened may be transplanted to the open ground more successfully.

CABBAGE.

Of the different varieties of cabbage experimented with the following seven varieties have proved the most desirable :—

Seed sown in the hot-bed April 1. Transplanted to the cold frame April 20. Transplanted to the open ground May 10.

EARLY VARIETIES.

Extra Early Express.—The earliest variety tested, a firm conical shaped head, of medium size with few outside leaves. Can be planted about 20 inches apart in the rows.

Early Jersey Wakefield.—The best early variety. It is about four days later than the Express but has made better heads. Medium size with few outside leaves and conical in shape, of excellent quality. It can also be planted close.

MEDIUM EARLY VARIETIES.

Henderson's Succession.—A very attractive variety, heads large and even, firm, round and a good header. The best to head of all the varieties tested.

Vandergaw.—Considerably later than Succession ; a large round firm head, of excellent quality. It heads well and is a good keeper—one of the best all round cabbages.

LATE VARIETIES.

Marblehead Mammoth Drumhead.—A very large variety, a good header, and firm. Quality excellent, a good keeper. A very desirable late sort.

Late Flat Dutch.—Large solid, round, flat head, a good header ; quality excellent and a good keeper.

Mammoth Rock Red.—Deep red colour, heads large, round and firm, an excellent header. The best red variety so far cultivated here.

CABBAGE SEED SOWN IN THE OPEN GROUND.

Seed of the varieties, Succession and Vandergaw, sown on May 15, also on June 1, in the open ground produced an excellent crop of good keeping winter cabbage. The seed was sown in rows 3 feet apart, scattered at intervals of 2½ feet in the rows, and thinned out to one plant when large enough. Cabbage grown this way have usually escaped the attack of the root maggot and are not set back by transplanting.

CAULIFLOWER.

For early cauliflower sow the seed in the hot bed April 1. Transplant to the cold frame April 20. Transplant to the open ground about the middle of May or earlier if possible. Cauliflower, as well as cabbage, will stand a light frost, and it is well where a few are wanted for early use to plant early and protect if necessary by covering. Those started early have made the best heads. Seed sown in the open ground along with cabbage have produced very fine heads for autumn use. The variety, Demi-Dur, gave the best results of the varieties sown in this way.

The following have been found to give the best results :—

Early—Early Snowball.—This is one of the earliest varieties and the most reliable in heading. Dwarf in habit it has a compact deep head, white, medium in size with short outer leaves. The plants can be set in rows 2½ feet apart and 20 inches apart in the rows.

Early—Selected Early Dwarf Erfurt.—Dwarf and compact, with a large white head, solid and of excellent quality. Heads well, plant 24 inches apart in the rows.

Half Early—Demi-Dur, or Half Early Paris.—White solid compact head, a good header. This variety comes in well as a medium early variety. Has a large head of excellent quality.

Late—Large Late Algiers.—A favourite late variety, a sure header, producing large compact heads of excellent quality.

TOMATOES.

The past season was not favourable for the growth of tomatoes. The vines made strong growth and although vigorously cut back the fruit did not set well.

The seeds were sown in the hot-bed April 10. Transplanted to the cold frame May 3, and set in the open ground June 9. When removing the plants from the cold frame to the open ground a transplanter is used, thus considerable earth is lifted with the plant and the growth is but slightly checked. Of the red varieties tested the following four have proved the most desirable. They ripened in the order named.

Imperial.—Ripens its fruit well, of excellent quality, medium in size, solid, smooth The fruit is inclined to crack open badly. Fruit ripe August 22.

Fordhook's First.—Medium in size, ripens about the same time as the Atlantic Prize, August 30. The fruit is smooth, solid, of a deep red colour, quality excellent, and ripens up well.

Early Ruby.—Good form, smooth, solid. The earliest large sized tomato. The vines are open, allowing the fruit to ripen up evenly. The best market variety so far tested.

Conqueror.—A late variety but very prolific, the best variety to plant if unripe fruit is desired. Fruit large, medium smooth, solid and of good quality.

Golden Queen.—A bright yellow smooth fruit. The best yellow variety tested. Flavour good.

To ripen tomatoes after they have been picked.—This can be successfully done by putting them in a cool, dark, dry place. Fruit of a much better flavour and solidity can be had by ripening in this way than in some sunny part of the house as is generally the practice. When fruit is gathered for this purpose be careful not to bruise it, as careful handling is quite essential if good results are to be obtained.

CELERY.

About the last of March sow the seed in a flat box or a large flower pot is sometimes used. Sow the seed shallow and cover with a piece of white cotton, thus keeping the soil dark and moist. Water frequently but do not go to extremes. Place in a window or where a moderate heat can be obtained. About ten days after sowing the seed will begin to sprout. Remove the covering and be careful not to allow the earth to dry out. As soon as the plants are large enough to handle transplant to the hot-bed placing them in rows 3 inches apart and from ½ to ¾ of an inch apart in the row. Keep shaded for a day or two if the weather should be bright, and keep the plants well watered. With good plants secured early celery culture may be made a success. When the celery is ready to transplant to the open ground, make a trench by ploughing deep, and taking out the loose material with a shovel, put in this trench 6 or 8 inches of well rotted barnyard manure covering with earth and mixing well. Firm the ground well when it will be ready for the plants. If the plants are strong and vigorous the tip of the roots and top should be clipped off. Plant in rows 4 feet apart, and 5 inches apart in the rows. It is advisable to shade the plants for a few days after planting.

Not much cultivation other than an occasional hoeing is required. Should the season prove dry the plants should occasionally be thoroughly watered. For blanching the early crop of such varieties as the white plume, boards are successfully used placing one on each side of the row, and in a couple of weeks the celery is fit for use. Other varieties of celery for the late supply can be more thoroughly blanched by earthing up. This is done where only a limited quantity is grown by wrapping paper around the plants in September and banking with earth. Should paper not be used hold the plant firmly with one hand while the first earth is being placed around the plant, thus preventing the earth from getting in around the stalks, after which bank nearly to the top.

When storing for the winter, lift the plants with a spade allowing earth to adhere to the roots, pack upright in a deep box in about 6 or 8 inches of earth, place the box on an earth floor in a cool dry cellar. Essential requirements for keeping celery in winter are a cool temperature with roots moist and tops dry.

The following varieties are recommended as among the most desirable.

White Plume.—The finest early celery, of dwarf self-blanching habit. It is crisp and solid and has a rich nutty flavour. One of the finest fall and early winter varieties and blanches easily. It is not as good a keeper as the *Paris Golden.*

Paris Golden.—Being of the self-blanching habit, it blanches easily. Not as early as the white plume but of a much larger growth. Has a compact solid growth, is crisp, and has a flavour that cannot be surpassed. It is a good keeper and the best early variety we have tested.

Giant Pascal.—Blanches quickly. Stalks are large, thick and crisp, and of a superior nutty flavour. It retains remarkable freshness after harvesting and is the best late market variety that we have grown, keeping well all winter.

LETTUCE.

There is no garden crop that will give as satisfactory returns for liberal cultivation and manure as lettuce. The value of the crop, as far as quality goes, depends largely upon the richness of the soil. Seed sown in the hot-bed, and transplanted to the open ground as early in the spring as possible, will give the earliest crop. To obtain a succession of crops, sow at intervals of two weeks in rows, in the open ground, and thin out or transplant to one foot apart, making the first sowing as early in the spring as possible. The varieties which have been most satisfactory for general use are as follows:—

Early Curled Silesia.—This is a valuable variety for forcing. It does not form a cabbage head, but the leaves are large and form a compact mass. The leaves are light green in colour, white inside, tender, crisp, and of fine flavour. It does not wilt readily, and stands well after cutting.

Hanson.—Forms a large, solid head, resembling a cabbage; white, crisp, tender, and quality excellent. Leaves green on the outside. One of the best for general culture. A standard market variety, and withstands dry weather well.

Paris White Cos.—The leaves of the Cos varieties do not form a head, are long, and require to be tied up to insure blanching; thus forming a bunch of tender, white, crisp leaves of excellent flavour. One of the best of the Cos type.

GARDEN PEASE.

Considering the great number of varieties of garden pease placed upon the market by the different seedsmen, experiments with as many varieties as possible was thought advisable. As a result of the information collected, the following three varieties can be safely recommended for general use:—

Little Giant.—Very early; medium sized pod; peas green, wrinkled, of delicious flavour. The vines are of very dwarf habit, and need no support. One of the most prolific early varieties.

Heroine.—Second early; large pod; peas wrinkled and large, of excellent quality. The vines grow about two feet high, are stiff, and will grow well without support. Very productive.

Stratagem.—One of the best varieties for general crop. Large pods, well filled; peas wrinkled, large, and of the finest flavour. Vines make strong growth about two feet high, and can be grown without support. Very prolific.

BEETS.

As soon as the ground can be prepared beet seed should be sown. If the seed is soaked in water for a few hours then put into a cotton bag and covered with earth for 24 hours before sowing, this treatment will promote early growth.

The following varieties are excellent for general use:—

Flat Egyptian Turnip.—A flat beet with dark-red, tender flesh of good quality. The earliest variety tested.

Extra Early Eclipse.—A globe-shaped, smooth beet of fine quality, deep red, tender flesh. Very few tops. Keeps well and is one of the best varieties for general crop.

Half Long Blood.—Long, smooth, dark-red, tender, flesh of excellent quality. A good keeper and fine winter variety.

EARLY TURNIPS.

The seed of these should also be sown as soon as the ground is fit.

Extra Early Milan.—The earliest variety we have tested. Rather a flat round bulb; flesh white, firm, and of excellent quality. It keeps well and is the best early market variety so far tested.

Early Golden Ball or Orange Jelly.—The best yellow variety tested; flesh bright yellow, firm, of good quality. Globe shape; a good keeper and valuable market variety. One of the best table sorts.

CARROTS.

Carrot seed can be sown as early as the ground is fit to work. Of the early garden and market sorts the following two varieties are entitled to a place among the best:—

Early Scarlet Horn.—A very early carrot, size small, quality excellent, skin orange red. Its shape is something similar to the Guerande. This variety is excellent for early crop.

Guerande or Oxheart.—One of the best varieties for general crop. Growth short and large, tapering abruptly to a small tap root. A deep red coloured carrot of very fine quality.

PARSNIPS.

Parsnip seed does not germinate readily and care should be taken to properly prepare the soil. Cover the seed not more than half an inch deep, and when up thin to 4 inches apart.

Parsnips not wanted for winter use can be left in the ground all winter in this climate and can be used as soon as the frost is out of the ground in the spring. Frost seems to improve the quality of these roots.

Guernsey.—A half-long variety best adapted to a shallow soil, of excellent quality, and a very desirable sort.

Hollow Crown.—Long, white and smooth; sweet and tender. A favourite variety, and its culture is recommended, although it is harder to gather than the Guernsey.

GARDEN CORN.

For early corn the liberal use of well rotted barn-yard manure, or even better that from the pig-yard, is quite essential. Plant the corn in hills 3 feet apart and about 5 kernels to the hill; put a good forkful of manure under each hill and sow the seed about the second week in May 1 inch deep. Give frequent culture if the best results are to be obtained.

The following varieties have proven the best here for general use:—

Early White Cory: A very early white sweet corn, of excellent quality, very productive.

Extra Early Marblehead: Later than the Cory, of excellent quality, white and sweet. A prolific and promising sort.

Mitchell's Extra Early: A very early corn, white, of good quality, one which produces well.

CUCUMBERS.

For early cucumbers plant in the hot-bed about the middle of April, and as soon as danger from spring frosts is over transplant, being careful that the earth around the roots is disturbed as little as possible. This can best be done by thoroughly soaking the ground and using a transplanter. For general crop plant in the open ground from the 10th to the 15th May. By removing from 10 to 12 inches of the top soil; filling in with manure, and covering with from 4 to 6 inches of earth, a very suitable place for growing cucumbers can be obtained. The following varieties have given good results:

Siberian: The earliest variety tested, grows from 4 to 5 inches long, and is very prolific.

White Spine: The most promsing sort for general culture, grows from 8 to 12 inches long, and when cut young are excellent for pickling.

Chicago Pickling: A small growing variety used entirely for pickling, the most prolific of the pickling sorts tested.

SQUASH.

The different varieties of squash can be easily divided into two quite distinct kinds —bush and running. The Bush Scallop and Summer Crookneck belong to the former and can be planted in rows 6 feet and 4 feet apart in the rows; the later and running sorts 12 feet apart each way. When preparing the hills use a liberal amount of barn-yard manure. Throw out the surface soil, put in the manure and cover with from 4 to 6 inches of earth. The following 3 varieties are very prolific and on account of their uperior quality can be safely recommended.

Summer Crookneck: Bush habit of growth, very early; fruit long with a crooked neck, orange yellow colour, flesh firm and of excellent quality. Gives the best satisfaction of all the early varieties.

Essex Hybrid: Of a running habit, resembles the Turban Squash in appearance, but is much superior in quality. It has a hard shell and is an excellent keeper. Flesh thick, solid, fine grained, dry, sweet and of superior flavour. It has a rich yellow colour, is quite early and a very desirable sort.

Hubbard: A well known standard variety. Large, green, late, a good keeper, of excellent quality, fine grained and dry. One of the best for late winter use.

EXHIBITIONS ATTENDED.

An exhibit has been prepared of the products of the Maritime Experimental Farm, which were shown at the Charlottetown, P.E.I., exhibition, from 21st to 24th of September, also at the Nova Scotia provincial exhibition at Halifax, from September 28th to October 5th, and at the Westmoreland County exhibition, Sackville, N.B., October 14th. This exhibit included many of the varieties of fruits, besides the varieties of grains and grasses, grown on the farm.

AGRICULTURAL MEETINGS.

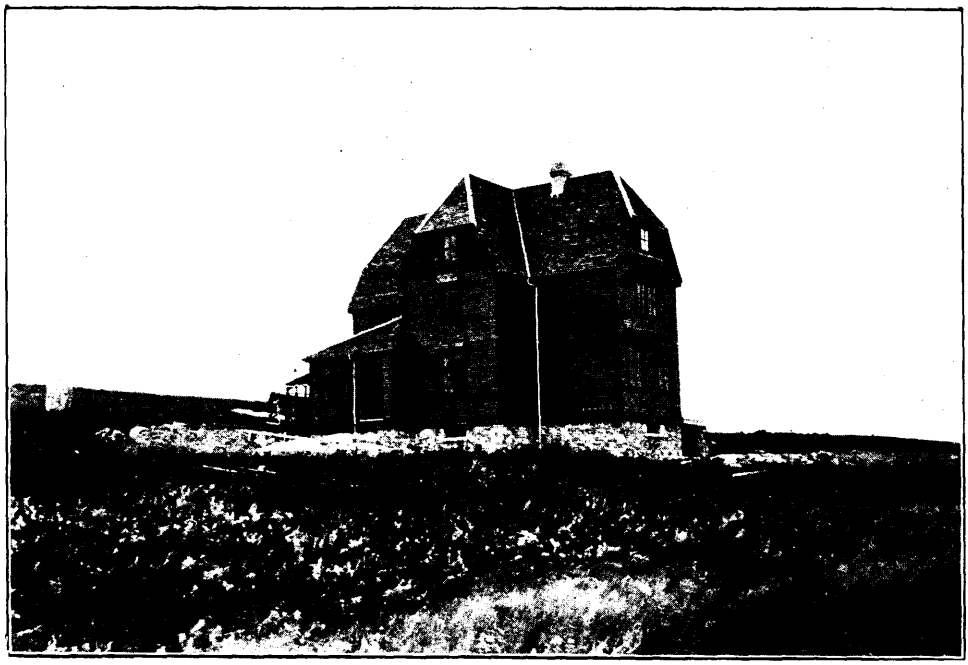
I attended the Nova Seotia Fruit Growers' Association at Wolfville, N.S., from January 19th to 22nd, also the Nova Scotia Farmers' Association at Middleton from the 26th to 29th January. Attended and took part in the meetings of the New Brunswick Farmers' Association at Fredericton, N.B., February 9th to 12th; the Colchester County Fruit Growers' Association, Truro, N.S., January 19th; and agricultural meetings at Jeffries' Corner, King's County, N.B., February 16th; Penobsquis, King's County, N.B., February 17th; and, at Point de Bute, West Co., N.B., February 26th.

Addressed farmers' meetings, called by Mr. W. W. Hubbard, secretary of the New Brunswick Farmers' Association, as follows:—

March 10th, Westfield, King's Co., N.B.
" 12th, Clifton "
" 13th, Central Norton "
" 15th, Berwick "
" 17th, Carsonville "
" 18th, Corn Hill "
" 23rd, Elgin, Albert Co., N.B.
" 26th, Harvey "
" 30th, Shediac, West Co., N.B.
April 5th, Baie Verte "
" 7th, Great Shemogue, West Co., N.B.
" 9th, Upper Cape "
May 3rd, Jolicure "

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

W. S. BLAIR,
Horticulturist.



Appearance of grounds surrounding house of Superintendent, Experimental Farm, Brandon, Manitoba, at time of building.

Appearance of grounds surrounding house of Superintendent, Experimental Farm, Brandon, Manitoba, three years after grading and planting, with addition of verandah.

EXPERIMENTAL FARM FOR MANITOBA.

BRANDON, MAN., 30th November, 1897.

To DR. WM SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith to you my tenth annual report with details of the experiments undertaken and work accomplished on the Brandon Experimental Farm during the past year.

Although the past season has generally been a very favourable one for the Manitoba farmer owing to the excellent quality of wheat and the high prices obtained for all kinds of farm produce, it has not been as favourable as usual for experimental purposes, especially with the oat crop on account of the prevailing severe wind storm and frost in the early part of the season.

The rainfall throughout the provinces during the growing season was very variable, the eastern portions generally having a plentiful supply while in the western districts it was considerably below the average, on this farm the rainfall was about 50 per cent of either of the two previous years, two inches only falling during June and July the two most critical months of the season.

The last week of May and first of June were noticeable for very low temperatures and high wind storms, which was very disastrous to the oat crop in exposed situations, the one-tenth acre plots devoted to the varietal test of oats suffering severely.

The benefit of hedges and shelter belts was very clearly demonstrated at this time, the grain growing on portions of the farm protected ever so slightly by a hedge or windbreak escaped injury from drifting soil and when this was followed by severe frost the unbruised plants in the protected areas were not frozen while the exposed grain was in many instances completely killed.

Fortunately the test plots of wheat and barley were uninjured by frost or wind and the results from them were very satisfactory.

There has been an almost total absence of rust among the grain crops and very little smut.

I beg to draw special attention to that portion of my report devoted to grasses and clovers, this very satisfactory series of plots has attracted considerable attention during the year and may open up the way to a more general cultivation of grasses and especially clovers in this country where nitrogenous gathering plants are so much needed.

Owing to the light rain-fall the yield of all fodder crops was below the average, but the favourable weather enabled them to be stacked in good condition.

No injury whatever was experienced from fall frosts, the grain all being harvested before there was any injury from this cause.

EXPERIMENTS WITH WHEAT.

Although the yield of wheat throughout the province has generally been much below the average, the returns of this cereal on the experimental farm has been about the average and the quality and weight much better than usual, owing to patches of scrub land many fields on this farm will not usually produce No. 1 Hard, but this year all fields and plots of Red Fife graded No. 1 hard and No. 1 extra.

Although the $\frac{1}{10}$ acre plots of wheat were grown in the same field as the oats and suffered equally from the winds of May ; the frosts during that month and early in June

did not appear to injure the wheat plants and the crop was a very even one and the several experiments with wheat very satisfactory.

As usual Red and White Fife and White Connell are near the head of the list for productiveness and every effort is being made on this farm to improve the quality and productiveness of these excellent varieties.

Velvet Chaff, generally known here as Blue Stem, is being highly recommended by many farmers in this country, but we have found it no more productive than Red Fife and generally about five days later than that variety, an obvious disadvantage in this climate.

In addition to the varietal test of wheat will be found the following experiments in connection with wheat growing; different ways of summer-fallowing, preventatives of drifting soil, wheat on stubble and fall and spring ploughed land, preventatives of smut in wheat, sowing at different dates, &c.

The varietal test included thirty-nine varieties all were sown on 26 April, on black sandy loam. The size of the plots was one-tenth of an acre each and there was no injury from rust in any case.

WHEAT—Test of Varieties.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre		Weight per Bush.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
White Fife	Aug. 19	115	42	Stiff	3¼	Beardless	3,570	40	30	61
White Russian	" 19	115	36	"	3	"	3,370	36	20	62
Red Fife	" 19	115	36	"	3½	"	3,080	35	20	61
Golden Drop	" 16	112	32	"	3	"	2,700	34	10	62
Monarch	" 20	116	41	"	3	"	3,310	34	..	61
Crown	" 14	110	41	"	3½	Bearded	2,870	33	..	59½
White Connell	" 23	119	37	"	3	Beardless	3,190	32	40	62
Wellman's Fife	" 23	119	34	"	3½	"	2,450	32	30	61
Blenheim	" 16	112	37	"	3	Bearded	3,110	31	30	60
Velvet Chaff or Blue Stem	" 24	120	42	"	2½	Beardless	3,370	31	20	60
Vernon	" 13	109	29	"	2½	Bearded	2,730	31	10	62
Emporium	" 20	116	36	"	3	"	3,490	31	..	61
Pringle's Champlain	" 19	115	33	"	3	"	2,790	31	..	61
Percy	" 16	112	41	"	3½	Beardless	2,610	30	40	62
Admiral	" 19	115	38	"	3½	"	2,870	30	30	61
Advance	" 16	112	36	"	4	Bearded	2,790	30	10	60
Hungarian	" 14	110	33	"	2½	"	2,640	30	10	62
Alpha	" 16	112	36	"	3	Beardless	2,370	29	40	60½
Beaudry	" 14	110	33	"	2	Bearded	2,670	29	40	62
Red Fern	" 19	115	34	"	3	"	2,900	29	10	61
Campbell's White Chaff	" 17	113	32	"	3¼	Beardless	2,640	28	30	61½
Colorado	" 14	110	40	"	3¾	Bearded	2,690	28	30	61
Rio Grande	" 15	111	32	"	3½	"	2,430	27	50	61
Preston	" 20	116	49	"	3	"	3,120	27	10	61½
Goose	" 20	116	42	Weak	2½	"	2,710	26	30	62½
Dion's	" 19	115	33	Stiff	2¼	"	3,470	26	20	61
Rideau	" 19	115	33	"	2½	Beardless	2,190	26	..	60½
Old Red River	" 18	114	35	"	3	"	1,890	26	..	61
Dawn	" 13	109	26	"	2½	"	2,740	26	..	62½
Herrison Bearded	" 15	111	27	"	1	Bearded	2,370	25	30	63
Dufferin	" 17	113	33	"	3	"	2,170	24	40	60½
Countess	" 16	112	34	"	3	Beardless	2,540	24	20	61½
Ladoga	" 14	110	36	"	3	Bearded	2,690	24	20	59
Black Sea	" 14	110	33	"	3	"	3,240	23	30	59½
Progress	" 20	116	35	"	3	Beardless	2,570	23	..	62
Captor	" 20	116	38	"	3	"	4,390	22	40	61
Stanley	" 16	112	33	"	3	"	2,900	22	30	61
Beauty	" 18	114	33	"	3	"	1,800	22	30	59
Huron	" 16	112	35	"	3	Bearded	2,060	22	20	62

TEST OF DIFFERENT WAYS OF SUMMER FALLOWING.

It is claimed by some of our leading farmers that land can be ploughed in the early part of the season, a crop of green fodder taken off or pastured, and as large a yield of wheat obtained the following year as could be had from a bare fallow.

The following table shows the result of a series of plots devoted to this test.

The ploughing for all was done on the 22nd May, the oats on plot 3 were cut when in the milk stage, and yielded 2½ tons of dry fodder per acre, cattle were first turned into plot 1 when the oats were nine inches high.

The size of plots for this test were $\frac{1}{10}$ acre, the soil a strong black loam, and the seed was sown on the 28th of April.

From the foregoing table it would appear—

1. That sowing oats at the end of May and cutting them for green fodder lessened the yield of wheat the following year.

2. That where oats were sown on the 31st July and fed off the yield of wheat was somewhat larger than was obtained from bare fallow.

Name of Variety.	How treated during 1896.	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.	Bus. lbs.	Lbs.
Red Fife....	Oats sown in July and fed off.. .. .	Aug. 20	114	33	Stiff..	3½	2,790	34 20	61½
"	Ordinary bare summer fallow.....	" 20	114	37	" ..	3½	3,130	32 50	61
"	Oats sown in spring and cut.....	" 19	113	36	" ..	3½	1,130	22 50	61

TEST OF PREVENTIVES FOR DRIFTING SOIL.

Certain classes of soil, when cultivated for a number of years, have a tendency here to drift badly in high winds, bruising some of the grain plants and uncovering the roots of others, and thereby greatly lessening the yield.

With a view of ascertaining whether different modes of sowing have any effect in lessening this evil, a number of plots on one of the most exposed parts of the farm were sown to wheat with different machines or at varying depths.

Owing to the prevailing wind storms being more northerly than usual, these plots were not as badly drifted as they have been in other years, still the results are suggestive.

All the plots were sown on 14th May, on summer fallow; soil, a light loam; size of plots, $\frac{1}{10}$ acre.

Name of Variety.	How Sown.	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.	Bus. lbs.	Lbs.
Red Fife....	Shoe drill, 4 inches deep.....	Aug. 26	107	34	Stiff..	2½	2,650	32 30	61½
"	" 3 "	" 26	107	34	" ..	3	2,380	32	61
"	" 1 "	" 26	107	37	" ..	3	2,730	29 30	61
"	Hoe drill.....	" 26	107	35	" ..	3	2,750	29 10	61

RESULTS.

1st. The yield from the grain sown with the shoe drill exceeded that sown with the hoe drill by two bushels and fifty pounds per acre.

2nd. The yield increased in proportion to the depth of sowing. Many plants on the shallow sown plot were injured, which somewhat delayed their ripening.

FALL OR SPRING PLOUGHING FOR WHEAT.

This test has given the result usually obtained on this farm, the spring ploughing giving the largest return; this agrees with the experience of many Manitoba farmers on similar soil, but under the system of farming generally adopted here there does not appear to be sufficient time in the spring to plough for wheat.

For comparison the yield of an adjoining plot of summer fallowed land is given.

The soil was a black loam and the size of plots $\frac{1}{10}$ acre each.

Name of Variety.	How prepared.	Date of Sowing.	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.	Bsh Lbs	Lbs
Red Fife ...	Summer fallowed	Apr. 26.	Aug. 19	115	36	Stiff ..	3½	3080	35 20	61
" ...	Spring ploughed.....	" 26.	" 16	112	32	" .	3	2620	29 40	60
" ...	Fall ploughed.....	" 26.	" 16	112	33	" .	3	2200	26 40	59½

PREPARING STUBBLE LAND FOR GROWING WHEAT.

In some districts increased areas are being sown on clean unploughed stubble, the second crop after fallow, but there is a great difference of opinion regarding the most suitable treatment for such land.

Four plots each $\frac{1}{10}$ acre were selected for this test, the soil was a moderately rich black loam.

The burning and disc harrowing of the stubble was all done in the spring, and the sowing was made with a drill.

Size of plots $\frac{1}{10}$ acre, soil a moderately rich loam.

Name of Variety.	How treated.	Date of Sowing.	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.
				Inch.			In.	Lbs.	Bsh Lbs	Lbs
Red Fife....	Disced on burnt stubble....	May 3..	Aug. 18.	107	33	Stiff ..	3	2260	30 40	61
"	Drilled on burnt stubble....	" 3..	" 18.	107	33	" ..	"	1860	24	61
"	" on unburnt stubble .	" 3..	" 18.	107	34	" ..	3½	2480	23 40	61
"	Disced on " "	" 3..	" 18.	107	33	" ..	3	2040	22 40	61

THE TREATING OF SEED WHEAT FOR SMUT

Although experiments for the prevention of smut in wheat have been conducted here for a number of years, it is still one of the principal subjects dealt with by correspondents; for that reason it was thought advisable to repeat the experiments again this year.

From the accompanying table, it will be seen that the result of the test is very emphatically in favour of bluestoning. This result, however, should not encourage any one to sow smutty wheat, even when treated, if clean seed can be procured.

The proper use of bluestone is to prevent comparatively clean wheat from becoming smutty rather than to encourage the sowing of wheat already badly affected.

The size of the plots used for this test was $\frac{1}{10}$ acre, the soil a light loam, and both were sown on 12th of May.

Variety.	How treated.	When Ripe.	No. of Days Maturing.	No. of smutty heads on three feet square.	No. of good heads on three feet square.	Yield per Acre.	Pounds per Bushel.
						Bush. Lbs.	Lbs
Red Fife, very smutty.. ..	Not treated.....	Aug. 26	106	435	95	8 40	46
" "	Blue stone sprinkled, 1 lb. to 10 bushels.....	" 26	106	84	355	20 10	59

EARLY, MEDIUM AND LATE SOWINGS.

The Red Fife wheat plots in this series are particularly regular in the yields and dates of maturing; the second sown plot as usual giving slightly the largest yield.

The injurious effects of the severe wind storms and frosts of May and June are very apparent on the earlier sown oats; the two earliest sown being completely killed out and the third plot of Abundance badly injured.

Its effect is also shown in the uneven ripening of this grain, the early sown plots being thin the plants continued to stool out and did not ripen in some instances as early as the later sown plots.

The Canadian Thorpe barley is evidently more susceptible to injury from frost than Odessa, as two plots of the former were destroyed from this cause, while no injury was apparent to the Odessa.

The third and fourth sown plots of Golden Vine pease were so badly mixed by a severe wind storm soon after cutting that it was impossible to keep the yields separate; this frequently occurs with pease here if sown alone. The only preventative I know for this is to sow oats with them at the rate of two pecks per acre, the combined crop can then be cut with a binder and stooked the same as any other grain.

All these plots were sown on summer fallow with a hoe drill. Soil a clay loam, uniform in character.

WHEAT—Early, medium and late sowings.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number 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.
Red Fife	April 28	Aug. 17	111	37	Stiff	3	Beardless	2,330	32	50	61½
"	May 5	" 23	110	35	"	3	"	2,370	33		61½
"	" 12	" 25	105	36	"	3½	"	2,640	31		61½
"	" 19	" 31	104	33	"	3½	"	2,750	30	50	60
"	" 26	Sept. 2	99	37	"	3½	"	2,690	26		60
"	June 2	" 11	101	32	"	3½	"	1,820	21	20	59½
Stanley	April 28	Aug. 14	108	39	"	3½	"	2,290	26		61
"	May 5	" 23	110	34	"	3½	"	1,990	21	50	61
"	" 12	" 25	105	39	"	3½	"	2,080	21	10	60
"	" 19	" 27	100	38	"	3½	"	2,490	26		61
"	" 26	" 31	97	39	"	3½	"	2,620	20	30	60
"	June 2	Sept. 4	94	38	"	4	"	3,540	15	10	58

OATS—Early, medium and late sowings.

Banner	April 28						Killed by	wind &	frost.		
"	May 5						"	"	"		
"	" 12	Aug. 25	105	42	Stiff	9	Branching	3,280	44	24	34
"	" 19	" 23	96	41	"	7	"	2,700	54	24	35
"	" 26	" 25	91	42	"	8	"	3,730	41	26	34
"	June 2	" 31	90	40	"	8½	"	3,900	29	14	33
Abundance	April 28						Killed by	wind &	frost.		
"	May 5						"	"	"		
"	" 12	Aug. 27	107	42	Stiff	8	Branching	3,930	27	2	34
"	" 19	" 25	98	42	"	9	"	2,540	48	28	34
"	" 26	" 23	89	41	"	8	"	3,990	31	6	34
"	June 2	" 25	84	42	"	8	"	4,090	25	10	33

BARLEY—Early, medium and late sowings.

Odessa	April 28	Aug. 14	108	23	Stiff	2½	6 rowed	1,860	20	30	47
"	May 5	" 18	105	29	"	3	"	2,240	22	4	47
"	" 12	" 18	98	31	"	2	"	1,970	31	42	49
"	" 19	" 19	92	29	"	2½	"	1,880	32	34	49
"	" 26	" 20	86	29	"	2	"	2,280	35	40	49
"	June 2	" 31	90	29	"	2	"	2,340	31	22	47
Canadian Thorpe	April 28						Destroyed by	wind &	frost.		
"	May 5						"	"	"		
"	" 12	Aug. 31	111	30	Stiff	3	2 rowed	2,380	21	12	48
"	" 19	" 31	104	33	"	3½	"	2,180	28	26	49
"	" 26	Sept. 4	101	30	"	3	"	3,700	25		49
"	June 2	" 11	101	32	"	3	"	2,960	24	38	48

PEASE—Early, medium and late sowings.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw	Length of Pod.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				In.	In.		Bush. Lbs.	Lbs.
Golden Vine	April 28	Aug. 20	114	26	2½	Small	27 30	64
"	May 5	" 22	109	40	2½	"	27 10	64
"	" 12	" 30	110	34	2¼	"	60 50	64*
"	" 19	Sept. 3	107	34	2¼	"		
"	" 26	" 9	106	38	2½	"	34 10	63
"	June 2	" 12	102	40	2½	"	28	63
Mummy	April 28	Aug. 22	116	28	3½	Medium	27	64
"	May 5	" 30	117	29	3	"	20 50	64½
"	" 12	Sept. 1	112	30	3	"	29 50	64
"	" 19	" 8	112	33	3	"	30 20	63½
"	" 26	" 10	107	40	3	"	33 30	63
"	June 2	" 13	103	42	3	"	25 30	63

* The crop from these two plots was badly mixed by a wind storm after cutting and the yield given is the product of both.

EXPERIMENTS WITH OATS.

More injury was done to the oat crop by spring frost last May than during any year in the history of the province, where the frost was preceded by drifting soil, carried by strong winds, many fields of oats were either completely destroyed or the plants so badly thinned that weeds took possession of the ground choking out the grain.

In the varietal test of oats on this farm, 15 varieties were completely killed out, 11 badly injured and many others more or less thinned; depending on their exposure to the high north-west winds of 29th May; for this reason the results obtained from the series of plots planted as a comparative test of varieties are unfortunately this year of little or no value for the purpose designed.

All the plots uninjured by wind and frost gave a fair yield of grain and the straw was unusually free from rust; the seed of all varieties was immersed for five minutes in a bluestone liquid composed of 1 pound bluestone to 3 pails (24 quarts) of water before sowing and very little injury was done by smut.

Sixty-one varieties of oats were sown with a hoe drill, all on 1st May, on $\frac{1}{10}$ acre plots, soil a fairly rich black loam which had been summer-fallowed.

OATS—Test of Varieties.

Name of Variety.	Date of Ripening	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw per Acre.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs
Golden Tartarian	Aug. 23	114	42	Stiff	12	Sided	2,760	83	18	33
New Electric	" 18	109	37	Weak	8	Branching	3,040	78	8	36
Early Golden Prolific	" 18	109	42	Stiff	8	"	2,640	76	26	37
Joanette	" 21	112	29	Weak	6	"	3,120	71	16	36½
California Prolific Black	" 23	114	42	Stiff	8	Sided	3,130	68	8	36
Rosedale	" 20	111	41	"	8	Half sided	3,410	67	12	36½
Pearce's Black Beauty	" 20	111	40	Weak	10	Branching	2,770	67	2	36
Pense	" 25	116	44	Stiff	10	Sided and half sided	3,550	64	24	36
Russell	" 18	109	42	"	10	Half branch'ng	2,870	62	22	35
Golden Beauty	" 20	111	42	"	9	Branching	2,650	57	12	34
Siberian O. A. C	" 25	116	42	"	10	"	3,260	57	2	34
Early Etampes	" 25	116	42	"	9	"	3,690	56	6	33
Prize Cluster	" 10	101	42	"	11	"	2,140	56	6	38
Holstein Prolific	" 20	111	42	"	9	"	3,130	55	..	34
Scotch Hopetoun	" 25	116	38	Weak	9	"	4,290	54	24	36
Banner	" 19	110	42	Stiff	9	"	3,240	53	8	34
Columbus	" 25	116	38	"	9	"	3,220	52	12	35
Victoria Prize	" 18	109	43	"	9	"	2,480	52	2	38
Coulommiers	Sept. 4	126	44	"	9	"	4,080	52	2	35
Early Maine	Aug. 24	115	39	"	8	"	3,030	52	2	34
Early Blossom	" 20	111	42	"	10	Half sided	3,690	51	26	35
White Schonen	" 29	120	42	"	6	Branching	3,190	50	10	33
Oxford	" 19	110	41	"	10	Branching and half sided	3,490	48	28	35½
Miller	" 19	110	35	"	6	Branching	3,160	48	8	34
Flying Scotchman	" 19	110	42	"	10	"	3,940	47	12	37½
Improved Ligowo	" 25	116	40	"	8	"	2,590	47	12	37½
Early Archangel	" 18	109	39	"	7	"	3,370	46	16	37
Mortgage Lifter	" 10	101	42	"	10	"	2,480	44	26	35
Master	" 25	116	42	"	8	Branching and half sided	3,040	44	14	35
King	" 19	110	36	"	7	Branching	3,460	42	12	31
Wallis	" 25	116	42	"	10	"	3,370	39	4	35
Abundance	" 25	116	49	"	9	"	3,530	38	28	34½
Newmarket	" 11	102	42	"	9	"	2,480	38	28	34
Dunn	Sept. 4	126	44	"	10	"	3,980	37	12	34
Lincoln	Aug. 25	116	40	"	8	"	3,080	37	12	36
Oderbruch	" 19	110	40	"	7	Half branch'ng	3,040	37	2	35½
White Russian	" 25	116	42	"	11	Branching	4,630	35	30	34
Welcome	" 13	104	38	"	10	"	2,860	35	..	38
Winter Grey	" 24	115	42	"	9	"	3,060	35	..	37
Abyssinia	" 31	122	42	"	10	Half sided	3,850	33	28	34
Green Russian	" 14	105	40	"	8	Branching	3,780	32	32	32
Hazlett's Seizure	" 24	115	42	"	10	"	3,290	32	22	35
Medal	" 26	117	42	"	9	Branching and half sided	3,080	31	16	35
Rennie's Prize White	" 18	109	44	"	10	Branching	2,640	29	24	38
Poland	" 20	111	42	"	10	"	2,940	28	8	36
Imported Irish	" 23	114	41	"	9	"	3,340	28	8	38
Cream Egyptian	" 19	110	42	"	9	Half sided	3,340	26	26	37
Excelsior	" 8	99	34	"	8	Branching	480	21	6	34
Doncaster Prize	" 20	111	37	"	7	"	3,360	20	10	36
Wide Awake	" 25	116	39	"	8	"	3,870	18	18	35

Excelsior was extremely early, for that reason birds gathered on this plot and destroyed a large proportion of the grain.

OATS TEST OF VARIETIES ON SPRING-PLOUGHED WHEAT STUBBLE.

Many farmers have the impression that Banner Oats may possibly prove the most prolific variety on summer-fallowed land, but that Black Tartarian gives the largest yield on spring-ploughed stubble.

From the accompanying table, it will be seen that in this instance the Black Tartarian equalled the Banner Oats in yield, a result which is seldom obtained on summer-fallowed land.

The soil on these plots was a moderately rich black loam, size of plots, $\frac{1}{20}$ acre; sown with a shoe drill.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number 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.
Abundance	May 3..	Aug. 13.	102	34	Stiff..	7	Branching	1,790	41 16	42
Banner	" 3..	" 14.	103	35	" ..	7	"	1,450	36 26	43
Black Tartarian	" 3..	" 16.	105	33	" ..	8	Sided	1,050	36 26	44
White Russian	" 3..	" 16.	105	36	" ..	7	Branching	1,810	35	44

EXPERIMENTS WITH BARLEY.

The barley plots fortunately were sown this year somewhat later than usual, and escaped injury both from wind and frost; the test as a comparison of varieties was a very successful one, and the yield good for such a dry year.

The size of the plots for both six and two-rowed varieties was $\frac{1}{10}$ acre, and the soil a clay loam, which had been summer-fallowed. Thirty-eight varieties were tested, twenty of six-rowed and eighteen of two-rowed, and all were sown on the 13th of May. No rust occurred on any of the plots.

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.
			Inch.		Inch.	Lbs.	Bush. Lbs.	Lbs.
Trooper	Aug. 17..	96	28	Stiff....	2½	2,690	51 12	50
Summit	" 19..	98	33	" ...	3½	3,240	50 10	49
Excelsior	" 11..	90	34	" ...	3½	2,640	49 8	40
Champion	" 11..	90	38	" ...	3	2,910	47 34	37
Success	" 10..	89	28	" ...	3	1,950	44 38	40
Common	" 11..	90	29	" ...	3	2,310	43 26	50
Rennie's Improved	" 16..	95	33	" ...	2	2,000	42 34	49
Nugent	" 17..	96	28	" ...	3	2,180	41 2	48
Odessa	" 17..	96	33	" ...	3	2,300	40 30	48½
Phœnix	" 17..	96	32	" ...	2½	2,260	39 18	51
Surprise	" 20..	99	30	" ...	3	2,980	38 46	51
Petschora	" 25	104	31	" ...	2	2,230	35 40	47
Oderbruch	" 16..	95	34	" ...	3	2,490	34 28	49
Mensury	" 17..	96	33	" ...	4	2,400	34 18	49
Stella	" 23..	102	31	" ...	3	2,590	33 26	48½
Baxter's	" 18..	97	32	" ...	2	2,580	32 34	51
Vanguard	" 16..	95	30	" ...	2½	2,090	29 18	49
Pioneer	" 24..	103	31	" ...	3	2,600	29 8	52
Blue	" 14..	93	30	" ...	2½	1,870	27 34	48
Royal	" 16..	95	27	" ..	2¾	3,330	25 20	49

BARLEY, TWO-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.
Sidney	Aug. 17..	96	30	Stiff....	3½	3,010	46 32	53
Pacer	" 20..	99	34	" ...	3½	3,630	46 12	52
Nepean	" 20..	99	32	" ...	3½	3,340	46 2	50
French Chevalier	" 23..	102	32	" ...	5	3,610	43 26	48
Thanet	" 24..	103	30	" ...	5	3,480	42 4	50
Victor	" 20..	99	32	" ...	3½	3,480	42 4	51½
Emerson	" 19 .	98	31	" ...	3	2,710	40 20	51
Bolton	" 17..	96	32	" ...	3¾	2,320	37 4	52
California Prolific	" 20..	99	32	" ...	3	2,750	36 22	47
Prize Prolific	" 24..	103	31	" ...	5	4,030	34 38	49
Beaver	" 20..	99	28	" ...	3½	2,710	34 8	52
Rigid	" 17..	96	31	" ...	3	2,240	32 24	47½
Danish Chevalier	" 24..	103	33	" ..	4	3,340	30 20	48
Canadian Thorpe	" 25..	104	33	" ...	3	3,180	23 16	48
Duckbill	" 20..	99	30	" ...	3	2,830	22 14	48½
Newton	" 23..	102	33	" ...	3	2,840	22 4	49
Monck	" 23..	102	34	" ...	3½	3,770	21 22	51
Kinver Chevalier	" 25..	104	32	" ..	4½	3,230	21 12	48

EXPERIMENTS WITH PEASE.

For the first time in the history of the farm the crop of field pease was injured by spring frost, it was noticeable, however, that only such plants as were bruised by drifting soil showed serious injury, ten degrees of frost having very little injurious effect on the unbruised plants.

The following varieties were exposed to the full force of the north-west storms of early June, and in consequence were seriously injured, hence the returns given of these cannot fairly be used in comparing the productiveness of varieties—Archer, White-eyed Marrowfat, White Wonder and Chancellor.

The four most productive sorts this year were all cross-bred varieties, which have been originated on the experimental farms.

The sample of pease was much finer this year than usual, the care exercised in selecting uniform seed each year has greatly improved many sorts.

All the varieties were sown on the 17th of April, the size of the plots was $\frac{1}{20}$ acre each, and the soil a clay loam, which had been summer fallowed; a hoe drill was used in seeding and from 2 to 2½ bushels of seed sown per acre.

PEASE—Test of Varieties.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Length of Pod.	Size of Pea.	Yield Per Acre.	Weight per Bushel.
			Inch's	Inch's		Bush. Lbs.	Lbs.
King	Aug. 26	131	38	3	Large	42 40	62
Alma	" 26	131	34	3½	"	40 40	63½
Bedford	Sept. 6	142	28	2½	Medium.	40	64
Trilby	Aug. 26	131	39	3½	Large	38 20	62
Mummy	" 25	130	24	2	Medium.	37 40	62
Bright	Sept. 6	142	35	3	"	37 20	63½
Carleton	" 4	140	38	3	Small.	36 40	64
Creeper	Aug. 26	131	30	2	"	36 40	63½
Archer	" 26	131	44	2½	Medium.	36	64
Centennial	" 26	131	33	3½	Large	35 40	62
Victoria	" 30	135	36	3	"	35 20	64
Mackay	" 26	131	33	3½	"	35	63
Prussian Blue	" 26	131	42	3	Medium.	35	63
White Wonder	" 18	123	24	2	"	34 40	64
New Potter	" 26	131	28	2	"	34 40	63
Kent	" 26	131	31	3½	Large	34	63
Golden Vine	" 20	125	30	2	Small.	34	63½
Chancellor	" 10	115	32	2	"	34	63
Elephant Blue	" 20	125	34	3	Medium.	34	62½
Crown	" 20	125	30	2	Small.	33 40	63½
Prince	" 26	131	39	3½	Large	33 20	63
Prince Albert	Sept. 5	141	32	3	Small	32	63½
Agnes	Aug. 25	130	33	3	Medium.	32	63½
Harrison's Glory	" 25	130	20	3	"	32	62
Pride	" 19	124	16	3	"	31 40	65
Canadian Beauty	" 26	131	36	3	"	30 20	63½
Black Eyed Marrowfat	" 26	131	33	3½	Large	29 20	64
Oddfellow	" 26	131	36	3	Medium.	29 20	65
Arthur	" 20	125	30	.....	"	29 20	62
Duke	Sept. 4	140	30	.....	Large	27	64
Nelson	Aug. 23	128	37	2½	Medium.	26 40	64
Early Britain	" 20	125	27	3	"	26 40	61
Paragon	Sept. 6	142	30	3	"	26 40	63
Multiplier	" 2	138	42	2½	Small.	26 20	63
Vincent	Aug. 25	130	33	3	Medium.	26	63
Daniel O'Rourke	" 18	123	31	3	"	25 20	65
Macoun	Sept. 4	140	34	3	"	25	62½
Perth	Aug. 26	131	36	3	"	24 40	62
Large White Marrowfat	" 30	135	44	3½	Large	22 40	64
Bruce	Sept. 6	142	30	3½	"	21 20	63¼

EXPERIMENTS WITH INDIAN CORN.

The very light rainfall of the past season lessened the yield of fodder corn very materially, and the returns were considerably below the average.

The soil was a black loam; all the varieties were sown on the 19th of May, and the yield per acre has been calculated from the weight of crop cut from two rows, each 66 feet long.

The long open fall was favourable for ripening, and matured ears could have been obtained from many varieties, but it was thought advisable to cut the fodder at the usual date, 28th August.

For the first time in our experiments, the yield from corn sown in hills exceeded that sown in drills. This is probably to be attributed to the hills being in a soil slightly more moist.

In addition to the test plots of fodder a field of 8 acres was planted for ensilage purposes, and a fair crop was harvested and cured for ensilage. As the corn in this field was in the late milk stage when cut, the ensilage will doubtless be fully up to the average in quality. The yield, however, is less than usual.

Indian Corn—Test of Varieties.

Name of Variety.	Height.	Leafiness.	When Tasselled.	In Silk.	Early Milk.	Late Milk.	Condition when cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
	Inches.							Tons.	Lbs.	Tons.	Lbs.
Red Cob Ensilege	82	Very leafy	Aug. 20				In tassel	19	500	16	100
Wisconsin White Dent	73	"	" 7	Aug. 13	Aug. 21	Aug. 27	Late milk	18	1,400	14	1,700
Rural Thoroughbred White Flint	66	"	" 21	" 26			In silk	17	1,200	16	100
North Dakota Yellow Flint	60	"	" 7	" 13	Aug. 24		Early milk	17	1,200	11	
Longfellow	68	"	" 7	" 21	" 25		"	16	1,000	11	1,100
Giant Prolific Ensilage	79	"	" 10	" 24			In silk	15	800	13	400
Canada White Flint	72	Fairly leafy	" 6	" 14	Aug. 24		Early milk	15	800	10	900
Saltzer's North Dakota	65	Very leafy	" 8	" 13	" 21	Aug. 25	Late milk	15	800	11	
Kaffir Corn	52	"					Not in tassel	15	800	18	1,400
White Pearl Pop Corn	67	"	Aug. 25				In tassel	15	800	12	1,300
Sanford	64	Fairly leafy	" 13	Aug. 21	Aug. 25		Early milk	14	600	9	1,800
Extra Early Huron Dent	60	"	" 6	" 13	" 21	Aug. 25	Late milk	14	600	12	1,300
White Rice Pop Corn	78	"	" 6	" 14	" 21		Early milk	13	1,500	10	900
Champion White Pearl	73	Very leafy	" 7	" 13	" 21	Aug. 27	Late milk	13	400	19	1,600
Sweet Fodder Corn	52	Fairly leafy	" 5	" 12	" 21	" 25	"	13	400	9	700
Clouds Early Yellow	92	"	" 20	" 25			In silk	12	1,300	16	1,000
Mammoth 8-rowed flint	73	Very leafy	" 6	" 13	Aug. 21	Aug. 25	Late milk	12	200	16	1,000
King of the Earliest	69	"	" 8	" 13	" 21	" 25	"	12	200	14	600
Ninety-day Corn	74	Fairly leafy	" 12	" 21	" 25		Early milk	12	200	11	1,760
Early Butler	77	"	" 6	" 14	" 20		"	11	1,760	18	1,400
Compton's Early	66	"	" 7	" 13	" 20		"	11	1,100	14	1,700
Angel of Midnight	62	Very leafy	" 8	" 14	" 21		"	11	1,100	19	1,600
Selected Leaming	79	"	" 21	" 25			In Silk	11	1,100	13	400
New White Cap Yellow Dent	84	"	" 9	" 15	Aug. 20		Early milk	11		15	1,800
Pearce's Prolific	62	Fairly leafy	" 8	" 16	" 21	Aug. 25	Late milk	11		9	700
Cuban Giant	80	Very leafy	" 20	" 25			In silk	11		17	1,200
Amber Rice Pop Corn	62	Few leaves	" 8	" 15	Aug. 21	Aug. 25	Late milk	11		9	700
Wisconsin Yellow Dent	72	Fairly leafy	" 14	" 21	" 27		Early milk	11		9	700
Mitchell's Extra Early	42	"	" 1	" 6	" 10	Aug. 21	Late milk	8	1,600	13	400
Pride of the North	77	"	" 13	" 20	" 25		Early milk	8	500	11	
Kendalls Giant Corn	45	Few leaves	" 1	" 8	" 14	Aug. 23	Late milk	7	300	9	700

FIELD ROOTS.

The season has not been a favourable one for field roots, the rainfall being much too light for these moisture-loving plants.

The land for all kinds of field roots was prepared by spreading ten loads of well rotted manure per acre in the fall. The land was then ploughed at once eight inches deep, and well harrowed and rolled. In the spring the field was simply harrowed and the seed sown in flat drills, and kept clean during the growing season by means of a one-horse cultivator and hoeing.

EXPERIMENTS WITH TURNIPS.

Eighteen varieties of turnips were tested this year, sown at two different dates. The previous crop was mangels. They were quite free of injury from insect enemies, but the yield, owing to insufficient rainfall, was much below the average, although the quality was excellent. As usual, the early sown plots, with few exceptions, gave the largest returns. The purple top varieties continue to take the lead for productiveness.

The soil was a rich sandy loam; the estimate of yield has been made from the product of two rows, each 66 feet long. The roots are free of rot. The first plots were sown on the 20th May, the second on the 3rd June, in drills 30 inches apart; all were pulled on 1st October.

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.
Hall's Westbury	11	1,232	387	12	8	1,952	299	12
Halewood's Bronze Top	11	440	374	..	8	1,424	290	24
Mammoth Clyde	10	328	338	48	6	1,200	220	
Shamrock Purple Top	9	1,800	330	..	8	1,424	290	24
Prize Purple Top	9	1,536	325	36	8	1,160	286	
Marquis of Lorne	9	1,008	516	48	6	1,992	233	12
East Lothian	9	480	308	..	8	1 688	294	48
Pearce's Prize Winner	9	216	303	36	10	856	347	36
Bangholm Selected	9	216	303	36	8	1,424	290	24
Carter's Elephant	8	1,952	299	12	7	520	242	
Skirving's	8	1,952	299	12	8	1,160	286	
Giant King	8	1,688	294	48	7	1,576	259	36
Jumbo or Monarch	8	1,424	290	24	8	632	277	12
Hartley's Bronze	8	896	281	36	8	1,952	299	12
Sutton's Champion	8	632	277	12	9	1,800	330	
Perfection Swede	7	1,576	259	36	9	744	312	24
Selected Champion	7	1,048	250	48	6	1,728	228	48
Selected Purple-Top Swede	4	712	145	12	11	440	374	

EXPERIMENTS WITH MANGELS.

The light rainfall of the past year has reduced the crop of mangels to one-half of last year's returns.

Eighteen varieties were sown, but the seed of three of these germinated badly, and the yield given is not a fair test of these varieties.

The first set of plots were sown on the 20th of May, the second on the 3rd of June, and the roots from both were pulled on 30th September.

They were sown after turnips, the soil was a rich sandy loam which was ploughed deeply in the fall, the seed was sown in flat drills 30 inches apart, and the yields per acre have been estimated from the product of two rows each 66 feet long.

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.
Champion Yellow Globe	26	8	866	48	15	96	501	36
Mammoth Long Red	25	424	840	24	15	1,944	532	24
Selected Mammoth Long Red	23	464	774	24	26	1,328	888	48
Giant Yellow Intermediate	22	352	739	12	16	1,000	550	
Canadian Giant	21	32	700	32	20	1,184	686	24
Norbitan Giant	20	1,976	699	36	23	1,256	787	36
Red Fleshed Globe	20	392	673	12	13	1,984	466	24
Giant Yellow Globe	19	808	646	48	15	1,944	532	24
Ward's Large oval shaped	18	1,488	624	48	19	1,336	655	36
Golden Tankard	17	584	576	24	14	1,832	497	12
Giant Yellow Half Long	15	1,944	532	24	18	112	585	12
Mammoth Long Red (Evans)	15	1,680	528	..	18	696	611	36
Warden Orange Globe	14	1,832	497	12	12	816	413	36
Gate Post	14	776	479	36	20	128	668	48
Golden Fleshed Tankard	13	400	440	..	11	1,760	396	
Red Fleshed Tankard	11	176	369	30	6	144	202	24
Large Oval Globe	10	856	347	36	12	1,344	347	36
Yellow Intermediate	6	672	211	12	17	56	567	36

EXPERIMENTS WITH CARROTS.

As usual carrots have suffered more from the light rainfall than any of the other field roots, and the yield of all varieties is much below the average.

Fifteen varieties of carrots have been under test this year. The soil was a rich sandy loam which had been deeply fall ploughed; the previous crop was turnips. The seed was sown in flat drills 18 inches apart at two different dates, the first plots on the 20th of May, the second on the 3rd of June, and all were pulled on the 30th September.

The yields per acre have been calculated from the product of two rows each 66 feet long.

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.
White Green Top Orthe	4	360	139	20	3	600	110	
Mammoth Intermediate	3	600	110		3	1,480	124	40
Giant White Vosges	3	600	110		5	1,440	190	40
Iverson's Champion	3	600	110		5	1,000	183	20
White Belgian	2	1,720	95	20	3	160	102	40
Early Gem	2	840	80	40	3	1,480	124	40
Half Long White	2	840	80	40	4	1,240	154	
Yellow Intermediate	2	400	73	20	3	1,920	132	
Half Long Chantenay	2	400	73	20	2	400	73	20
Long Orange or Surrey	1	1,520	58	40	3	160	102	40
Scarlet Intermediate	1	1,520	58	40	3	1,920	132	
Improved Short White	1	1,080	51	20	3	160	102	40
Guerande or Ox Heart	1	640	44		2	400	73	20
Carter's Orange Giant	1	640	44		2	1,280	88	
Long Scarlet Altringham		1,760	29	20	3	160	102	40

EXPERIMENTS WITH SUGAR BEETS.

The following are the yields obtained from five varieties of sugar beets, sown at two different dates on rich black loam treated in the same manner as mangels.

The first plots were sown on the 20th of May, and the second on 3rd June.

All were pulled on the 30th September, and the yield per acre has been calculated from the produce of one row 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.
Red Top Sugar	20	1,184	686	24	16	1,792	563	12
Vilmorin's Improved	20	656	677	36	10	1,120	352	
Improved Imperial	15	1,680	528		13	1,192	453	12
Danish Improved	13	928	448	48	20	392	673	12
Wanzleben	11	176	369	36	13	1,720	462	

EXPERIMENTS WITH POTATOES.

The yield of potatoes was not only lessened by the unusually light rainfall, but from some unknown cause many varieties germinated badly.

The land selected was in barley last year, and was deeply ploughed in early spring. It was again ploughed shallow on 21st of May, and the tubers cut in pieces, with two or three eyes each, were planted in every third furrow.

The field was kept clean of weeds during the growing season by the use of harrows and cultivator.

There were no rotten potatoes and very few scabby ones.

All the varieties were planted on the 21st May, in black loam soil, without manure, and were dug 29th September.

The yield per acre has been estimated in each case from the product of one row, 66 feet long.

The following varieties germinated badly and the returns given from them should not be considered a fair test of their productiveness: Pearce's Prize Winner, Lee's Favourite, Good News, Early White Prize, Honeoye Rose, Orphan's, Beauty of Hebron, Albany No. 1, Daisy, Lightning Express, Early Ohio and I.X.L.

POTATOES—Test of Varieties.

Name of Variety.	Character of Growth.	When Matured.	Average Size.	Quality.	Yield per Acre.						Form and Colour.
					Total.		Marketable.		Unmarketable.		
					Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
New Variety No. 1.	Rank	Sept. 9.	Med. to large	Fair	363	..	341	..	22	..	Flat, white.
Reeve's Rose	"	" 9.	Sm'll to med.	Very dry.	341	..	333	40	7	20	Round, red.
Seedling No. 7 B.C.	Very rank	" 9.	Med. to large	Wet	322	40	322	40	..	..	Long, flat, deep red.
Reading Giant	Fair	" 9.	Medium	Dry	315	20	293	20	22	..	Round oval, pink and white.
Flemish Beauty Seedling	Rank	" 12.	..	"	304	20	275	..	29	20	Long, red.
E. J. Hunter	"	" 9.	Med. to large	"	300	40	300	40	..	..	Long, round, red.
Clarke's No. 1	"	" 9.	Medium	"	289	40	282	20	7	20	" pink.
General Gordon	Fair	" 13.	Med. to large	"	264	..	245	40	18	20	" red.
Everett	"	" 9.	"	"	260	20	260	20	..	..	" light red.
Great Divide	"	" 9.	Sm'll to med.	Wet	256	40	242	..	14	40	" white.
Lizzie's Pride	"	" 9.	Med. to large	Dry	256	40	256	40	..	..	Flat oval, lt. red.
Late Puritan	Rank	" 9.	..	Fair	253	..	238	20	14	40	Long, red.
Pride of the Market	"	" 9.	Med. to large	Dry	253	..	253	..	..	..	Wht. kidney.
Hale's Champion	Fair	" 13.	Sm'll to med.	"	249	20	231	..	18	20	Flat, round, wht.
Brown's Rot Proof	Very rank	" 9.	"	Fair	249	20	238	20	11	..	Round oval, red.
King of the Roses	Fair	" 3.	Medium	Dry	245	40	245	40	..	..	Oval, light red.
Dreer's Standard	Rank	" 9.	"	Fair	242	..	238	20	3	40	Long, round, wht
Chicago Market	Fair	" 13.	Med. to large	Dry	238	20	220	..	18	20	Flat oval, light yellow.
Houlton Rose	"	" 9.	"	Fair	238	20	238	20	..	..	Long, round, lt. pink.
Irish Cobbler	Weak	" 13.	"	Dry	231	..	231	..	..	..	Flat, round, wht.
Hopeful	Rank	" 9.	"	Fair	223	40	223	40	..	..	Long, flat, white.
Seedling No. 7	Very rank	" 9.	"	Damp	220	..	220	..	..	..	Round oval, deep pink.
Lady Frances	Rank	" 9.	Sm'll to med.	Fair	216	20	179	40	36	40	Oval white.
McKenzie	"	" 9.	"	Choice	216	20	198	..	18	20	Long, round, wht.
American Wonder	"	" 9.	Med. to large	Wet	212	40	205	20	7	20	Large, oval "
Money Maker	Fair	" 9.	Sm'll to med.	Dry	209	..	179	40	29	20	" round "
State of Maine	Very rank	" 9.	"	Fair	209	..	198	..	11	..	" flat "
Russell's Seedling	Rank	" 9.	Med. to large	Dry	205	20	187	..	18	20	Round oval "
Delaware	Fair	" 9.	"	Damp	201	40	201	40	..	..	Long flat "
Forty Fold	Rank	" 9.	Sm'll to med.	..	201	40	154	..	47	40	Round, blue.
Quaker City	Very rank	" 9.	Med. to large	Fair	201	40	201	40	..	..	Flat oval, white.
Carman No. 1	Rank	" 9.	Sm'll to med.	Wet	201	40	201	40	..	..	Long, round "
Seattle	"	" 9.	Medium	Dry	201	40	190	40	11	..	" "
Charles Downing	Fair	" 9.	Med. to large	"	198	..	198	..	..	..	Flat oval "
Early Rose	Fair	" 13.	"	Dry	198	..	198	..	..	..	Oval, pink.
Burpee's Extra Early	Weak	" 5.	"	Fair	198	..	183	20	14	40	"
Sharpe's Seedling	"	" 5.	"	Dry	198	..	198	..	..	..	"
Empire State	Very rank	" 9.	Medium	Wet	194	20	194	20	..	..	Round, white.
Early Gem	Weak	" 10.	"	Dry	194	20	172	20	22	..	Oval, red.
Green Mountain	Rank	" 9.	Med. to sm'll	"	194	20	190	40	3	40	Long, white.
Munroe Country	Fair	" 9.	" to large	Choice	194	20	194	20	..	..	" red.
Troy Seedling	"	" 9.	Sma. to med.	Wet	190	40	157	40	33	..	" white.
Wonder of the World	"	" 5.	Med. to large	Dry	190	40	190	40	..	..	Oval, red.
Uncle Sam	"	" 9.	Sma. to med.	Wet	190	40	190	40	..	..	Long, white.
Northern Spy	"	" 9.	Med. to large	Dry	187	..	176	..	11	..	" deep red.

POTATOES—Test of Varieties—*Continued.*

Name of Variety.	Character of Growth.	When Matured.	Average Size.	Quality.	Yield per acre.						Form and Colour.
					Total.		Marketable.		Unmarketable.		
					Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Satisfaction (Suttons)	Rank	Sept. 9	Sma. to med.	Wet	187		161	20	25	40	Round, lig. y'l'w.
S. E. Bill	Fair	" 9	"	Fair	183	20	110		73	20	" blu. wh'e.
Seedling No. 230	"	" 13	"	Choice	183	20	183	20			" white.
Queen of the Valley	Very rank	" 9	Large	Dry	183	20	183	20			Long, pink.
Early Six Weeks	Weak	" 10	Med. to large	"	183	20	168	40	14	40	Round, "
Dakota Red	Rank	" 9	Large	Wet	183	20	183	20			Long, red.
Crown Jewel	Weak	" 10	Med. to large	Dry	179	40	161	20	18	20	Round, light red.
Earliest of All	"	" 3	"	"	179	40	176		3	40	Oval, "
Ideal	Rank	" 9	Large	Fair	179	40	179	40			Long, red.
White Beauty	Fair	" 13	Med. to large	Dry	179	40	179	40			" white.
Early Norther	"	" 5	"	Fair	176		176				" pink.
Satisfaction	Rank	" 12	Medium	Dry	176		157	40	18	20	" white.
Vanier	"	" 9	Med. to small	"	176		168	40	7	20	" pink.
World's Fair	Fair	" 9	Med. to large	"	176		176				Flat, white.
Early Harvest	Weak	" 10	"	Choice	172	20	172	20			Long, "
Early Puritan	Fair	" 9	Sma. to med.	Wet	172	20	165		7	20	" "
Good News		" 9	Med. to large	Fair	168	40	168	40			Long, round, pink
Pride of the Table	Fair	" 9	"	Dry	168	40	157	40	11		Flat, oval, "
Brownell's Winner	Rank	" 9	"	Fair	168	40	168	40			" red.
Duke of York		" 9	"	"	165		165				" yellow.
Victor Rose	Fair	" 9	"	Wet	165		161	20	3	40	Long, flat, red.
Columbus	Rank	" 9	Sma. to med.	Dry	165		146	40	18	20	" round, "
Burnaby Seedling	Fair	" 9	Large to med	Fair	161	20	161	20			" " "
Peerless Junior	Rank	" 9	Small to med	Fair	161	20	154		7	20	Round, white.
Rough Red	Fair	" 9	"	"	161	20	88		73	20	" pink.
Grampions	"	" 9	"	Wet	157	40	135	40	22		" "
Irish Daisy	"	" 9	"	Dry	157	40	157	40			"
Polaris	Weak	" 9	Med. to large	"	154		150	20	3	40	" pink.
Rochester Rose	Fair	" 9	"	"	154		154				Long "
Maule's Thoroughb'd	"	" 9	"	Wet	154		150	20	3	40	" "
Jennie Deans	Rank	" 9	Small.	Dry	150	20	143		7	20	Round, white.
Early Sunrise	Weak	" 5	Med. to large	Fair	146	40	124	40	22		" oval, pink.
Pearce's Extra Early	"	" 10	"	Dry	146	40	139	20	7	20	Oval, lt. red.
Rural Blush	Rank	" 9	Small to med	"	146	40	146	40			" red.
Seedling 214	Very weak	" 13	"	Fair	146	40	146	40			" white.
American Giant	Fair	" 9	Medium	"	143		132		11		White.
Algoma No. 1	Very weak	" 1	Med. to large	Dry	139	20	132		7	20	Oval, pink.
Thorburn	Fair	" 13	"	"	139	20	139	20			" "
Princess May	"	" 13	Small.	Fair	135	40	102	40	33		" "
"Bill Nye"	"	" 9	Small to med	Wet	132		132				Long r'nd, white.
Early White Prize	Weak	" 5	Med. to large	Fair	124	40	124	40			Oval, lt. yellow.
Fill-basket	Fair	" 9	"	Dry	124	40	124	40			Long, deep pink.
London	Weak	" 5	"	"	124	40	124	40			Flat, oval, red.
Rose No. 9	Rank	" 9	"	Fair	121		113	40	7	20	" " "
Snowdrop	Fair	" 9	Small to med	Dry	113	40	95	20	18	20	" " white.
Harbinger	"	" 10	"	"	113	40	99		14	40	" pink.
Sir Walter Raleigh	"	" 9	"	"	110		110				" white.
New Queen	Weak	" 10	Large	Fair	110		102	40	7	20	Long r'nd, pink.
Freeman	Fair	" 10	Small to med	Wet	110		110				Flat oval, white.
Abundance (Sutton's No. 6)	Rank	" 9	Small		110		58	40	51	20	White.
Maggie Murphy	"	" 9	Med. to large	Dry	106	20	106	20			Long flat, lt. red.
Stourbridge Glory	"	" 9	Small	Wet	102	40	47	40	55		White.
I. X. L	Fair	" 9	Med. to large	Fair	102	40	102	40			Long round, red.
Her Majesty	Rank	" 9	Small		99		51	20	47	40	
Beauty of Hebron	Weak	" 10	Med. to large	Dry	95	20	95	20			Long oval, red.
Rural New Yorker, No. 2	Fair	" 9	Small to med	Wet	91	40	55		36	40	Round flat, white
Carman No. 3	"	" 9	"	Fair	88		51	20	36	40	Long flat, lt. yel'w
Clay Rose	Rank	" 9	Med. to large	Wet	88		51	20	36	40	Long flat, red.
Lee's Favourite	Very weak	" 10	" "	Dry	88		80	40	7	20	Oval, light red.
Record	Rank	" 9	Small	Fair	88		7	20	80	40	White.
Bovee	Weak	" 5	Med. to large	Choice	78	20	71		7	20	Oval light red.

POTATOES—Test of Varieties—*Concluded.*

Name of Variety.	Character of Growth.	When Matured.	Average Size.	Quality.	Yield per Acre. Total. Bush.	Total. Lbs.	Marketable. Bush.	Marketable. Lbs.	Unmarketable. Bush.	Unmarketable. Lbs.	Form and Colour.
Holborn Abundance.	Fair	Sept. 9..	Sm'll to med.	Wet.....	73	20	36	40	36	40	Round, white.
Early Ohio.....	Weak.....	" 1..	Med. to large	Choice....	73	20	73	20	..	..	" light rose.
Vick's Extra Early..	Fair	" 9..	Sm'll to med.	Fair.....	71	..	71	..	..	.	" " yellow
Ohio Junior.....	Very weak	" 1.	Med. to large	Dry.....	71	..	71	..	..	.	" " pink.
Prize Taker.....	Fair	" 9..	" "	Fair.....	71	..	71	..	..	.	" deep red.
Orphans.....	"	" 9..	Small	Wet.....	66	..	36	40	29	20	White.
Daisy.....	Very weak	" 10..	Medium ...	Dry.....	51	20	51	20	..	..	Round oval, red.
Lightning Express..	....	" 9..	Large	"	44	..	44	..	..	..	Long flat, pink.
Turner's Hall Seedling No. 5..... ..	Rank.....	" 9..	Small	Wet.....	44	..	..	..	44	..	
Pearce'sPrizeWinner	.....	" 9..	Med. to large	Dry.....	36	40	36	40	..	..	Flat oval, white.
Honeoye Rose.....	.....	" 9..	" "	Fair.....	22	..	22	.	..	..	Oval, light pink.
Albany No. 1..	.....	" 9 .	Small	Wet.....	18	20	18	20	..	..	Kidney.
Table King.....	Fair	" 9..	Sm'll to med.	Dry.....	14	40	14	40	..	..	Round, white.

EXPERIMENTS WITH FLAX.

The series of experiments with flax begun in 1896, were continued during the past season, the yield of straw is heavier this year but the return of seed is less.

The soil was a rich clay loam summer-fallowed, size of plots $\frac{1}{20}$ acre. One half of each plot was pulled as soon as the seed pods had turned brown, the other half was left until the seed had ripened, when it was cut and threshed in the usual way.

Variety.	Amount of Seed sown per acre. Lbs.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw. Inch.	Date when Pulled for Fibre.	Weight of Straw when pulled for Fibre, per Acre. Lbs.	Yield per Acre. Bush	Yield per Acre. Lbs.	Weight per Bushel. Lbs.	Weight of Straw when cut per Acre. Lbs.
Flax	40	May 26..	Aug. 27..	93	30	Aug. 17..	2,600	9	36	56	3,180
"	80	" 26..	" 27..	93	25	" 17 .	3,700	11	44	56	3,320
"	40	June 2..	" 31..	90	29	" 25..	3,300	11	24	56	2,660
"	80	" 2..	" 31..	90	29	" 25..	3,900	14	16	56	2,560
"	40	" 9..	Sept. 3..	86	29	Sept. 1..	3,500	12	28	56	2,100
"	80	" 9..	" 3..	86	29	" 1..	3,800	12	48	56	2,280
"	40	" 16..	" 6..	82	28	" 5..	3,540	10	20	56	2,720
"	80	" 16..	" 6..	82	28	" 5..	2,040	11	44	56	2,140

The plots sown on the 2nd of June gave the best return of seed, the sowings of the 9th June the largest quantity of straw. In every instance the thicker sowing gave the largest return of seed per acre and with one exception the largest quantity of straw also.

EXPERIMENTS WITH GRASSES AND CLOVERS.

Owing to the rapidly increasing herds of cattle and the lessening natural pasturage in Manitoba, the interest in grasses and fodder plants is increasing each year. For this reason special attention has been paid to this branch of experimental work, and during the past season about one hundred plots, varying in size from $\frac{1}{40}$ acre each to 6 acres, have been devoted to grasses and clovers with gratifying success.

The objects in view when undertaking this work were :—

1st. To ascertain the hardiness and suitability for this country of the different varieties tested.

2nd. To compare results from sowing grass seed with and without a crop of grain.

3rd. To ascertain the most suitable quantities of seed for sowing.

4th. To see whether a crop of clover, sufficiently heavy to benefit the soil as a green manure, could be grown either in one or two years.

5th. To gain information regarding the most suitable mixtures of grasses for hay and permanent pasture.

The summer of 1896 was an exceptionally favourable season for grasses, and all the varieties were in good condition by fall ; the snow came early and remained until the following spring, making an excellent covering during the severe months of winter.

The following plots of grass were one-tenth acre in size and the clovers one-twentieth acre each. The field was in barley during 1895 and the stubble was ploughed in the spring of 1896. The seed was sown broadcast on all the plots on the 8th of May, 1896, and at once harrowed in. Weeds were mowed twice during 1896, but none of the plots produced sufficient grass in that year to pay for cutting.

The soil was a medium sandy loam.

GRASSES—Test of Varieties.

Variety.	Seed per Acre.	Height on 15th May.	Height of Aftermath.	Thickness of Aftermath.	Yield per Acre.	
	Lbs.	In.	In.		Tons.	Lbs.
Western Rye Grass (Agropyrum tenerum)	20	6	8	Thin	3	750
Awnless Brome Grass (Bromus inermis)	20	10	10	Very thick	3	400
American Rye Grass (Elymus americanus)	20	6	8	Thin	2	510
Bald Rye or Wheat Grass (Elymus Virginicus)	20	7	4	Poor	2	200
Fall Meadow Oat Grass (Avena elatior)	30	8	11	Fair	1	400
Meadow Foxtail (Alopecurus pratensis)	20	7	12	Germinated badly	1	200
Hard Fescue (Festuca duriuscula)	20	4	6	" "	1	200
Timothy (Phleum pratense)	15	4	9	Thin	1	200
Orchard Grass (Dactylis glomerata)	25	5	10	Very thick	1	50
Red Top (Agrostis vulgaris)	20	7	8	Fair	1	
Timothy, mixed	10	4	10	"		750
Common Clover "	10	4	12	"		

GRASSES—Thin, Medium and Thick Sowing.

Variety.	Seed per Acre.	Apparent Thickness on 6th July.	Height when cut.	Yield per Acre.	
	Lbs.		In.	Tons.	Lbs.
Timothy (Phleum pratense)	5	Rather thin	27	1	600
" "	10	Right thickness	27	1	670
" "	15	Too thick	27	1	750
" "	20	"	27	1	700
Awnless Brome Grass (Bromus inermis)	10	Thin	28	2	350
" " "	15	Right thickness	28	2	
" " "	20	Too thick	28	2	400
Western Rye Grass (Agropyrum tenerum)	10	Too thin	27	3	400
" " "	15	Right thickness	27	3	200
" " "	20	Too thick	27	3	300
Bald Rye or Wheat Grass (Elymus Virginicus)	10	Too thin	26	2	700
" " "	15	Right thickness	26	2	700
" " "	20	Too thick	26	2	750
American Rye Grass (Elymus americanus)	10	Too thin	32	3	
" " "	15	Right thickness	32	3	555
" " "	20	Too thick	32	3	500

GRASSES—Mixtures for Hay and Pasture.

No.	Variety.	Seed of each Variety.	Total seed per Acre.	Appearance 6th July.	Aftermath.	Yield per Acre.	
		Lbs.	Lbs.			Tons.	Lbs.
1	Western Rye Grass	10	15	Principally Western Rye Grass	Poor	2	800
	Canadian Blue	5					
2	Alfalfa Clover	20	40	" Alfalfa Clover	"	2	400
	Western Rye Grass	20					
3	White Dutch Clover	5	20	" Timothy	Fair	2	200
	Kentucky Blue Grass	10					
	Timothy	5					
4	Hard Fescue	5	25	" Timothy and Fescue	"	1	900
	Sheep "	5					
	Canadian Blue	5					
	Timothy	5					
	Red Top	5					
5	Canadian Blue	5	15	" Timothy	"	1	600
	Timothy	10					
6	Canadian Blue	10	20	" Timothy	"	1	400
	Timothy	10					
7	Awnless Brome Grass	10	20	" Awnless Brome	Good	1	200
	Canadian Blue	10					

CLOVERS—Test of Varieties.

Variety.	Seed per Acre.	Height on 15th May.	Aftermath Height.	Aftermath Thickness.	Yield per Acre.	Remarks.
	Lbs.	Inch's	Inch's		Tons. Lbs.	
Bokhara	10	4	32	Fair	14 ..	Very woody.
Alfalfa	60	6	15	"	2 100	Promising.
Mammoth Red	25	4	8	"	1 500	"
Alsike	10	3	4	"	1 100	Too short for hay.
Red Clover	20	4	15	Thick	.. 900	Injured by drought.
White Dutch	12	2	...	.....	not cut....	Only fit for pasture.

SUMMARY.

1st. In a favourable season, that is when the snow comes early and remains all winter; many of the hardier varieties of grasses and clovers will winter successfully in this climate,

2nd. Western Rye Grass (a native of our prairies) again takes the lead for yield of hay, the quality is also excellent but Awnless Brome Grass gives nearly as much hay and better aftermath, the pasture in spring is also earlier.

3rd. The yield of hay for the first year is not materially influenced by the amount of seed used above a certain quantity, but thick seeding is expected to lessen the yield during the second and following years.

4th. Western Rye Grass and Canadian Blue gave the largest yield of any mixtures tested but the aftermath is light for the first year, but may improve in a year or two when the Blue Grass gets established.

5th. Clover sown without a nurse crop can be depended upon for a green manure in a favourable season, but it is doubtful whether it will prove a success if sown with a grain crop.

GRASS SEED DISTRIBUTION.

There has been a very much larger demand for samples of grass seed during the past season than in any former year; fortunately the crop on the Experimental Farm was larger than usual. Seventeen hundred and fifty-one pound bags were sent out in the free distribution, and forty-two lots of about fifteen pounds each were sold.

MILLETS.

Five varieties of millets were tested during the past season, they were all sown on summer fallow in drills 7 inches apart.

Some of the plots suffered more than others from the severe winds of May, and for that reason the experiment as a comparative test of varieties can not be considered conclusive.

Hungarian Grass has generally given the best results on this farm, and it was one of the most productive this year.

Size of plots one-twentieth of an acre, soil rich black loam; all were sown on 27th May.

Name of Variety.	When Sown.	Size of Plot.	When Headed.	Kind of Head.	Height of Straw.	Yield per Acre.	
		Acre.			Inch.	Tons.	Lbs.
Japanese	May 27	1/20	.....	Not headed	32	4	1,000
Hungarian	" 27	1/20	Aug. 20	Round	33	3	1,800
Golden Wonder	" 27	1/20	" 15	"	30	3	800
New Manitoba	" 27	1/20	" 1	Branching	44	2	....
New Siberian	" 27	1/20	" 20	Round	31	1	1,800
Golden Millet	" 27	1/20	" 11	"	30	1	....
*Holy Terror	.....	.....	.....	.....	.....	.....	.....

* Destroyed by wind, &c.

CATTLE.

The herd of cattle on this farm now consists of 20 head; all have been perfectly healthy during the year.

Since the outbreak of tuberculosis in 1894 all animals have been tested with tuberculin before being admitted into the regular cattle buildings. The whole herd has been tested again this fall, and none of the animals have reacted.

The following is a list of the names, breed, age and weight of the animals:—

Name of Animal.	Breed.	Age.	Weight.
			Lbs.
Qu'Appelle Red Knight, bull	Shorthorn	4 years	2,165
Brandon Fashion, cow	"	4 "	1,265
Rideau Chief, bull	Ayrshire	4 "	1,510
Dandy, cow	"	8 "	1,200
Brandon Jock, bull calf	"	9 months	430
Princess Leda 2nd, cow	Holstein	8 years	1,545
Manitoba Prince, bull	"	4 "	2,170
Leda of Brandon, cow	"	3 "	1,235
Leda's Princess of Brandon, heifer	"	18 months	1,000
Brandon Monk, bull calf	"	10 "	785
Lady Jane Grey, cow	Grade	9 years	1,220
Topsy, cow	"	5 "	1,115
Daisy, cow	"	9 "	1,300
Pansy, cow	"	3 "	1,140
Fanny Fern, cow	"	2 "	1,135
Violet, heifer	"	21 months	875
Jennie, heifer	"	19 "	920
Black Prince, steer calf	"	2 years	1,290
Barney, steer calf	"	6 months	540
Spotty, steer calf	"	2 "	170

EXPERIMENTS IN FEEDING STEERS.

The exports of steers from this province have been much larger this year than during any previous year in the history of the province, but I regret that a large proportion were stockers sold probably at from fifty to seventy-five per cent less money than they would bring if stall fed and shipped to Great Britain; if it pays the Ameri-

cans to purchase these stockers for fattening with the addition of a heavy import duty it would certainly pay our farmers to fatten them here.

In 1895 a test was made on this farm of the feeding value of native hay cut in the unbroken meadows, as compared with oat sheaves; this year native hay made from wheat grass (Elymus virginicus) but grown on cultivated land was fed in comparison with oat sheaves. For this purpose eight shorthorn grade steers two years old were purchased in December at 2½ cents per pound live weight and sold in May at 4 cents.

The steers were divided into two evenly matched groups of four each and fed all they would eat clean of the following ration.

First lot of four steers.

	Pounds.
Native hay cut (Elymus virginicus)	18
Turnips cut	30
Barley chopped	5
Oats "	2

Second lot of four steers.

	Pounds.
Oats sheaves cut (Banner)	18
Turnips cut	30
Barley chopped	5
Oats "	2

The actual amount and estimated value of the feed consumed during the feeding period of 93 days was as follows :—

First lot of four steers.

5,976 pounds native hay at $5 per ton	$14 94
128 bushels turnips at 5 cents per bushel	6 40
1,758 pounds barley chop at ½ cent per pound	8 79
700 pounds oats chop at ½ cent per pound	3 50
	$33 63

Second lot of four steers.

6,416 pounds oat sheaves at $5 per ton	$16 04
133 bushels turnips at 5 cents per bushel	6 65
1,840 pounds barley chop at ½ cent per pound	9 20
728 pounds oat chop at ½ cent per pound	3 64
	$35 53

Summary of Results.	First cost of Steers.	Value of Feed consumed.	Price sold for.	Profit per lot.	Daily gain of each Steer.
	$ c.	$ c.	$ c.	$ c.	Lbs. Oz.
First lot of four steers with hay	109 75	33 63	198 80	55 42	1 8
Second lot of four steers with oat sheaves	110 50	35 53	196 40	50 37	1 5

From the above it would appear that the cultivated native hay is worth rather more per ton than oat sheaves, for fattening purposes.

The yield of hay from this grass varies greatly from year to year, depending on the rainfall, but it averages somewhat less than the yield of oat sheaves, under the same conditions.

This grass succeeds remarkably well on dry uplands where an oat crop would give small returns; its roots are also very useful in preventing the drifting of soil.

EXPERIMENTS FOR THE PURPOSE OF MAINTAINING THE FLOW OF MILK DURING THE AUTUMN MONTHS.

Last year's report contained the particulars of an experiment with Awnless Brome Grass for the above purpose. During the past season the experiment was repeated with equally satisfactory results, and an additional test with fodder corn was undertaken.

Four cows were selected for this test, and, after several weeks of uniform feeding to ascertain the normal yield of milk, two were fed for three weeks commencing on fair native pasture, and the other two on the same pasture, with the average addition of 755 pounds of green fodder corn per week for the two.

The following table gives the details of the experiment.

First Week Aug. 22nd to 28th or Normal Yield.

How Fed.	Yield of Milk.
No. 1. Pasture alone	317 lbs.
No. 2. do	241 lbs.

Second Week.

How Fed.	Yield of Milk.	Gain over Normal.
No. 1. Pasture and 665 lbs. corn	343 lbs.	26 lbs. gain.
No. 2. Pasture alone	226 "	15 " loss.

Third Week.

How Fed.	Yield of Milk.	
No. 1. Pasture and 750 lbs. corn	330 lbs.	13 lbs. gain.
No. 2. Pasture alone	231 "	10 " loss.

Fourth Week.

How Fed.	Yield of Milk.	
No. 1. Pasture and 850 lbs. corn	319 lbs.	2 lbs. gain.
No. 2. Pasture alone	209 "	32 " loss.

Summary.

No. 1. Two cows with corn and pasture average weekly gain over normal 13 pounds.

No. 2. Two cows with pasture alone weekly loss below normal 19 pounds.

From the above it will be seen that the yield of milk from the two fed on pasture decreased at the average rate of 19 pounds per week while the two cows receiving the additional feed of corn made an average gain of 13 pounds per week for the three weeks, showing that this useful fodder plant can be utilized for the purpose of maintaining the flow of milk until severe frost, when the cows can be turned into Brome Grass aftermath; which is not affected by even severe frosts.

Brome Grass pasture in comparison with native grass pasture during the autumn months.

For this test the same cows were used as in the experiment just mentioned, but in this case the No. 1 group of two cows were fed on native pasture while the No. 2 group were kept on Brome Grass pasture.

The large gain made by the first two cows during the second week was no doubt owing to their having a somewhat larger range of pasture than before, the change evidently being a decided benefit at first.

The results given in the following table indicate the great value of the Awnless Brome Grass for this purpose.

First Week, Sept. 12th to 18th.

How fed.	Yield of Milk.
No. 1. Pasture and 850 lbs. green corn	319 lbs.
No. 2. Pasture alone	209 "

Second Week.

How fed.	Yield of Milk.	Gain over first week.
No. 1. Native pasture	424 lbs.	105 lbs. gain.
No. 2. Brome Grass	431 "	222 " "

Third Week.

No. 1. Native pasture	230 lbs.	89 lbs. loss.
No. 2. Brome Grass	227 "	18 " gain.

Fourth Week.

No. 1. Native pasture	194 lbs.	125 lbs. loss.
No. 2. Brome Grass	202 "	7 " "

Summary.

No. 1. Group. Native pasture lost a weekly average of 36 pounds of milk.
No. 2. " Brome Grass made a weekly average gain of 77 pounds of milk.

SWINE.

The herd of swine on the farm consists of:—

Name.	Breed.	Age.
Chrissie, sow	Berkshire	2 years.
Sir Richard, boar	"	1 "
Amber Belle, sow	Tamworth	2 "
Barrow (not named)	"	1 "
Dunrobin, boar	"	6 months.
Squire, boar	Chester, white	6 "

As it was impossible to procure young pigs for experimental purposes at a suitable time, no experiments were made with these animals during the year.

POULTRY.

The breeds of poultry kept on the farm during the past year consisted of White and Barred Plymouth Rocks and Black Minorcas. All were perfectly healthy and there has been no recurrence of the sore throat so troublesome last year.

As a thorough trial of the Barred Plymouth Rocks has been made during former years, it was thought advisable to discontinue keeping this breed and a change has been made to White Plymouth Rocks, for that reason no record of eggs has been kept during the year.

About sixty chickens about equally divided between White Plymouth Rock and Black Minorcas have been raised this summer without any loss whatever from sickness.

The White Plymouth Rock Cockerels being quite promising as table fowl their fitness for this purpose has been tested. A number of turkeys were also procured for the same purpose.

FATTENING POULTRY.

The importation into this province of dressed fowls reaches large dimensions each year, it is estimated that twenty thousand turkeys alone were imported into Winnipeg last season. This represents a large sum of money, all of which should be retained in the province. In addition the demand for dressed fowl in many other districts is large and increasing, much of which could be supplied from here.

Recognizing the importance of this subject, some attention has been paid during the past season to the fattening of poultry. Ten turkeys, five male and five female, hatched on a neighbouring farm in May, were purchased. Five of these were penned up and fed with a mixture composed of 50 per cent wheat, 25 per cent oats and 25 per cent barley. The ration was fed chopped and wet with milk in the morning and the whole grain fed for the evening meal.

The five running at large were allowed to gather the bulk of their food in the fields, only a very small quantity of grain being given them morning and evening to attract them to the roost.

The five penned birds were given all they would eat up clean twice a day.

In addition to the ten turkeys ten cockerels were selected for the same purpose, six of them being White Plymouth Rocks and four Black Minorcas. These were fed with the same kind of food and in the same manner as the turkeys.

The penned fowl both turkeys and chickens were, when dressed, much plumper and in every way more inviting than those which had been running at large, but the close confinement and heavy feeding appears to injure the chickens otherwise, the White Plymouth Rocks being badly "off their feet," while those running at large were quite healthy and active.

The turkeys were apparently more fond of oats than either barley or wheat, and towards the latter portion of the fattening period the proportion of this grain was increased with benefit.

RESULTS WITH TURKEYS.

			Lbs.	Oz.
Oct.	14.	Weight of 5 birds in pen	32	12
Nov.	25.	" "	53	00
		Gain	20	04

Amount of grain consumed 120 pounds, or 6 pounds of grain to 1 pound of increase.

			Lbs.	Oz.
Oct.	14.	Weight of 5 birds running at large	32	12
Nov.	25.	" " "	42	00
		Gain	9	04

CHICKENS.

		Lbs.	Oz.
Sept. 28.	Weight of 3 White Plymouth Rock Cockerels in pen	12	02
Nov. 26.	" " " "	21	07
	Gain	9	05

		Lbs.	Oz.
Sept. 28.	Weight of 3 White Plymouth Rock Cockerels at large	11	11
Nov. 26.	" " " "	17	13
	Gain	6	02

		Lbs.	Oz.
Sept. 28.	Weight of 2 Black Minorca Cockerels in pens	8	05
Nov. 26.	" " " "	10	02
	Gain	1	13

		Lbs.	Oz.
Sept. 28.	Weight of 2 Black Minorca Cockerels at large	7	04
Nov. 26.	" " " "	10	05
	Gain	3	01

Total amount of grain consumed by the 5 penned chickens 3 White Plymouth Rocks and 2 Black Minorcas was 57 pounds.

GAIN IN PERIODS.

		Lbs.	Oz.
5	turkeys penned, gained first three weeks	13	6
5	" " second "	6	14
3	White Plymouth Rock penned, gained first three weeks	5	5
3	" " at large "	2	11
3	" " penned, gained 2nd period of two weeks	2	7
3	" " at large " "	1	6
3	" " penned " 3rd period of three weeks	1	9
3	" " at large " "	2	1

Shrinkage between live and dressed weight.

5	turkeys penned, lost	25 per cent.
5	" at large "	30 "
3	White Plymouth Rocks penned, lost	34 "
3	" at large "	33 "
2	Black Minorcas penned "	34 "
2	" at large "	34 "

SUMMARY

1st. The 5 penned turkeys gained in the 24 days 11 pounds more than the 5 running at large.

2nd. The 3 penned White Plymouth Rock Cockerels gained in the 59 days 3 pounds 3 ounces more than the 3 running at large.

3rd. The 2 penned Black Minorcas made a gain for the first two weeks over those running at large, but for the whole 59 days the birds running loose gained the most by 1 pound 4 ounces.

4th. Both turkeys and chickens made the largest increase during the first three weeks.

5th. After 6 weeks of close confinement chickens are probably kept at a loss.

6th. White Plymouth Rock chickens are better adapted for feeding in small pens than Black Minorcas.

7th. The White Plymouth Rocks were a better colour and more attractive when dressed than the Black Minorcas.

8th. Penned turkeys shrunk 5 per cent less in dressing than those running at large.

9th. Chickens whether penned or running at large lost practically the same in dressing, viz., 34 per cent.

Our climate is suitable, feed is abundant and there is no reason why this province should not be a large exporter rather than an importer of dressed fowl.

EXPERIMENTS WITH BEES.

WINTERING.

As mentioned in last year's annual report five hives of Italian Bees were placed in the cellar of one of the dwellings on the farm on 10th October, 1896, the room containing bees was the one usually devoted to vegetables and was separated by a wooden partition from the furnace, ventilation was given by means of a chimney opening in the cellar, the temperature during the winter as ascertained by a self registering thermometer remained steady between 40 and 50 degrees Fah.

The hives were placed six inches from the floor and protected with a piece of old woollen carpet placed under the wooden cover; when placed in the cellar each colony had 30 pounds honey which proved more than sufficient for the winter and all the hives wintered successfully.

They were placed on the summer stands on 30th April and commenced to work at once on native willows.

One hive was forwarded to the Indian Head Experimental Farm and the other four were worked through the season for extracted honey.

TO PREVENT EXCESSIVE SWARMING.

As some difficulty was experienced in 1896 with persistent swarming and a resulting weakness of the colonies, special efforts were made to prevent this by giving plenty of room; on 6th July most of the brood frames were filled with bees and a very large upper story 14 x 20 and 15 inches deep filled with wired foundations and without a queen excluder was added, and the frames extracted as required, this gave an abundance of room and no swarming whatever occurred and all the colonies became very strong before fall.

An average of forty-five pounds of extracted honey was taken from each hive which was readily sold at 10c. per pound wholesale.

BEES.

Following is a list of plants, trees and shrubs, on the flowers of which the bees were seen working during the summer, together with dates when first noticed. Gum Weed (Grindelia squarrosa), a native plant, apparently yielding the largest amount of honey :—

Date.	Botanical Name.	Common Name.
May 1	Salix discolor	Native Willow.
" 12	Amelanchier alnifolia	Saskatoon.
" 12	Prunus Americana	Native Plum.
" 15	Negundo aceroides	Ash Leaf Maple.
" 20	Caragana arborescens	Siberian Pea Tree.
" 22	Prunus Pensylvanica	Pin Cherry.
" 25	Ribes rubrum, etc.	Red Currants.
" 26	Ribes aureum	Yellow Flowering Currant.
" 26	Caragana pendula	Weeping Pea Tree.
" 27	Caragana mollis glabra	Woolly Pea Tree.
June 1	Asparagus officinalis	Garden Asparagus.
" 1	Syringa Josikea	Josika's Lilac.
" 1	Prunus pumila	Ground Cherry.
" 1	Lonicera splendens	Honeysuckle.
" 3	Populus tremuloides	Aspen-leaved Poplar.
" 5	Lonicera gracilis	Graceful Honeysuckle.
" 9	Lonicera Tatarica	Tartarian "
" 12	Rheum hybridum	Rhubarb.
" 22	Rosa blanda	Native Rose.
" 23	Rubus	Raspberry.
" 25	Vicia villosa	Winter Vetch.
" 25	Trifolium repens	White Dutch Clover.
" 26	Syringa villosa	Downy Lilac.
" 30	Allium cepa	Garden Onion.
July 4	Sinapis alba	White Mustard.
" 6	Dianthus caryophyllus	Pinks.
" 6	Trifolium hybridum	Alsike Clover.
" 9	Melilotus alba	Bokhara Clover.
" 10	Reseda odorata	Mignonette.
" 15	Spiraea salicifolia	Willow-leaved Meadow Sweet.
" 17	Trifolium pratense	Common Clover.
" 18	Satureja hortensis	Summer Savory.
" 20	Papaver (all types)	Garden Poppies.
" 20	Rosa rugosa	Japan Rose.
" 28	Grindelia squarrosa	Gum Weed.
" 30	Borago officinalis	Borage.
" 30	Cucumis sativus	Cucumber.
" 31	Tropæolum minor	Dwarf Nasturtium.
Aug. 4	Raphanus sativus	Radish.
" 4	Linum perenne	Blue Flax.
" 11	Ænothera biennis	Evening Primrose
" 12	Cucurbita Pepo	Squash.
" 12	Helianthus giganteus	Wild Sunflower.
" 13	Antirrhinum majus nanum	Snapdragon.
" 14	Salpiglossis variabilis.	Beauty of Bolivia.
" 14	Solidago rigida	Golden Rod.
.....	" Canadensis	"
.....	" Missouriensis, and others	"
Aug. 14	Liatris	
" 14	Epilobium angustifolium	Great Willow Herb.
" 14	Aster Lindleyanus, and others	Native Asters.
" 19	Verbena hybrida	Garden Verbenas.
" 19	Helichrysum monstrosum	Everlasting Flower.
" 19	Zinnia elegans	Garden Zinnia.
" 19	Dahlias	Garden Flower.
" 19	Phlox Drummondii	Drummond's Phlox.
" 19	Hollyhocks	Garden Flower.
" 19	Mentha Canadensis	Wild Mint.
" 19	Monarda fistulosa	Wild Bergamot.
" 19	Portulaca grandiflora	Garden Portulaca.
" 20	Gaillardia Lorenziana	Double Gaillardia.

From the experience gained in keeping bees for ten seasons in this country, I see no difficulty in keeping them in Manitoba with profit. Bees can be wintered in any fairly dry cellar if sufficiently warm to keep vegetables from freezing, and sufficient plants giving honey can be found near all well watered or wooded sections. The honey obtained from native plants is excellent in quality, and sufficiently plentiful to make the business both pleasant and profitable.

EXPERIMENTS WITH APPLES.

Although a very large number of so-called hardy varieties of apples have been tested here and all have been found too tender for this climate, we still think it is advisable to give any very promising kinds a trial.

Four standard apple trees—two Tonka and two Wealthy—were received from Mr. A. P. Stevenson, Nelson, Manitoba, in the spring of 1896. These were grafts of trees that have become acclimatized at the low altitude in which Nelson is situated, namely, 900 feet above sea level. They have so far proven hardy, and we trust that coming from this source, they may succeed even at this altitude—1,231 feet.

PYRUS BACCATA—WILD CRAB OF SIBERIA.

Specimens of this tree were sent here from the Central Experimental Farm at Ottawa in 1890, and they have proved perfectly hardy; additional varieties from the same source have been added from time to time, until at this date we have a very promising collection; the oldest trees, which are Pyrus Baccata-aurantiaca, produce a fair amount of fruit each season, and are found to be most useful for the making of jelly, the fruit being rich in pectin.

The number of trees in this block were increased last year by 100 very fine seedlings —25 Pyrus Prunifolia and 75 Pyrus Baccata Yellow. These were raised at the Central Experimental Farm, Ottawa, from selected seed, and many of them are expected to produce larger fruit than the varieties already fruited here.

The Yellow Siberian crab apple seedlings give great promise of future usefulness, 48 of which were raised from seed in 1893 are now vigorous trees, and, although growing in the open valley, have successfully stood the severity of four winters.

Many seedlings of the Transcendent Crab have been raised here this season from Manitoba grown seed, the fruit having been raised by Mr. A. P. Stevenson, of Nelson. These will be carefully transplanted in the spring, and we think that with trees from this source greater success may be had.

PLUMS.

In the spring of 1896, 72 trees of 36 varieties of improved native kinds were received from Charles Luedloff, Carver, Minnesota. Having been grown so near to Manitoba, it was hoped that these would all prove hardy here. They were all root grafts and the hardiest sorts have made a fine growth, and have wintered well while others have been killed to the ground by frost and are at present growing from below the graft. A list is given below with notes on their present condition.

PLUMS—Test of Varieties.

Name of Variety.	Number planted.	Number alive.	Number dead.	Remarks.
New Ulm	2	2		Healthy growth.
De Soto	2	2		
Clinton	2	2		Killed to ground, growing below graft.
Deep Creek	2	2		" " " "
Neill's	2	2		Slightly killed, healthy growth.
Van Buren	2	2		Half hardy "
Easter	2	2		Killed to snow line.
Missouri Apricot	2	2		" "
Gaylord	2	2		Slightly killed back.
Ocheeda	2	2		Killed to near ground.
Silas Wilson	2	2		Slightly winter-killed.
Irene	2	1	1	Killed to ground.
Weaver	2	2		Apparently hardy.
American Eagle	2	2		Killed to snow line.
Forest Rose	2	2		" near ground.
Emerson	2	2		" "
Hammer	2	2		" "
Illinois Ironclad	2	2		" "
Chas. Downing	2	2		" "
Van Deman	2	2		Slightly killed back.
Crescent City	2	1	1	Killed to snow line.
Wood	2	2		Slightly killed back.
Large Red Sweet	2	1	1	Killed to snow line.
Speer	2	1	1	Apparently hardy.
Dunlop Nut	2	2		" "
Colorado Queen	2	2		Killed to snow line.
Peffer's Premium	2	2		Apparently hardy, some bloom.
Cheney	2	2		" " "
Purple Yosemite	2	2		" " "
Cottrell	2	2		Apparently hardy.
Milton	2	2		Killed to snow line.
Yellow Sweet	2	2		Apparently hardy.
City	2	2		Killed to snow line.
Col. Wilder	2	2		" "
Richland	2	2		Slightly killed back.
Dr. Dennis	2	2		Killed back half.

The seedlings of Weaver, De Soto, Cheney, Voronesh 102, and Speer sent from the Central Farm which have now been growing here for three years, came through last winter in good condition, many of them blossoming for the first time, but owing to late spring frosts the fruit did not form.

A large consignment of seedlings of Cheney, Hungarian, Yosemite Yellow, Voronesh, Ida, Rollingston, Weaver, De Soto, Van Buren, Wolf, Yosemite Purple, Speer and American were received from the Central Experimental Farm, Ottawa, this spring. They arrived here in good condition and specimens of all were planted in permanent orchards.

The remainder were planted in nursery rows where they will be available for distribution for test in other parts of the province. With few exceptions they have become established and made healthy growth.

The native Manitoba plum, however is the variety on which our hopes are chiefly centered as a hardy sort for this province, and some of them transplanted from the river banks have already fruited here.

Many thousand trees have been raised from seeds of selected fruit from different parts of this province, and when these arrive at the fruiting stage, the work of selecting the best will be most interesting. Scions have been taken from the more promising types of those that have already borne fruit so that propagation by grafting may be accomplished.

CHERRIES.

With regard to the above fruit some attention has been given of late to the improvement of one of the native cherries, known as the Sand Cherry, *Prunus pumila*. Three varieties of wild cherries grow here, the pin cherry (Prunus Pennsylvanica), a verry small red cherry, very acid but which makes a good jelly. The choke cherry (P. Virginiana) somewhat larger but astringent and bitter. These latter do not appear to vary in character and hence much improvement by selection cannot be looked for. With the Sand Cherry, however, the variation is remarkable, almost every bush showing some distinct characteristics in size or quality from the small useless bitter sort scarcely eatable to a large pleasant eating cherry with very little astringency or bitterness. Several varieties of extra promise have been named and are being propagated as rapidly as possible.

In 1895 there were sent from the Central Experimental Farm 5 seedlings each of the following cultivated varieties: Bessarabian, Olivet; Montmorency, Carnation; Red Morella, and Wragg. These were planted under shelter of a thick hedge.

The seedlings of the first three named have so far proved hardy and grow from the tips each spring, seedlings of Carnation freeze back slightly each year and those from Wragg and Red Morella winter kill to near the ground.

RASPBERRIES.

The past season has more than ever shown the desirability of protecting raspberries during winter. Those lifted from their winter covering on 5th May were in splendid condition alive to the tips while a block of bushes which was purposely left unprotected was killed back to half the length of the canes.

The yield of fruit this year did not reach the average. All the varieties set a fair quantity and a large yield was expected, but prolonged dry weather in July followed as it invariably is by red spider greatly lessened the yield, but in the latter part of the season copious showers exterminated the red spider and revived the plants, so that a fair amount of late fruit was gathered. The new canes also made a vigorous growth and have been laid down this winter in fine condition.

Following is a list of new varieties which have become established, but have not yet fruited:—

Miller,	Palmer,	Kenyons Seedling,
London,	Kansas,	Gregg.
Parnell,	Niagara,	Heebner.
		Garfield.

Two varieties of blackberries, Agawam and Snyder, also are thus far promising as to hardiness.

CURRANTS.

This season currants of all kinds were more or less adversely affected by protracted spring frosts and dry weather, but notwithstanding this a very fair crop was harvested, and much valuable data was gathered respecting the frost and drought resisting capabilities of the many varieties undergoing test.

With the varieties of black currants previously reported on the Climax one of the new seedlings from the Central Farm and the Prince of Wales gave the best results. The Lee's Prolific and Black Champion (the standard varieties hitherto) are hard to

beat for a avourable season, but they have not the frost and drought resisting powers of some of the newer kinds, especially the two above mentioned.

With the Red Currants, Red Grape gave the best results; this variety and the Raby Castle can be confidently recommended. They are vigorous growers and produce large crops of fine flavoured fruit.

With the White Currants the White Grape has not yet been superseded.

The following varieties fruited here for the first time this season :—

Variety.	Flavour.	Colour.	Size.	Earliness.	Productiveness.	Growth.
Ethel	Good	Black	Large	Late	Good	Vigorous.
Charmer	Acid	"	Small	Early	Poor	Not thrifty.
Perry	Poor	"	"	Medium	"	Fairly healthy.
Monarch	Very good	"	Large	Late	Good	Vigorous.
Standard	Good	"	Medium	Early	"	Very vigorous.
Climax	Excellent	"	Large	Very early	Very good	Very healthy.
Eagle	Woody	"	Small	Late	Poor	Fairly "
Ontario	Sweet	"	"	Medium	Fair	Healthy.
Beauty	Excellent	"	Very large	Late	Good	Vigorous.
Clipper	Sour	"	Medium	Early	Fair	"
Winona	Very good	"	Large	Late	Good	Very healthy.
Sterling	Sweet	"	Small	Early	Fair	Fairly "
Parker	Acid	"	Medium	"	Poor	Vigorous.

GOOSEBERRIES.

Six each of ten new varieties of gooseberries were received this spring. They arrived in good condition and most of them have made fine healthy growth. They will be reported on more fully when they have fruited here.

The five Manitoba sand hill gooseberries mentioned on page 355 of last year's report, have been increased largely by cuttings. Specimens will be planted in pemanent positions next season, we hope this may prove a valuable addition to the list of Manitoba fruits.

NOTES ON THE ARBORETUM.

This plantation of trees and shrubs improves in appearence every year and each season some objects of beauty are added.

The whole of the Arboretum was sown with grass seed in the fall of 1896, and has this year formed a fairly good sod; this adds greatly to the beauty of the appearance of the plantation. Circles sufficiently large to allow of root developement have been cut in the grass around each specimen, and the surface soil is kept cultivated and free from weeds so as to give favourable conditions for further growth and developement.

There is now in this plantation a succession of bloom during the growing season which makes this part of the farm most interesting and attractive.

Following are notes taken of some of the ornamental shrubs in this block in continuation of the list given on page 363 of last year's report.

BUFFALO BERRY (*Sheperdia argentea*).—A native shrub, useful as well as ornamental. The flowers are inconspicuous and the shrubs diæcious, that is, the male flowers are produced on one specimen and the female flowers on another. The pistillate trees bear a

red acid fruit, useful for jellies. Shrubs nine years old are now ten feet high and five feet in spread of branches; flowers early in May.

ALBERT HONEYSUCKLE (*Lonicera Alberti*).—This beautiful floriferous shrub is worthy of all praise, but is not well enough known. Its pendulous branches, with its striped-leaved foliage and clusters of showy violet flowers of pleasing perfume, make it unique and very desirable. Height, 2 feet 6 inches; in full bloom on 4th June; readily propagated by layers or cuttings.

COMMON BARBERRY (*Berberis vulgaris*).—This is not thoroughly hardy, but is apparently becoming more so each year. Seed was gathered from it in 1896 and sown last spring, and many vigorous young seedlings are the result. It is expected that this second generation will withstand our winters. In bloom 7th June; pretty wax-like yellow flowers, succeeded by bright red berries in drooping clusters. They are acid and are said to be useful for jelly. One bush, nine years planted, is now five feet high; may be increased either by cuttings or seed

RUSSIAN SOUTHERNWOOD (*Artemisia abrotanum Tobolskianum*) is an importation from Siberia. Its maximum height is about seven feet, and serves a very useful purpose where a rapid growing wind-break and snow collector is wanted on the open and often bleak prairies as a shelter for more valuable and less hardy trees. Cuttings seldom fail to strike. Too much stress cannot be placed on the necessity of clipping at least twice in the growing season; for, if allowed to ripen, their seed (which are produced on a terminal spike) they will scatter and grow and may become a nuisance. This shrub is recommended for hedges on high bleak plains.

OLD MAN (*Artemisia abrotanum*) is an English form of the above; has a much sweeter scent; it only attains the height of 1½ to 2 feet; useful for a lawn or flower garden.

PURPLE CYTISUS (*Cytisus purpurea*).—A delicate free blooming little shrub, which, with slight winter protection, has proved hardy. In bloom 5th June; produces pretty pea-shaped purple flowers; grows readily from seed.

NATIVE HONEYSUCKLE (*Lonicera glauca var. Sulivanti*) is in flower on 25th June; a pretty, trumpet flowered, woody twiner, with rich, red, sweet-scented blossoms; they are found native in the shady ravines and bluffs of the country; should be grown in shade of a wall.

VIRGINIAN CREEPER (*Ampelopsis quinquefolia*).—This is indigenous to Manitoba, and is an ornamental climber of much merit, which thrives well and is perfectly hardy. This, when well rooted, soon covers a house with its rich foliage; is propagated quickly by cuttings. The flowers are inconspicuous.

WHITE VIRGIN'S BOWER (*Clematis flammula*).—Another pretty climber, which is very showy when in bloom, and is a desirable acquisition for the verandah or trellis. In full bloom in August. The roots of this clematis are hardy, but the stem dies back each year to the ground. It makes a rapid growth during the summer.

NEW FOREST TREES AND ORNAMENTAL SHRUBS.

The consignment of trees received from the Central Experimental Farm, Ottawa, in 1896, have now been tested for one winter and two summers.

Many of them have proven hardy and will increase the collection of hardy varieties materially. The more tender ones will be useful as specimens, the roots in many cases being perennial and the shoots making each season a good growth.

The Elders and Clematis coming under this category, after they have had the test of another winter, fuller particulars will be given regarding their hardiness and usefulness for this climate.

FOREST TREE SHELTER BELT.

Notwithstanding the dry season the forest tree shelter belt has made good progress, the trees having made a small but healthy growth. This belt has now become very dense, and with the accumulation of the leaves of several years' growth, to act as a natural mulch, the evaporation is reduced to a minimum.

Work in keeping down weeds by cultivation has been unnecessary in this block for the last two years, and it is now kept up without expense, except for occasional thinning.

In continuation of last year's report, descriptions are given of some of the most useful trees in this belt with average heights and spread of branches in the following notes:

Green Ash (Fraxinus viridis).—This is a native tree and grows readily from seed. It is not, however, a popular tree on account of the lateness of leafing in the spring and its slow growth.

Measurement of an average 9-year old tree was 2½ inches in diameter, 1 foot from the ground, and 10 feet high, the wood is valuable both for fuel and manufacturing purposes.

Balm of Gilead (Populus balsamifera).—This native tree is deserving of praise, it is a rapid grower attaining a large size and although the wood is not specially useful for lumber it makes fair firewood and is a desirable shade tree. An average tree (9 years old) measures 16 feet high, 12 feet spread of branches with a trunk 4 inches in diameter, 1 foot from the ground.

Native Aspen (Populus tremuloides).—This tree is found common in all parts of this province. The prairie fires are its greatest enemy; in tracts of country protected from fire for a few years, little bluffs grow up in profusion. It is the wood used almost exclusively for fuel in Manitoba and is excellent for that purpose, it is not specially desirable as a shade tree.

The measurements of a 9-year old tree are as follows:—16 feet high with 5 feet spread of branches and a trunk 4 inches in diameter at the base. This poplar can be propagated from cuttings.

Mossy-cup Oak (Quercus macrocarpa).—This is the native scrub oak. The maximum height of this tree is about 40 feet.

Its knarled trunk and brittle wood reduces its value for manufacturing purposes, but it is much valued as fuel. It is a very slow grower, average specimens grown from seed were measured at 8 years old and were 3 feet high with a trunk 1½ inches in diameter. Propagation is not difficult from the acorn.

White Willow (Salix Alba).—This was sent from the Central Farm in 1890. It has done remarkably well here, grows naturally in tree form to a large size. Its capability to withstand a bleak exposure makes it highly desirable for general culture. Height 20 feet, spread of branches 13 feet, diameter of trunk 6 inches, tree measured was 8 years old.

American Larch (Larix Americana).—This is indigenous to the province and is much sought after for fuel. It seems to thrive equally well on the upland prairie as in the lower valley lands, although it is usually found in the swamps in the vicinity of the sand hills, where young seedlings can be procured in abundance. A specimen planted 8 years ago now measures 10 feet high, 4 feet in spread of branches, with a trunk 4 inches in diameter 1 foot from the ground.

HEDGES.

The use and beauty of a well trimmed hedge is becoming more and more acknowledged each season, also the value of untrimmed or partially trimmed hedge inclosures for shelter, and many inquiries are made as to the varieties of trees and shrubs best adapted for these purposes.

As we now have growing on the farm many sample hedges of 50 feet each or more in length and several miles of hedge inclosures of various kinds planted in different ways we are able to give from experience some information on this question.

Test hedges to afford shelter for large inclosures were planted in 1890 at different distances apart in double and single rows to gain information as to the best method. So far our experience leads us to prefer the single rows, planted 18 inches apart.

Two year old trees should be used, those if kept clipped back for a year or two to encourage a good bottom growth make a very dense and attractive hedge.

The white spruce, cottonwood, ash-leaved maple, bereolensis poplar and sharp-leaved willow hedges planted in 1890 have made very fine growth and are much admired by the visiting public.

Appended is a list of hedges with date of planting and other particulars.

Name of Variety.	When planted.	Remarks.
Green Ash (Fraxinus viridis)	1890	A slow growing hedge; coming into leaf late in season.
Hawthorn (Cratægus coccinea var Sullivanti)	1897	Very slow growing.
White Spruce (Picea alba)	1893	One of the best hedge trees for this province.
Yellow Flowering Currant (Ribes aureum)	1897	Ornamental; not dense.
Ash-leaved Maple (Acer negundo)	1890	A splendid wind-break; loses its leaves early in the fall; readily grown.
Spiræa Opulifolia	1894	Ornamental; a good collector of snow.
" " aurea	1894	" " " "
Native Aspen (Populus tremuloides)	1894	Fair wind-break; difficult to transplant.
Choke Cherry (Prunus pennslyvanica)	1894	Ornamental; a good shelter hedge.
Hazel Nut (Corylus Americana)	1894	Not a good hedge, too open.
Saskatoon (Amelanchier alnifolia)	1894	So far not promising.
Native Rose (Rosa Blanda)	1894	A pretty low dense hedge for ornamental purposes
Native Meadow Sweet (Spiræa salicifolia)	1894	A beautiful little two-foot hedge useful for flower garden.
Snowberry (Symphoricarpus racemosus)	1894	A low ornamental hedge; suckers badly.
Bush Honeysuckle (Lonicera tatarica)	1897	A good wind-break and ornamental.
Cotoneaster vulgaris	1897	Hardy and ornamental.
Siberian Pea Tree (Caragana arborescens)	1893	A most useful and ornamental wind-break.
Red-leaved Rose (Rosa rubrifolia)	1897	A quick grower; suitable for lawn.
Yellow Willow (Salix aurea)	1894	Ornamental in winter; a fine snow collector and wind-break.
Wild Plum (Prunus Americana)	1897	A promising hedge.
French Laurel Willow (Salix)	1897	Liable to sun-scald.
European " (Salix laurifolia)	1897	Much admired; a useful wind-break.
Cottonwood (Populus monilifera)	1890	An attractive, fast-growing hedge.
Siberian Southernwood (Artemisia abrotanum var Tobolskianum)	1895	The quickest growing hedge; if kept clipped is almost evergreen.
Rosemary-leaved Willow (Salix rosmarinifolia)	1897	Not sufficiently tested.
Salix Britzensis	1896	Makes a fair wind-break.
Caragana Mollis glabra	1895	A low hedge; useful for lawn.
Breaking buckthorn (Rhamnus frangula)	1897	Ornamental.
Asiatic Maple (Acer ginnala)	1893	A low hedge; very pretty in fall, turning to a deep crimson.
American White Elm (Ulmus Americanus)	1891	A good wind-break; dense hedge.
Wolf Willow (Eleagnus argentea)	1894	A low hedge, with pretty silvery foliage; suckers badly.
Red Osier Dogwood (Cornus stolonifera)	1894	A native; makes a useful and ornamental hedge.
Common Lilac (Syringa vulgaris)	1894	A good hedge plant for ornament or shelter.
Old Man (Artemisia abrotanum)	1893	A low, sweet-scented, ornamental hedge easily propagated.
Populus Bereolensis	1890	A very fine hedge; suitable for high ground; retains its leaves late in the season.

SPRAYING FOR INSECT PESTS.

We have had an unusual visitation during the past season from insects of the Aphis family, this may probably be attributed to the climatic conditions of the season, different forms of these plant lice have attacked the Maples, Willows, Currants and other shrubs and trees. The pest was kept in subjection by the use of refuse tobacco soaked in water and the liquid applied with a spray pump; 6 pounds of tobacco was steeped for 6 hours in boiling water, then diluted with 25 gallons of water; each large maple tree required $1\frac{1}{4}$ gallon of the liquid at each spraying, from one to two sprayings each season was found sufficient.

NOTES ON TREE SEEDS

Last fall many tree seeds such as plums, crab-apples and cherries were saved and were placed in boxes with alternate layers of sand. These were placed in a position where they were exposed to the action of frost and were found to be in excellent condition for planting in the spring, most of the hard shell pits having burst. These were sown as soon as the ground was in condition and some thousands of flourishing young seedlings are the result.

The advantage of sowing tree seeds on summer-fallow was well demonstrated this season. Two plots of Caragana seed being sown on 25th April. Plot one was summer-fallow, Plot 2 was spring ploughing, harrowed and rolled the same day as it was ploughed.

On the 18th May the seeds in Plot No. 1 had germinated and were well out of their seed leaf stage; on the other hand not one plant could be found in Plot No. 2; in fact they did not germinate until after heavy showers in the late summer. After the growing season trees on both plots were counted and measured, there were 25 per cent more plants on the summer-fallow and they were one foot higher and more vigorous.

FOREST TREE DISTRIBUTON.

Number of packages, trees distributed	906
" reports received	81
" received in good condition	74
" " in fair condition	2
" " in poor condition	5
" had good success	71
" had fair success	10
" failures	0

MAPLE SEED DISTRIBUTION.

Number of packages sent	385
" reports received	99
" very successful	58
" fairly successful	30
" failures	11

EXTRACTS FROM A FEW OF THE REPORTS ON FOREST TREE DISTRIBUTION, 1896.

Henry Smith, Chumah.—All made good growth, willows especially.

John M. Scott, Winnipeg.—All received from you made good growth.

D. D. Buchanan, Winnipeg.—Have distributed cuttings from plants sent me in 1895.

Rev. G. C. Hill, Boissevain.—All shrubs have grown splendidly.

A. Lawrence, Miami.—Received in first-class condition and have made good growth.

A. Laughlin, Cartwright.—Received in good condition. Had been put up with much greater care than some received from nurseries.

Wm. Allison, Burnbank.— Received in good condition, all I got are alive.

H. B. Perris, Fort Rouge.—Willows have made remarkable growth. Others nearly as good.

J. W. Irwin, Emerson.—Received in good condition, all plants lived.

Charles Cannon, Belmont.—Received in excellent condition. All growing but 3.

E. Pitman, Shrubland.—All did well, especially elm.

Wm. Hood, Sidney.—Received in good condition. All growing.

D. W. McDiarmid, Winnipeg.—I think there is no question, that the shrubs and trees coming from you, have given the best general satisfaction.

THE VEGETABLE GARDEN.

The past season was in many respects unfavourable for the successful production of vegetables. The spring opened propitiously, the garden being ready for the seed-drill about the middle of April, and we anticipated a long growing season. As soon as the seedlings were above ground, however, we experienced high winds, which, carrying the soil with them seriously cut the young plants, and left them an easy prey to the severe frosts in May and early June. Several varieties had to be re-sown, including carrots, beans, turnips and radishes, which threw those vegetables back considerably. We were partially compensated by the open fall, which allowed many varieties to attain maturity, which otherwise would not have done so, and the late crops, such as cabbage, cauliflower, beets, turnips, &c., were fully up to their usual standard of excellence. Following will be found a summary of the work done in this department, the main portion of which was devoted to testing as fully as possible the following ; pease, beans and squash.

PEASE.

Sixty varieties of this vegetable were sown, and all germinated with two exceptions, viz., "Anticipation" and "Laxton's Prolific Long Pod." During the early part of the season they suffered severely from drought, high winds and frost, being repeatedly cut back by the latter, and it appeared for a time that re-sowing would become imperative. On the approach of better weather, however, they rallied, and beyond being later than usual, in maturing, gave no cause for complaint, the yield and flavour being fully up to the average. All varieties ripened their seed, and enough of each was saved for samples, which will make an interesting addition to our sample-room. Following will be found arranged in tabular form the result of this test, together with a few notes on the more meritorious varieties. Sown with drill in rows 3 feet apart on 29th April.

PEASE.

Name of Variety.	Ready.	Ratio of Productiveness.	No. of Pease in Pod.	Length of Pod.	Length of Vine.	Character of Pea.
				Inches.	Inches.	
Philadelphia	July 8	7	5—6	2¼	24	Smooth.
French Canner	" 16	8	8—9	3⅛	30	"
American Wonder	" 17	8	5—6	2½	9	Wrinkled.
Blue Peter	" 18	12	4—5	2½	12	"
Ferry's First and Best	" 5	7	5—6	2¼	28	Smooth.
McLean's Little Gem	" 17	7	6—7	2¾	14	Wrinkled.
Long Island Mammoth	" 14	8	7—8	3¾	48	"
Hair's Dwarf Mammoth	" 30	11	7—8	3	24	"
Blue Beauty	" 8	9	6—7	2½	18	Smooth.
Horsford's Market Garden	" 20	10	9—10	4	24	Wrinkled.
Burpee's Profusion	" 24	15	6—7	3	24	"
John Bull	Aug. 1	12	8—9	4¼	24	"
Station	July 14	16	6—7	2½	14	"
Scorcher	" 1	6	4—5	2	18	Smooth.
Maud S	" 5	3	4—5	2	16	"
Exonion	" 12	10	5—6	2½	24	Wrinkled.
Rural New Yorker	" 7	8	5—6	2¼	22	Smooth.
Improved Alpha	" 16	7	4—5	2¼	14	Wrinkled.
Tom Thumb	" 12	12	6—7	2½	17	Round.
Lightning	" 8	6	4—5	2¼	28	Smooth.
Alaska	" 10	5	4—5	2	14	"
Admiral	" 18	5	7—8	2½	36	Wrinkled.
Chelsea	" 8	10	5—6	3	12	"
Carter's First Crop	" 12	10	5—6	2¼	15	Smooth.
Extra Early Tom Thumb	" 10	5	6—7	2¼	8	Round.
Kentish Invicta	" 14	7	6—7	2½	30	Smooth.
Wm. Hurst	" 14	9	5—6	2¾	10	Wrinkled.
Premium Gem	" 10	8	5—6	2½	12	"
Heroine	" 26	10	9—10	4⅛	26	"
Rennie's New Queen	" 24	12	8—9	4¼	30	"
Improved Forty-Fold	" 20	15	7—8	3¾	48	"
Stanley	" 22	10	8—9	4	24	"
Abundance	" 20	10	6—7	2⅛	18	"
Nott's Excelsior	" 12	8	5—6	2½	9	"
Pride of the Market	" 20	8	8—9	3½	18	Smooth.
Dr. McLean	" 24	9	8—9	3¾	24	Wrinkled.
Daisy	" 23	9	8—9	3¾	18	"
Bliss' Everbearing	" 22	11	5—6	3	24	"
McLean's Advancer	" 20	12	6—7	2¾	24	"
Juno	" 26	10	7—8	4	24	"
Improved Stratagem	" 21	9	7—8	4¼	18	"
Telephone	" 19	10	6—7	4	36	"
Improved Fillbasket	" 21	10	8—9	4	26	Smooth.
Large White Marrowfat	" 20	13	6—7	3¾	48	"
Paragon	" 24	8	6—7	3½	24	Wrinkled.
Black Eyed Marrowfat	" 22	15	7—8	3⅛	48	Smooth.
Duke of Albany	" 18	10	7—8	4	36	Wrinkled.
Laxton's Supreme	" 21	10	7—8	3¾	36	Smooth.
Telegraph	" 23	10	7—8	4	36	Wrinkled.
Sander's Marrow	" 24	12	8—9	4¼	18	"
Champion of England	" 22	13	7—8	3¾	48	"
Duke of York	" 22	8	9—10	4	36	"
Shropshire Hero	" 26	10	7—8	4	16	"
New Victory	" 26	12	7—8	4	36	"
Melting Sugar	" 14	12	7—8	4	36	Smooth.
Tall Scimitar	" 16	12	7—8	4	36	"
Crossbred, N. Q. 5	" 20	10	6—7	3	12	Wrinkled.
Crossbred N. A. 5	" 8	10	6—7	3	12	"

The following varieties are worthy of special mention :—

Chelsea. —Extra long pods, well filled with pease of fine flavour, and very productive for an early variety. Certainly an improvement on American Wonder, being earlier, more productive and of just as good flavour as that variety.

Wm. Hurst.—An early variety, of excellent flavour and very productive. This should rank as a first-class early pea.

French Canner.—A very productive variety, and, as its name implies, is a typical canner. The pods are long and gracefully formed and well filled. A fine sort for the market gardener.

Improved Forty-Fold.—One of the best main crop pease tested. Very productive and of excellent flavour.

Sander's Marrow.—The finest flavoured pea grown this season. Individual pease exceptionally large and sweet. A high class variety.

BEANS.

Forty-seven varieties of beans were sown on 20th May, and all germinated well. On the morning of June 4th the thermometer registered several degrees of frost, and in consequence this sowing was completely eradicated. A second sowing was made on 7th June, and, as in some instances all the seed had been sown on the first occasion, the list of available varieties was reduced to 43. Notwithstanding this drawback, all varieties did fairly well, and many of them ripened their seed. Below is given, in tabular form, the result of this test, coupled with some short notes on those kinds deemed worthy of special mention. Sown with Planet Junr. hand drill in rows 30 inches apart, and afterwards thinned to 6 inches apart in the row.

BEANS.

Name of Variety.	Ready.	No. of Beans in Pod.	Productiveness.	Length of Pod.	Colour.	Flavour.
				In.		
Yellow 6 weeks	Aug. 18	6	Fairly productive.	5½	Light green	Fair.
Detroit Wax	" 11	4	" "	4½	Dark yellow	Good.
Boston Favorite	" 22	4	Very "	6	Dark green	Very good.
Refugee, or 1000 to 1	" 30	4	Fairly "	6	Light green	Fair.
New Stringless Green Pod	" 8	5	Very "	5½	"	Good.
Cylinder Ivory Pod	" 7	5	" "	5	Dark yellow	"
Wilson's Golden Eye	" 20	5	Fairly "	3½	Green	Poor.
Dwarf Triumph	" 12	4	Very "	4½	"	Good.
Marvel of Paris	" 17	5	Fairly "	5	"	"
Ne Plus Ultra	" 9	6	Very "	6	"	Very good.
Defiance	" 10	3	Not "	5	"	Good.
Pink Eyed Wax	" 12	4	Fairly "	4½	Light yellow	Fair.
Speckled Wax	" 20	4	" "	5	Dark "	Good.
Blue Podded Butter	" 20	5	Very "	5	Blue	"
Dwarf Lyonaise	" 23	4	" "	6	Dark green	"
Early Giant Wax	" 17	4	" "	6¼	Dark yellow	Very good
Davis' Wax	" 20	4	Fairly "	4½	Green	Fair.
Scarlet Flageolet Wax	" 13	5	Very "	7½	Dark yellow	Very good.
Golden Eyed Wax	" 14	4	Fairly "	4¾	Light "	Good.
Improved Navy	" 20	4	Very "	5	Green	Fair.
Best of All	" 15	4	Fairly "	5¼	"	Good.
California Pea	" 25	4	" "	4	"	Poor.
Early China	" 10	5	Very "	5¾	"	Good.
White Field	" 15	5	" "	4½	"	Fair.
Canadian Wonder	" 10	5	" "	7	Dark yellow	Very good.
Early Golden Wax	" 11	4	Fairly "	4¼	"	"
Mohawk	" 9	5	Very "	5½	Green	"
Saddleback Wax	" 12	5	Fairly "	5	Light yellow	"
Black Eyed Wax	" 12	6	" "	5½	"	"
Dwarf Horticultural	" 10	5	Very "	4¾	Dark green	Fair.
Giant Yosemite Wax	" 12	4	" "	6¼	Light yellow	Very good.
Mexican Prolific Tree	Did not produce fruit.					

BEANS—*Continued.*

Name of Variety.	Ready.	No. of Beans in Pod.	Productiveness.	Length of Pod.	Colour.	Flavour.
				In.		
Nettle Leaved Bagnolet	Aug. 10..	4	Very productive.	6	Green.....	Very good.
White Valentine.....	" 15..	5	Fairly " .	5	Light green...	Fair.
Challenge, Black Wax.....	" 10..	4	Very " .	4	Light yellow..	Good.
Round Podded.....	" 12..	4	" " .	4	Light green...	Fair.
Currie's Rust Proof.....	" 20..	5	" " .	5	Dark yellow..	Good.
White Kidney.....	Did not produce fruit.					
Large White Marrowfat.....	"	"				
Keeney's Rustless Golden.....	Aug. 12..	4	Very " .	4¼	Light yellow..	Good.
Burpee's Bush Lima..... ...	Did not produce fruit.					
Soya Bean..... ..	"	"				
Early, White-seeded Wax.....	Aug. 20..	4	Fairly " .	5	" ..	Fair.

The following varieties are worthy of special mention :—

Boston Favourite.—A green bean, with long pod, and very productive.

Ne Plus Ultra.—An extra early variety, having green, flat, fleshy pods, and exceedingly productive.

Blue Podded Butter.—Rather an oddity in beans. The pods, which are produced abundantly, are of a blush black colour. Flavour good.

Early Giant Wax.—A yellow bean, producing long pods, and very productive. A good variety for general purposes.

Scarlet Flageolet Wax.—A wax bean of large size, and very productive.

Canadian Wonder.—This was undoubtedly the best variety tested this season. Its long, yellow pods, of good flavour, are borne in profusion. An attractive market sort.

Mohawk.—A green podded bean, pods long, flat and straight. Very productive.

Giant Yosemite Wax.—Very large, yellow pods, abundantly produced, of excellent flavour.

Nettle Leaved, Bagnolet.—Straight long green pods. Very productive.

SQUASH AND PUMPKINS.

Fifty varieties of the above were sown on 21st May and germinated well, with four exceptions. viz. : *Mediterranean and Mammoth Whale Squash*, and *Tenessee Sweet Potato* and *White Cushaw Pumpkins.* The protracted spring frosts, cut the young plants badly, but as the seed was sown thickly, all varieties that had germinating power were found to be represented on the approach of settled weather. Owing to the dry season and our inability to irrigate, no heavy weights were recorded, but taking the above drawbacks into consideration, the growth and yield was remarkable, the many curious forms of this variable order proving a source of interest to visitors. The correctness of our previous views, with reference to the special adaptability of the bush forms of squash for this province, was again amply demonstrated, the compact form, and early setting propensities of these varieties making them very desirable. The seeds were sown outside in hills 8 feet apart each way, and the block was surrounded by a double row of corn to act as a windbreak. This precaution proved to be a good one, for it entirely prevented the usual damage occasioned to this class of plants, by the high winds exper-

ienced here. Following arranged in tabular form are the results of this test, together with a few notes on varieties specially suited for this climate.

Name of Variety.	Ready for Use.	Weight.	Colour of Flesh.	Outside Colour.	Shape.	Form.
		Lbs				
Delicata	Sept. 10	15	Light yellow	Green and yellow	Oblong	R.
Orange Marrow	Aug. 20	8	Orange "	Orange	Round, pointed at end	R.
Eureka	Sept. 15	10	Greenish "	Light yellow	Oblong	R.
Red China	" 1	5	Bright "	Orange	Round, flattish	R.
Large Yellow Chili	" 10	20	Orange "	Light yellow	Pumpkin-shaped	R.
Pineapple	Aug. 20	8	White	White	Scalloped	R.
Straight Neck	" 14	6	Light yellow	Orange yellow	Warted	B.
New Egg	" 12	10	Whitish yellow	Deep "	Long	B.
Valparaiso	Sept. 10	10	Greenish "	Light "	Field pumpkin type	R.
Bay State	Aug. 17	6	Dark "	Mottled green	Turban-shaped	R.
Der Wing	" 25	4	Greenish "	White	Warted	R.
*Mammoth Whale						
*Mediterranean						
Green Mountain	Sept. 5	15	Greenish yellow	Dark green	Elongated	R.
†Fordhook						
†Marble-Head						
†Cocoanut						
Italian Striped	Aug. 8	8	Cream yellow	Green and yellow striped	Oblong	B.
†Leonard's Golden Heart						
Sibley or Pike's Peak	Sept. 10	12	Greenish yellow	Slate colour	Oblong	R.
French Olive-shaped	Aug. 20	6	Yellow	Deep yellow	Round	R.
English Vegetable Marrow	" 20	7	Greenish white	Light cream	Oblong	R.
Rennie's Green Mammoth	" 25	60	Green and white marbled	Greenish yellow	"	R.
Golden Bush Scalloped	" 14	6	Light yellow	Deep orange	Scalloped	B.
Early White Bush Scalloped	" 14	6	Whitish	White	"	B.
Golden Custard	" 15	6	"	Deep yellow	"	B.
Cocozelle Bush	" 12	8	Yellowish white	Green and yellow striped	Long	B.
Long White Bush Marrow	" 8	10	White	Creamy white	"	B.
Turban or Turk's Cap	Sept. 10	12	Yellow	Deep orange	Turban	R.
Hubbard	" 18	10	Greenish yellow	" green	Oval	R.
†Perfect Gem						
†Faxon						
Early Crookneck	Aug. 20	6	Yellow	Deep orange	Crooked	B.
White Pineapple	" 14	7	Greenish yellow	White	Scalloped	B.
White Chestnut	Sept. 1	8	Whitish	Very white	Oval	R.
Warted Marrow	Aug. 14	7	Greenish white	White	Warted	R.
†Etampo (P)						
†Calhoun (P)						
Sweet or Sugar (P)	Sept. 1	10	Yellow	Deep yellow	Field pumpkin type	R.
Japanese Pie (P)	" 10	15	Greenish yellow	" green	Twisted	R.
Jumbo (P)	" 15	39	Light "	" yellow	Field pumpkin type	R.
Mammoth Prize (P)	Aug. 20	14	" "	" "	Flattish	R.
Mammoth Tours (P)	" 23	15	Greenish "	Gray	Field pumpkin type	R.
Nantucket or Negro (P)	Sept. 5	10	Light "	Dark	"	R.
Winter Luxury (P)	" 15	18	" "	Netted	"	R.
Large Field (P)	Aug. 25	25	Deep "	Deep orange	"	R.
*White Cushaw (P)						
*Tennessee Sweet Potato (P)						
Golden Oblong (P)	Sept. 10	17	Light yellow	Yellow	Oblong	R.
100 Weight (P)	" 15	15	Yellow	Deep yellow	Field pumpkin type	R.

* Did not germinate. † Did not produce fruit.

N.B.—P=Pumpkin. R. running form B. bush form.

The following is a list of varieties that appear to be specially adapted to this province :—

Long White Bush Marrow.—This variety as usual heads the list. It is of bush form, producing in profusion its long, white and well-flavoured fruit at an early date. Always succeeds here.

Italian Striped Marrow.—A bush variety; fruit long, green, striped with yellow; of fine flavour and very early.

Cocozelle Bush.—Very similar to above.

New Egg Plant.—A very prolific bush form; fruit oblong and of fair flavour; early.

Extra Early Orange Marrow.—A running variety that should do well here. The fruit is very attractive, and fine for pies.

English Vegetable Marrow.—A running form which is highly prized in England. As a vegetable its flavour is delicious; fairly early.

Pumpkin, Sweet or Sugar.—A typical pie variety, of medium size and earliness.

Winter Luxury.—Apparently a good keeper; of good size and quality. When ripe the fruit is beautifully netted, making it very attractive.

List of Varieties specially suitable for

Pies.		Vegetables.	
Orange Marrow	S	Pine Apple	S
Red China	S	New Egg	S
Yellow Chili	S	Italian Striped	S
Bay State	S	English Veg., Marrow	S
Green Mountain	S	Cocozelle Bush	S
Olive shaped	S	Long white Bush Marrow	S
Turban or Turk's Cap	S	Early Bush Scalloped	S
Hubbard	S		
Etampes	P		
Sweet or sugar	P		
Japanesse Pie	P		
Jumbo	P		
Mammoth Prize	P		
Negro	P		
Winter Luxury	P		

N.B.—S. Squash. P. Pumpkin.

CUCUMBERS.

Four varieties of the above were sown outside in hills, on 21st May and three varieties in hotbeds (for inside culture) on 15th April. Although the former were badly cut by the frosts previously mentioned in my report, they eventually recovered and produced a fine crop of fruit. Following are the results:

OUTSIDE SOWING.

Variety.	Ready.	Colour.	Shape.	Flavour.	Weight.	Productiveness.	Length.
White Spine.....	Aug. 13.	Light green...	Short, spiny..	Good.....	9 oz..	Fairly productive.	8 inches..
Cool and Crisp...	" 20.	Dark green...	" " ..	"	8 " ..	" " ..	8 " ....
White Wonder...	" 10.	Creamy white.	" " ..	"	10 " .	Very " ..	8 " ....
Gherkins.....	Sept. 1.	Light green...	Oval, spiny...	"	Small...	Poor.	For pickling

INSIDE SOWING.

White Spine.....	July 3.	Light green...	Short, spiny..	Good.....	5 oz..	Fair.	5 inches..
White Wonder...	" 15.	Creamy white.	" " ..	"	4 " ..	Poor.	4½ " ....
Telegraph.....	" 7.	Dark green...	Long smooth .	Very good	24 " ..	Very.....	18 " ....

The "White Wonder," as a forcing variety, was a failure, while outside, it was the most productive variety, although not generally grown here, it has much to recommend it to market gardeners, viz. :—Earliness, productiveness and excellent flavour, and colour for pickling, it no doubt will soon work its way into public favour. "Telegraph" again demonstrated its superiority as a forcing variety. The "Gherkins" were late.

GARDEN LEMON OR VEGETABLE PEACH.

This was sown 21st May in hills outside, and ripened 10th September. It comes highly recommended from the seedsmen, but did not fulfil expectations. The fruit, when ripe is of the size of a lemon, and similarly coloured, with a centre resembling a miniature musk-melon. Flavour of the flesh (which consists of a very narrow strip), sub-acid and disagreeably perfumed. It is credited with making a fine preserve, but we found it far inferior to the citron in this respect.

TOBACCO.

A sample of tobacco seed was received from the Department of the Interior for testing purposes. Sown in hotbed on 8th April, and transplanted into boxes on 23rd April, and planted outside on 16th June. Following is the result:

Variety.	Harvested.	Height of Plant.	Length of Leaf.	Width of Leaf.
Havana.....	August 17th ...	3 feet.....	22 inches.....	10 inches.

Fearful of frost, which in previous tests have spoilt the leaf, this was harvested before it was properly ripened, although had it been allowed to stand, it would probably have ripened this season on account of the peculiarly open fall. The product was dried as carefully as possible, and a sample has been forwarded to an expert for examination, but has not yet been reported on. The average season does not appear to be long enough for the varieties that have been tested up to the present, to mature. The leaf grown this year would answer for tree spraying purposes, and it might be advisable to grow a small quantity each year, with that end in view.

MISCELLANEOUS VEGETABLES.

Representative varieties of the following vegetables were grown: onions, salsify, lettuce, broad beans, tomatoes, corn, carrots, savory herbs, radishes, celery, cabbage, cauliflower, turnips and beets, but (with the exception of the four latter) did not attain their usual standard. Asparagus of which we have four varieties represented here, was above the average, the cool spring greatly prolonging the production of edible shoots. It is worthy of remark, that in tomatoes, Early Ruby and Earliest of All, again proved themselves specially desirable varieties for Manitoba, the wisdom of severely pruning this vegetable, being also again apparent.

THE FLOWER GARDEN.

It was deemed advisable last season to change the site of the flower garden from the hill-side, to a more level situation in front of the superintendent's house, which has proved to be an advantage, as this location is entirely free from the annual spring wash, which was usually troublesome, in connection with the former site. Twenty varieties of annuals, and about sixty varieties of perennials were planted, and, during the summer, made a very creditable showing. It is pleasing to note the increased interest shown in this branch of work every year, many inquiries being made, especially with regard to the perennial flowers.

The following tabulated list gives particulars showing period of flowering, hardiness, etc., of the different varieties tested :—

ANNUALS.

Variety.	How Sown.	Date Sown.	Date Transplanted.	Planted Out.	Flowering Period.
Salpiglossis variabilis	Boxes in hotbed	April 6	April 19-25	June 9-15	June 20 to frost.
Gaillardia Lorenziana	"	" 6	" 19-25	" 9-15	July 3 "
Phlox Drummondii	"	" 6	" 19-25	" 9-15	" 20 "
Petunias, double	"	" 6	" 19-25	" 9-15	" 15 "
" single	"	" 6	" 19-25	" 9-15	" 12 "
Verbenas, mixed	"	" 6	" 19-25	" 9-15	" 20 "
Asters, mixed types	"	" 6	" 19-25	" 9-15	" 25 "
Antirrhinum, dwarf	"	" 6	" 19-25	" 9-15	" 10 "
Nicotiana affinis	"	" 8	" 19-25	" 9-15	" 1 "
Stocks, mixed types	"	" 6	" 19-25	" 9-15	" 1 "
Zinnia elegans	"	" 6	" 19-25	" 9-15	June 20 "
Marigolds, mixed	Outside	Self sown	Not transplanted		July 1 "
Sweet pease, mixed	"	April 30	"		" 1 "
Nasturtiums, dwarf	"	May 15	"		June 20 "
Candytuft, mixed	"	" 15	"		" 25 "
Larkspur, mixed	"	" 15	"		Aug. 1 "
Poppy, paeony flowered	"	" 15	"		June 25 fo Aug. 5.
" the Shirley	"	" 15	"		" 23 "
Pyrethrum aureum	Boxes in hotbed	April 6	April 19-25	June 9-15	Foliage plant.
Lobelia compacta	"	" 6	" 19-25	" 9-15	June 20 to frost.

Asters, usually so good here, were not a success this season. Nearly all the flowers were blighted and only partially expanded. The trouble was general in this district.

Stocks contained an exceptionally large amount of single flowers this year.

PERENNIALS.

Variety.	When Planted.	Flowering Period.	Hardiness.
Eryngium macrocarpa	1894	July 10 to Aug. 5	Very hardy.
Sedum medenezii	1894	" 1 to July 30	"
Hemerocallis fulva	1894	" 15 to Aug. 25	"
" flava	1894	" 20 to " 10	"
Aconitum Kusmalowi	1894	" 25 to frost	"
" Napellus	1894	Did not flower	Questionable.
Coreopsis lanceolata	1894	June 7 to Aug. 20	Very hardy.
Lychnis Chalcedonica	1893	" 27 to " 7	"
Salvia (variety?)	1894	" 15 to July 10	"
" lavandulifolia	1894	" 20 to " 10	"
Delphinium grandiflorum	1894	July 10 to Aug. 20	"
" Dwarf	1894	" 19 to " 20	"
Campanula Grasseckii	1894	" 25 to " 15	"
Papaver orientale	1894	June 10 to June 30	"
" nudicaule	1894	May 20 to frost	"
Phlox (Perennial)	1894	Aug. 10 "	Fairly hardy.
Pæony Double	1893	June 28 to July 12	Very hardy.
Dictamnus fraxinella	1894	Did not flower	"
Anthemis coronaria	1894	July 5 to frost	"
Veronica salurgoides	1894	" 20 to Aug. 20	"
Gaillardia aristata	1894	June 28 to " 1	"
Linum perenne	1893	" 5 to July 10	"
Aquilegias (in variety)	1893	" 1 to " 25	"
Platycodon grandiflorum	1893	Did not flower	"
" " album	1893	July 20 to Aug. 10	"
Dielytra spectabilis	1893	June 15 to July 10	"
Lilium tigrinum	1893	Aug. 10 to frost	"
Convallaria majalis	1894	Did not flower	"
Grass Pinks	1894	June 23 to Aug. 1	"
Iris Germanica (in variety)	1893	" 18 to July 5	"
" sibirica "	1895	" 13 to June 30	"
" " alba	1894	Did not flower	Unhealthy.
" biglumis	1894	June 24 to July 6	Very hardy.
Thalictrum aquilegifolium	1894	Did not flower	"
Scilla sibirica	1893	May 1 to June 1	"
Tulips (in variety)	1893 to 1897.	" 9 to " 30	"
Dahlias	1894	Aug. 5 to frost	Lifted in fall.
Gladiolus "	1893 to 1897.	" 14 "	"

The following varieties, have only survived one winter, and although very promising, their hardiness cannot as yet be positively stated :—

Name of Variety.	Whether flowered or not.
Lychnis Haageana Hybrid	Flowered.
Hemerocallis Flava fl. pl	"
" Fulva fol. var	"
" Kwanso fl. pl	"
" grandiflora	"
Hesperis matronalis	"
Hollyhocks Lorenz's Prize	"
Polemonium reptans	"
Baptisia australis	Did not flower.
Myosotis palustris	Flowered.
Orobus lathyroides	"
Salvia argentea	Did not flower.
Galega officinalis	Flowered.
" alba	"
Stachys lanata	Did not flower.
Gysophila paniculata	Flowered.
Iberis sempervirens	Did not flower.

Avenue of Box-elder trees, *Acer negundo*, at the Experimental Farm at Brandon, Manitoba, nine years planted.

The following varieties, have only survived one winter, &c.—*Concluded.*

Name of Variety.	Whether flowered or not.
Penstemon murrayanus	Flowered.
Glaucium luteum	"
Asclepias tuberosa	Did not flower.
Stenactis speciosa	Flowered.
Alyssum argenteum	"
Agrostemma coronaria	"
Fragaria indicia	"
Centaurea macrocephala	"
Iberis Gibraltarisa	"
Lychnis Chalcedonica alba	"
Saponaria ocymoides	"

ROSES.

As stated in last year's report, two varieties of roses were alive in the fall of 1896, viz., Mad. Bruant and Gem of the Prairies. The former came through the winter in very poor condition, and did not long survive its removal to permanent location. Gem of the Prairies made vigorous growth and flowered, and from all appearances promises to be a very hardy variety. The colour of the flower is a deep pink, and it is very sweetly scented. Another variety (the identity of which is in doubt) was received from a local grower and came through the winter of 1896 in fine condition without any protection. It flowered from 17th to 25th July, the bud being long, pointed and sweet scented. Twelve varieties were received from the Central Farm this season. These are named in the following list, and their condition described on the approach of winter.

Name of Variety.	Condition, Fall 1897.	Name of Variety.	Condition, Fall 1897.
Madame Geo. Bruant	Vigorous	Merveille de Lyon	Vigorous
" Victor Verdier	"	Marshal P. Wilder	"
" Plantier	"	Baron Prevost	"
" Gabriel Luizet	"	Francois Levet	Weak
Mlle Marie Rady	Weak	Caroline de Sansal	"
Crimson Rambler	"	Lady H. Stewart	Died soon after arrival.

The above were treated in the same manner as raspberry canes, being laid down, and covered with soil for winter protection. The result will be reported on next season.

HYACINTHS.

Last fall a test was made to ascertain if, by covering these bulbs very heavily, they could be brought through our severe winter. A piece of tar paper was first laid over the bed, extending four feet over each side, and on this was piled four feet of fresh manure. The covering was removed in the spring following, and the Hyacinths came up regularly and flowered well. From this it may be inferred that these most desirable bulbs, thus treated, may be grown here successfully.

COLLECTION OF PERENNIAL FLOWERING PLANTS.

A perennial bed has been commenced this fall, in which it is intended to have represented all the varieties of perennial flowers growing on the farm, and among them the best of our native perennials. There are at present 150 species and varieties represented in the collection, and additions will be made from time to time as plants are procurable.

DISTRIBUTION OF SEED GRAIN AND POTATOES.

The distribution of 3-pound samples of grain, etc., was larger this year than usual but owing to the limited supply of grain available we were only able to supply a fraction of the applications for 2-bushel lots of grain.

The following quantities were sent to applicants from this farm in spring:—

Wheat, 2 bushels or more	20
Oats " "	13
Barley " "	32
Pease " "	11
Grain of all kinds in 3-pound bags	357

From these many favourable reports have been received.

DISTRIBUTION OF POTATOES, ETC.

Potatoes in 3-pound bags	210
Maple seed, 1-pound bags	385
Flower seed, packages	488
Rhubarb " "	135
" roots "	130
Vegetable seed "	136
Perennial flowering plants, packages	94

The following reports have been received on the potatoes distributed:

Name of Variety.	No. Received.	No. Reporting Rot.	No. Reporting Scab.	Average Yield in lbs.	No. Reporting favourable.	No. Reporting unfavourable.
Everett	5	0	0	59½	5	0
Early Ohio	6	0	1	36	3	3
Pearce's Extra Early	5	0	1	49½	3	2
Lightning Express	1	0	0	31	1	0
Sharpe's Seedling	5	0	1	34½	4	1
Early Puritan	5	0	2	76	5	0
State of Maine	3	0	0	75	2	1
Daisy	6	1	2	55	4	2
Rural Blush	5	0	0	54½	5	0
Crown Jewel	3	0	1	89	3	0
Pearce's Prize Winner	2	0	1	40	2	0
Northern Spy C.E.F		0	0	92	1	0
Lee's Favourite	2	0	0	42½	1	1
I. X. L	1	0	0	54	1	0
Beauty of Hebron	1	0	0	25	1	0
Early Sunrise	1	0	0	30	0	1

NEW BREAKING.

As mentioned in a former report the grass land in the valley on this farm reserved for pasture has become run out, the ground being occupied mainly by White Anemone, Artemisia and Sunflowers. Each year portions of this part of the farm are being broken up and cropped with the result that much larger returns of hay and pasture have been obtained from the portions cultivated.

During the past summer 37 additional acres were broken up, back set and also well disc-harrowed late in the fall, this has completely broken up the decayed sod and brought the soil into excellent condition, and will probably give good returns next year.

FENCING.

The wire and rail fencing erected in 1889 and 1890 on the outer boundaries of the farm have given good satisfaction, and no heaving of posts has taken place.

During the past season forty-five rods of additional fence has been built across the northern cattle pastures and 220 rods on the Assiniboine River banks at the extreme southern boundary of the farm, this latter fence has enabled us to utilize the 50 acres of pasture in this portion of the farm and the young stock have thriven well on the luxuriant pasture with the good water supply.

NEW BUILDINGS.

During the year a driving shed 72 x 20 feet, to be used for sheltering vehicles and implements has been built, this is open to the west and implements can be readily backed in when not in use.

A room has also been built in the superintendent's house over the office, providing accommodation much needed.

ROADS.

The roads laid out through the experimental farm here have proved very satisfactory, and the gravel has not been much cut up even with the heavy travel of the autumn months, and it is evident that good gravel properly applied is as suitable for rural roads in this province as it is in the east.

Nine hundred and ninety additional feet has been gravelled during the year, this is in addition to the repairs required to the roads already gravelled.

FARMERS' MEETINGS.

Since my last report addresses have been given at seventeen farmers' meetings. Nearly all of these were well attended and much interest taken in the work of the experimental farms

The location and dates of the meetings are given below:—

January	4th,	1897,	Birtle.
"	11th	"	Elkhorn.
"	12th	"	Virden.
"	13th	"	Oak Lake.
"	14th	"	Douglas.
"	16th	"	Pipestone.
"	18th	"	Melita.
"	19th	"	Deloraine.
"	20th	"	Boissevain.
February	6th	"	Brandon.
"	15th	"	Stony Mountain.
"	16th	"	Manitoba Dairy Convention.
"	17th	"	Bird's Hill.
"	17th	"	Kildonan.
"	18th	"	Swine Breeders' Meeting, Winnipeg.
"	20th	"	Rosser.
December	4th	"	Brandon.

VISITORS.

It is evident, from the large increase of visitors each year, that the interest in the work of the farm is not abating.

During the past year 15,700 visited the farm, principally farmers and their families, many coming from distant parts of the province, and spending a day or two inspecting the various crops growing on the farm.

The month of July and the first two weeks in August is the most suitable time for this purpose, as the distinguishing features of the different varieties of grain, grasses, &c., can then be seen to the best advantage, and the trees and shrubs are also in full leaf.

METEOROLOGICAL RECORD.

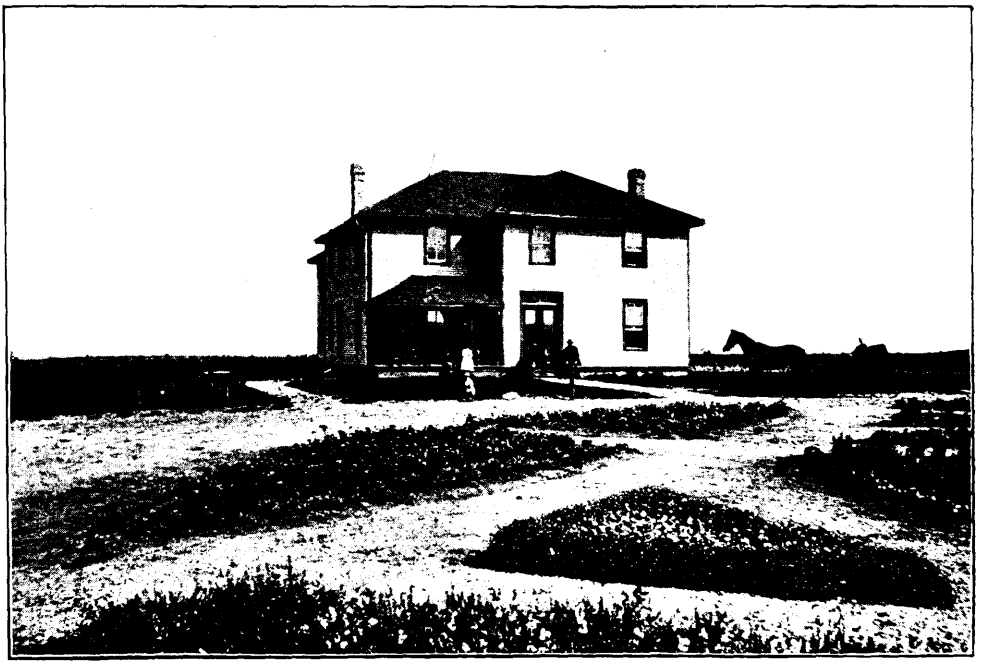
Month.	Highest Temperature.	Lowest Temperature.	Total Rainfall.	Depth of Snowfall.	Total amount of Sunshine.
1896.			Inches.	Inches.	Hrs. Min.
November	30° above zero on 2nd.	40° below zero on 20th.	.....	23¾	62 6
December	39° " 10th.	33° " 1st.	.....	10	71 9
1897.					
January	38° " 8th.	35° " 23rd.	.....	16½	97 7
February	31° " 4th.	39° " 26th.	.....	13½	125 5
March	40° " 31st.	41° " 14th.	.....	12	145 8
April	74° " 17th.	10° above zero on 19th.	1 1/10	.....	153 9
May	92° " 4th.	21° " 31st.	3/10	.....	266
June	100° " 13th.	26° " 5th.	6/10	.....	205 4
July	96° " 28th.	41° " 27th.	1½	.....	230 3
August	96° " 12th.	33° " 30th.	2 3/10	.....	236 3
September	94° " 8th.	25° " 16th.	1 1/10	.....	237 3
October	80° " 6th.	6° " 9th.	1	.....	140 9
	Total, 1897		6½	75½	1,968 6
	" 1896		14 9/10	65¼	1,951 18

CORRESPONDENCE.

The correspondence from this office shows an increase each year, there were 2,900 letters received during the year and 3,060 despatched, this is irrespective of 1,558 circulars sent out.

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

S. A. BEDFORD, *Superintendent.*



Appearance of grounds surrounding house of Superintendent, Experimental Farm, Indian Head, N.W T., first year after building.

Appearance of grounds surrounding house of Superintendent, Experimental Farm, Indian Head, N.W.T., seven years after planting

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

REPORT OF ANGUS MACKAY, SUPERINTENDENT.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.,
31st October, 1897.

To DR. WM. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith to you the tenth annual report of the operations on the Experimental Farm for the North-west Territories at Indian Head, Assiniboia, during the year 1897.

The past season has, on the whole, been favourable over the greater portion of the Territories. In many districts the harvest has been very gratifying; in other portions the yield of grain has not been large but it is of excellent quality, and in no part has there been a complete failure. In addition to the fair crop, the good price commanded by almost everything grown or raised in the Territories has placed the farmers in a better position than has heretofore been attained.

Perhaps no previous year has shown the results of good farming to better advantage than the past season.

Spring opened about the 15th April, after one of the finest winters ever experienced in the North-west Territories. Snow fell early in November and lay till April, during which time sleighing was good, and at no time was the cold excessive. For weeks together almost perfect winter weather was experienced.

Seeding commenced on the experimental farm on the 16th April and continued without intermission till completed. High and continuous winds were prevalent during the last week of April, the whole of May, and from 1st to 15th June, when a heavy rain put an end to the winds and drouth which were threatening destruction of the crops in many portions of the Territories.

The rainstorm which passed over the experimental farm and district of Indian Head from 15th to 18th June inclusive was almost a deluge. On the 15th rain fell from 9.30 to 19 o'clock to a depth of 6·6 inches; on the 16th from 22 to 24 o'clock to a depth of 0·9 inch, a nd on the 18th from 13 to 19 o'clock to a depth of 2·5 inches—a total of 10 inches in four days. While the greater portion of this rain flowed over the land to the coulees, thence to the Qu'Appelle River, it ensured to the experimental farm and district an a bundant crop of grain. Unfortunately the heavy rains extended over a small area, and in several districts the rain-fall was below the average. Nevertheless good farming in these districts caused a fair crop where in former years total failure would have been the result.

Smut caused little or no loss the past season. Where any took place, neglect in using bluestone as a preventive, or carelessness in the treatment of the seed was the sole cause.

Weeds, on the other hand, were very prevalent; and the dangerous ones, such as Stink-weed and Hare's Ear Mustard, are fast spreading in many—if not in every—district in the Territories.

The harvest was the earliest on record in the North-west, and with the usual harvest weather in August and September, the grain was quickly secured. Threshing

proceeded without delay and long before cold weather set in, was completed. It is safe to say that no previous harvest has been taken off and threshed with less delay or expense and with so much satisfaction to the farmer.

Protection from winds is one of the needs of the Territories, and as the soil becomes fine from working and cropping, the need becomes more apparent. For several years past the experimental farm has sustained considerable injury from winds. Last spring, however, the wind-breaks and hedges afforded protection to a large portion of the crop and on only a few fields was the grain injured. Other farms in the district, with no protection, suffered severely.

Barley was the most uniform and the best crop grown on the experimental farm the past season. A few one-tenth acre plots not protected were more or less damaged by wind, but on the whole the thirty-five varieties sown on large and small areas gave heavy yields of grain and straw.

Wheat tests of one-tenth acre each were not exposed to winds, and produced a large quantity of straw, with varied yields of grain, caused partially by dead heads in some parts and the excessive yield of straw in others. Winds swept continuously over the acre and larger plots causing lighter yields.

About one-half of the one-tenth acre plots of oats suffered more or less from winds, but on the whole the returns were satisfactory. The acre and field lots suffered a good deal and the yields were lighter. Where sown on stubble-land the crop was very poor.

Pease were the most surprising crop grown. Though repeatedly cut down by winds and frost up to 15th June, when the rains came nothing on the farm made more rapid progress, and the yields were very satisfactory. The sample surpasses any previously grown on the farm.

The hay crop on the farm was much better than it at one time promised. Before the rains came only low spots and margins of fields grew to any extent, but the rains made a wonderful change in a few weeks, and though parts, especially of fields sown four or five years ago, were light, the crop generally was good. Brome grass requires some moisture early in the spring to give it a start, and although it will grow with less than any other variety, May rains are worth a great deal to it.

The root crop was not at all satisfactory. Up to 15th June, when rains came, neither turnips, mangels, carrots, nor sugar-beets had appeared above ground. This also applies to corn and millets sown on the experimental farm, and to potatoes and vegetables generally in many portions of the Territories. July and August were dry months, and the growth was checked soon after starting, giving poor returns.

Potatoes and vegetables on the experimental farm, though late in starting, gave, in many cases, very fair results.

Small fruits, with the exception of strawberries, were a good crop. Wild fruits were a failure.

Trees and shrubs made a very satisfactory growth, and less of the new varieties died this year than ever before.

EXPERIMENTS WITH SPRING WHEAT.

Thirty-eight varieties of wheat were tested in $\frac{1}{10}$ acre plots, six of the same varieties again on plots of one acre each, and five sorts on five and ten acre fields. The $\frac{1}{10}$ acre plots were on a field protected by hedges from the prevailing winds, and did not suffer in the least. The acre plots and five and ten acre fields were more exposed and all sustained more or less injury.

RESULTS OF EARLY, MEDIUM AND LATE SOWINGS.

Red Fife and Stanley were used. The plots were $\frac{1}{10}$ acre each, and the soil a clay loam. The first plots were sown on the 17th of April, and six successive sowings were made a week apart, the last plots being sown on the 22nd of May. The plots came up

and matured in the order sown. As will be seen, the three first seedings gave the best returns. There was no rust on any of the plots.

Seed sown by hoe-drill, on fallow at rate of 1½ bushel per acre.

WHEAT—Sown at Different Dates.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Length of Head.	Weight of Straw per Acre.	Yield per Acre.	Weight per Bushel.
				In.	In.	Lbs.	Bus. Lbs.	Lbs.
Stanley	April 17.	Aug. 21.	126	48	3	5,590	37 40	61
"	" 24.	" 27.	125	48	3	4,700	36 40	61½
"	May 1.	" 27.	118	45	3	4,500	36 50	62
"	" 8.	" 31.	115	45	3	4,160	30 40	62
"	" 15.	Sept. 2.	110	42	3	3,850	31 40	63
"	" 22.	" 6.	107	39	2½	3,450	25 50	62
Red Fife	April 17.	Aug. 27.	132	45	3	5,650	39 10	62¼
"	" 24.	" 27.	125	45	3	4,540	37 40	62
"	May 1.	" 31.	122	45	3	4,270	35 30	62½
"	" 18.	Sept. 2.	117	45	3	4,170	34 40	63
"	" 15.	" 2.	110	45	3	4,450	35	62¼
"	" 22.	" 10.	111	45	3	5,250	33 20	62

TEST OF VARIETIES ON ONE-ACRE, FIVE-ACRE AND TEN-ACRE FIELDS.

In these tests the more promising varieties of wheat grown in previous years were sown, not only to test the grain on larger areas but for the purpose of obtaining seed in quantities for distribution or for sale for seed. The plots were exposed to winds and sustained more or less injury therefrom. The soil chosen for these tests was a clay loam. Most of the varieties were slightly rusted, but no smut was observed on any of them.

WHEAT—Field-lots.

Name of Variety.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.
Sown on.	Acres.				In.	In.	Lbs.	Bush. Lbs.
Red Fife, summer-fallowed	10	April 17..	Aug. 25..	130	42	3¼	3,500	33 50
" corn stubble, fall ploughed	3½	" 16..	" 27..	133	42	3	3,480	32 45
White Fife, summer-fallowed	2½	" 19..	" 25..	128	43	3	4,120	30 25
Wellman's Fife "	2½	" 19..	" 25..	128	44	3¼	3,360	28 41
Preston " "	5	" 20..	" 27..	129	45	3¼	3,700	28 8
Stanley " "	5	" 20..	" 25..	127	44	3	3,870	27 44
Acre Plots.								
Hungarian, summer-fallowed	1	April 20..	Aug. 23..	125	39	2½	4,340	30 45
Monarch "	1	" 20..	" 30..	132	44	3	4,050	30 7
Red Fern "	1	" 20..	" 23..	125	45	3½	4,230	29 30
Emporium "	1	" 20..	" 27..	129	40	3	3,250	27 40
White Russian "	1	" 20..	" 30..	132	44	3	2,940	24 10
Percy "	1	" 20..	" 23..	125	42	2½	3,120	23 57

SPRING WHEAT TEST OF VARIETIES.

Thirty-eight varieties were sown by hoe-drill on fallow on the 24th of April, at the rate of 1½ bushel per acre. The soil was a clay loam, and the plots, which measured one-tenth acre each, were protected from winds. Many of the varieties made a rank growth of straw but produced a poor sample of grain. No rust was observed on any of these plots.

WHEAT—Test of Varieties.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw per Acre.	Yield per Acre.		Weight per Bushl.
			In.		In.		Lbs.	Bus.	Lbs.	Lbs.
Hungarian	Aug. 21	119	39	Weak	2½	Bearded	4,630	42	..	63
Countess	" 21	119	32	"	2½	"	4,180	40	20	63¾
Admiral	" 21	119	45	Strong	3½	Bald	5,040	40	10	62½
Vernon	" 27	125	39	Weak	3½	Bearded	4,810	39	..	61
Herisson Bearded	" 28	126	42	Strong	2	"	5,510	39	..	65
Percy	" 21	119	45	Weak	3	Bald	4,930	38	40	63
Red Fern	" 27	125	45	"	4	Bearded	6,240	38	30	63
Wellman's Fife	" 28	126	45	Strong	3½	Bald	4,580	37	50	62½
Progress	" 21	119	48	Weak	2½	"	4,080	37	50	62½
Red Fife	" 27	125	45	Strong	3	"	4,380	37	50	63
Alpha	" 21	119	45	"	3	Bearded	5,710	37	20	62
Pringle's Champlain	" 21	119	42	Weak	3½	"	5,420	37	10	61
Huron	" 21	119	45	Strong	3¾	"	5,230	37	..	61½
Old Red River	" 28	126	45	"	3½	Bald	4,240	36	50	63
Emporium	" 28	126	48	"	3½	Bearded	4,400	36	40	63¼
Rideau	" 21	119	42	Weak	2½	Bald	3,680	36	10	62
Beaudry	" 30	128	48	Strong	3	Bearded	4,830	36	10	64
Captor	" 21	119	42	"	2½	Bald	4,690	36	..	62½
Preston	" 27	125	42	Weak	3½	Bearded	4,690	36	..	63¾
Crown	" 21	119	45	Strong	3	"	4,710	35	40	62¼
White Fife	" 28	126	45	"	3	Bald	4,370	35	30	63
Monarch	" 27	125	45	"	2¾	"	4,430	35	20	62
White Connell	" 28	126	45	"	3	"	4,430	35	20	63
Dawn	" 21	119	32	Weak	3	"	4,150	35	..	62
Advance	" 27	125	42	"	3½	Bearded	4,820	33	50	63½
Beauty	" 21	119	48	"	3	Bald	4,350	33	20	60¼
Campbell's White Chaff	" 28	126	45	Strong	3	"	4,050	32	30	59
White Russian	" 28	126	42	"	3	"	3,740	31	50	61
Rio Grande	" 28	126	45	Weak	3	Bearded	4,550	31	40	62¼
Golden Drop	" 28	126	48	Strong	3	Bald	4,140	31	10	62
Stanley	" 24	122	45	"	3	"	4,440	31	..	60½
Black Sea	" 21	119	48	"	3	Bearded	4,810	30	40	61
Blenheim	" 28	126	48	"	3½	"	4,420	30	30	62
Dufferin	" 27	125	42	Weak	3	"	4,500	29	10	61½
Ladoga	" 30	128	48	Strong	3	"	3,930	28	40	62
Dion's	" 27	125	45	Weak	3½	"	6,210	27	20	63¼
Goose	" 27	125	42	"	3	"	4,820	27	10	63
Colorado	" 28	126	45	"	3	"	4,150	25	..	62

WHEAT—Test of Sowing Seed at different Depths.

Sown by hoe-drill, on fallow, on the 22nd April, on clay loam at rate of 1½ bushel per acre. A great difference will be observed between the different depths of seeding. Size of plots $\frac{1}{10}$ acre each.

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.	Bus	Lbs	
Red Fife—1 inch deep	Aug. 23..	123	45	Strong...	3	5,600	40	..	62½
" 2 "	" 23..	123	45	" ..	3	5,560	40	40	62½
" 3 "	" 23..	123	42	" ..	3	4,820	33	50	62

YIELDS and average for past six years.

Name of Variety.	1892.		1893.		1894.		1895.		1896.		1897.		Average.	
	Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.	Bus.	Lbs.
*Red Fife—1 inch deep									38	30	40		39	15
" 2 "	27	00	41	20	15	20	45	00	39	15	40	40	34	45
" 3 "	22	30	37	10	18		37	30	38	50	33	50	31	18

*Not tested previous to 1896.

WHEAT—Test of sowing different quantities of seed, per acre.

Sown on the 22nd April, by hoe-drill, on clay loam, summer-fallowed. Size of plots $\frac{1}{10}$ acre each.

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.	Bus.	Lbs.	Lbs.
Red Fife—1 bushel per acre	Aug. 25..	125	45	Strong....	3	5,440	38	30	62½
" 1¼ "	" 25..	125	42	"	3	5,720	38	50	62½
" 1½ "	" 25..	125	42	"	3	4,930	38	40	62

YIELDS and average for past six years.

Name of Variety.	1892.		1893.		1894.		1895.		1896.		1897.		Average.	
													Bus.	Lbs.
Red Fife—1 bushel per acre.	35	50	28	20	14	30	35	50	38	30	38	30	31	55
" 1¼ " ..	40	..	28	..	11	40	44	..	40	10	38	50	33	46
" 1½ " ..	39	40	26	30	13	20	42	20	38	20	38	40	33	8

WHEAT—Test of Press *vs.* Hoe-drill.

Sown on the 22nd April, on clay loam, summer-fallowed, at the rate of 1½ bushel per acre. Size of plots $\frac{1}{10}$ acre each.

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.	Bus. Lbs.	Lbs.
Red Fife, sown press-drill	Aug. 21..	121	45	Strong....	3	5,190	41 ..	62¼
" "	" 21..	121	48	"	3	4,610	39 ..	62

YIELDS and average for past six years.

Name of Variety.	1892.	1893.	1894.	1895.	1896.	1897.	Average.
							Bus. Lbs.
Red Fife, press-drill.....	30 20	38 20	18 40	45 ..	41 30	41 ..	35 48
" hoe-drill...	24 ..	36 18	17 50	44 ..	40 40	39 ..	33 38

BLUESTONE AS A REMEDY FOR SMUT IN SPRING WHEAT.

Seed used.	Treatment.	Good Heads on 25 Sq. Feet.	Smutty Heads on 25 Sq. Feet.
Red Fife, clean seed	Bluestoned, 1 pound to 10 bush.....	1,342	.....
" "	Untreated	1,014	244
" smutty seed	Bluestoned, 1 pound to 8 bush.....	1,110	21
" "	Untreated.....	741	643

For the above tests bluestone was dissolved in water, in the proportion of one pound to two pailsful. In this solution the seed was dipped. The smutty seed used was quite black and totally unfit for any purpose whatever.

TEST OF FALLOW *vs.* SPRING AND FALL PLOUGHING FOR WHEAT.

1st. Ten acres of fallow-land was sown by hoe-drill at rate of 1½ bushel per acre on 17th April.

2nd. Three acres of corn-stubble were ploughed in October, 1896 and harrowed. Sown by hoe-drill at rate of 1½ bush. per acre on 16th April, and harrowed after seeding.

3rd. One acre of burnt stubble-land was ploughed, three inches deep by gang-plough on 29th April, 1897; then harrowed and sown by press-drill at the rate of 1½ bush. per acre on same day.

4th. One acre of burnt stubble-land was sown by press drill without ploughing at the rate of 1½ bushel per acre on 29th April, then rolled.

Following will be found return from each plot :—

Plot No.	No. of Acres.	Method of Cultivation.	Bushels per Acre.
1	10	Red Fife on fallow	33·50
2	3	" fall ploughing	32·45
3	1	" stubble, spring ploughed	24·33
4	1	" " not ploughed	26·07

The fallow-land was considerably blown while the others did not suffer from winds.

EXPERIMENTS WITH BARLEY.

Barley was the best crop on the farm the past season, and having no wind or rain storms after the crop headed out, the grain all stood up and was easily harvested. The straw, especially that of the six-rowed varieties, was extra fine. All varieties were cut back by wind-storm on 13th June, but rain coming two days after soon repaired the injury.

TEST OF EARLY, MEDIUM AND LATE SOWINGS.

Two varieties were used in this test, Canadian Thorpe, a two-rowed sort and Odessa, a six-rowed variety. The soil was a clay loam and the size of the plots $\frac{1}{10}$th acre each. The first plots were sown on 24th April, one week after the first seeding of wheat, and the sowings were continued on the same day each week for five weeks or until 29th May. The seed was sown on summer-fallowed land by hoe-drill at the rate of 2 bushels per acre. The twelve plots were protected by a wind-break and did not suffer from winds but six of them were frozen down on 13th May. All the plots ripened in the order sown but the early seedings gave much the better yields of grain and straw.

BARLEY—Test of Early, Medium and late Seeding.

Name of Variety.	Date of Sowing.	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.
Canadian Thorpe	April 24	Aug. 17	115	45	Strong	3	4,310	58	6	54½
"	May 1	" 17	108	45	"	3	4,050	56	12	53
"	" 8	" 20	104	45	"	3	4,230	46	22	54½
"	" 15	" 20	97	45	"	3	3,920	44	18	53½
"	" 22	" 24	94	36	"	3	3,350	44	38	51½
"	" 29	" 30	93	36	"	3	3,000	43	6	50½
Odessa	April 24	" 13	111	39	"	2½	3,890	75	..	50
"	May 1	" 17	108	39	"	2½	4,210	77	4	49½
"	" 8	" 17	101	39	"	2½	4,450	64	18	50
"	" 15	" 17	94	39	"	2½	4,600	71	2	49½
"	" 22	" 20	90	39	"	2½	4,060	61	12	49½
"	" 29	" 28	91	39	"	2½	2,750	53	6	49½

BARLEY—Field Lots.

Seed sown from the 3rd to the 5th of May on summer-fallow, by hoe-drill at the rate of 1¾ bushels per acre, soil clay loam.

Name of Variety.	Size of Plot.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.
				In.		In.		Bush. Lbs.
Odessa	5 acres	Aug. 13	102	42	Strong	2½	6 rowed	56 40
Trooper	5 "	" 13	102	40	"	3	6 "	54 20
Canadian Thorpe	5 "	" 17	105	45	"	4	2 "	45 6
Sidney	4 "	" 21	108	45	"	3½	2 "	44 8

BARLEY—Acre Plots.

Six varieties were sown on the 5th of May on clay loam on plots of one acre each: two on corn stubble-ploughed six inches deep and harrowed and four on summer-fallow. Winds thinned the plots on summer-fallow. Seed sown by hoe-drill at rate of 1¾ bushel per acre.

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.
			In.		In.		Bush. Lbs.
Baxter's—Corn stubble	Aug. 13	100	42	Strong	3	6 rowed	48 33
French Chevalier—Fallow	" 21	108	40	"	4½	2 "	48 6
Bolton— "	" 18	105	36	"	3½	2 "	45 32
Mensury— "	" 18	105	36	"	3	6 "	44 29
Oderbruch—Corn stubble	" 13	100	40	"	2	6 "	40 40
Beaver—Fallow	" 21	108	40	"	2½	2 "	38 26

BARLEY—Test of Varieties.

In this test twenty varieties of six-rowed and fifteen varieties of two-rowed barley were sown.

A few plots were slightly injured by winds, and all were cut down by frost on the 13th of May, but speedily recovered after rain on the 15th of June, and gave heavy crops of grain and straw.

Seed was sown on the 5th of May on fallow by hoe-drill, at the rate of two bushels per acre. The soil was clay loam, and the size of the plots was one-tenth acre each. Baxter's and Phœnix both suffered somewhat from smut, all the other varieties were free from smut.

SIX-ROWED BARLEY—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.	Bus. Lbs.	Lbs.
Common	Aug. 12	99	36	Strong	3	4,180	71 12	53¼
Oderbruch	" 12	99	36	"	2½	3,690	71 2	53¼
Petschora	" 12	99	36	"	2½	3,740	70 ..	51¼
Odessa	" 12	99	36	"	3	3,630	68 6	51½
Rennie's Improved	" 13	100	36	"	3	3,780	68 6	53
Mensury	" 12	99	39	"	3½	4,140	66 42	50
Baxter's	" 12	99	36	"	2	3,750	66 32	53
Vanguard	" 12	99	36	"	2¾	3,150	66 32	52¼
Blue	" 13	100	33	Weak	3	4,540	65 40	46¼
Royal	" 12	99	36	Strong	3	3,040	63 36	51
Stella	" 12	99	36	"	3	4,150	58 16	50¾
Trooper	" 12	99	33	"	2½	4,070	57 44	51¼
Excelsior	" 13	100	42	"	3	3,280	57 34	47¼
Nugent	" 12	99	33	"	2	3,850	56 12	51¼
Summit	" 12	99	33	"	2½	3,530	55 30	53¼
Surprise	" 12	99	36	"	3	3,280	55 30	53
Champion	" 13	100	44	"	4	3,140	54 18	48½
Success	" 6	93	42	"	3	2,820	51 32	51
Phœnix	" 13	100	39	"	3	3,340	51 12	50¾
Pioneer	" 17	104	36	"	3	3,260	49 38	54½

TWO-ROWED BARLEY—Test of Varieties.

French Chevalier	Aug. 24	111	33	Strong	5	3,390	53 16	52¼
Canadian Thorpe	" 21	108	33	"	4	4,300	53 6	54
Beaver	" 24	111	33	"	3	3,430	52 24	54¼
Danish Chevalier	" 24	111	30	"	5	3,250	52 4	53
Kinver Chevalier	" 28	115	33	"	3	3,900	51 2	52
Newton	" 20	107	36	"	3	3,550	51 2	53½
Rigid	" 20	107	36	"	3	4,040	50 10	53½
Prize Prolific	" 28	115	33	"	5	3,500	50 ..	52¼
Nepean	" 20	107	36	"	4	4,360	47 34	54¼
Bolton	" 20	107	39	"	4	3,480	47 14	55¼
Victor	" 20	107	36	"	3½	3,160	45 30	54¼
Thanet	" 28	115	33	"	5	3,280	45 10	52
Sidney	" 24	111	36	"	4	3,200	44 38	54
Pacer	" 20	107	36	"	4	3,510	43 26	53
Monck	" 24	111	36	"	4½	5,000	37 24	54¼

TEST OF BLUESTONE AS A REMEDY FOR SMUT IN BARLEY.

Variety of Seed.	Treatment.	Good Heads.	Smutty Heads.
		On 25 Square Feet.	
Canadian Thorpe	Bluestone, 1 lb. to 10 bushels	750	3
" "	Untreated	711	97

EXPERIMENTS WITH OATS.

TEST OF EARLY, MEDIUM AND LATE SOWINGS.

Banner and Abundance were used in this test. The sowings were one week apart, and continued from 24th April to 29th May. The last sowing of each variety gave a good crop of straw, but the yield of grain was small. The second seeding of Abundance was greatly injured by heavy rains in June, which washed away portions of the grain and soil. The plots were one-tenth acre each, and the soil a clay loam.

OATS—Test of Early, Medium and Late Seeding.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Weight of Straw.	Yield per Acre.	Weight per Bushel.
				Inches.		Lbs.	Bush. Lbs.	Lbs.
Banner	April 24	Aug. 18	116	48	Strong	3,800	101 16	39
"	May 1	" 21	112	45	"	3,280	78 18	36
"	" 8	" 21	105	46	"	3,540	90	37¼
"	" 15	" 21	98	46	"	3,400	88 8	37
"	" 22	" 30	100	45	"	3,150	73 18	36½
"	" 29	Sept. 6	100	42	"	3,660	49 24	33½
Abundance	April 24	Aug. 21	119	43	"	3,830	78 18	39½
"	May 1	" 23	114	42	"	2,950	63 8	37½
"	" 8	" 23	107	43	"	3,440	91 16	39½
"	" 15	" 23	100	45	"	3,680	84 14	39½
"	" 22	" 30	100	45	"	3,430	69 24	37
"	" 29	Sept. 6	100	42	"	3,150	58 28	37

OATS—Field-lots.

Sown on the 28th and 29th of April on summer-fallow by hoe-drill at the rate of 2½ bushels per acre. The soil was clay loam. All the fields were injured by frosts and winds.

Name of Variety.	Size of Plot.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Kind of Head.	Weight of Straw.	Yield per Acre.
				Inches.			Lbs.	Bush. Lbs.
Banner	5	Aug. 26	120	44	Strong	Branching	3,060	69 30
Abundance	5	" 26	120	42	"	"	3,670	65 12
Golden Beauty	5	" 26	119	42	"	"	2,510	63 21
Improved Ligowo	2½	" 18	111	40	"	"	2,480	63 2
Holstein Prolific	1¼	" 18	111	38	"	"	2,300	40 ..

OATS—One Acre Plots.

Sown 29th April on summer-fallow by hoe-drill at rate of 2¼ bushels seed per acre. All suffered from winds, being on a very exposed portion of the farm. The soil was clay loam.

Name of Variety.	Size of Plot	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Kind of Head.	Weight of Straw.	Yield per Acre.	
					In.		Lbs.	Bush.	Lbs.
Early Archangel	1 acre	April 29	Aug. 27	120	44	Branching	3,130	63	12
Oderbruch	1 "	" 29	" 18	111	36	Sided	2,120	63	9
Bavarian	1 "	" 29	" 18	111	38	Branching	2,980	60	25
White Schonen	1 "	" 29	" 27	120	36	"	2,950	59	25
Early Golden Prolific	1 "	" 29	" 18	111	40	"	3,000	59	13
Flying Scotchman	1 "	" 29	" 27	120	36	"	2,960	56	24
American Beauty	1 "	" 29	" 26	119	44	"	2,340	56	6
Columbus	1 "	" 29	" 27	120	39	"	3,100	53	8
Wallis	1 "	" 29	" 26	119	45	"	2,630	52	14
Wide-Awake	1 "	" 29	" 30	123	40	"	2,230	40	

The following were all sown on the same date, 3rd May, on clay loam, summer-fallowed. The size of the plots was, in most instances, one-tenth acre each. The seed was sown by hoe-drill at the rate of 2¼ bushels per acre.

OATS—Test of Varieties.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw	Character of Straw.	Kind of Head.	Weight of Straw	Yield per Acre.		Weight per Bushel.
			In.			Lbs.	Bush.	Lbs.	Lbs.
Abyssinia	Aug. 30	119	45	Strong	Sided	3,490	87	2	39
Improved American	" 30	119	48	"	Branching	3,200	86	26	38
Siberian O.A.C	" 20	109	48	"	"	4,800	86	16	37¼
Columbus	" 20	109	45	"	"	4,080	86	30	37½
Olive	" 30	119	48	"	Sided	4,360	85		37½
Rosedale	" 30	119	46	"	"	3,650	83	28	40½
Hazlett's Seizure	" 20	109	48	"	Branching	4,550	82	12	42¼
Early Gothland	" 20	109	45	"	Sided	4,050	82	12	39
Early Golden Prolific	" 23	112	43	"	Branching	2,370	80	10	35
Golden Giant	" 30	119	48	"	"	3,920	80	10	34
Mennonite	" 30	119	45	"	"	3,130	80		38
Holstein Prolific	" 23	112	42	"	"	2,560	80		37
Flying Scotchman	" 23	112	44	"	"	3,540	79	24	40
Buckbee's Illinois	" 28	117	46	"	"	3,660	79	4	38
Early Blossom	" 30	119	48	"	Sided	3,660	79	4	39
Early Maine	" 30	119	46	"	Branching	2,990	78	8	38¼
Oxford	" 28	117	45	"	"	3,160	77	22	38¼
American Beauty	" 20	109	36	"	"	2,770	75	30	38
Early Archangel	" 20	109	45	"	"	3,820	75	30	39¼
Finland Black, No. 1	" 23	112	42	"	"	3,310	74	24	36
Wide Awake	" 20	109	42	"	"	3,570	74	14	40
Cromwell	" 23	112	45	"	"	3,200	73	30	36
Wallis	" 28	117	46	"	"	3,440	73	28	37
Lincoln	" 20	109	42	"	"	3,240	73	28	39¼
Medal	" 30	119	43	"	"	2,840	73	28	39
Poland	" 27	106	42	"	"	3,460	73	8	41¼

OATS—Test of Varieties—*Continued.*

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.			Lbs.	Bush.	Lbs.	Lbs.
Miller	Aug. 30	119	43	Strong	Branching	2,410	73	8	38
Improved Ligowo	" 20	109	43	"	"	1,870	72	32	39
Black Beauty	" 28	117	36	"	"	2,570	72	32	36
White Schonen	" 28	117	45	"	"	3,500	72	2	35
Bavarian	" 20	109	42	"	"	3,200	72	2	34¼
Early Etampes	" 23	112	32	"	"	3,380	71	16	37
White Russian	" 20	109	42	"	"	3,890	71	12	40¼
Welcome	" 17	106	45	"	"	3,590	71	12	43¼
White Monarch	" 30	119	42	"	"	3,060	70	10	39
Prize Cluster	" 17	106	45	"	"	3,490	69	14	43½
Russell	" 23	112	42	"	"	3,000	69	4	37¼
California Prolific Black	" 23	112	46	"	Sided	3,410	68	28	36¼
Pense	" 23	112	43	"	"	4,110	68	28	37½
Winter Grey	" 17	106	42	"	Branching	3,220	68	18	42¼
Master	" 28	117	46	"	"	3,270	68	18	37¼
Bonanza	" 17	106	45	"	"	3,060	67	12	41¼
Scottish Chief	" 20	109	42	"	"	3,260	67	12	41½
Oderbruch	" 20	109	45	"	Sided	1,860	67	12	38
Imported Irish	" 17	106	45	"	Branching	3,170	67	2	42¼
King	" 17	106	42	"	"	2,880	66	26	34¼
Rennie's Prize	" 17	106	42	"	"	2,800	66	6	42¼
White Wonder	" 17	106	46	"	"	3,100	66	6	42¼
Cream Egyptian	" 20	109	45	"	"	3,420	65	20	42¼
Doncaster Prize	" 30	119	42	"	"	3,620	65	20	39¼
Siberian	" 30	119	48	"	Sided	4,120	65	20	35¼
Golden Tartarian	" 28	117	42	"	"	2,540	63	18	34¼
Mortgage Lifter	" 17	106	45	"	Branching	2,350	63	8	41
Abundance	" 28	117	45	"	"	3,520	62	22	35
Golden Beauty	" 20	109	42	"	Sided	2,340	61	16	35
Prolific Black Tartarian	" 28	117	36	"	Branching	3,190	60	20	38
American Triumph	" 20	109	45	"		2,220	59	24	35
Newmarket	" 23	112	42	"	Branching	1,800	58	28	39
Coulommiers	" 28	117	36	"	"	3,000	57	22	37¼
Scotch Hopetoun	" 28	117	45	"	"	3,290	57	22	34¼
Joanette	" 23	112	32	"	"	2,520	56	16	37
Finland Black, No. 2	" 20	109	40	"	"	2,520	55	10	33¼
Brandon	" 28	117	43	"	Sided	2,420	52	12	35
Banner	" 28	117	36	"	Branching	3,330	52	2	31
*Victoria Prize	" 28	117	45	"	"	3,040	50	10	41¼

* Blown out; resown 14th June.

EXPERIMENTS WITH PEASE.

The yield of pease from the different varieties was, on the whole, satisfactory Early in the season winds and frost several times apparently ruined the plots, but after the rains came in June nothing on the farm made such rapid progress or, considering the thinning out the pease had sustained, gave better returns. The plots protected by trees gave larger returns of grain and straw than those in more exposed positions. A finer sample of all the varieties was never grown on the farm.

TEST OF EARLY, MEDIUM AND LATE SOWINGS.

In this test, Mummy, a large and Golden Vine a small variety were used. Commencing on 24th April the sorts were sown each week till 29th May. The three plots

of Golden Vine giving the larger yields were entirely under the protection of a wind break. The other plots were all more or less injured.

The soil was a clay loam and the size of the plots one-tenth of an acre. The land was summer-fallow and the seed sown at the rate of 2½ bushels small pease and 3½ bushels large pease per acre.

PEASE—Test of Early, Medium and Late Sowings.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Size of Pea.	Yield per Acre.	Weight per Bushel.
					In.	Lbs.		Bush. Lbs.	Lbs.
Mummy	April 24	Aug. 23	121	Rank	36	3,110	Large	30	65¼
"	May 1	" 23	114	"	36	3,740	"	27 30	65¼
"	" 8	" 23	107	"	36	3,300	"	28 20	66¼
"	" 15	" 23	100	Medium	35	3,320	"	28	67
"	" 22	" 25	95	Weak	36	3,200	"	33	67
"	" 29	Sept. 1	95	"	26	2,400	"	19 20	66
Golden Vine	April 24	Aug. 23	121	Very rank	48	4,890	Small	51 10	65
"	May 1	" 23	114	Rank	40	4,000	"	42 50	65¼
"	" 8	" 23	107	"	36	3,900	"	41 10	65¼
"	" 15	" 23	100	"	36	3,650	"	34	65¼
"	" 22	" 25	95	"	36	3,320	"	31 20	65
"	" 29	Sept. 1	95	Medium	28	2,550	"	22 50	65

PEASE—Test of Varieties.

Forty-one varieties were sown on summer-fallowed land on the same date, the 6th of May, on a clay loam, and the size of the plots, in most instances, was one-tenth of an acre. The seed was sown by hoe drill at the rate of 2½ bushels per acre for the small varieties and 3½ bushels for the larger sorts.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Character of Growth.	Length of Straw	Weight of Straw.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				In.	Lbs.		Bush. Lbs.	Lbs.
Potter	Aug. 24	110	Rank	34	4,280	Large	45 10	64
Bright	" 26	112	"	32	4,200	"	40	65
Centennial	" 25	111	"	32	4,850	"	35 40	65½
Prince Albert	" 24	110	"	36	3,620	Small	34 40	65¼
Golden Vine	" 24	110	"	32	3,750	"	34 10	65
Daniel O'Rourke	" 21	107	Medium	30	3,610	"	34 10	66
Arthur	" 23	109	Rank	32	3,920	"	34 10	66
New Potter	" 26	112	Medium	30	3,900	Large	33 20	64
Victoria	" 24	110	Rank	32	3,625	"	33	66¼
Crown	" 24	110	"	32	3,530	Small	32 50	66¼
Macoun	" 26	112	"	30	3,030	Medium	32 20	66¼
White Marrowfat	" 26	112	"	36	4,120	Large	31 50	65
Trilby	" 24	110	Medium	28	3,200	Medium	31 50	65
Vincent	" 24	110	"	30	3,330	"	31 40	65¼
Creeper	" 25	111	"	30	3,620	Small	30 50	65
Carleton	" 24	110	Rank	34	3,790	Medium	30 40	66¼
Alma	" 23	109	Medium	30	3,050	Large	30 30	65¾
White Wonder	" 20	106	Rank	30	3,820	"	30 10	67
Multiplier	" 25	111	Medium	30	4,150	Small	30	66
Pride	" 23	109	Rank	33	3,910	Large	29 50	65¼

PEASE—Test of Varieties—*Continued.*

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Size of Pea.	Yield per Acre.	Weight per Bushel.
				In.	Lbs.		Bush. Lbs.	Lbs.
Nelson	Aug. 19..	105	Weak	30	3,560	Large	29 40	65½
Perth	" 23..	109	Rank	27	3,500	"	29 30	65½
Paragon	" 24..	110	"	28	3,740	"	29 30	64½
Canadian Beauty	" 25..	111	"	32	3,650	"	29	65
Black Eyed Marrowfat	" 25..	111	"	32	3,330	"	28 50	64½
Mummy	" 24..	110	"	33	3,620	"	28 50	65½
Chancellor	" 17..	103	Medium	30	3,510	Small	28 40	65¾
King	" 25..	111	"	30	3,520	Large	28 40	65¼
Duke	" 23..	109	Weak	24	2,610	"	28 30	65
Early Britain	" 19..	105	Rank	36	3,720	"	28	64½
Prince	" 25..	111	Medium	28	3,340	"	27 30	66
Bedford	" 26..	112	Rank	32	3,300	Small	27 20	66½
Bruce	" 24..	110	Medium	28	3,000	"	27 10	65
Oddfellow	" 19..	115	Rank	34	3,680	Medium	27	68½
Kent	" 24..	110	Medium	27	3,110	"	26 20	65¾
Archer	" 25..	111	"	28	3,150	"	26 10	65½
Elephant Blue	" 19..	105	"	30	3,310	Large	25 50	64½
Agnes	" 23..	109	"	29	3,040	"	24 50	65
Prussian Blue	" 24.	110	"	31	3,320	"	24 30	65½
Mackay	" 24..	110	Rank	30	3,400	"	23 20	65½
Harrison's Glory	" 19..	105	Weak	24	2,780	"	22	64¼

MIXED GRAIN FOR FODDER.

Four grain mixtures were sown on one-tenth acre plots on summer-fallow on 26th April and cut by binder on 18th August. All the plots were allowed to partially mature before being cut.

	Mixture.	Seed sown per acre.	Weight per acre. Dry.	
			Tons.	Lbs.
1	Barley—Odessa	1 bush.	4	200
	Oats—Banner	1 "		
2	Wheat—Red Fife	1 bush.	4	...
	Barley—Odessa	1 "		
	Rye—Spring	1 "		
3	Oats—Banner	1 bush.	3	650
	Pease—Golden Vine	1 "		
4	Wheat—Red Fife	1 bush.	3	500
	Pease—Golden Vine	1 "		

EXPERIMENTS WITH INDIAN CORN.

Thirty varieties were tested. All were planted on the 19th of May in hills, three feet apart each way and twenty-seven of the same varieties were sown by hoe-drill in rows three feet apart. The land was clay loam, fallowed in 1896. Two rows of sixty-six feet each were cut from each variety and from this the yield per acre was computed. As will be seen the corn sown in rows gave better returns than the same varieties planted in hills. This is accounted for by the seed in the rows germinating shortly after being sown which was caused by deep seeding—3 inches; whereas that planted in hills was ten days later in germinating and the plants never overtook those grown in rows.

INDIAN CORN—Test of Varieties.

Test 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.
Giant Prolific Ensilage	Strong	84	Aug. 17.	Sept. 3.	.....	Silk	16	450	11	1,650
Sanford	" ..	60	" 12.	Aug. 26.	.....	"	15	1,900	14	1,600
Cuban Giant	" ..	96	" 14.	" 28.	.....	"	15	250	12	1,190
Cloud's Early Yellow	" ..	84	" 15.	" 21.	Sept. 4.	Early milk	14	50	11	1,320
Early Butler	" ..	72	" 11.	" 29.	.....	Silk	13	1,170	10	1,230
Pride of the North Dent	" ..	72	" 17.	Sept. 3.	.....	"	13	950	11	1,650
North Dakota White	" ..	72	" 14.	Aug. 24.	Sept. 4	Early milk	13	400	11	1,430
Mammoth Sweet Fodder	Fair ...	54	" 5.	" 16.	" 3.	" ..	12	1,850	9	700
Canada White Flint	Strong..	72	" 12.	" 24.	.....	Silk	12	1,850	12	750
Red Cob Ensilage	" ..	78	" 17.	Sept. 1.	.....	"	12	1,300	13	950
Mitchell's Extra Early	" ..	48	" 5.	Aug. 25.	Sept. 1.	Early milk	12	1,300	11	....
Kendall's Giant	Fair ..	48	" 5	" 12.	Aug. 28.	Late milk.	12	1,300	9	1,030
Mammoth Eight-rowed Flint	Strong..	72	" 11.	" 28.	.....	Silk	12	1,200	11	870
Mammoth Yellow Flint	" ..	72	" 10.	" 28.	.....	" .. .	12	860	12	640
Burpee's First of All	Fair ...	48	" 3.	" 12.	Sept. 1.	Early milk	12	750	7	960
North Dakota Yellow	" ..	72	" 10.	" 20.	.....	Silk	12	1,200	11	1,100
Pearce's Prolific	" ..	54	" 12.	Sept. 1.	.....	"	12	1,200	6	1,200
Longfellow	" ..	60	" 12.	Aug. 28.	.....	Silk	12	1,200	9	1,140
Compton's Early	" ..	60	" 12.	" 24.	Sept. 4.	Early milk	11	1,870	12	1,850
Ninety-day	" ..	72	" 17.	" 26.	" 4.	" ..	11	1,650	8	1,930
Champion White Pearl	" ..	84	" 17.	Sept. 1.	.....	Silk	11	1,650	11	1,650
New White Cap Yellow Dent	" ..	78	" 17.	Aug. 26.	Sept. 4.	Early milk	11	1,100	12	1,750
Wisconsin White Dent	" ..	76	" 11.	" 26.	" 3.	" ..	11	1,100	..	....
Wisconsin Yellow Dent	" ..	80	" 12.	" 26.	" 4.	" ..	11	960	..	....
Extra Early Huron Dent	" ..	74	" 12.	" 26.	" 4.	" .	11	900	..	....
King of the Earliest	" ..	72	" 11.	Sept. 1.	.....	Silk	11	....	10	240
Selected Leaming	" ..	78	" 17.	Aug. 30.	.....	"	10	1,450	9	1,800
Angel of Midnight	" ..	54	" 12.	" 26.	Sept. 4.	Early milk	10	900	11	....
Thoroughbred White Flint	Weak ..	60	" 17.	Sept. 1.	" 4.	" ..	8	1,600	6	1,200
Country Gentleman	" ..	48	" 15.	" 4.	.....	Silk	8	500	5	1,220

FIELD CORN—SOWN FOR ENSILAGE.

North Dakota flint corn was sown on a five acre field for ensilage. The land had produced a crop of oats the year previous, was ploughed in the spring seven inches deep, well harrowed and rolled and the seed sown by grain drill, in rows three feet apart. The corn was sown on 20th May, but on account of dry weather did not germinate till 20th June. Twenty-one tons fifteen hundred pounds was the yield from the 5 acres.

Two acres of Mitchell's Extra Early corn were also sown for ensilage. The land produced a crop of flax and millet in 1896, and was deeply ploughed in the spring

before seeding with corn. Corn was sown by drill in rows three feet apart on 21st May. The plants on one of the two acres were thinned out to one every 12 inches in the row; the other acre was left as it came up.

The yield from the acre thinned was 8 tons, 260 pounds; from the acre not thinned, 7 tons 1,140 pounds. Both lots of Mitchell's Extra Early and the five acres of North Dakota flint were cut on 6th September by binder, left in the field to wilt for two days, then drawn and cut by ensilage cutter and put in silo. The ensilage is being used now and is in excellent condition.

The above varieties are early in maturing, and though less productive are used in preference to the later and larger yielding sorts.

EXPERIMENTS WITH FLAX.

Seed sown at Rate of	Date of Seeding.	Date of Cutting.	Days to Mature.	Length of Straw.	Weight of Straw per Acre.	Yield per Acre.	
				Inches.	Lbs.	Bush.	Lbs.
40 lbs. per acre	May 11	Aug. 18	99	24	820	6	30
80 "	" 11	" 18	99	24	1,380	10	20
40 "	" 18	" 18	92	24	1,370	12	30
80 "	" 18	" 18	92	24	1,390	13	10
40 "	" 25	" 18	85	22	1,470	13	30
80 "	" 25	" 18	85	22	2,400	13	
40 "	" 29	" 18	81	20	1,230	9	20
80 "	" 29	" 18	81	20	1,890	13	10

EXPERIMENTS WITH MILLETS AND HUNGARIAN GRASS.

Variety.	Size of Plot.	Date Sown.	Date Cut.	Days to Mature.	Length of Straw.	Yield per Acre.	
	Acre.				Inches.	Tons.	Lbs.
New Siberian Millet	1/10	May 8	Aug. 27	111	36	2	400
Manitoba "	1/10	" 7	" 27	112	32	1	150
Japanese "	1/10	" 7	" 27	112	31	1	100
Hungarian Grass	1/10	" 7	" 27	112	27	1	1,400
Manitoba Millet	2/10	" 12	" 27	107	32	2	200
Garden "	2/10	" 12	" 27	107	32	1	1,350
New Siberian "	1/10	" 12	" 27	107	36	1	1,100
Holy Terror "	1/10	" 12	" 27	107	30	1	700

EXPERIMENT WITH CANARY GRASS.

One-tenth acre was sown on 7th May. Ripe, 23rd Aug.. Yield per acre, 26 bushels seed, 3,250 pounds straw.

EXPERIMENT WITH BUCKWHEAT.

One-tenth acre was sown 7th May. Ripe, 27th Aug. Matured in 112 days. Height. 27 inches. Weight of straw per acre, 3,240 pounds. Yield of grain per acre, 22·24 bushels,

EXPERIMENT WITH TARES.

One plot of $\frac{1}{40}$ acre was sown for feed and another of the same size for seed.

Variety.	Size of Plot.	Date Sown.	Date Cut.	Length of Straw.	Weight of Straw. Per Acre.	Yield Per Acre.
For Feed.	Acres.			Feet.	*Green.*	Bush. Lbs.
Black Tares	$\frac{1}{40}$	May 7...	Aug. 9..	4½	17,540	
For Seed.					*Dry.*	
Black-Tares	$\frac{1}{40}$	May 7...	Aug. 28..	4½	3,410	33 30

EXPERIMENT WITH SPRING RYE.

One-tenth acre sown on 26th April, and cut for seed 6th Sept. ; 75 inches high ; 4,200 pounds straw per acre ; 50·50 bushels grain per acre.

EXPERIMENTS WITH GRASSES

In the spring of 1896, five varieties of grass, viz., Awnless Brome Grass, Timothy, Meadow Fescue, Agropyrum Tenerum and Agropyrum Caninum were sown, also, Alsike, Red and Mammoth Clovers.

Awnless Brome Grass, Agropyrum Tenerum and Agropyrum Caninum were sown separately ; the others mixed and sown together. Red Clover was entirely killed, Alsike was also killed, except near protection, where snow lay till spring opened. Mammoth Clover was very thin and little or no Timothy appeared. Meadow Fescue was a fair crop, near the protection of the western wind-break, the yield was large ; away from it only fair. The yield of the mixed grasses was from 2¾ acres, 3 tons 300 pounds, or 1 ton 290 pounds, per acre.

Agropyrum Tenerum and Agropyrum Caninum. Both produced a good crop the past season, but neither variety is eaten by stock as readily as Awnless Brome Grass. Absence of leaves on the stalks is probably the reason for this. The varieties were sown very thin, and during the season of 1896 gave little promise of yielding a crop this year, but thin seeding proved an advantage during the dry weather in May, and a good crop resulted. Seed of Agropyrum Tenerum has been saved, and further experiments will be made with this grass. The following yields were obtained :

Agropyrum Tenerum—1¼ acre : 3 tons, 1,205 pounds, or 2 tons 1,764 pounds per acre.

Agropyrum Caninum—1¼ acre : 3 tons, or 2 tons 400 pounds per acre.

AWNLESS BROME GRASS (Bromus Inermis).

As stated in the report for 1896, a large area was sown with Brome Grass that spring. The grass made a good catch and growth, and gave excellent pasture up to the time snow fell last fall or about 1st November.

This spring a fair start was made about 20th April, but dry weather set in shortly after, and very little progress was made, except in low places or margins of the fields till 20th June. The rains a few days before this date made a rapid change and insured, on the whole, a fair yield, but not so good as would have been caused by an earlier rain. Parts of the fields were extra heavy, while other portions on knolls were short.

Thirty-two tons of the grass were saved for seed, but it is not in a very satisfactory condition, in so far as a large yield of seed is concerned. Throughout the field reserved for seed, the early growth was ripe while the growth caused by the June rains was quite green, consequently much of the early seed was lost. On account of the large amount of green growth at the bottom, the mower instead of the binder was used in cutting the crop for seed. This makes threshing more difficult, but gives a very fine lot of fodder, as good in fact, as if cut for hay.

The older fields of Brome Grass gave light crops, several portions being very short and hardly worth cutting. Being an early grass to start, the past spring was greatly against a good crop, especially on fields from which several crops had been cut.

From several years' experience with Brome Grass, it appears, to obtain the best results in hay that two crops should be taken from the field, which should then be ploughed up unless required for pasture. While this will necessitate a little more work in sowing a fresh field or a few acres each spring and ploughing up the same amount of old grass land, various advantages will arise from the adoption of this course, 1st, good fodder will be supplied each year by the newly seeded land; 2nd, there being a first crop of hay each year, it is likely to be a good one; 3rd, Brome sod is easily ploughed after the second crop, but is very tough after the fourth or fifth, 4th, the roots of the grass when ploughed up afford protection from winds and in this respect are equal, so far as experience shows, to the native sod; this being the case it is evident that it will be a great advantage to other crops to treat old worked land in this way.

Without the heavy rain which fell on the farm in June last, it is probable that from the fields on which two crops had been previously cut, there would not have been one-half ton of hay per acre.

On 18th, 19th and 20th May, several acres of Brome sod were ploughed up. One portion was ploughed six inches deep; a second, three inches deep, and a third one and one-half inch deep. The deep ploughing was sown with pease, harrowed well and rolled. The other portions rolled down, and on 23rd and 28th July backset five inches deep. The pease did not germinate till after rains on 15th and 18th June, and were caught by frost before maturing. There was, however, a good crop of straw and grain, the pods being well filled. Except where the first two furrows met no Brome Grass roots survived.

On the other portions some roots were still alive when the plots were backset, but at this date all seem to be dead.

Considering the large amount of rain which fell on 15th to 18th June, and the favourable growing weather for several weeks after, the growth on the land ploughed was very small indeed, and with our ordinary June rainfall there will not be the least difficulty in killing the roots of this grass by breaking and backsetting. One acre of sod five years old has, this fall, been ploughed four inches deep as a further experiment in getting rid of Brome Grass.

For information regarding sowing the following is quoted from the report for 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 also advisable to sow the seed on soil 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 on top prevents all drifting.

"Fifteen to eighteen 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 makes better pasture than hay.

"The seed being light, long and thin, seeding by hand is the only practicable method. 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 better hold.

"The first crop of hay can be cut the next year after seeding, and will, in ordinary years be ready early in July. Eight or ten 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 blossom for hay and ten days from this time it is considered in proper state 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 as deemed best.

"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 closed off as much as practicable. From three to six hundred pounds of seed may be expected from an acre."

YIELDS.

Twenty acres from fields which have been cut 3, 4 or 5 times, 52,100 pounds or 1 ton 605 pounds per acre.

Twenty-two acres new crop 79,555 pounds or 1 ton 1,616 pounds per acre. (One acre of this field yielded 3 tons 1,000 pounds.)

EXPERIMENTS WITH ROOTS.

The root crop was very light the past season. No seeds germinated until the middle of June, nearly one month later than usual, and excessive rains for three days in June hardened the land to such an extent that it was in very bad condition to stand the dry weather which set in early in July and continued, with the exception of two or three days upon which showers fell, to the time the roots were taken up. The roots were on clay loam summer-fallowed land, which was ploughed before the seeds were sown.

Following will be found yields of two seedings each of turnips, mangels, carrots and sugar beets. The yield per acre, in each case, has been calculated from the weight of roots obtained from two rows each, 66 feet long.

TURNIPS—Test of Varieties.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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.
Hartley's Bronze	May 18	May 28	Oct. 5	Oct. 5	9	1,548	325	48	10	856	347	36
Aberdeen Purple Top	" 18	" 28	" 5	" 5	9	1,140	319	..	13	1,894	466	24
Hall's Westbury	" 18	" 28	" 5	" 5	8	1,424	290	24	10	268	337	48
Shamrock Purple Top	" 18	" 28	" 5	" 5	8	596	276	36	10	460	341	.
Perfection Swede	" 18	" 28	" 5	" 5	7	1,048	250	48	10	64	334	24
Selected Purple Top	" 18	" 28	" 5	" 5	7	520	242	..	9	348	305	48
Sutton's Champion	" 18	" 28	" 5	" 5	7	256	237	36	8	1,820	297	..
Skirving's	" 18	" 28	" 5	" 5	6	1,464	224	24	9	1,932	332	12
Prize Winner	" 18	" 28	" 5	" 5	6	1,332	222	12	7	1,180	253	..
Marquis of Lorne	" 18	" 28	" 5	" 5	6	672	211	12	6	1,860	231	..
East Lothian	" 18	" 28	" 5	" 5	6	408	206	48	7	1,576	259	36
Jumbo or Monarch	" 18	" 28	" 5	" 5	6	408	206	48	8	896	281	36
Carter's Elephant	" 18	" 28	" 5	" 5	5	1,352	198	12	7	1,312	255	12
Selected Champion	" 18	" 28	" 5	" 5	5	560	176	..	6	1,992	233	12
Improved Greystone	" 18	" 28	" 5	" 5	5	332	172	12	5	1,880	198	..
Bangholm Selected	" 18	" 28	" 5	" 5	4	1,768	162	48	6	1,464	224	24
Mammoth Clyde	" 18	" 28	" 5	" 5	4	1,504	158	24	6	1,464	224	24
Prize Purple Top	" 18	" 28	" 5	" 5	4	1,372	156	12	10	1,648	360	48
Halewood's Bronze Top	" 18	" 28	" 5	" 5	4	316	138	36	8	1,160	286	..
Giant King	" 18	" 28	" 5	" 5	3	468	107	48	7	338	239	48

MANGELS—Test of Varieties.

Gate-post	May 18	May 28	Oct. 4	Oct. 4	12	420	407	..	13	1,984	466	24
Norbitan Giant	" 18	" 28	" 4	" 4	11	1,760	396	..	12	420	407	..
Giant Yellow Globe	" 18	" 28	" 4	" 4	11	1,628	393	48	13	1,324	455	24
Giant Yellow half-long	" 18	" 28	" 4	" 4	10	1,912	365	12	14	1,568	492	48
Champion Yellow Globe	" 18	" 28	" 4	" 4	10	1,912	365	12	12	1,476	424	36
Yellow Intermediate	" 18	" 28	" 4	" 4	10	1,912	365	12	15	1,944	532	24
Mammoth Long Red	" 18	" 28	" 4	" 4	10	1,780	363	..	13	268	437	48
Giant Yellow Intermediate, Steele	" 18	" 28	" 4	" 4	10	1,120	352	..	13	1,852	464	12
Selected Mammoth Long Red	" 18	" 28	" 4	" 4	10	1,120	352	.	12	1,476	424	36
Prize Mammoth Long Red	" 18	" 28	" 4	" 4	10	988	349	48	13	1,456	457	36
Golden Fleshed Tankard	" 18	" 28	" 4	" 4	9	1,404	323	24	13	1,852	464	12
Ward's Long oval-shaped	" 18	" 28	" 4	" 4	9	480	308	..	13	268	437	48
Red Fleshed Globe	" 18	" 28	" 4	" 4	9	216	303	36	10	460	341	..
Giant Yellow Intermediate, Pearce	" 18	" 28	" 4	" 4	9	216	303	36	13	664	444	24
Golden Tankard	" 18	" 28	" 4	" 4	8	1,820	297	..	12	684	411	24
Warden's Orange Globe	" 18	" 28	" 4	" 4	8	896	281	36	11	1,628	393	48
Canadian Giant	" 18	" 28	" 4	" 4	7	388	239	48	11	176	369	36
Red Fleshed Tankard	" 18	" 28	" 4	" 4	6	1,728	228	48	8	92	268	12

CARROTS—Test of Varieties.

Name of Variety.	1st Plot Sown.	2nd Plot Sown.	1st Plot Pulled.	2nd Plot Pulled.	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.
Improved Short White...	May 14	May 27	Oct. 6	Oct. 6	3	1,524	125	24	3	468	107	48
Mammoth White Intermediate.	" 14	" 27	" 6	" 6	3	1,128	118	48	3	1,128	118	48
Iverson's Champion	" 14	" 27	" 6	" 6	3	996	116	36	4	448	140	48
White Belgian	" 14	" 27	" 6	" 6	3	852	114	12	3	1,392	123	12
Green-top White Orthe..	" 14	" 27	" 6	" 6	3	600	110	..	2	1,016	83	36
Guerande or Oxheart...	" 14	" 27	" 6	" 6	3	600	110	..	3	204	103	24
Half-long White	" 14	" 27	" 6	" 6	3	204	103	24	3	864	114	24
Half-long Chantenay....	" 14	" 27	" 6	" 6	3	72	101	12	3	1,524	125	24
Giant White Vosges.	" 14	" 27	" 6	" 6	2	1,544	92	24	3	1,392	123	12
Early Gem	" 14	" 27	" 6	" 6	2	1,412	90	12	2	1,808	96	48
Carter's Orange Giant....	" 14	" 27	" 6	" 6	2	1,016	83	36	3	76	101	12
Scarlet Intermediate.	" 14	" 27	" 6	" 6	2	1,016	83	36	2	352	72	36
Yellow Intermediate	" 14	" 27	" 6	" 6	2	1,016	83	36	2	1,676	94	36
Long Orange or Surrey..	" 14	" 27	" 6	" 6	2	752	79	12	2	620	77	..
Long Scarlet Altringham.	" 14	" 27	" 6	" 6	1	1,960	66	..	1	1,036	50	36

SUGAR-BEETS—Test of Varieties.

Danish Improved..	May 18	May 28	Oct. 4	Oct. 4	10	1,252	354	12	11	308	371	48
Danish Red-top	" 18	" 28	" 4	" 4	9	1,932	332	12	12	1,740	429	..
Improved Imperial	" 18	" 28	" 4	" 4	9	1,140	319	..	8	1,292	288	12
Wanzleben	" 18	" 28	" 4	" 4	8	632	277	12	11	704	378	24
Vilmorin's Improved....	" 18	" 28	" 4	" 4	7	1,180	253	..	7	1,120	257	..
Red Top Sugar	" 18	" 28	" 4	" 4	6	1,452	224	12	8	1,028	283	48

POTATOES.

One hundred and fifteen varieties of potatoes were tested.

One hundred of these were in uniform test plots and were planted on a piece of land which was afterwards nearly submerged by the rains of 15th–18th June, and out of the hundred varieties twenty-eight were entirely destroyed. The varieties giving the larger yields were on a high part of the plot and were not put back or injured by the water, on this account, the results reported on this year cannot be regarded as a reliable test of the relative productions of the different sorts planted. Many of the varieties were scabby and a great many small tubers were found in all the sorts. There were no rotten potatoes in any of the plots.

The potatoes were planted in rows thirty inches apart and twelve inches apart in the rows. The soil was a clay loam and the yield per acre has been calculated from the product of two rows each 66 feet long.

POTATOES—Test of Varieties.

Name of Variety.	Planted.	Dug.	Character of Growth.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.	
				Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Lee's Favourite	May 17.	Oct. 4.	Fair	530	24	387	12	143	12
Northern Spy	" 17.	" 4.	"	530	24	387	12	143	12
Carman No. 3	" 17.	" 4.	"	451	..	396	..	55	..
Vick's Extra Early	" 17.	" 4.	"	389	24	264	..	125	24
World's Fair	" 17.	" 4.	"	387	12	290	24	96	48
Early White Prize	" 17.	" 4.	"	363	..	277	12	85	48
Brownell's Winner	" 17.	" 4.	"	330	..	290	24	39	36
Clarke's No. 1	" 17.	" 4.	"	330	..	246	24	83	36
White Beauty	" 17.	" 4.	"	325	36	228	48	96	48
Ohio Junior	" 17.	" 4.	"	321	12	246	24	74	48
I. X. L	" 17.	" 4.	"	316	48	184	48	132	..
Seedling No. 230	" 17.	" 4.	"	314	36	224	24	90	12
Flemish Beauty Seedling	" 17.	" 4.	"	310	..	255	..	55	..
Dakota Red	" 17.	" 4.	"	305	48	279	24	26	24
New Variety No. 1	" 17.	" 4.	"	301	24	253	..	48	24
Seedling No. 7	" 17.	" 4.	"	292	36	246	24	46	12
American Wonder	" 17.	" 4.	"	290	24	176	..	114	24
State of Maine	" 17.	" 4.	"	290	24	242	..	48	24
Early Sunrise	" 17.	" 4.	"	288	12	222	12	66	..
Charles Downing	" 17.	" 4.	"	286	..	169	24	116	36
Lizzie's Pride	" 17.	" 4.	Weak	283	48	255	12	28	36
Early Norther	" 17.	" 4.	"	277	12	237	36	39	36
Quaker City	" 17.	" 4.	"	272	48	211	12	61	36
Polaris	" 17.	" 4.	Rank	268	24	239	48	28	36
Dreer's Standard	" 17.	" 4.	Weak	266	12	226	36	39	36
Irish Daisy	" 17.	" 4.	"	262	..	233	24	28	36
Victor Rose	" 17.	" 4.	"	257	24	215	36	41	48
Holborn Abundance	" 17.	" 4.	"	255	12	176	..	79	12
Early Gem	" 17.	" 4.	"	248	12	193	12	55	..
Early Puritan	" 17.	" 4.	"	246	24	182	36	63	48
Prize-taker	" 17.	" 4.	"	246	24	206	48	39	36
Rural Blush	" 17.	" 4.	"	231	24	194	..	37	24
Reeve's Rose	" 17	" 4.	"	231	..	195	48	35	12
Maggie Murphy	" 17.	" 4.	"	226	36	193	36	33	..
Holton Rose	" 17.	" 4.	"	226	..	176	..	50	..
Columbus	" 17.	" 4.	"	224	24	204	36	19	48
Algoma, No. 1	" 17.	" 4.	"	224	24	180	24	44	..
McKenzie	" 17.	" 4.	"	222	12	176	..	46	12
Pride of the Market	" 17.	" 4.	"	220	..	191	24	28	36
Daisy	" 17.	" 4.	"	217	48	156	12	61	36
Wonder of the World	" 17.	" 4.	"	215	36	158	24	57	12
Empire State	" 17.	" 4.	.	213	24	184	48	28	36
Satisfaction	" 17.	" 4.	"	211	12	176	..	35	12
Record	" 17.	" 4.	"	211	12	140	48	70	24
Hale's Champion	" 17.	" 4.	"	207	..	156	24	50	36
Stourbridge Glory	" 17.	" 4.	"	204	36	173	48	30	48
Fillbasket	" 17.	" 4.	"	198	..	143	..	55	..
Early Rose	" 17.	" 4.	"	198	..	171	36	26	24
Seedling No. 314	" 17.	" 4.	"	197	..	135	..	62	..
Russell Seedling	" 17.	" 4.	"	180	..	120	..	60	..
Vanier	" 17.	" 4.	"	173	48	138	36	35	12
Late Puritan	" 17.	" 4.	"	169	24	105	48	63	36
Harbinger	" 17.	" 4.	"	169	24	147	24	22	..
Reading Giant	" 17.	" 4	"	160	36	118	48	41	48
Early Harvest	" 17.	" 4.	"	158	24	123	12	35	12
Irish Cobbler	" 17.	" 4.	"	156	12	105	36	50	36
Sharpe's Seedling	" 17.	" 4.	"	156	12	127	36	28	36
Delaware	" 17.	" 4.	"	151	48	112	12	39	36
Crown Jewel	" 17.	" 4.	"	145	12	110	..	35	12
Orphan's	" 17	" 4.	"	138	36	94	36	44	..
Early Ohio	" 17.	" 4.	"	134	12	110	..	24	12
Everett	" 17.	" 4.	"	129	48	116	36	13	12
Seattle	" 17.	" 4.	"	129	48	101	12	28	36
Burpee's Extra Early	" 17.	" 4.	"	129	48	101	12	28	36

POTATOES.—Test of Varieties.—*Continued.*

Name of Variety.	Planted.	Dug.	Character of Growth.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.	
				Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Carman No. 1	May 17.	Oct. 4.	Weak	129	48	105	36	24	12
Rose No. 9	" 17.	" 4.	"	127	36	99	..	28	36
Beauty of Hebron	" 17.	" 4.	"	127	36	118	48	8	48
Hopeful	" 17.	" 4.	"	125	24	77	..	48	24
Good News	" 17.	" 4.	"	123	12	96	48	26	24
Burnaby Seedling	" 17.	" 4.	"	105	36	.....		105	36
Troy Seedling	" 17.	" 4.	"	100	..	66	..	34	..
Table King	" 17.	" 4.	"	92	24	68	12	24	12
King of the Roses	" 17.	" 4.	"	79	..	52	48	26	12
Bill Nye	" 17.	" 4.	"	77	..	61	36	15	24
Honeoye Rose	" 17.	" 4.	"	48	24	35	12	13	12
Brown's Rot-proof	" 17.								
Clay Rose	" 17.								
American Giant	" 17.								
Chicago Market	" 17.								
Early Market	" 17.								
Earliest of all	" 17.								
Early Six-weeks	" 17.								
Freeman	" 17.								
Great Divide	" 17.								
General Gordon	" 17.								
Green Mountain	" 17.								
Irish Beauty	" 17.								
Ideal	" 17.								
Lightning Express	" 17.	Killed out by water.							
London	" 17.								
Monroe County	" 17.								
Money-maker	" 17.								
Peerless Junior	" 17.								
Pride of the Table	" 17.								
Pearce's Extra Early	" 17.								
Pearce's Prize Winner	" 17.								
New Queen	" 17.								
Queen of the Valley	" 17.								
Rochester Rose	" 17.								
Rural No. 2	" 17.								
Thorburn	" 17.								
Toronto Queen	May 17.	Oct. 4.	Fair	431	12	378	24	52	48
Great Northern	" 17.	" 4.	"	330	..	264	..	66	..
Uncle Sam	" 17.	" 4.	"	323	24	264	..	59	24
American Giant	" 17.	" 4.	"	297	..	242	..	55	..
Sir Walter Raleigh	" 17.	" 4.	Weak	264	..	193	36	70	24
Clarke's Extra Early	" 17.	" 4.	"	228	48	206	48	22	..
Maule's Thoroughbred	" 17.	" 4.	"	189	12	162	48	26	24
Puritan No. 1	" 17.	" 4.	"	187	..	171	36	15	24
Early London	" 17.	" 4.	"	173	48	149	36	24	12
Early Summer	" 17.	" 4.	"	171	36	132	..	39	36
She	" 17.	" 4.	"	162	48	99	..	63	48
Bovee	" 17.	" 4.	"	162	48	107	48	55	..
Wonderful Clayrose	" 17.	" 4.	"	134	12	114	24	19	48
Primrose	" 17.	" 4.	"	116	..	106	..	10	..

VEGETABLE GARDEN.

The spring being very dry during the whole of the month of May and the first half of June, was unfavourable for the vegetable garden. In places where snow banks had collected during the winter, and when melted left moisture, the vegetable seeds germinated quickly and gave good returns, but where there was little or no moisture from this source the seeds remained till 20th June before starting, and as a rule the returns were small. The season was favourable for anything started in the hot beds. Attention is drawn to the difference between onions started in the hot beds and those grown in the garden, details of which will be found following. The season was also very favourable for tomatoes, the weather both during the day and at night being warm for a longer period than is usual.

ASPARAGUS.

Three varieties were grown in beds planted in 1893 and 1891. These were Conover's Colossal, Barr's Mammoth and Donald's Elmira.

Donald's Elmira produced the largest stalks, but Conover's Colossal was the earliest and gave the best average cuttings. First cut 1st May, continued in use till 1st July.

BEANS.

Eleven varieties were tested.

Early Valentine Wax was fit for use on	July	20.
Pearce's Golden Beauty	"	" 24.
Kenny's Rust Proof	"	" 24.
Wardwell's Kidney Wax	"	" 24.
Golden Eye Wax	"	" 24.
Challenge Black Wax	"	" 24.
Yellow Six-weeks	"	" 24.
Detroit Wax	"	" 30.
Lima Wax	"	" 30.
German White Wax	"	" 30.

All ripe on 8th September.

Broad Windsor beans came up slowly but did not ripen.

Wardwell's Kidney Wax had the best pods and was the finest bean.

BEETS.

Nine varieties were sown on 23rd April. Came up well, but were killed by wind on 22nd May. Re-sown 25th May. Grew well and were lifted on 25th September.

Name of Variety.	Fit for use.	Bu per acre.	Remarks.
Arlington Favourite Blood Turnip	July 10..	1,000	Very good.
Dewar's Half-long	" 20..	980	Good.
Detroit	" 2..	980	Very good.
Long Smooth Blood	" 20..	960	Good.
Simmer's Extra Early	" 2.	880	Very good.
Columbia	" 10..	780	Poor quality.
Edmund's Blood Turnip	" 10..	770	Very good.
Bousecour's Market	" 20..	680	"
Covent Garden	" 10..	580	Small; good.

CARROTS.

Nine varieties were sown on 23rd April, but on account of dry weather were a complete failure.

CABBAGE.

Sown in hot-bed, 6th April. Transplanted into frames, 6th May. Transplanted into garden, 4th June.

Name of Variety.	Fit for use.	Weight of Heads.	Remarks.
		Lbs.	
Luxemburgh	Sept. 1..	8	Fair.
Vaughan's Allhead	Aug. 13..	14	Extra good.
Early Standard	" 10..	10	Good.
Burpee's Allhead	" 13..	16	Extra good.
First and Best	" 13..	11	Good.
Bruce's Winter	Sept. 1..	13	"
The Lupton	Aug. 20..	8	Poor.
Brunswick Short Stem	Sept. 1..	10	Fair.
Matchless Flat Dutch	" 1..	10	Good.
Brunswick	" 1..	15	Extra good.
Fielder	" 1..	5	Poor.
Mammoth Red Rock	" 1..	3	"
Earliest Dwarf Red	" 1..	2	"
Improved Pickling	" 1..	2	"
Dwarf Early Savoy	" 1..	..	"
Lorenz's Favourite Savoy	" 1..	..	"
Brunswick Savoy	" 1..	..	"
Surehead	" 1..	10	Good.
Vandergaw	" 1..	13	Extra good.

Cabbage, sown in cold frame and transplanted direct to garden.

Seed sown in cold frame 29th April. Plants set out in garden 10th June.

Name of Variety.	Fit to use.	Weight of Head.	Remarks.
		Lbs.	
Burpee's All-head	Aug. 20..	14	Extra good.
Vaughan's First and Best	" 20 .	11	"
Early Summer	" 20..	7	"

The above were just as good as the same varieties sown in hot beds, transplanted to cold-frames, thence to garden and were a great deal less trouble. Only second-early varieties should, however, be grown in this way.

CAULIFLOWER.

Nine varieties were sown in hot bed on 6th April, and again on 12th April, but only about 40 plants came up. The varieties were again sown very thick in cold-frame on 29th April, and from the plants which grew one of the best crops ever raised on the farm

was produced. Autumn King was the only variety which came up in the hot bed but it is too late for the North-west Territories.

Name of Variety.	Transplanted to Garden.	Fit for use.	Remarks.
Earliest Dwarf Erfurt	June 10..	Aug. 13..	Very good.
X X X Erfurt	" 10..	" 13..	"
Extra Early Whitehead	" 10..	" 13..	Large and good.
Henderson's Early Snowball	" 10..	" 15..	Very good.
World's Best Snowball	" 10..	" 15..	Good.
High Grade Dwarf Erfurt	" 10..	" 13..	Very good.
Gilt Edge	" 10..	" 15..	Good.
Autumn King	" 10..	Sept. 1..	Cut one head.
Selected Early Erfurt—Bruce	" 10..	Aug. 15..	Extra good.

CELERY.

Seven varieties were sown in hod-beds on 6th April, transplanted to cold-frame 6th May, transplanted to trenches 2nd July, and fit for use 10th September, and lifted 15th October.

Giant Pascal—very good.
Red Pascal—one of the best.
White Plume—very good.
Paris Golden Yellow—very good.
Dwarf White Golden-heart—very good.
Pink Plume—very good.
New Dwarf Red—small.

Some celery seed was also sown in the open ground but the plants did not grow to any size.

CUCUMBERS.

Eleven varieties were sown in pots in the hot-bed on 15th April, and planted out in frames in garden on 20th May.

Swan Neck—none grew.
Peerless White Spine—in use 12th July. Very fine.
Pride of Canada—none grew.
Cool and Crisp—in use 12th July. Very fine.
Giant White Perfection—none grew.
White Wonder—In use 8th July. Small, but good crop.
New Giant Pera—in use 12th July. Good crop.
Livingstone's Emerald—in use 12th July. Very fine.
White Wonder (Simmer's)—in use 8th July. Very fine.
Paris Pickling—in use 12th July. Extra good.
New Siberian—in use 1st July. Good.

These varieties were again sown on 15th May in the garden, under protection of small frames. They gave a fair crop, but were neither as early nor as prolific as those which were forced in the hot-bed.

CORN.

The following seven varieties were planted on 20th May, but on account of dry weather did not germinate until after rain on 15th June:—Ford's Sugar, Early Market, Early Cory, First of All, Minnesota, Mitchell's Extra Early and Squaw. All except Squaw, which did not grow, were fit to use on 1st September. No corn of any variety ripened during 1897.

CITRONS.

Colorado Preserving was sown 19th April, planted out on 20th May, and gave a very good crop of large citrons.

LETTUCE—2 SEEDINGS.

1st seeding, sown 27th April—fit for use 25th June.
2nd seeding, sown 1st June—fit for use through September.
Early Curled Simpson—did not make close heads, but was large and of excellent quality.
St. Louis—fine large heads.
New Asparagus—poor, long, narrow leaves.
Silver Ball—extra fine, large heads.
Denver Market—fine large heads.
Toronto Gem—fair.

MELONS.

Newport, Earliest of All and Emerald Gem musk melons were sown in pots in a hot bed on 19th April and put out in frames in the gardens on 20th May. All bore a large quantity of fruit but only four Earliest of All and one Emerald Gem ripened, quality good.
Black Spanish water-melon was sown but did not ripen.

MARROWS AND SQUASH.

Bush Marrows were sown 15th May in frames in garden and produced a large crop of small marrows.
Scallop Squash sown 15th May in frames in garden, produced a fair crop.

KALE.

Scotch and Lorenz's finest garnishing, sown in hot-bed 6th April; transplanted to cold frames 6th May; to garden 4th June. Both very fine.

BRUSSEL'S SPROUTS.

New Giant and Improved Exhibition sown 6th April. Transplanted 6th May. Did not do well.

ONIONS—Sown in Hot-bed and Transplanted.

Name of Variety.	Sown in Hot-bed.	Trans-planted in Garden.	Taken up.	Bushels per Acre.	Remarks.
Red Victor	April 6..	June 7..	Sept. 16..	480	Very large.
Prize Taker	" 6..	" 7..	" 16..	440	Early; fine shape.
Yellow Dutch Setts	" 16..	" 7..	" 16..	440	Very large.
Red Globe	" 6..	" 7..	" 16..	400	Large and coarse.
Large Yellow Danvers	" 6..	" 7..	" 16..	380	Extra fine.
White Globe	" 6..	" 7..	" 16..	320	"
Red Globe (Exp. Farm seed)	" 6..	" 7..	" 16..	320	Very large.

The above were much larger than the same varieties sown in the open ground but they did not ripen as well nor will they keep as long.

ONIONS.—Sown in the open ground.

Name of Variety.	Sown.	Taken up.	Bushels per Acre.	Remarks.
Large Yellow Danvers	April 16..	Sept. 16..	380	Very fine.
World-beater Wethersfield	" 16..	" 16..	360	"
Red Globe	" 16..	" 16..	280	"
Large Red Wethersfield	" 16..	" 16..	280	"
Red Globe (Ex. Farm seed)	" 16 .	" 16..	240	"
White Globe	" 16..	" 16.	200	"
New Queen	" 16..	" 16..	180	Extra fine pickling
White Silver Skin	" 16..	" 16..	100	"

The above were rather small but were of excellent quality and ripened well. One bed of Large Red Wethersfield sown the fall of 1896, came up on the same day as those sown in the spring and no difference could be seen between them all season.

PEASE.

Ten varieties were sown on 24th April, and nine varieties on 5th May. With the exception of a few feet on one end of each row of those sown on 24th April, none came up till after rain on 15th June. The crop was consequently very late.

Name of Variety.	Sown.	Fit for use.	Ripe.	Remarks.
Wm. Hurst	April 24..	July 12..	Aug. 31 ..	Extra good.
Daisy	" 24..	" 24 ..	Sept. 10..	One of the best.
American Wonder	" 24..	" 12 ..	Aug. 31..	Good.
Laxton's Alpha	" 24..	" 12..	" 31..	"
Eclipse	" 24..	" 10..	" 31..	"
Shropshire Hero	" 24..	" 24..	Sept. 10..	" but late.
Yorkshire Hero	" 24..	" 24..	" 10..	" "
Telephone	" 24..	" 24..	" 10..	Extra good ; large pods.
Stratagem	" 24..	" 20..	" 10..	"
Heroine	" 24..	" 24 ..	" 10..	Large and prolific.
New Queen	May 5..	" 24..	" 10..	Good ; late variety.
Alaska	" 5..	" 12..	Aug. 31..	Early ; small.
Nott's Excelsior	" 5..	" 12..	" 31..	Good.
Horsford's Market Garden	" 5..	Aug. 10..	.....	Did not ripen ; very prolific.
Burpee's Profusion	" 5..	" 10..	.....	" "
S. R. M. Extra Early	" 5..	July 12..	Aug. 31..	Small.
Little Giant	" 5.	" 12..	" 31..	Extra good.
Champion of England	" 5..	Aug. 30..	.....	Did not ripen.
C.P.R.	" 5..	Sept. 1..	.....	Frozen ; too late.

PUMPKINS.

Connecticut Field, Jumbo and Prize were sown on 15th May. Protected by boxes, provided with light 12 x 12 glass. Connecticut Field was very fine ; of good size and all ripened. Jumbo and Prize were larger but did not quite mature.

PARSNIPS.

Magnum Bonum, Hollow Crown and New Intermediate were sown 17th April. All came up well but the crop was poor and the roots very small.

RADISHES.

Nine varieties were sown on 27th April. All came up well but were frozen down. Resown 10th May, and again on 1st June. All were fit to use six weeks after seeding.

Olive Gem ; good.
Rosy Gem ; good.
In & Out ; very good ; ready in 40 days.
Early Eclipse ; poor crop.
Ne plus ultra ; poor crop.
Long White Vienna ; good.
Scarlet Turnip ; poor.
Earliest White ; poor.
Colorado Glass ; extra good.

RHUBARB.

The old beds of Linnæus, Victoria and Tottle's Improved did well, but some of the plants have died although all the crowns were sprayed with Bordeaux mixture. A new bed 2 years old of Victoria and Large Green made a strong growth.

PEPPERS.

Sweet Spanish and Red Bell were sown. Both set a good crop, but did not ripen.

HERBS

Moss Curled Parsley, Sage, Summer Savory and Borage were sown on 26th April, and all did well.

EGG PLANTS.

Early Purple and White Pearl were sown. The former had two to four good sized fruits on each plant. White Pearl did not set any fruit.

TOMATOES.

Seven varieties were tested and all did well except Livingstone's Honor-Bright, which never seemed healthy. All the others bore a large crop of ripe fruit before frozen. The night before frost came, the vines were covered with frames and a further crop of ripe fruit was the result.

Name of Variety.	Sown.	Potted.	Transplanted.	Ripe.	Remarks.
Canada	April 5..	May 17..	June 9..	Sept. 1..	Extra fine, late.
Imperial	" 5..	" 17..	" 9..	" 1..	" "
Earliest of All	" 5..	" 17..	" 9..	Aug. 7..	Fair, early.
Early Atlantic	" 5..	" 17..	" 9..	" 20..	Extra fine.
Everbearing	" 5..	" 17..	" 9..	" 25..	Prolific.
Yellow Plum	" 5..	" 17..	" 9..	" 21..	Fine.
Honor-Bright	" 5..	" 17..	" 9..	Sept. 1..	Poor crop.

TOBACCO.

Sown in hot-bed, 20th April; planted out, 4th June. Suckers and flower-buds were trimmed off. Cut 9th September, and seemed fairly well matured.

FLOWER GARDEN.

As in preceding years as many varieties as possible were tested. On the whole the season was not favourable for the culture of flowers and many varieties did not do as well as formerly.

ANNUALS.

Grown in hot-bed and transplanted.

Name of Variety.	Sown in Hot-bed.	Trans-planted to Garden.	In bloom.		Remarks.
			From	Till	
Asters, 10 varieties	April 6..	June 23..	Aug. 20..	Sept. 9..	Very poor this year.
Carnation Marguerite	" 6..	" 23..	Sept. 1..	Frozen ...	Good show.
Dianthus, 10 varieties	" 6..	" 23..	Aug. 1..	"	Extra fine.
Stocks, 4 "	" 6..	" 23..	July 24..	"	Flowers fair.
Pansies, 12 "	" 6..	" 23..	" 24..	Nov'r	Did well.
Antirrhinum	" 6..	" 23..	Aug. 10..	Frozen....	Good show.
Petunia, Double	" 6..	" 23..	" 10..	" ...	Very few double.
Verbena	" 6..	" 23..	" 10..	"	Good.
Brachycome	" 6..	" 23..	" 10..	" ...	Showy.
Amaranthus	" 6..	" 23..	" 10..	"	Only one plant. Fine.
Linum Scarlet	" 6..	" 23..	" 10..	"	Good show.
Calliopsis	" 6..	" 23..	" 10..	"	Very poor.
Zinnia Elegans	" 6..	" 23..	" 10..	"	Extra fine.
Phlox Drummondi	" 6..	" 23..	" 10..	"	Good show.
Sunflower, Double	" 6..	" 8..	" 1..	"	Very fine.
Marigold, Eldorado	" 6..	" 20..	" 1..	"	"
Nicotiana Affinis	" 6 .	" 20..	" 1..	"	Very fine, morning and evening but does not look well during the day.

ANNUALS SOWN IN THE OPEN GROUND.

Sweet Pea—Eckford's finest, sown 17th April; came up and grew well until heavy rains in June, when more than one-half the plants died; the remainder flowered well until frozen. Eight varieties were sown on 20th April, and all did well.

Dwarf Nasturtium—Sown 17th May. Made a good border and flowered freely until frozen.

Sweet Alyssum—Sown 17th May. Flowered freely all season.

Escholtzia—Sown 17th May. Did well; in flower all season. One of the best hardy annuals.

Phlox Drummondii—Sown 17th May; in bloom 1st July. Made a good show all season.

Candytuft—Sown 1st May. Did not do as well as in former years.

Mignonette—Four kinds were sown on 17th May. All did extra well.

Poppy—Sown 17th May. Made a good show.

Godetia—Sown 25th May. Made a good show all season.
Salpiglossis—Sown 25th May. Late in flowering, but flowers were very fine.
Convolvulus Minor—Sown 17th May. Made good bed.
Japanese Morning Glory—Sown 17th May. Made good growth of vine, but did not flower.
Larkspur—Sown 17th May. Flowers very fine, but late.

PERENNIALS.

Pæony—In bloom 20th June ; very fine.
Scarlet Lychnis—In bloom 5th June ; made a good show.
Veronica—Did not blossom.
Yellow Flax—Very fine ; one of the best perennials.
Platycodon grandiflora—White and blue. In bloom 1st July ; very fine.
Rudbeckia—Golden Glow—Very strong grower ; made a good show.
Sweet William—In bloom 5th June ; one of the best.
Columbine—In bloom 1st June ; very fine.
Delphinium grandiflorum—In bloom 1st June ; very fine.
Garden Pink—Did not do well.
Everlasting Pea—Did not do well.
Iceland Poppy—In bloom 24th May ; very showy.
Perennial Flax—Did not do as well as usual.
Spiræa Ulmaria, Filipendula and *Palmata Elegans*—All very fine.

BULBS.

Tulips—A large collection planted last fall did well this year. They were in bloom from 20th May to 20th June. Thirty-two varieties, 16 bulbs each, were planted this autumn.
Crocuses—A number were planted last fall but did not bloom this year. More were planted this season.
Hyacinths—Planted in garden last fall ; all died. Potted in house ; did well.
Narcissus—Four varieties planted last fall. Did not flower this year. Three varieties were planted this autumn for further test.
Scilla sibirica—Planted fall 1896 ; did well ; in bloom 1st May. Forty more were planted this season.
Scilla bifolia—Planted fall 1896 ; did not do well. Twenty more were planted this autumn.
Lilies—Four Lilium Candidissima were planted last fall and lived through the winter, but did not flower.
Iris—A large number of different varieties of Iris planted last fall lived through the winter and did well this season. A further supply was received and planted this autumn.
Hemerocallis—Three varieties were planted last fall, and again this spring, but the plants have not done well.

FRUIT TREES AND BUSHES.

The past season was very unfavourable for any kind of small fruit with the exception of currants.
Native fruits were almost an entire failure in many districts, while in others a fair crop was produced.
Lists are submitted giving details of the growth and fruiting of all varieties of large and small fruits growing on the Indian Head Experimental Farm.

APPLES.

A few trees of the berried crab (Pyrus baccata) blossomed, but the frost in May destroyed them; and there was no fruit.

PYRUS PLANTED, 1896.

In the following list will be found particulars of the condition of the different varities of Pyrus planted in the spring of 1896 :—

RECEIVED from Central Experimental Farm Ottawa.

Name of Variety.	Number planted, Spring 1896.	Number living, Fall 1897.	Notes on Growth.
Pyrus Baccata Edulis	4	4	Strong growth.
" Sanguinea	8	7	"
" Flava	1	1	"
" Conocarpa	1	1	"
" Macrocarpa	3	2	" 1 died, 1896.
" Aurantiaca	2	2	"
" Cerasiformis	7	6	" "
" Lutea Regel	2	1	" "
" Genuina	5	5	"
Pyrus Prunifolia	4	4	"
" Xanthocarpa	4	4	"
" Intermedia	4	4	"
Pyrus Alnifolia	5	5	"
" Spuria	4	0	4 died, winter 1896-97.
" Intermedia	4	0	" "
Seedlings raised at Indian Head.			
Pyrus Prunifolia	19	19	Strong growth.
" Baccata Macrocarpa	8	8	"
" " Genuina	8	8	"
" " Cerasiformis	13	13	"
" " Sanguinea	5	5	"

SEEDLING PLUM AND PYRUS ORCHARD, 1897

An orchard containing four plots each 210 x 250 feet has been this year laid out west of the superintendent's house.

Plot No. 1 is partially planted as follows :—

Row 1.—4 Pyrus prunifolia.
" 1.—16 " baccata yellow.
" 2, 3, 4, 5 and 6.—96 Pyrus baccata yellow.
" 7, 8.—40 seedlings of Siberian crab.

Leaving 16 rows vacant.

PLOT No. 2.

Row 1, 2, 3, 4, 5 and 6.—120 seedlings of native plums.
" 7, 8, 9, 10, 11.—100 seedlings of Hungarian plum.
" 12.—20 seedlings of Speer plum.
" 13, 14, 15, 16, 17.—100 seedlings of Weaver plum.
" 18, 19, 20, 21.—80 seedlings of De Soto plum.
" 22.—20 seedlings of Yosemite yellow "
" 23.—20 seedlings of Ida plum.
" 24.—20 seedlings of seedling No. 3 plum.

PLOT No. 3.

Row 1, 2.—40 seedlings of Speer plum.
" 3, 4.—40 " " Wolf "
" 5, 6.—40 " " Purple Yosemite plum.
" 7, 8.—40 " " Van Buren plum.
" 9, 10.—40 " " Hungarian "
" 11, 12.—40 " " Weaver "
" 13, 14.—40 " " American "
" 15.—20 " " Yosemite Yellow plum.
" 16.—20 " " Cheney plum.
" 17.—20 " " Rollingston plum.
" 18, 19, 20.—60 seedlings of Ida plum.
" 21, 22, 23.—60 " " De Soto plum.
" 24.—20 seedlings of Voronesh plum.

PLOT No. 4.

Rows 1 to 24.—Vacant.

Eighty-five per cent of the above have lived and made fair to strong growth and are in good condition for the winter. In the spring of 1898 some of the blanks will be filled with new varieties of crosses between Pyrus baccata and some of the larger varieties of apples which have been recently originated at Ottawa.

Plots No. 1 and 2 are inclosed by a hedge of seedling *Lilacs* raised from seed of *Syringa Vulgaris Chas. X.*, 18 inches high, set out 3 feet apart. Plots No. 3 and 4 by seedlings of *Caragana Arborescens*, 18 inches high, planted 30 inches apart.

These plantations when completely filled will accommodate 1,920 trees.

PLUMS.

Seedlings of Weaver.—Eighty trees were planted in the spring of 1894. Sixty-eight were living in the autumn of 1897. These have made a strong growth and appear to be hardy. One tree bore three plums this year, but they did not ripen.

Seedlings of Hungarian.—Twenty of these were planted in the spring of 1894. Five were living in the autumn of 1897. They have made strong growth and appear to be hardy. No fruit has yet been borne on any of this variety, but the trees were covered with blossoms this year; which were however frozen in May.

Seedlings of Speer.—Four of these were planted in the spring of 1895 and were all living in the autumn of 1897. They have made strong growth and appear to be hardy, but have not yet borne fruit.

Seedlings of De Soto.—Eight were planted in the spring of 1895, and 6 were living in the autumn of 1897. They have made a strong growth and seem hardy, but have as yet borne no fruit.

Seedlings of Voronesh.—Four of these were planted in the spring of 1897, and 4 were living in the autumn. They have made strong growth.

Seedlings of Imperial Blue.—Five were planted in the spring of 1895, and one was living in the autumn of 1897. This has made strong growth, but this variety does not seem sufficiently hardy to stand the climate here.

PLUMS FROM CHAS. LUEDLOFF, COLOGNE, MINN.

In the spring of 1896, 38 varieties of plums were ordered by the Director from the above nursery and when received they were planted in an inclosure. In the following list will be found the names, number planted and notes on the condition of the trees in the fall of 1897.

Name of Variety.	Number Planted.	Notes on Condition and Growth, 1897.
Purple Yosemite	2	Strong growth.
Clinton	2	1 fair growth, 1 dead.
Mi-souri Apricot	2	2 fair growth.
Deep Creek	2	2 strong growth.
Irene	2	2 fair growth ; kills back.
Milton	2	1 strong growth, 1 dead.
Anthony	2	2 "
Cottrell	2	2 fair growth.
Emerson	2	2 strong growth.
Weaver	2	2 fair growth ; partly winter killed.
Van Buren	2	2 "
Reed	2	2 " partly winter killed.
Esther	2	1 " 1 strong growth.
Forest Rose	2	2 " partly winter killed.
Dr. Dennis	2	2 " "
New William	2	2 "
Newman	2	2 strong growth.
Van Deman	2	2 "
Yellow Sweet	2	1 fair growth, 1 strong growth.
Chas. Downing	2	1 " "
Ocheeda	2	2 strong growth.
Speer	2	1 " 1 dead.
American Eagle	2	2 fair growth.
Col. Wilder	2	2 "
Pepper's Puritan	2	2 "
Dunlop No. 1	2	1 strong growth, 1 broken.
Wood	2	1 " 1 dead.
Illinois Iron-clad	2	1 fair growth, 1 dead.
Crescent City	2	2 strong growth.
Large Red Sweet	2	2 "
Hammer	2	1 " 1 fair growth.
Silas Wilson	2	2 "
City	2	2 fair growth.
Richland	2	1 " 1 dead.
Gaylord	2	1 " "
Moldavka	2	2 "
Neil's	2	1 " "
Hawkeye	2	2 "

PLUMS FROM THE CENTRAL EXPERIMENTAL FARM, OTTAWA, PLANTED 1897.

De Soto	2	
Aikin	1	
Hoskin	1	

MANITOBA NATIVE PLUM.

Planted 1895, and grown from seed planted on this farm.

Three trees grown from seed planted on the Experimental Farm, Indian Head, bore fruit this season. The crop was not large but the fruit was of fair size and quality.

The following trees (from Stonewall, Man.) were planted in 1895. These have not yet borne fruit, but those living will probably do so in 1898 :—

Variety No.	No. Planted.	Notes on Growth, 1897.
No. 60	2	1 strong growth, 1 dead.
" 27	3	2 " 1 "
" 7	2	2 fair growth.
" 12	1	Dead.
" 32	1	"
" 29	2	1 strong growth, 1 weak growth.
" 47	3	1 " 2 dead.
" 59	1	1 "
" 63	1	1 "
" 23	1	Dead.
" 53	1	1 strong growth.
" 22	2	1 fair growth, 1 dead.
" 84	2	1 strong growth, 1 dead.
" 64	2	2 strong growth.
" 46	2	2 dead.
" 31	2	2 strong growth.
" 21	3	2 " 1 dead.
" 94	1	Dead.
" 14	1	"
" 52	1	"
" 36	3	2 strong growth, 1 dead.
" 15	1	1 fair growth.
" 27	1	Dead.
" 63	1	"
" 88	1	Strong growth.
" 79	1	Dead.
" 12	1	"
" 11	1	"
" 91	2	2 strong growth.
" 65	2	"
" 71	1	Dead.
" 56	2	1 fair growth, 1 dead.
" 67	2	2 strong growth.
" 26	2	1 strong growth, 1 dead.
" 69	1	1 "
" 40	1	1 "
" 51	1	1 "
" 30	2	1 " 1 dead.
" 61	2	1 " 1 "
" 86	1	1 "
" 85	1	1 "
" 89	2	2 "
" 57	2	2 "
" 76	2	2 dead.
" 81	1	1 strong growth.
" 41	1	1 "
" 68	2	2 "
" 39	1	1 "
" 67	2	2 "

CHERRIES.

Mahaleb.—One tree planted, 1897. Fair growth.

Seedlings of Carnation.—Five were planted in the spring of 1894, and one was living in the autumn of 1897. This tree has made fair growth.

Seedlings of Lithauer Weichsel.—Twenty of these were planted in the spring of 1894, and six were living in the autumn of 1897. These have made fair growth.

Seedlings of Olivet.—Four were planted in the spring of 1895, and all have since died.

Seedlings of Minnesota Ostheim.—Thirty-five of these were planted in the spring of 1895, and 11 were living in the autumn of 1897. These have made strong growth.

Rocky Mountain Cherry.—Fourteen were planted in the spring of 1895, and 12 were living in the autumn of 1897. Some of these fruited this year and made strong growth. The fruit was good.

Wild Cherry from Nebraska.—Four of these were planted in the spring of 1896, and 3 were living in the autumn of 1897. They appear to be hardy and have made strong growth.

Sand Cherry.—One hundred and eighty were planted in the spring of 1894, 168 are now living. These appear to be hardy and have made strong growth and 12 of them have borne fruit.

APRICOTS.

Two Apricots from Turkestan were planted last spring and have made fair growth.

PEARS.

One Longworth pear was planted last season and has made fair progress.

GRAPES.

Gibb.—Five were planted in the spring of 1895. All are living but have made slow growth.

Bacchus.—Five were planted in the spring of 1895. All are living and have made fair growth.

Manitoba Native Wild Grape.—Three were planted in the spring of 1895. All are living and have made strong growth, but none of them have yet borne fruit.

SMALL FRUITS.

The currants planted previous to 1896; both white and red produced a good crop last season, but the black currants were small and the crop light.

White.

White Grape,	3	planted,	1896;	fair growth, no fruit.
White Imperial,	3	"	1897	" "

Red.

PLANTED, 1896.

Raby Castle,	3	trees;	strong growth,	few berries.
Victoria,	3	"	fair "	no fruit.
Red Dutch,	2	"	" "	few berries.
Versillaise,	4	"	" "	very large, fine.
Fertile d'Angers,	3	"	weak "	no fruit.
Fay's Prolific,	2	"	fair "	very fine.
Cherry,	4	"	" "	few good bunches.
Prince Albert,	3	"	strong "	"
Red Dutch,	4	"	" "	"
2/2	4	"	" "	no fruit.
Dakota Tree Currant,	2	"	" "	no fruit.

Section of part of shelter belt chiefly Box-elder, eight years planted, 100 feet wide, extending about 1¾ mile along west and north boundaries of Experimental Farm, Indian Head, N.W.T.

Shelter belt of Aspen or Tremulous Poplar, *Populus tremuloides*, at the Experimental Farm at Indian Head, N.W.T., nine years planted.

PLANTED, 1897.

North Star, 3 trees; strong growth.
Pomona, 3 " fair "

BLACK CURRANTS, PLANTED, 1896.

Lewis,	3 trees;	fair growth,	no fruit.
Oxford,	2 "	" "	"
Winona,	3 "	strong "	few fair berries.
Perth,	1 "	weak "	no fruit.
Ethel	4 "	strong "	"
Eclipse,	4 "	" "	few on one bush.
Kerry,	3 "	" "	no fruit.
Madoc,	3 "	fair "	"
Star,	4 "	" "	"
Sterling,	4 "	strong "	1 bush good crop, 3 none
Orton,	4 "	" "	no fruit.
Standard,	3 "	" "	few berries.
Perry,	3 "	" "	no fruit.
Eagle,	4 "	fair "	1 bush good fruit, 3 none.
Monarch,	4 "	" "	no fruit.
Charmer,	4 "	strong "	few good berries.
Beauty,	4 "	" "	fair crop, fine fruit.
Ontario,	4 "	" "	a few berries.
Stewart,	4 "	" "	no fruit.
Clipper,	4 "	" "	small crop, fair size.
Climax,	4 "	" "	no fruit.
Star,	4 "	" "	a few good berries.

PLANTED 1897.

Victoria, 3 trees; weak growth.
Crandall, 3 " strong "

RASPBERRIES.

Planted 1893.

Dr. Reider.—Fair crop fine flavoured berries.
Philadelphia.—Small crop.
Turner.—Fair crop of small berries.
Caroline.—Winter killed. No fruit.
Golden Queen.—Winter killed. No fruit.

Planted, Spring 1897.

Garfield	6	planted.—	3 dead, 3 strong growth.
Craig	8	"	8 fair growth.
Muriel	6	"	1 dead, 5 fair growth.
Percy	2	"	2 dead.
Caroline	2	"	1 dead, 1 strong growth.
Lady Ann	3	"	3 fair growth.
Sir John	2	"	1 dead, 1 strong growth.
Sharpe	6	"	5 " 1 fair growth.
R. B. Whyte	2	"	2 "

Empire	3	planted.—2	dead,	1	fair	growth.	
Carleton	2	"	2	"			
Sarah	12	"	10	"	2	"	"
Miller	6	"	3	"	3	"	"
Kenyon	12	"	9	"	3	"	"

Saunders' Large Red 2 planted 1 dead, 1 weak growth.

BLACK AND PURPLE CAP RASPBERRIES.

Planted 1893.

Schaffers' Colossal and Early Ohio bore fruit. Berries small and of medium quality.

Planted 1897.

12 Older.—All dead, fall 1897.
12 Progress.— " " "
1 Charles.—Fair growth.
1 Royal.— " "

GOOSEBERRIES.

Planted 1893.

Smith's Improved	45	trees planted,	38	living.	Fair crop.	
Lancashire Lad	2	" "	1	"	"	"
Governess	2	" "	1	"	No fruit.	
Columbus	2	" "	2	"	Few, very large.	
Houghton	25	" "	23	"	Fair crop.	
Native	5	" "	2	"	Small.	

Planted 1897.

Golden Prolific	3	planted,	2	dead, 1 weak growth.
Red Jacket	3	"	3	"
Keepsake	3	"	3	weak growth.
Pearl	4	"	2	dead, 2 weak growth.

STRAWBERRIES.

Planted 1895.

Windsor Chief, New Dominion and Pine Apple bore a small crop of poor fruit.

Planted 1896.

13 Mitchell's Early	All dead, spring 1897.
13 Timbrell	" " "
13 Hilton Gem	" " "
13 Brandywine	" " "
12 Mrs. Cleveland	" " "
13 Marshall	2 living, spring 1897.

Planted 1897.

On 15th August the following plants were received from the Central Experimental Farm, Ottawa, and planted in cold frame. In spring of 1898 they will be set out in beds in garden.

25 Scarlet Queen.
25 Brandywine.
25 Gem, P.
25 Paris King.
25 Wm. Belt.
25 H. W. Becher.
20 Alpine No. 5.

FOREST TREES.

Since tree culture on the farm commenced, trees have never made more satisfactory progress than during the past season.

The spring being unfavourable for early growth, no set backs in the way of April or May frosts were encountered, and the trees, when the growth did start, made excellent progress during the entire season. Single trees, hedges and wind breaks all did well, and only one tree was lost on the avenues of the farm.

Among the trees transplanted last spring, losses occurred with the Norway Spruce. A good many were transplanted during the second week of May when the weather was dry and windy, and after that date and on 21st and 22nd May a strong windstorm which lasted for 48 hours killed all that had not become firmly rooted.

The planting of hedges around fields for protection from winds was continued last spring. Those set out in 1896 have done very well. Next spring planting will complete the hedges around every field on the farm with the exception of the pasture inclosure. The trees used for this purpose are principally native maple (*Acer negundo*) 2 or 3 years old.

In the spring of 1895, five one-half acre plots of trees were planted at different distances apart, for the purpose of ascertaining the cost of planting and keeping clean and in a thriving condition until the trees shade the ground sufficiently to prevent the growth of weeds, and hence need no further cultivation. These trees were planted as follows:—

	Plot No. 1.	Box Elder.	Set out 2½	feet	apart each way.
	" 2	"	" 3	"	
	" 3	"	" 3½	"	
	" 4	"	" 4	"	
and	" 5	Green Ash	" 2½	"	

In addition to these were

Plot No. 6, ½ acre Box Elder seed, sown in rows 2½ feet apart, and plot No. 7, ½ acre Green Ash seed, sown in rows 2½ feet apart.

Following will be found the cost of taking care of these trees for the 1st, 2nd and 3rd years.

PLOT NO. 1.—½ ACRE.

1st year cost of planting,	15 hours	$2 25
" scruffling, etc.,	12 "	1 80
2nd year "	10 "	1 50
3rd year "	6 "	0 90
		$6 45

PLOT NO. 2.—½ ACRE.

1st year cost of planting,	12 hours	$1 80
" scruffling, etc.,	15 "	2 25
2nd year "	13 "	1 95
3rd year "	5 "	0 75
		$6 75

PLOT NO. 3.—½ ACRE.

1st year cost of planting,	9 hours	$1 35
" scruffling, etc.,	11 "	1 65
2nd year "	12 "	1 80
3rd year "	4 "	0 60
		$5 40

PLOT NO. 4.—½ ACRE.

1st year cost of planting,	9 hours	$1 35
" scruffling, etc.,	10 "	1 50
2nd year "	14 "	2 10
3rd year "	3 "	0 45
		$5 40

PLOT NO. 5.—½ ACRE.

1st year cost of planting,	18 hours	$2 50
" scruffling, etc.,	11 "	1 65
2nd year "	9 "	1 35
3rd year "	5 "	0 75
		$6 25

PLOT NO. 6.—½ ACRE.

1st year cost of making drills,	2 hours	$0 30
" " sowing seed	4 "	0 60
" " covering seed	6 "	0 90
" scruffling, etc.,	11½ "	1 72
2nd year "	10 "	1 50
3rd year "	5 "	0 75
		$5 77

PLOT NO. 7.—½ ACRE.

1st year cost of making drills,	2 hours	$0 30
" " sowing seed,	4 "	0 60
" " covering seed,	6 "	0 90
" scruffling, etc.,	10½ "	1 57
2nd year "	9½ "	1 42
3rd year "	12 "	1 80
		$6 59
Taking up trees for five plots,	22½ hours	$3 38

Plots No. 1 and 2 will require little or no work in future as the trees, especially in plot No. 1 entirely shade the grounds.

Plots No. 3 and 4 will require two years further growth and care to place them in the same position. Plot No. 5 although planted only 2½ feet apart each way, being ash which is of slower growth, is very far behind the box elder in the matter of shade.

Next spring it is proposed to continue this work and mix the plantations with ground shading varieties of trees such as sand cherry.

Experimental Farms.

ARBORETUM.

The arboretum now contains 173 species and varieties of trees and shrubs which have been planted as follows:—In 1895, 41 varieties; in 1896, 65 varieties, 6 of which replace deaths of 1895; and in 1897, 75 varieties, two of which replace deaths of 1896.

The varieties added in 1897 are:—

Acer monspessulanum.
" dasycarpum.
" saccharinum (from Minnesota).
" spicatum.
Arbor vitæ. Meehan's Golden.
Berberis ilicifolia.
" vulgaris.
" Asiatica.
" vulgaris violacea.
Betula dahurica.
" populifolia.
" pendula youngii.
Cornus white-leaved.
" sanguinea.
" sibirica variegata.
" sanguinea variegata.
" sericea.
Cytisus hirsutus.
" trifolium.
" purpureus.
Celtis occidentalis.
Cratægus sanguinea.
" sibirica.
" coccinea.
" edulis.
Deutzia?
Diervilla Lutea.
Euonymus Americana.
Fraxinus Lutea.
" Berlanderiana.
" quadrangulata.
Gleditschia triacanthos.
Hydrangea paniculata grandiflora.
Juniperus Virginiana.
Lonicera sibirica.
" phylomela.
Ligustrum Stauntoni.
Populus Bolleana.
" Argentea.
Pinus Montana.
" ponderosa.
Ptelea trifoliata aurea.
Philadelphus Deutziflorus.
" coronarius.
" inodorus.
Ribes Gordonianum.
Rhus coriaria.
Spiræa callosa superba.
" bumalda.
" callosa alba.
" ulmifolia.
" variegata.
" Van Houttei.
" callosa rosea.
" Billardi rosea.
" Billardi alba.
Sorbus domestica.
Sambucus heterophyllus.
" variegata argentea.
" nigra.
" canadensis.
" variegata aurea.
" aurea nova.
Syringa purpurea.
" Emodi variegata.
Salix Villarsiana.
" aurea pendula.
" Salamoni.
" alba.
" purpurea pendula.
" capræa.
Thuya, Hoveyi Golden.
Tilia americana.
Ulmus sibirica.
Viburnum lantana.

SAMPLE HEDGES.

Ten varieties of trees and shrubs were, this spring, added to the list of sample hedges, viz.:—

Rhamnus frangula.
Lonicera grandiflora.
Rosa rubrifolia.
Salix voronesh.
Salix Laurifolia.
Cotoneaster vulgaris.
Seedling plum (native).
Picea pungens.
Betula papyrifera.
Betula lutea.

The two latter were killed by drought but the others have made satisfactory progress and are in good condition for winter.

Of the hedges set out in 1895 and 1896, Salix acutifolia, Populus monilifera, Acer ginnala, Caragana arborescens, Artemisia abrotanum var. Tob. and Negundo aceroides continue to do well and to these may be added Syringa vulgaris, Populus balsamifera, Elæagnus angustifolia and Symphoricarpus racemosus.

TREES AND SHRUBS PLANTED 1897.

The following trees and shrubs were received in May from the Central Experimental Farm, Ottawa, and planted in nursery rows.

300 Acer ginnala.
20 American hornbeam.
22 Betula populifolia.
30 Acer spicatum.
10 Betula rubra.
2 Enonymus Americana.
18 Populus fastigiata.
15 Acer saccharinum.
8 Celtis occidentalis.
2 Cornus white-leaved.
1 Salix regalis.
1 Populus frigilea.
4 Acer saccharinum, No. 2 (Minn.)
9 Eleagnus angustifolia.
1 Thuya pumila.
2 Arbor-vitæ. Douglas Golden.
2 Juniperius virginiana.
7 Abies balsamea.
1 Rhus coriaria.
11 Celastrus scandens.

ROSES.

In May, 12 varieties of roses were received from the Central Experimental Farm, Ottawa, and planted in one of the garden inclosures.

Following will be found a list of varieties and notes on their progress during the past season :

Mashall P. Wilder—Grew well and flowered.
Mme. Marie Rady—Died.
Merveille de Lyon—Strong growth, flowered.

Baron Prevost—	do	flowered profusely.
Caroline de Sansal	do	did not flower.
François Levet	do	flowered.
Lady Helen Stewart	do	do
Crimson Rambler	do	did not flower.
Mme. Victor Verdier	do	do
Mme. Plantier	do	do
Mme. Geo. Bruant	do	flowered.
Mme. Gabriel Luizet	do	do

This fall the plants were surrounded by frames and covered with 8 or 10 inches of dry leaves, which it is hoped will afford sufficient protection during the winter.

LIVE STOCK—CATTLE.

At present the herd consists of fifty-one animals, as follows :—
Shorthorns—2 males, 6 females.
Holsteins—4 males, 11 females.
Polled Angus—1 female.
Ayrshire—1 male.
Grades—5 cows, 5 heifers and 16 steers.

In grade steers, are included 10 animals recently purchased for use in feeding tests to be carried on during the winter of 1897-98.

All the animals are in good condition and apparently healthy.

FEEDING TEST.

Twelve head were divided into three lots of four each and fed from 1st December, 1896, to 31st March 1897. The lots consisted of eleven 2½ year old steers and one cow; the twelfth steer not being procurable at the time the test commenced.

Lot No. 1 was fed wheat-chaff.

Lot No. 2 was fed cut oat sheaves, and

Lot No. 3 was fed cut Brome hay.

To each of the animals fed as above was given the same ration of meal and ensilage. The rations were in the proportion of 2 pounds ensilage to each pound of dry fodder, and 6 pounds of meal per day (consisting of ground barley, 2 parts, ground wheat, 1 part) to each animal for the first two months of the test.—During the last two months each animal received 8 instead of 6 pounds of meal per day. The animals were fed three times a day and were fed for two weeks on a uniform ration before the test commenced.

Appended will be found the monthly and total gains of each lot:—

Lot.	Principal ration.	December.	January.	February.	March.	Total.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Lot No. 1....	Wheat-chaff.....	324	264	211	226	1,025
" 2....	Oat sheaves.....	235	262	248	165	910
" 3....	Brome hay.....	320	277	290	128	1,015

It will be noticed that the principal gains were made during the first two months when only 6 pounds of meal was fed per day to each animal.

Lot No. 2 did not do as well as Lots Nos. 1 and 3.

PROFIT IN FEEDING STEERS.

Six of the eleven steers used in this feeding test were purchased in the fall of 1896 and sold 5th May, 1897.

Weight when Purchased.	At	$ cts.	Weight when Sold.	Less Shrinkage	Net Weight.	At	$ cts.
6,260.....	$ 2 00	125 20	7,770.....	388½	7,381½	$ 3 60	265 72
Net gain.....	.....	140 52	.....	.....	.....	.....	.....
		265 72					265 72

Or a net gain per animal of $23.43 from which must be deducted the cost of feed and labour.

Five steers bred on Experimental Farm, when sold realized as follows:—

Weight December 1st.	Weight when Sold.	Less Shrinkage	Net Weight.	At	$ cts.
5,035 Lbs. or $43\cdot\frac{05}{100}$ for each animal.....	6,295	314¾	5,980¼	$ 3 60	215 28

SWINE.

The herd on the farm at present consists of 42 animals as follows:—

Chester White	1	Boar.
Berkshire	2	" 2 sows.
Large Yorkshire	4	" 3 barrows, 8 sows.
Tamworth	8	" 9 sows.
Grades (Berkshire)	2	Barrows, 3 sows.

Since my last report, 1 Berkshire boar, 1 Large Yorkshire boar, 3 Large Yorkshire sows, 4 Tamworth sows and 2 Berkshire sows have been sold to farmers.

POULTRY.

Four breeds are kept, Barred Plymouth Rocks, White Wyandottes, White Leghorns and Black Minorcas. The breeding pens were made up on 15th March, and eggs were gathered as follows:—

Breed.	2 wks. — Mch.	April.	May.	June.	July.	Aug.	Sept.	3 wks. — Oct.	Total.
Plymouth Rock	10	118	65	22	41	31	40	34	361
White Wyandotte	21	89	71	24	38	44	30	34	351
White Leghorn	24	126	89	59	51	48	55	35	487
Black Minorca	50	122	92	49	44	63	50	33	503

The hens were all allowed to run together after 20th October.

Twelve cockerels and twenty settings of eggs were sold to farmers during the year.

THE FLOCK NOW CONSISTS OF

Breed.	Cocks.	Hens.	Pullets.	Total.
Plymouth Rock	8	8	9	25
White Wyandotte	10	12	7	29
White Leghorn	14	11	14	39
Black Minorca	3	9	4	16

BEES.

As stated in my last report two hives of bees were last fall packed in chaff and put away in a room over the poultry house. Both swarms were dead when the hives were opened in the spring allthough a large quantity of honey was found in each.

In May last, one hive was obtained from Mr. S. A. Bedford, Superintendent, Experimental Farm, Brandon. From this three swarms have been secured. The first on 16th July; the second on 26th July, and the third on 28th July. The last swarm having lost its queen was put in with its predecessor. The three colonies had respectively 46, 44 and 47 pounds of honey when put away for the winter. No honey was taken from any of the colonies during the season as at no time was a hive filled. The bees worked principally on fruit-bushes, raspberries producing the greatest amount of honey.

The three hives have been stored for winter in an upper room of a dwelling house, where the temperature can be regulated as desired.

HOPS.

All varieties produced a poor crop.
From Washington—Did not mature and hops were badly rusted.
do British Columbia—Did not mature and hops were badly rusted.
Native—Poor crop, hops fair in quality.

WEEDS.

Weeds are increasing with great rapidity, in many sections of the North-west Territories and in no previous year have they been so hard to keep in check.

The three worst varieties that have up to the present become prominent are Stink weed, Hares Ear Mustard and Tumbling Mustard. The first and second varieties mentioned seem to be the most difficult to eradicate; while Tumbling Mustard spreads more rapidly from the ease with which it travels over the country and its habit of distributing seed along its path.

On the Experimental Farm, in former years the Tumbling Mustard gave an endless amount of labour, as each fall, fresh seed was blown in from neighbouring fields. During the season of 1896, these hot-beds for this weed were taken in charge by the municipal council and little or no seed allowed to ripen. The same course was followed this year, with the result that we are now almost entirely free from this weed, except in the outer windbreaks where some still exists.

Hare's Ear Mustard does not spread to any great extent, and with very little attention and trouble when it first appears can be eradicated or held in check. If, however, it is neglected for a few years, the soil becomes so full of the seeds that an endless amount of labour is entailed in bringing it to a clean state.

Stink weed is without doubt the worst weed in the Territories to-day, from the fact of its being able to stand the most severe winter and cultivation and ripen its seeds several times during each season. Besides this the habit of having blossoms and ripe seed at the same time makes it a most dangerous weed. It spreads invisibly, unlike Tumbling Mustard, it does not blow from the place it grew. Pulling by hand and burning is the only effectual way of killing this weed.

The bulletin on "weeds," issued by Dr. Fletcher, under your direction, is much appreciated by farmers in the Territories, and a copy should be in the hands of every one interested in agriculture.

ENSILAGE.

The corn ensilage of 1896 gave by far the greatest satisfaction of any fed since the first of this valuable fodder was made on the farm. The corn in that year was in the glazed state when cut, and afforded good material for the preparation of ensilage. Feeding was started early in November last, and when the herd was turned out to pasture in June this year, a good deal of ensilage was still on hand. This year neither the supply nor quality equals that of 1896. No covering was put over the ensilage this year, and very little has spoiled, not over one inch on the top of the silo being unfit for use. In former years a covering of cut straw was put over the cut corn in the silo.

DISTRIBUTION OF SAMPLES OF GRAIN, POTATOES, FOREST-TREES, ETC.

During the months of March, April and May, the following distribution of products of the farm was made to applicants throughout Assiniboia, Alberta and Saskatchewan.

The number of applications for samples was largely in excess of our supply.

Samples Distributed.	Number.	Total.
Wheat, 3-lb. bags	253	
Oats "	401	
Barley "	259	
Pease "	233	
Rye "	18	
Flax "	2	
		1,166
Forest Trees—		
Artemisia Abrotanum, cuttings	6,200	
Caragana Arborescens, seedlings	1,920	
Willow, cuttings	2,120	
Poplar "	1,836	
Maple (Box Elder), seedlings	4,500	
Lilac "	70	
Ash "	150	
		16,796
Fruit Bushes—		
Raspberries, roots	2,680	
Currants, roots and cuttings	5,420	
Gooseberries, roots	210	
Plum seedlings	350	
		8,660
Garden seeds, packages	139	
Potatoes, 3-lb. bags	372	
Bromus Inermis Grass, 1-lb. bags	590	
Rhubarb, roots	348	
Ash, seed	570	
Maple, seed	570	
Caragana Arborescens, seed	320	
Strawberries	192	

SUMMARY.

Samples.	Bags and Packages.	Roots, Cuttings and Seedlings.
Grain	1,166	
Forest trees		16,796
Fruit bushes		8,660
Garden seeds	139	
Tree seeds	1,460	
Bromus Inermis grass seed	590	
Potatoes	372	
Rhubarb		348
Strawberries		192
	3,727	25,996

IMPROVEMENTS.

The improvements consist, chiefly, of planting avenues of trees on the cross roads of the farm and in repairing dams or water reservoirs where washed out by the great rains of June last. Not only was the damage considerable, in so far as the amount of labour required to repair them was concerned, but from the loss of water, as from this source all the water supply for stock is obtained.

Experimental Farms.

CORRESPONDENCE.

During the twelve months ending 31st October, 1897, 3,183 letters were received and 3,395 mailed from this office. In letters received, reports on grain and other samples, are not counted, and in letters mailed, circulars of instruction *re* grain and other samples are not included.

MEETINGS ATTENDED.

Agricultural and dairy meetings and exhibitions were attended during the year, at the following towns:—Fort Qu'Appelle, Moosejaw, Regina, Qu'Appelle Station, Wolseley, Grenfell, Moosomin and Indian Head.

VISITORS.

Visitors to the farm, chiefly from surrounding districts, were numerous during the months of June, July and August. Among those from a distance were Lord and Lady Kelvin and other distinguished members of the British Association.

METEOROLOGICAL.

Month.	Highest Temperature.		Lowest Temperature.		Snow-fall, inches.	Total Rainfall.		Total Hours of Sunshine.
	On	Degrees	On	Degrees		No. of Days.	Inches.	
1896.								
November	4	34	19	—38	14	0	0	70·
December	9	45	1	—33	4	0	0	65·5
1897.								
January	8	34	24	—38	3	0	0	95·1
February	5	30	26	—34	5	0	0	96·4
March	30	38	14	—48	3	0	0	140·9
April	17	78	28	15	0	0	0	130·6
May	4	91	13	26	0	0	0	290·9
June	13	92	28	5	0	5	11·2	213·6
July	27	91	30	39	0	6	1·52	261·1
August	11	91	30	34	0	2	1·3	235·3
September	6, 21, 22	87	16	22	0	2	·2	154·5
October	1	79	9	8	0	1	·4	113·6
					29	16	14·62	1,867·5

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

ANGUS MACKAY,
Superintendent.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA

REPORT OF THOMAS A. SHARPE, SUPERINTENDENT.

AGASSIZ, B.C., 30th November, 1897.

To DR. WM. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my ninth annual report of the work done on the Experimental Farm at Agassiz.

A cold wave struck the province in November, 1896, doing some damage to fruit trees which were yet growing, and catching some unharvested root crops, but the weather during the winter was mild. The lowest temperature recorded at this station being nine degrees above zero, on the 27th of November.

The spring opened fairly early, and the weather during seeding was favourable followed by fine growing weather, with sufficient rainfall, and crops of all kinds throughout the province have been good.

Nearly nine acres of land have been cleared, and part of it cropped since my last report.

HEDGES.

The hedges have made a fine growth this year. Two of willows and one of beech were added last spring.

FOREST TREE PLANTATION.

The forest tree belt continues to make vigorous growth, and several of the Spanish chestnut trees planted in the belt bore fruit this year, producing nuts of large size.

ORNAMENTAL TREES AND SHRUBS.

The ornamental trees and shrubs on the lawn, and the bulb and flower beds have produced a profusion of bloom, from the last of March up to about the 15th of this month.

DISTRIBUTION OF SEED GRAINS AND POTATOES.

A considerable number of 3-pound bags of seed grain and potatoes have been distributed, and reports returned show that owing to the varying climatic conditions existing in British Columbia, grains or potatoes which do well in one locality, may not do so well in another.

A number of sample packages of small fruit plants were distributed, and so far as heard from, these have done well. Packages of tree seeds were also sent out, quite a number of maple and other forest trees having borne seed this year.

BEES.

The two swarms of bees wintered last winter, each threw off a swarm this season, both of which were hived, but one swarm abandoned its hive the next day.

AUSTRALIAN SALT BUSH.

The Australian salt bush mentioned in my last report, was entirely killed by the frost in November.

ACKNOWLEDGMENTS.

The following gentlemen, or firms, have kindly sent trees or scions of new fruits for testing :

Prof. Shinn, of Berkeley, California—Scions of apple and pear.
Prof. J. A. Balmer, of Pullman, Washington—Scions of apple and pear.
Mr. Alfred Woodroffe, of Auckland, N.Z.—Scions of apples.
Messrs. W. W. Walker, Salem, Oregon—Cherry and apple trees.
Oregon Wholesale Nursery Co., Salem, Oregon—Apple and cherry trees.
Mr. Hoskins, of Springbrook, Oregon—Scions of cherry.
Mr. H. Kipp, Chilliwhack, B.C.—Scions of seedling pear.
Mr. J. C. Mollet, Salt Spring Island—Scions of cherry.
Pears, 31 ; apples, 122=153.

A number of these are seedlings of merit not yet introduced, and a fair measure of success has attended the budding and grafting of all of them.

FALL WHEAT.

Twenty-eight varieties of fall wheat were sown early last October, and an even promising growth was made up to the November frost, which killed out most varieties entirely, and in none were more than a few plants left.

The ground was harrowed in the spring, and a mixed crop for green feed was sown.

EXPERIMENTS WITH SPRING WHEAT.

Thirty-eight varieties of spring wheat were tested this year. The land was loamy and fairly even throughout, and in a very fair condition as to fertility. The size of the plots was one-twentieth acre each, and all were sown on the 14th and 17th of April. There was very little smut, and no rust to injure the crop, and the quality of the grain is very good.

SPRING WHEAT--Test of Varieties.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.
			Inches.		In.		Lbs.	Bush. Lbs.
White Connell	Aug. 18..	126	48	Stiff & bright	3½	Bald	3,800	31 40
Wellman's Fife	" 17..	125	42 to 48	" ..	4	"	4.400	31 20
Preston	" 13..	121	50 to 54	" ..	3	Bearded..	4,160	31 ..
Captor	" 9..	117	52 to 56	" ..	3½	Bald	4,300	30 40
Monarch	" 17..	125	46 to 50	" ..	4	"	4,000	30 40
Alpha	" 13..	121	40 to 42	" ..	3	"	3,600	30 ..
White Russian	" 13..	123	48 to 52	" ..	4	"	4,200	30 ..
Red Fife	" 13..	121	44 to 48	" ..	3½	"	4,600	29 40
White Fife	" 18..	126	48 to 50	" ..	3½	"	4,000	29 20
Old Red River	" 18..	126	48 to 50	" ..	4½	"	3,540	29 20
Rideau	" 9..	117	34 to 38	" ..	3	"	3,900	29 ..
Herisson Bearded	" 17..	125	40 to 42	" ..	2½	Bearded..	4,200	28 40
Admiral	" 13..	121	52 to 56	" ..	3½	Bald	3,800	28 20
Vernon	" 18..	126	44 to 46	" ..	3	Bearded..	3,900	28 20
Goose	" 18..	126	48 to 50	" ..	4	" ..	3,900	28 20
Progress	" 18..	126	44 to 48	" ..	4	Bald	4,100	28 ..
Hungarian	" 18..	123	48 to 50	" ..	4	Bearded..	4,000	28 ..
Pringle's Champlain	" 18..	126	46 to 50	" .	4	" ..	3,500	27 40
Advance	" 17..	125	48 to 50	" ..	3½	" ..	3,300	27 20
Huron	" 18..	126	46 to 48	" ..	3½	" ..	3,900	27 20
Countess	" 13..	121	42 to 46	" ..	3½	Bald	4,000	27 20
Blenheim	" 18..	126	46 to 50	" ..	3½-4	Bearded..	3,800	27 20
Beaudry	" 13..	121	52 to 56	" ..	3	" ..	4,200	27 ..
Golden Drop	" 9..	117	46 to 50	" .	3	Bald	4,200	27 ..
Percy	" 7..	115	48 to 52	" ..	4	"	3,800	27 ..
Black Sea	" 7..	112	42 to 44	" ..	3½	Bearded..	4,000	27 ..
Campbell's White Chaff	" 13..	121	40 to 44	" ..	3	Bald	3,300	26 40
Dion's	" 18..	126	46 to 48	" ..	4½	Bearded..	3,800	26 40
Crown	" 18..	126	46 to 50	" ..	4½	" ..	3,800	26 ..
Rio Grande	" 17..	125	45 to 48	" ..	4	" ..	4,000	26 ..
Red Fern	" 17..	125	46 to 48	" ..	4	" ..	5,700	25 40
Stanley	" 13..	121	38 to 42	" ..	3	Bald	3,120	25 40
Ladoga	" 6..	114	36 to 40	" ..	3½	Bearded..	3,120	25 20
Dawn	" 5 .	113	32 to 34	" ..	4	Bald	3,400	25 00
Beauty	" 7..	115	42 to 45	" ..	4	"	3,600	24 20
Emporium	" 18..	126	56 to 60	" ..	5	Bearded..	3,100	24 20
Dufferin	" 13..	121	42 to 44	" .	3	" ..	3,300	23 20
Colorado	" 18..	123	50 to 52	" ..	4	" ..	3,700	23 20

EXPERIMENTS WITH OATS.

Sixty-four varieties were sown on loamy soil on the 16th of April on plots of one-twentieth of an acre each.

These plots were sown in the apple orchard, on land that had been partly in corn and part of it in oats in 1896. The following varieties were injured by rust, especially: the White Russian, Mortgage Lifter, Olive, White Wonder, Victoria Prize, and Abundance; and some plots have suffered owing to the land on which they were sown having been dug to a depth of three or four feet in taking out fir stumps. In such cases it requires a number of years of cultivation to restore the land to a condition equal to that adjoining, which has not been grubbed to such a depth.

The growth of straw was very rank, but the weight of straw shown in the following table is greater than it would be but for the ferns, of which there were a good many in all the plots.

OATS—Test of Varieties.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	
			In.		In.		Lbs.	Bush.	Lbs.
Early Maine	Aug. 12	117	66	Stiff & bright	10	Branching	6,200	92	32
Black Beauty	" 12	117	60	"	12	"	6,300	92	32
Golden Giant	" 11	116	68	"	12	Sided.	6,600	89	14
Lincoln	" 5	110	52	"	8½	Branching	6,640	87	22
Oderbruch	" 19	124	66	"	11	Half "	6,400	82	32
Early Blossom	" 16	121	66	"	12	" "	6,300	77	22
Improved American	" 16	121	65	"	11	Branching	5,600	77	22
Buckbee's Illinois	" 15	120	66	"	10	"	6,300	76	16
Bavarian	" 16	121	60	"	10½	"	6,400	75	30
American Beauty	" 14	119	60	"	10	"	6,200	74	24
Flying Scotchman	" 12	117	66	"	12	"	5,500	74	4
Columbus	" 4	109	58	"	9	"	6,200	73	18
Scottish Chief	" 17	122	63	"	10½	"	6,040	73	18
Wide Awake	" 17	122	60	"	10½	"	6,600	73	18
Coulommier's	" 18	123	60	"	11	"	6,100	72	32
Bonanza	" 12	117	66	"	10	"	5,600	71	26
Cromwell	" 12	117	60	"	12	"	6,000	71	26
King	" 17	122	60	Fair	10½	"	4,700	71	26
Cream Egyptian	" 17	122	68	Weak	11	"	6,400	70	20
Rosedale	" 17	122	66	"	10	Half sided	5,440	70	20
Doncaster Prize	" 3	108	62	Stiff	9½	Branching	6,500	70	10
Prolific Black Tartarian	" 16	121	66	Fair	12	Sided.	7,000	70	
White Russian	" 4	109	57	Stiff	9	Branching	5,700	70	
American Triumph	" 14	119	52	Fair	10	"	5,800	69	24
Golden Tartarian	" 12	117	66	"	11	Sided.	5,400	69	14
Wallis	" 16	121	60	"	11	Branching	6,600	69	4
White Schonen	" 4	109	56	Stiff	8½	"	5,680	68	28
Hazlett's Seizure	" 12	117	54	Medium	10	"	5,900	68	28
Miller	" 12	117	60	Weak	10	"	5,400	68	18
Brandon	" 12	117	72	"	12	"	6,500	68	8
Siberian	" 19	124	65	Fair	11½	Sided.	7,500	67	22
White Monarch	" 16	121	70	Weak	14	Branching	7,200	67	2
Golden Beauty	" 14	119	60	Medium	10½	"	6,200	66	26
Early Etampes	" 14	119	66	"	12	"	6,200	66	16
Early Archangel	" 12	117	66	Weak	10	"	6,900	66	16
Welcome	" 14	119	54	"	8½	"	5,000	66	12
Mortgage Lifter	" 5	110	57	Fair	8½	"	5,400	66	8
New Electric	" 11	115	60	"	10	"	5,200	65	30
Olive (Black)	" 16	121	66	Weak	12	Half sided	6,800	65	10
Early Golden Prolific	" 14	119	60	"	10	Branching	5,500	65	10
Scotch Hopetoun	" 16	121	60	"	10	"	6,400	64	24
Rennie's Prize White	" 13	118	66	Fair	11	"	6,000	64	24
Imported Irish	" 11	116	66	"	10	"	6,200	64	4
Banner	" 12	117	68	Strong	12	"	5,760	64	4
Improved Ligowo	" 12	117	64	Medium	10	"	5,600	63	18
Newmarket	" 17	122	62	Fair	9	"	5,200	62	32
Holstein Prolific	" 16	121	60	"	11	"	5,800	62	22
White Poland	" 3	108	60	"	10	"	5,200	62	17
Early Gothland	" 14	119	66	Weak	10	Half sided	5,600	62	12
Medal	" 12	117	72	"	12	Branching	6,200	62	2
Joanette	" 14	119	56	Fair	10	"	5,100	61	16
California Prolific Black	" 12	117	60	"	10	Sided.	4,700	61	8
Oxford	" 14	119	66	Medium	12	Branching	5,080	60	20
Siberian O.A.C.	" 17	122	60	"	10	Sided.	5,000	60	10
Winter Grey	" 3	107	62	"	9	Branching	5,800	60	
Russell	" 16	121	63	"	12	Half sided	4,900	59	14
Abyssinia	" 14	118	60	Weak	10½	"	5,700	58	28
Prize Cluster	" 11	115	56	Fair	9½	Branching	5,000	58	28
White Wonder	" 16	121	66	Weak	12	"	5,600	58	18
Mennonite	" 3	107	53	Medium	9	"	4,400	57	32
Victoria Prize White	" 3	107	63	"	9½	"	5,920	52	32
Abundance	" 16	121	56	"	10	"	5,210	52	22
Master	" 11	115	67	Weak	11	"	4,600	52	12
Pense	" 16	121	54	Strong	10	Sided.	5,100	42	32

EXPERIMENTS WITH BARLEY.

Thirty-five varieties of barley have been grown in uniform test plots of one-twentieth acre each, fifteen of these were two-rowed sorts and twenty were six-rowed. They were all sown on loamy soil of fairly uniform character on the 17th of April. No injury was done by rust or smut.

BARLEY, TWO-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.	
			Inches.		In.	Lbs.	Bush.	Lbs.
Kinver Chevalier	Aug. 14	119	36 to 38	Stiff	3½	3,600	40	40
Canadian Thorpe	" 14	119	41 to 43	"	3½	3,200	37	4
French Chevalier	" 14	119	37 to 39	"	3	3,400	37	4
Nepean	" 14	119	43 to 45	Weak	3½	3,280	32	44
Prize Prolific	" 13	118	40 to 42	Fair	4	3,400	32	24
Newton	" 15	120	41 to 43	"	3½	2,900	31	12
Danish Chevalier	" 12	117	36 to 38	"	3	3,600	31	12
Thanet	" 14	119	34 to 36	"	3	3,200	31	12
Victor	" 16	121	44 to 46	"	3½	2,500	30	20
Pacer	" 9	114	34 to 36	"	3½	3,000	29	8
Beaver	" 13	118	43 to 45	Weak	3½	3,380	28	36
Monck	" 12	117	48 to 50	"	3½	2,900	28	16
Bolton	" 14	119	40 to 42	Fair	3	2,600	28	6
Sidney	" 11	116	33 to 35	Stiff	3	2,700	27	24
Rigid	" 10	115	43 to 45	"	3½	3,520	27	4

BARLEY, SIX-ROWED—Test of Varieties.

Blue	Aug. 7	112	38 to 40	Stiff & clean.	3½	3,900	42	24
Oderbruch	July 28	102	26 to 30	"	2½	3,600	40	20
Petschora	" 28	102	24 to 26	"	2	3,200	38	36
Mensury	Aug. 5	110	40 to 42	"	2½	3,700	38	16
Common 6-rowed	" 6	111	32 to 34	Fair	3	3,600	38	16
Vanguard	" 2	107	28 to 32	"	2½	3,740	37	24
Rennie's Improved	July 28	102	30 to 32	"	2½	3,900	37	24
Royal	Aug. 2	107	28 to 30	"	3	2,800	36	22
Pioneer	" 2	107	34 to 36	"	3	3,500	36	12
Nugent	" 7	112	40 to 42	"	2¾	2,840	35	20
Stella	" 7	112	33 to 35	"	3½	3,700	34	8
Odessa	" 7	112	38 to 40	"	3¼	2,800	33	36
Champion	July 28	102	24 to 26	"	2½	3,100	33	16
Phœnix	" 28	102	25 to 28	"	2¼	3,300	33	16
Surprise	Aug. 7	112	38 to 40	Weak	3½	2,760	33	44
Summit	" 7	112	40 to 42	"	4	2,940	33	24
Trooper	" 6	111	40 to 41	"	3¼	2,740	32	30
Baxter's	" 3	108	34 to 36	Fair	3	2,500	32	30
Success	July 28	102	23 to 25	"	2½	3,000	32	10
Excelsior	Aug. 5	110	32 to 34	"	2½	2,400	30	00

EXPERIMENTS WITH PEASE.

These plots were sown on sandy loam, this land had been cleared and cropped for a number of years before the Experimental Farm was established and had got very weedy with sorrel, and in this soil and climate that is a very difficult weed to get rid of. The pease also suffered from mildew to a considerable extent. The size of the plots was one-twentieth of an acre each, and all were sown on the 1st of May.

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.
				Inches.	Tons. Lbs.	Inches.		Bush. Lbs.
King	Aug. 16	107	Medium	50 to 55	1 1,600	2½ to 3	Large	31 20
Bright	" 25	116	"	50 to 60	1 1,500	2½ to 3	Medium	30 20
Archer	" 14	105	Rank	30 to 36	2 1,300	2 to 3	"	29 40
Nelson	" 25	116	"	30 to 36	2 1,600	2 to 2½	"	29 20
Vincent	" 16	107	Strong	48 to 50	2 1,000	2 to 2½	Large	28 40
Arthur	" 24	115	Very strong.	55 to 60	2 1 800	2 to 2½	Medium	28 20
Canadian Beauty	" 23	114	Rank	36 to 40	3 300	2¾ to 3	Large	27 20
Prince Albert	" 23	114	Strong	36 to 40	2 1,400	2½ to 3	Small	26 ..
Creeper	" 13	105	"	30 to 34	2 980	2 to 2¼	"	25 20
Bedford	" 24	115	Medium	34 to 40	2 700	2½ to 3	Large	25 20
Prussian Blue	" 23	114	"	36 to 40	2 600	3 to 3½	Medium	24 40
Kent	" 23	114	"	30 to 34	2 900	3 to 3¼	Large	24 40
White Marrowfat	" 25	116	Strong	32 to 36	2 1,800	2¼ to 2¾	"	24 40
Early Briton	" 14	106	Medium	36 to 40	1 1,000	2 to 2½	"	24 20
Macoun	" 23	114	Strong	30 to 34	2 1,400	2½ to 3	"	24 ..
Victoria	" 10	103	Medium	24 to 28	2 400	1½ to 2	Small	24 ..
Duke	" 24	115	Strong	34 to 38	2 1,600	2¼ to 2¾	Large	23 40
White Wonder	" 14	106	Medium	22 to 26	1 900	2 to 2¼	Medium	23 40
Elephant Blue	" 25	116	Strong	34 to 36	2 900	2¼ to 2¾		23 20
Chancellor	" 25	116	"	34 to 38	2 900	3 to 3¼	Small	23 20
Carleton	" 24	115	"	30 to 36	2 300	2½ to 2¾	Medium	23 ..
Perth	" 16	108	Medium	65 to 72	1 1,500	2½ to 3	Large	23 ..
Oddfellow	" 25	116	Strong	32 to 36	2 800	2¼ to 2¾		23 ..
Bruce	" 23	114	"	30 to 36	2 500	2½ to 3	Large	22 40
Paragon	" 16	108	"	30 to 34	2 700	2 to 2½	Medium	22 40
Mummy	" 14	106	"	38 to 42	2 600	3 to 3½	"	22 ..
Harrison's Glory	" 14	106	"	24 to 28	2 ...	3 to 3½		21 40
Alma	" 25	116	"	34 to 38	2 900	2½ to 3	Small	20 20
Golden Vine	" 14	106	"	46 to 50	2 700	2¾ to 2¾	"	20 20
Prince	" 23	114	"	36 to 40	2 300	2½ to 3	Large	20 ..
Trilby	" 25	116	"	28 to 32	2 100	2 to 2½	Medium	20 ..
New Potter	" 14	106	"	36 to 40	2 400	2½ to 3	Large	19 40
Centennial	" 23	114	Medium	32 to 36	1 1,800	2 to 2½	Medium	17 40
Mackay	" 23	114	Strong	28 to 32	2 1,900	2½ to 3	Large	17 40
Black Eye Marrowfat	" 23	114	"	28 to 30	2 1,300	2 to 2½	"	16 40
Multiplier	" 23	114	"	34 to 38	2 500	2½ to 3	Small	16 20
Daniel O'Rourke	" 12	104	"	18 to 22	2 500	1½ to 2	"	16 20
Pride	" 13	105	"	28 to 32	1 1,700	2 to 2½	Large	16 20
Agnes	" 14	106	Medium	50 to 56	1 1,600	3 to 3½	"	14 40
Crown	" 16	108	"	30 to 34	1 1,700	1½ to 2	Small	13 20

RESULTS OF EARLY, MEDIUM AND LATE SOWINGS.

These plots were sown on loamy soil that had been under grain the previous year, part of it in oats and the remainder wheat. It was all ploughed early in spring and thoroughly harrowed when the first plots of the series were sown, and the unsown portion harrowed when each subsequent sowing was made. There was no smut, but rust on the oats and mildew on the pea vines lessened the yield of those grains. There was no rust on the wheat or barley plots. The size of the plots was one-twentieth acre each.

OATS—Early, Medium and Late Sowings.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.
				Inches.		Inches.		Lbs.	Bush. Lbs.
Banner	April 8	Aug. 12	126	54 to 55	Strong growth	10	Branching	4,000	55 10
"	" 15	" 14	121	58 " 60	" "	10	"	4,120	62 12
"	" 22	" 14	114	58 " 60	" "	10	"	4,400	64 24
"	" 29	" 16	109	60 " 62	" "	10½	"	6,100	72 32
"	May 6	" 18	104	60 " 62	" "	10½	"	5,960	76 16
"	" 13	" 23	102	60 " 64	" "	10	"	6,300	73 18
Abundance	April 8	" 12	126	54 " 56	" "	9	"	3,900	50 20
"	" 15	" 14	121	60 " 62	" "	10	"	4,000	60 00
"	" 22	" 14	114	58 " 60	" "	10	"	4,100	58 28
"	" 29	" 19	112	58 " 60	" "	10	"	5,240	67 22
"	May 6	" 22	108	60 " 62	" "	9	"	5,400	55 30
"	" 13	" 23	102	60 " 62	" "	8½	"	5,080	54 24

SPRING WHEAT—Early, Medium and Late Sowings.

Red Fife	April 8	Aug. 13	127	52 to 54	Stiff and bright	3½	Beardless.	4,800	30 40
"	" 15	" 16	123	52 " 54	" "	3½	"	5,200	36 20
"	" 22	" 17	117	56 " 58	" "	4	"	6,040	37 40
"	" 29	" 19	112	60 " 62	" "	4 to 4½	"	6,000	41 20
"	May 6	" 21	107	50 " 52	" "	4	"	4,200	38 20
"	" 13	" 24	103	48 " 50	" "	4	"	5,000	35 00
Stanley	April 8	" 9	122	54 " 56	" "	4½	"	4,500	32 45
"	" 15	" 15	121	52 " 54	" "	3½	"	5,200	41 45
"	" 22	" 17	116	52 " 54	" "	4	"	6,100	41 50
"	" 29	" 19	111	56 " 60	" "	4¼	"	7,300	42 20
"	May 6	" 21	106	56 " 58	" "	4	"	6,000	29 40
"	" 13	" 24	102	50 " 52	" "	3½	"	4,000	30 20

BARLEY—Early, Medium and Late Sowings.

Canadian Thorpe	April 8	Aug. 9	123	43 to 45	Stiff and bright	3	2-rowed	4,480	41 12
"	" 15	" 13	114	44 " 48	" "	3½	"	4,100	43 36
"	" 22	" 14	108	44 " 46	" "	3½	"	4,200	40 30
"	" 29	" 16	103	46 " 48	" "	4	"	4,210	40 40
"	May 6	" 18	98	44 " 46	" "	4	"	4,220	42 24
"	" 13	" 21	94	44 " 46	" "	4	"	4,800	45 25
Odessa	April 8	" 4	118	32 " 34	" "	3	6-rowed	3,000	28 36
"	" 15	" 6	113	40 " 42	" "	3½	"	3,400	32 9
"	" 22	" 9	109	37 " 39	" "	3	"	4,100	37 15
"	" 29	" 13	106	41 " 43	" "	3	"	3,760	35 20
"	May 6	" 14	100	36 " 38	" "	3	"	3,900	33 16
"	" 13	" 17	96	38 " 40	" "	3	"	4,100	42 24

PEASE—Early, Medium and Late Sowings.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Character of Straw.	Length of Straw.	Weight of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.
					Inches.	Lbs.	Inches.		Bush. Lbs.
Mummy.....	April 8	Aug. 9	123	Medium.....	36 to 38	4,100	2½	Medium..	25 00
"	" 15	" 12	119	"	36 " 38	4,040	2	" ..	24 40
"	" 22	" 14	114	"	33 " 36	3,600	2	" ..	20 30
"	" 29	" 16	109	"	33 " 36	3,840	2¼	" ..	22 40
"	May 6	" 17	103	"	33 " 36	3,940	2¼	" ..	25 20
"	" 13	" 19	98	"	30 " 34	3,700	1¾	" ..	20 00
Golden Vine....	April 8	" 10	124	Strong.....	45 " 50	2,960	2	Small	20 00
"	" 15	" 12	119	"	44 " 48	3,200	2	"	20 40
"	" 22	" 14	114	"	44 " 48	3,300	1¾	"	19 20
"	" 29	" 16	109	" ...	42 " 46	3,160	1¾	"	21 00
"	May 6	" 17	103	"	44 " 48	3,400	1½	"	17 20
"	" 13	" 19	98	"	46 " 50	4,000	1½	"	18 40

EXPERIMENTS WITH INDIAN CORN.

Twenty-six varieties of corn were tested in hills three feet apart each way and in drills three feet apart. The drills were thinned to leave one plant per foot of drill and hills to leave three plants in each hill. The soil was a warm sandy loam that had been in roots in 1896.

The season was favourable for corn and the yields as shown in the following table have been very good. The yield in each case has been calculated from 2 rows each 66 feet long.

INDIAN CORN—Test of Varieties.

Name of Variety.	Date of Sowing.	Character of growth.	Height.	When Tasselled.	In Silk.	Early Milk.	Late Milk.	Condition when cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
			Inches.						Tons.	Lbs.	Tons.	Lbs.
Red Cob Ensilage	May 18	Very strong.	144 to 160	Aug. 10	Aug. 28	Sept. 18		Roasting ear	43	900	40	1,950
Selected Leaming	" 18	"	112 to 120	" 5	" 18	" 12	Sept. 22	Beginning to glaze.	43	900	35	1,050
Cuban Giant	" 18	"	120 to 130	" 22	Sept. 14			Cobs formed	42	700	34	750
Early Butler	" 18	"	114 to 120	" 2	Aug 16	Aug. 27	Sept. 16	Glazed	37	800	31	700
Mammoth 8 rowed Flint	" 18	"	108 to 114	" 7	" 18	Sept. 4	" 24	Late milk	35	950	34	1,300
North Dakota White	" 18	"	78 to 84	" 6	" 16	" 2	" 17	Glazed	34	200	33	1,100
Angel of Midnight	" 18	Medium	84 to 90	" 13	" 27	" 11		Late milk	33		31	700
Giant Prolific Ensilage	" 19	Slender	108 to 120	" 18	" 30	" 20		Early milk	32	350	32	1,450
Thoroughbred White Flint	" 18	Strong	84 to 96	" 8	" 22	" 10	Sept. 24	Commencing to glaze.	29	300	31	1,800
King of the Earliest	" 18	Slender	114 to 120	" 7	" 20	" 7	" 20	Glazing	31	700	28	1,200
Ninety Day	" 18	Strong	88 to 100	" 6	" 11	" 2	" 15	Glazed	29	1,400	26	800
Pearce's Prolific	" 18	"	84 to 96	" 10	" 20	" 6	" 18	"	28	100	19	500
Champion White Pearl	" 18	"	90 to 96	" 22	Sept. 10			Cobs long but not in milk.	27	780	26	250
Clouds Early Yellow	" 18	Slender	80 to 90	" 16	Aug. 28	Sept. 18		Roasting ear	24	400	27	450
Wisconsin White Dent	" 19	Medium	78 to 84	" 20	" 29	" 26		Early milk	26	1,350	26	250
Sanford	June 1	"	72 to 78	" 13	" 26	" 11	Sept. 20	Glazed	22		26	470
Mammoth Sweet Fodder	May 19	"	80 to 90	" 17	" 26	" 20		Roasting ear	26	800	19	500
Canadian White Flint	June 1	"	72 to 78	" 14	" 25	" 10	Sept. 22	Glazing	17	1,860	26	690
Kendall's Giant	May 19	Slender	84 to 90	" 18	" 30	" 20		Early milk	24	950	20	1,250
Wisconsin Yellow Dent	June 1	"	78 to 84	" 20	" 30	" 18	Sept. 28	Late milk	21	1,450	20	1,800
Longfellow	May 18	Strong	72 to 78	" 4	" 13	Aug. 30	" 14	Glazed	19	610	20	1,360
White Cap Yellow Dent	" 18	Medium	72 to 78	" 17	" 28	Sept. 16		Roasting ear	20	800	18	1,950
Comptons Early	" 18	"	72 to 80	" 6	" 23	" 9	Sept. 21	Late milk	18	1,840	13	150
North Dakota Yellow	" 29	Slender	72 to 78	" 4	" 14	" 6	" 20	Glazed	16	780	17	1,200
Pride of the North	" 18	"	84 to 90	" 20	" 28	" 20		Roasting ear	14	1,810	16	1,220
Mitchell's Extra Early	" 18	Medium	54 to 60	July 18	July 29	Aug. 20	Aug. 28	Ripe	10	1,560	14	50

EXPERIMENTS WITH TURNIPS.

These roots, like the carrots, were sown on comparatively new land, which had been in oats the previous year. The growth was strong and even. Soil, a warm loam, ploughed early in spring and harrowed several times before sowing. Eighteen varieties were tested, and two sowings were made, the first on the 14th of May and the second on the 28th of May, and the roots from both were pulled on the 18th of October. The yield has been calculated from three rows each 66 feet long and 2½ feet apart.

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.
Prize Winner	66	1,555	2,059	14	49	1,000	1,650	..
Prize Purple Top	58	1,040	1,950	40	58	160	1,936	..
Selected Purple Top	57	48	1,900	48	47	600	1,576	40
East Lothian	56	1,168	1,888	8	60	384	2,006	24
Halewood's Bronze Top	56	200	1,870	..	51	80	1,701	20
Hartley's Bronze	55	880	1,848	..	50	1,376	1,689	36
Skirvings	55	....	1,833	30	49	1,264	1,654	24
Jumbo or Monarch	54	1,120	1,818	40	51	1,400	1,723	20
Giant King	53	1,712	1,795	12	47	840	1,580	40
Marquis of Lorne	53	1,360	1,789	20	52	1,600	1,760	..
Carter's Elephant	53	40	1,767	20	48	1,504	1,625	4
Hall's Westbury	51	960	1,716	..	48	800	1,613	20
Mammoth Clyde	50	760	1,679	20	44	880	1,481	20
Perfection Swede	49	208	1,636	48	50	1,376	1,689	36
Bangholm Selected	47	600	1,576	40	46	840	1,547	20
Champion Purple Top	47	600	1,576	40	45	200	1,503	20
Sutton's Champion	45	200	1,503	20	42	1,360	1,422	40
Shamrock Purple Top	40	520	1,342	..	40	960	1,309	20

EXPERIMENTS WITH MANGELS.

Eighteen varieties of mangels were tested along side the turnips, in similar loamy soil, the conditions in every respect being practically the same. These also show the advantage of early sowing.

All the roots this season are smooth, even, and remarkably free from prongs, or long neck. The yields are made up from the produce of three rows, each 66 feet long, and two feet and a half apart.

Two sowings were made, the first on the 24th of April, the second on the 8th of May, and the roots from both were pulled on the 15th of October.

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.
Selected Mammoth Long Red	39	1,024	1,317	4	32	240	1,070	40
Red Fleshed Tankard	39	320	1,305	20	35	400	1,173	20
Golden Fleshed Tankard	39	140	1,302	24	35	400	1,173	20
Norbiton Giant	35	1,456	1,190	56	34	1,960	1,166	..
Canadian Giant	35	752	1,179	12	28	1,200	953	20
Giant Yellow Intermediate (Steele)	34	1,080	1,151	20	31	40	1,034	..
Gate Post	34	992	1,149	52	36	160	1,202	40
Mammoth Long Red	32	1,824	1,097	4	30	1,600	1,026	40
Giant Yellow half-long	31	1,360	1,056	..	28	672	944	32
Yellow Intermediate	31	1,184	1,053	4	27	1,000	916	40
Prize Mammoth Long Red	29	1,136	985	36	23	1,960	799	20
Ward's Large Oval Shaped	28	496	941	36	22	1,760	762	40
Giant Yellow Globe	27	1,264	921	4	25	600	843	20
Champion Yellow Globe	27	1,000	916	40	25	656	842	36
Giant Yellow Intermediate (Pearce)	27	912	915	32	26	624	877	4
Golden Tankard	27	912	915	32	26	360	872	40
Red Fleshed Globe	24	1,280	801	20	24	400	806	40
Warden Orange Globe	19	1,424	657	4	18	80	601	20

EXPERIMENTS WITH CARROTS.

Fifteen varieties of carrots were tested, two sowings of each variety were made, two weeks apart, in drills one and one-half feet apart.

The soil was a sandy loam, and was new, having only been broken up in the spring of 1895, and was not yet thoroughly uniform, as shown by the heavier yields in the second sowing, in one or two cases. The character of the growth, however, was strong and fairly uniform.

The yields are calculated from three rows of 66 feet each. The first sowing was made on the 23rd of April, the second on the 7th of May, and the roots from both were pulled on the 15th of October.

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	37	1,680	1,261	20	46	400	1,540	
Yellow Intermediate	39	1,200	1,320	..	27	266	904	26
Improved Short White	33	1,466	1,124	26	30	1,893	1,031	33
Green Top White Orthe	33	880	1,114	40	26	800	880	
Carter's Orange Giant	31	1,360	1,056	..	23	640	777	20
Half Long White	31	333	1,038	53	22	1,760	762	40
Guerande or Ox-heart	30	1,600	1,026	40	29	1,840	997	20
White Belgian	30	1,600	1,026	40	24	160	769	20
Early Gem	27	560	909	20	20	480	674	40
Iverson's Champion	27	120	902	..	36	1,060	1,217	20
Half Long Chantenay	26	1,670	894	30	24	693	811	33
Mammoth White Intermediate	26	800	880	..	16	1,440	557	20
Scarlet Altringham	19	1,600	660	..	17	1,786	596	26
Long Orange or Surrey	18	960	616	..	21	240	704	
Scarlet Intermediate	11	880	381	20	13	1,280	454	40

EXPERIMENTS WITH SUGAR BEETS.

Six varieties of these roots were sown in sandy loam which had received a dressing of stable manure early in the spring of 1896, and had produced a crop of carrots that year.

The land was ploughed early in the spring and harrowed several times at short intervals to start and kill the weed seeds. Two sowings were made, the first on the 26th of April and the second on the 10th of May. The seed was sown in drills 2½ feet apart and the plants thinned to about 6 inches in the row. The growth was even and uniform and the roots from both sowings were pulled on the 15th of October.

The following table of weights per acre is calculated from the produce of three 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.
Wanzleben	14	1,040	484	..	13	1,456	457	36
Danish Improved	14	952	482	32	13	1,104	451	44
Red Top Sugar	12	1,080	418	..	15	800	613	20
Danish Red Top	14	600	476	40	13	400	440	..
Improved Imperial	13	1,720	462	..	13	1,280	454	40
Vilmorin's Improved	13	400	440	..	12	1,520	425	20

EXPERIMENTS WITH POTATOES.

One hundred and eleven varieties of potatoes were planted in a strong clay loam, that had been in small fruits for several years.

Some varieties suffered slightly from rot, but the yield has been very fair in every case, and the quality of most varieties very good. They were planted from the 4th to the 28th of May, and dug from the 18th to the 25th of September.

POTATOES—Test of Varieties.

Name of Variety.	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.	
Clay Rose	633	36	633	36	None	....	612	..	21	36	Long pink.
American Wonder	598	24	598	24	"	....	538	54	59	30	" white.
Irish Daisy	591	36	562	..	29	36	506	..	56	..	" "
Brownell's Winner	563	12	563	12	None	....	506	30	56	42	Long flat red.
Abundance Late	550	..	550	..	"	....	527	30	22	30	Round white.
Late Puritan	536	48	510	..	26	48	458	..	52	..	Long white.
Seedling No. 7	535	20	535	20	None	....	481	40	53	40	Long red.
Early Sunrise	528	..	528	..	"	....	475	..	53	..	" pink.
Early Puritan	528	..	528	..	"	....	473	..	55	.	" white.
Clarke's No. 1	528	..	528	..	"	....	448	48	79	12	" pink.
Prize Taker	528	..	528	..	"	....	396	..	132	..	" red.
Rose No. 9	513	20	513	20		....	460	20	53	..	" "

POTATOES—Test of Varieties—*Continued.*

Name of Variety.	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.	
Vanier	506	..	506	..	None	....	455	..	51	..	Long dark red.
Empire State	498	40	498	40	"	....	423	52	74	28	" pink and white.
Reading Giant	481	4	481	4	"	....	433	..	48	4	" white.
Reeve's Rose	481	4	481	4	"	....	409	..	72	4	" rose.
Foreman's Early No. 4	469	20	469	20	"	....	421	30	47	50	Oval white.
Charles Downing	469	20	469	20	"	....	397	40	71	40	"
Monroe County	462	..	462	..	"	....	439	..	23	..	Long red.
Satisfaction	457	36	457	36	"	....	411	46	45	50	" white.
Troy Seedling	457	36	457	36	"	....	410	..	47	36	Round white.
World's Fair	454	40	454	40	"	....	386	40	68	..	" "
Brown's Rot Proof	454	40	454	40	"	....	409	..	45	40	Long dark red.
Henderson's Late Puritan	451	44	428	14	23	30	372	20	45	44	" white.
Pride of the Table	451	44	451	44	None	....	406	44	45	..	Long dark red.
Carman's No. 3	447	20	447	20	"	....	403	50	43	30	Oval white.
Maule's Thoroughbred	447	20	447	20	"	....	402	30	44	50	Long rose.
Dakota Red	445	52	445	52	"	....	401	22	44	30	" red.
State of Maine	440	..	440	..	"	....	394	30	45	30	Oval white.
Dreer's Standard	419	48	419	48	"	....	356	30	63	18	Round white.
Bill Nye	419	28	419	28	"	....	377	10	42	18	Long white.
Algoma No. 1	418	..	418	..	"	....	376	20	41	40	" rose.
Columbus	418	..	418	..	"	....	355	30	62	30	" pink.
Holborn Abundance	418	..	418	..	"	....	355	30	62	30	" white.
Pearce's Extra Early	414	..	401	30	12	30	359	30	42	..	" rose.
Vick's Extra Early	414	..	414	..	None	....	372	..	42	..	" pink.
New Queen	411	..	411	..	"	....	369	30	41	30	" "
New Variety No. 1	409	36	409	36	"	....	369	46	39	40	Round white.
Northern Spy	408	18	408	18	"	....	367	48	40	30	Long red.
Early Norther	408	18	408	18	"	....	367	48	40	30	" pink and white.
Great Divide	407	14	386	14	21	..	347	44	38	30	Long white.
Lee's Favourite	403	20	403	20	None	....	342	50	60	30	" rose.
Ohio Junior	403	20	403	20	"	....	322	40	80	40	" "
American Giant	374	..	355	..	19	..	307	..	46	..	Long white.
McKenzie	363	44	363	44	None	....	319	24	44	20	"
Peerless Junior	362	16	362	16	"	....	308	6	54	10	Oval white.
Lopas White	361	32	361	32	"	....	307	32	54	..	Long white.
Chicago Market	360	10	360	10	"	....	313	10	47	..	" red.
Quaker City	360	10	288	10	72	..	201	43	87	27	" white.
Everett	358	36	358	36	None	....	268	56	89	40	" pink.
Seedling 230	355	40	355	40	"	....	338	10	17	30	Round white.
Pride of the Market	354	12	354	12	"	....	336	30	17	42	Long white.
Seedling No. 3	354	..	354	..	"	....	283	10	70	50	" red.
Good News	352	30	352	30	"	....	317	30	35	..	" rose.
Crown Jewel	352	30	352	30	"	....	317	10	35	20	" "
Flemish Beauty Seedling	352	30	352	30	"	....	281	30	71	..	" pink.
Ashleaf Kidney	346	8	346	8	"	....	294	28	51	40	" white.
Early London	344	20	344	20	"	....	293	50	50	30	" pink.
Ideal	334	24	334	24	"	....	290	44	33	40	Oval "
Sharpe's Seedling	334	24	334	24	"	....	283	54	40	30	Long red.
Money Maker	330	..	314	..	16	..	283	30	31	30	" white.
Record	330	..	330	..	None	....	280	10	49	50	" "
Sir Walter Raleigh	330	..	330	..	"	....	281	30	48	30	Oval "
Rural Blush	322	40	322	40	"	....	290	20	32	20	Long white.
Rochester Rose	322	40	322	40	"	....	258	35	64	5	" rose.
Honeoye Rose	322	40	322	40	"	....	256	40	66	..	" "
Houlton Rose	322	40	322	40	"	....	242	..	80	40	" "
Earliest of All	319	44	319	44	"	....	272	14	47	30	" light rose.
Early White Prize	316	48	316	48	"	....	268	18	44	30	Long white.
Early Harvest	316	48	316	48	"	....	253	28	63	20	Long white.
Seattle	315	20	315	20	"	....	251	20	54	..	"
Victor Rose	308	..	308	..	"	....	278	..	30	..	Long rose.
Rural No. 2	308	..	308	..	"	....	261	30	46	30	Oval white.
Irish Cobbler	305	4	305	4	"	....	244	4	61	..	"
Beauty of Hebron	303	36	303	36	"	....	258	6	45	30	Long rose.
Delaware	303	36	303	36	"	....	241	46	61	40	Oval white.

POTATOES—Test of Varieties—*Concluded.*

Name of Variety.	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.	
Burnaby Seedling	302	8	302	8	None		256	48	45	20	Long, pale rose.
Green Mountain	300	40	300	40	"		240	40	60	..	Oval white.
Seedling No. 23	300	40	300	40	"		180	40	120	..	Round, white purple eyes.
Carman No. 1	299	12	299	12	"		240	32	58	40	Oval white.
Polaris	297	44	297	44	"		267	14	30	30	Long white.
Thorburn	296	22	296	22	"		243	22	53	..	" rose.
Orphans	294	4	294	4	"		240	4	54	..	" white.
Bovee	293	20	293	20	"		264	20	29	..	" rose.
Daisy	293	20	293	20	"		249	44	43	36	" "
Early Rose	290	25	290	20	"		235	20	55	..	" "
Lightning Express	286	..	257	30	28	30	201	30	56	..	" "
Hale's Champion	284	32	270	2	14	30	170	30	99	32	Round white.
Queen of the Valley	281	36	281	36	None		230	6	51	30	Oval pink.
85 Nameless	277	12	277	12	"		223	12	54	..	Round white.
Seedling No. 25	271	20	271	20	"		218	50	52	30	Long white.
Freeman	271	20	271	20	"		203	35	67	45	"
Early Gem	271	20	271	20	"		203	35	67	45	Long rose.
I. X. L	266	..	238	..	26	..	180	..	58	..	" pink.
Hopeful	256	40	256	40	None		217	50	38	50	Oval white.
Seedling 214	256	40	256	40	"		205	..	51	40	Long "
King of the Roses	256	40	256	40	"		154	40	102	..	" pink.
Lizzie's Pride	249	20	249	20	"		176	20	73	..	" "
Fillbasket	244	36	244	36	"		197	56	45	40	" red.
Uncle Sam	234	40	234	40	"		222	46	11	44	Oval white.
Wonder of the World	234	40	234	40	"		189	52	44	48	Long rose.
Pearce's Prize Winner	234	40	234	40	"		176	40	58	40	" pale rose.
Early Ohio	228	48	228	48	"		206	28	22	20	" pink.
Bruce's White Beauty	228	48	228	48	"		171	36	57	12	Oval white.
Burpee's Extra Early	228	48	228	48	"		170	..	58	48	Long rose.
General Gordon	225	52	218	52	12	30	168	22	45	..	" red.
Early Six Weeks	205	20	205	20	None		184	..	21	20	" pink.
Maggie Murphy	205	20	205	20	"		162	50	42	30	" rose.
Lawton's White	202	24	202	24	"		181	54	20	30	" white.
Harbinger	176	..	176	..	"		151	..	25	..	" rose.
Vanguard	176	..	176	..	"		143	40	32	20	" pink.
Table King	176	..	176	..	"		140	45	35	15	Round white.

YIELD OF HAY, FODDER CROPS AND ROOTS.

Hay, first crop	12	tons	1,000 lbs.
" second crop	9	"	1,000 "
Mixed grain, cut for feed	40	"	1,215 "
Turnips	72	"	1,500 "
Carrots	15	"	1,700 "
Mangels	17	"	1,500 "
Sugar beets	5	"	.....
Clover, in silo	3	"	.....
Corn, in silo	51	"	.....

The first crop of clover was cut in June, the second in August. A considerable portion of the clover, both first and second crop, was cut and fed green.

EXPERIMENTS WITH FODDER CROPS.

These plots were sown on loam which had been in roots the previous year and was in very good condition. The Egyptian Lentils, Teosinte, Kaffir Corn, Hungarian Grass and Golden Wonder Millet did not prove worth cutting.

Fodder Crops.	Date of Sowing.	Character of Growth.	Weight per Acre, Green.	Weight per Acre, Cured.	Remarks.
			Tons. Lbs.	Tons. Lbs.	
Mixture No. 1—1 bush. each wheat, oats and pease	May 1	Strong..	9 900	4 500	Cut Aug. 2nd, wheat in late milk.
Mixture No. 2—1 bush. each oats, pease and barley	" 1	" ..	8 1,950	3 1,450	" oats in milk.
Golden Millet	April 27	" ..	Not weighed green.	3 1,140	Cut when grain was in late milk.
New Siberian Millet	" 27	" ..	" ..	3 1,240	" "
Holy Terror Millet	" 27	" ..	" ..	4 140	" "
New Mammoth Millet	" 27	" ..	" ..	3 1,550	" "
Hungarian Grass	May 18	.....	.....	.....	Seed did not germinate well, very few plants
Golden Wonder Millet	" 18	.....	.....	.....	" "
Egyptian Lentils	April 27	.....	.....	.....	Only a few seeds germinated, growth very feeble and no pods formed.
White Kaffir Corn	" 27	.....	.....	.....	Only a few seeds germinated, growth from 6 to 10 inches high.
Teosinte	" 27	.....	.....	.....	Only a few seeds germinated, growth from 3 to 5 inches high.

DISTRIBUTION OF SEED GRAIN, &c.

The following is a summary of the distribution of seed grain, plants, scions and cuttings made during 1897 :—

Wheat, 3-lb. bags	51
Oats "	57
Barley "	29
Pease "	49
Potatoes "	68
Lathyrus Sylvestris, packages	42
Scions "	105
Cuttings "	63
Small fruits "	71
Tree seeds "	150
Total	685

STOCK.

Since cool weather began three bulls have shown symptoms of the red water. They have been promptly treated and the disease arrested.

These animals have always had comfortable quarters, wholesome food and pure water, which makes it difficult to assign a cause, and, until a cause is found, difficult to prevent.

There are at present on the farm six head of horses, twenty head of cattle, four pigs, seven sheep, and forty-one fowls.

All—with the exceptions above mentioned—are in apparent good health.

BUILDINGS.

A small comfortable shed for shelter has been put up in each of the bull yards.

FENCING.

About three-quarters of a mile of wire fence has been put up along the west side of the farm, and a strip of land is being cleared along this to protect it from fire.

LARGE FRUITS.

APPLES.

The crop of apples has been a very heavy one, and the quality very fine, there being less scab and other fungus diseases than usual, and no injury from insects. The apple miner, which did considerable damage to the fruit last year, has been entirely absent this year. Whether their absence this season is because the injured fruit was carefully gathered and fed to the stock, and the trees sprayed, during the growing season with Bordeaux mixture and Paris green, and in winter with the lime sulphur and salt mixture, or from some other cause, is not known. The following apples fruited for the first time this year:—

Devonshire Quarrenden.—Tree a moderate grower. Fruit medium size, roundish and flattened. Skin deep rich crimson, with small green dots. Flesh white, crisp, juicy; pleasant sub-acid flavour. Season, August.

Summer Red Streak.—Tree a moderate grower. Fruit medium size, roundish conical. Skin yellow, splashed and striped with red. Flesh white, juicy, brisk sub-acid. Season, August.

Grandmother.—Tree an upright vigorous grower. Fruit above medium size, nearly conical. Skin greenish yellow, splashed and streaked with red. Flesh dry, granular and sweet. Season, last of August.

Bogdanoff.—Tree a strong grower. Fruit round, flattened, above medium size. Skin yellow, with a bright red cheek. Flesh white, juicy, sprightly acid. Season, September.

Borovinka (Solovieff).—Tree vigorous. Fruit of the Duchess type, only nearly twice as large. Season, September.

Gipsy Girl.—Tree a strong grower. Fruit large, obovate. Skin yellow, splashed with bright red. Flesh white, juicy, crisp, sprightly acid. Season, September and October.

No. 181.—Tree a vigorous grower. Fruit large, roundish, conical. Skin greenish, yellow. Flesh white, juicy, mild acid. Season, last of September.

Volga Anis.—Tree a strong grower. Fruit large, oblong conical. Skin greenish yellow, with a red blush. Flesh white, coarse, mild sub-acid. Season, October.

Haskell's Sweet.—Tree a vigorous grower. Fruit of medium size, round flattened. Skin greenish yellow, with a blush in the sun. Flesh yellowish, tender, medium, juicy and pleasant. Season, October.

King of Pippins.—Tree a strong grower. Fruit of medium size, roundish. Skin, pale yellow, splashed with red. Flesh firm and sharply acid. Season, October and November.

Somnitelnoe.—Tree a vigorous grower. Fruit small, conical. Skin green, nearly covered with bright red. Flesh white, not juicy or high flavoured. Season, September and October.

Karabovka.—Tree a very vigorous grower. Fruit small, obovate,conical. Skin green splashed with red. Flesh white, medium juicy, sub-acid. Season, September and October.

Titovka (Soloviejf).—Tree a very vigorous grower. Fruit large, oblong conical. Skin greenish yellow, with streaks of red on sunny side. Flesh white, medium juicy, mildly acid and pleasant. Season, late autumn.

Plodovitka (Soloviejf).—Tree a very vigorous, grower. Fruit of medium size, roundish flat. Skin green, splashed with red. Flesh white, juicy, crisp, pleasant acid. Season, late autumn.

Lapough.—Tree a very vigorous grower. Fruit large. Skin clear waxy yellow. Flesh white, crisp, juicy, sprightly acid. Season, late autumn.

Zolotoreff.—Tree a very vigorous grower. Fruit large, roundish, conical. Skin greenish yellow, with a reddish cheek. Flesh white, tender, juicy, sprightly acid. Season, late autumn.

Borsdorf.—Tree a strong and vigorous grower. Fruit of medium size, oblong, tapering to the eye. Skin greenish white, with a little russet. Flesh yellowish white, crisp, juicy, sub-acid. Season, late autumn.

Cox's Orange Pippin.—Tree a moderate and spreading grower. Fruit of medium size, oblate. Skin yellow, splashed, nearly over the whole surface with red. Flesh yellowish, crisp, juicy, rich sub-acid. Season, late autumn.

Melonen.—Tree vigorous. Fruit large, roundish conical. Skin yellow, with a pink blush. Flesh yellowish, crisp, medium juicy, mild acid. Season, autumn.

Calville Saint Sauveur.—Tree a medium grower. Fruit large, oblong conical. Skin greenish yellow, somewhat mottled and sprinkled with whitish dots. Flesh white, tender and juicy, acid. Season, late autumn.

Perry Russet.—Tree a strong grower. Fruit large, oblong. Skin yellow with russet nearly over the whole surface. Flesh, yellow, firm, juicy, pleasant acid. Season, late autumn.

Huntsman's Favourite.—Tree a vigorous grower. Fruit large, roundish conical, Skin greenish yellow with a little pale red on cheek. Flesh yellowish, coarse, crisp. juicy, and of pleasant flavour. Season November and December.

Carthouse.—Tree vigorous. Fruit large. Skin smooth, yellow, streaked with red. Flesh yellow, firm, juicy and fine. Season, winter.

Plum's Cider.—Tree a vigorous grower. Fruit of medium size, oblong. Skin yellow with a little russet, and sprinkled with gray dots. Flesh yellow, tender, juicy and mild, sub-acid. Season, winter.

Switzer.—Tree a moderately vigorous grower. Fruit small to medium, roundish, flattened. Skin green, nearly covered with dark red. Flesh white, firm, juicy, mild, sub-acid, and of pleasant flavour. Season, winter.

Iowa Blush.—Tree vigorous. Fruit of medium size, conical. Skin yellow, with a mottled yellowish red cheek. Flesh white, firm, juicy, mild acid. Season, winter.

Willow Twig.—Tree a medium but spreading grower. Fruit of medium size, roundish, slightly conical. Skin green, streaked and splashed with light red. Flesh greenish white, firm, juicy, pleasant sub-acid. Season, winter.

Scarlet Cranberry.—Tree a medium grower. Fruit small to medium, oblate. Skin green, nearly covered with dull red and freely sprinkled with whitish dots. Flesh yellowish white, firm and juicy, mild, sub-acid. Season, winter.

The list of varieties given last year as the most promising for winter have produced fine crops of apples this season, and that list may be extended by adding Smith's Cider and Stark. Smith's Cider is a strong, vigorous and productive tree, with fruit of medium size, handsome and of good quality, keeping until last of February.

Stark.—Tree a very strong grower and productive. Fruit large and of fair quality, keeping until last of March. Specimens have been kept until last of June.

PEARS.

The season has been a very favourable one for pears and the crop not only a large one but the quality was very fine.

Several of the newer varieties fruited for the first time this year. Below will be found some notes giving date of ripening and quality so far as an opinion can be formed from the first year's crop.

Salviate.—Tree a vigorous grower. Fruit of medium size, obovate, pyriform; skin greenish yellow with a few gray dots. Flesh dry, granular and poor. Ripe, 1st. August.

Wilder.—Tree a vigorous upright grower. Fruit large, obtuse, pyriform. Skin bright yellow, with a warm blush on sunny side. Flesh yellowish, juicy and sweet. Ripe August 4th.

Ritson.—Tree a strong grower. Fruit small to medium, oblong, pyriform. Skin yellow, sprinkled with russet. Flesh white, juicy, buttery. Ripe, last of August.

La France.—Tree a vigorous grower. Fruit of medium size, obovate, obtuse, pyriform. Skin green, with small gray dots. Flesh juicy, melting and of very fine flavour. Season September.

Jargonelle.—Tree a vigorous grower. Fruit large, long pyriform. Skin greenish yellow with a little bronze on cheek. Flesh juicy, white pleasant. Season, August.

Early Bergamot.—Tree a medium grower. Fruit small, roundish, pyriform. Skin yellowish green. Flesh sweet, pleasant but not juicy. Season August.

Comte de Lamy.—Tree a vigorous grower. Fruit small to medium in size, oblate, pyriform. Skin yellow with a reddish cheek and small patches of russet. Flesh white, fine grained, buttery and sweet. Season, September.

Beurre d'Amanlis.—Tree a strong grower. Fruit of medium size, obovate, pyriform. Skin green with a reddish brown cheek and many brown dots. Flesh juicy, with a pleasant flavour. Season, September.

Madame Treyve.—Tree a vigorous grower. Fruit of medium size, obovate, pyriform. Skin yellow, with a red cheek and small brown dots. Flesh white, melting, juicy, sweet, with a rich flavour. Season, September.

Jersey Gratioli.—Tree a medium grower; fruit of medium size, obovate pyriform. Skin yellowish green with patches of russet. Flesh white, juicy and melting. Season, September.

Pitmaston Duchess.—Tree a vigorous grower. Fruit large, oblong pyriform. Skin yellow with russet near the stalk. Flesh yellowish, juicy, buttery, and of pleasant flavour. Season, October.

Gansel's Bergamot.—Tree a moderate grower; fruit of large size, roundish, obovate, nearly flat. Skin russet brown, with a russet red cheek. Flesh white, juicy, melting, and sweet with a rich flavour. Season, September.

Conseiller de la Cour.—Tree a vigorous grower. Fruit above medium size, oblong, pyriform. Skin greenish yellow with russet dots. Flesh yellowish, juicy and melting. Season, last of September.

General Todtleben.—Tree a vigorous, spreading grower. Fruit large, obtuse, pyriform. Skin greenish yellow, sprinkled with russet dots; flesh whitish, coarse, juicy, sweet and pleasant. Season, October.

Nouvelle Fulvie.—Tree a medium grower. Fruit large, pyriform. Skin greenish yellow with a reddish brown cheek. Flesh yellowish, juicy, melting, sweet. Season, October.

Noveau Poiteau.—Tree a vigorous grower. Fruit of medium size, obovate, pyriform. skin greenish yellow; flesh whitish, buttery, juicy, with a rich sweet flavour. Season November.

Of the new pears the Dr. Jules Guyot, for early autumn. Rivers' Princess, Pitmaston Duchess and Knight's Monarch appear to be the most promising. More than thirty varieties of pears new to our collection were received as scions this year.

PLUMS.

This climate is so suitable to the plum that a crop of fruit is almost certain if the trees have received even ordinary care. This season the crop has been a fairly good one and some varieties gave very heavy crops. Several of the newer sorts fruited this year, as follows—

Early Favourite.—Tree a vigorous grower, but not an early bearer. Fruit small, roundish, oval. Skin nearly black with a blue bloom. Flesh greenish yellow, juicy, sweet, and of high flavour. Stone small and free. Ripe, 22nd July.

Early Prolific.—Tree a moderate grower, but not prolific here. Fruit small, nearly globular. Skin dark purple with a blue bloom. Flesh yellowish, juicy and sweet. Stone small and free. Ripe, 26th July.

Lincoln.—Tree a strong grower. Fruit large, oval. Skin reddish purple with many whitish dots and a thin white bloom. Flesh yellow, juicy, sweet and pleasant. Stone small. Ripe, 6th August.

July Green Gage.—Tree a moderate grower. Fruit of medium size, globular in shape. Skin yellow, with many small crimson dots. Flesh yellow, juicy, sweet. Ripe, 7th August.

Mariana.—Tree a moderate grower. Fruit small, oval. Skin glossy, yellow, with a reddish blush on sunny side. Flesh yellow, juicy and pleasant. Stone cling and large. Ripe, 10th August.

Goliath.—Tree a strong grower. Fruit large, roundish, oblong, one side enlarged, suture shallow. Skin reddish purple, with a thin whitish bloom. Flesh yellow, with a brisk pleasant flavour. Clingstone. Ripe, 10th August.

Angelina Burdette.—Tree a strong grower. Fruit above medium size, nearly round, with a deep suture and one side enlarged. Skin dark purple with brown dots and a blue bloom. Flesh greenish yellow, juicy, with a sprightly, pleasant flavour. Free stone. Ripe, 10th August.

Wooten.—Tree a moderately vigorous grower. Fruit small. Skin yellow, with a reddish blush nearly over the whole surface. Flesh yellow, juicy and pleasant. Clingstone. Ripe 10th August.

Early Red.—Tree a feeble straggling grower. Fruit, small oval. Skin, dark purple, with a heavy blue bloom; flesh, light greenish white, dry granular and acid; ripe, 10th August.

Golden Beauty.—Tree a fair grower. Fruit small, nearly heart shaped. Skin red, sprinkled with whitish dots, and a thin whitish bloom. Flesh yellow, juicy and sweet; clingstone. Ripe, 12th August.

Transparent Gage.—Tree a strong grower. Fruit of medium size, round, flattened. Skin light green with a light red blush, and a whitish bloom. Flesh greenish white, juicy, sweet and of fine flavour, but cracks badly. Ripe, 14th August.

Prince Englebert.—Tree a strong, vigorous grower. Fruit of medium size, oblong oval. Skin dark purple with brown dots and a light blue bloom. Flesh greenish yellow, sweet, juicy and firm. Stone large, and cling. Ripe, 14th August.

Robinson.—Tree a vigorous grower. Fruit small. Skin yellow with a bright red side. Flesh yellow, juicy and sprightly. Stone large, and cling. Ripe, 14th August.

McLaughlin.—Tree a strong grower. Fruit above medium, round and quite flattened. Skin greenish yellow, and dotted with reddish dots about the stem. Flesh yellow, firm, juicy, sweet, and of very rich flavour. Stone small, and cling. Ripe, 16th August.

Orleans Old.—Tree a moderate grower. Fruit below medium size, globular, with a shallow suture. Skin dark purple, with a dark, blue bloom. Flesh yellowish, sweet, juicy, pleasant. Ripe, 16th August.

Glass Seedling.—Tree a free grower. Fruit above medium size, oval, suture broad and shallow, one side enlarged. Skin dark purple with a blue bloom. Flesh greenish yellow, firm, juicy, sweet; free stone. Ripe, 19th August.

Giant Prune.—Tree a free grower. Fruit large, oblong, with a shallow suture. Skin yellow nearly covered with light red and a thin whitish bloom. Flesh yellowish, juicy, sweet and rich. Ripe, 20th August.

McGillivray.—Tree a moderate grower and poor producer. Fruit small, oval shape, shin light red. Flesh yellow, juicy, slightly astringent; cling stone. Ripe, 20th August.

Field.—Tree a vigorous grower. Fruit above medium in size, oblong with a deep suture. Skin purple with a thin blue bloom. Flesh greenish, sweet, firm and of pleasant flavour. Stone large, cling. Ripe, 20th August.

Tenant Prune.—Tree a strong vigorous grower. Fruit medium to large oblong with a shallow suture. Skin reddish purple with a whitish bloom. Flesh yellow, firm, sweet and pleasant. Stone small and free. Ripe, 22nd August.

Annie Spathe.—Tree vigorous. Fruit small oval with a shallow suture. Skin reddish purple with a thin bluish bloom. Flesh greenish yellow, sprightly and of pleasant flavour. Stone large. Ripe, 24th August.

Several of the Japanese plums fruited this year, but the fruit almost all fell off before fully grown.

Botan.—Tree a straggling poor grower. Fruit of medium size, pointed heart-shape. Colour bright red sprinkled with grayish dots and covered with a thin white bloom. Flesh yellow, juicy, crisp, and of pleasant flavour. Ripe, 7th August.

Ogon.—Tree a medium grower. Fruit large, nearly round. Skin yellow with a thin bloom. Flesh yellow, firm, sweetish and dry. Ripe, 17th August.

Burbank.—Tree a straggling grower. Fruit large, roundish conical. Skin yellowish red. Flesh yellow, moderately juicy, sweetish, not a pleasant flavour. Stone small and free. Ripe, 16th August.

Red Negate.—Tree a feeble straggling grower. Fruit of medium size, pointed heart-shape. Skin bright red with a thin bloom. Flesh yellow, juicy, sprightly, but not a good flavour. Ripe, 16th August.

Grand Duke, Gueii, Monarch, Cox's Emperor and *Lincoln* are the most profitable varieties among those which have fruited for two years or more. Several others are promising but have not been tested long enough to prove them thoroughly.

The Japan plums bloom very freely, but do not set their fruit well, and the trees are without exception lacking in growth and vigour.

Nineteen varieties of plums have been added to the collection this year.

CHERRIES.

The cherry trees bloomed freely this year and set a fine crop of fruit which, unfortunately, suffered very severely from the wet weather, which occurred when many of the varieties were nearly ripe, causing the fruit to split and rot.

Of those that have fruited in previous years, one of the most satisfactory is the Windsor, which gave a fine crop during the past season, and the fruit did not receive so much injury from the wet weather as other varieties of the same season.

Early Rivers.—Fruited this year for the first time. Fruit large, roundish, heart shaped. Skin, nearly black. Stalk, long. Stone, small. Flesh, tender, juicy and sweet. Ripe, 26th May.

White Heart.—Fruit small, heart-shaped. Skin, yellowish white with a pale reddish cheek. Flesh, melting, sweet and pleasant. Ripe, 5th June.

Schmidt's Bigarreau.—Fruit large, nearly round. Skin, nearly black. Flesh firm, juicy and of fine flavour. Ripe, 1st July.

Sparhawk's Honey.—Fruit of medium size, roundish, heart shaped. Skin, yellowish red. Flesh juicy, sweet, and of fine flavour. Ripe, 1st July.

Straus Weichsel.—Fruit large, nearly black, round, a little flattened. Flesh dark red, juicy, firm, slightly acid, of good flavour. Ripe, 1st July.

Nouvelle Royale.—Fruit large, roundish. Skin, bright glossy red, mottled with darker red spots. Flesh white, firm, juicy, pleasant and sprightly. Ripe, 2nd July.

Gruner Glass.—Fruit of medium size, nearly round. Skin dark red, or nearly black. Flesh firm, juicy, sprightly. Ripe, 5th July.

Arch Duke.—Fruit large, obtuse, heart-shaped. Skin, dark red. Flesh tender, juicy and high flavoured, sprightly, sub-acid. Ripe, 5th July.

Royal Duke.—Fruit large, roundish, flattened. Skin, dark red. Flesh reddish, tender, juicy, with a rich flavour. Ripe, 1st to 6th July.

Griotte du Nord.—Fruit small to medium, somewhat oval in shape. Skin light red. Flesh reddish white, juicy, acid. Stone, large. Ripe, 13th July.

Brusseler Braun.—Fruit of medium size, oval shape. Skin, deep red. Flesh reddish white, juicy, firm, pleasant acid. Ripe, 10th to 15th July.

Montmorency Court Queue.—Fruit above medium in size, round flattened. Skin light red. Flesh yellowish, tender, juicy, pleasant acid, very fine flavour, a little soft. Ripe, 5th to 10th July.

Duchess de Pallau.—Fruit large, nearly round. Skin bright red. Flesh yellowish white, firm, solid, and moderately juicy, mild, pleasantly acid, with a fine flavour. Ripe, 10th to 14th July.

Eleven varieties of cherries have been added to our collection this season.

Dwarf Rocky Mt. Cherries.—These bushes fruited freely this season, ripening about the last of August, the fruit hanging on the bushes in good condition for some weeks. A number of seedlings have been raised for distribution; as this fruit can be grown in the interior, where other cherries are not hardy, and under such conditions may be of value.

PEACHES.

Several varieties of peaches fruited fairly well, especially in sheltered locations, but they have not thus far been profitable to plant here for commercial purposes.

The following varieties produced a small crop this season. They are listed in the order of ripening.

Amsden, Early Canada, Hilborn, Crane's Early Yellow, Early Rivers, Mountain Rose, Barnard's New Rare Ripe, Foster, Early Barnard, Muir, Amelia, Druid Hill, Hill's Chili, Fox's Seedling. The above all ripened their fruit. Several of the varieties mentioned in my last report as not ripening their fruit, fruited again this year, but the fruit did not ripen or fully mature.

NECTARINES.

Many of the older nectarine trees blossomed freely, but none of them set more than two or three fruits. Nectarines, like peaches and apricots, do not appear to be well adapted to this climate.

APRICOTS.

Although nearly all the apricot trees bloomed freely the fruit did not set. Alexander, Alexis, Catherine, J. L. Budd, and Montgamet, each produced from two to half a dozen apricots, but the fruit was imperfect and poor. The apricot trees do not appear to be hardy, as large limbs die from time to time, and blossoming very early, as they do, the fruit does not set.

MULBERRIES.

All the mulberry trees fruited freely this year. The fruit began ripening the last of July and continued until the first of September. The fruit is large, sweet and juicy, and is produced in considerable quantities on the trees, but it falls off as soon as ripe, and is too soft for any but a home market.

QUINCES.

The quinces blossomed this year, but no fruit set.

FIGS.

The fig bushes continue to grow, but as they are frequently cut back in winter, and no ripe fruit has been produced, they are not of much value.

MEDLARS.

The Royal, Nottingham, and Holland medlar trees, fruited this year, but the trees evidently require age before the fruit is produced in quantity.

NUT TREES.

Filberts did not fruit freely this season, but a few very fine nuts were produced on the bushes got from Germany last year, and when these bushes have attained size, some desirable varieties, for this climate, may be found amongst them.

The Japanese walnut had a few fine nuts this season, and the hard shell almonds again fruited. The soft shell varieties have not yet fruited.

GRAPES.

The crop of grapes on the farm this season has been very small. Owing to the constant rain during the time they were in blossom, fertilization was imperfect, and consequently the bunches were open and not half the number of grapes in a bunch which there were last year, and a great many of the grapes were small in size and imperfect.

White or Nearly White.

Date of Ripening.

October 1.—Storr's Early.—Sweet, juicy, and of pleasant flavour; a very small crop.
" 3.—Duchess.—Sweet and juicy, but not so good in flavour as last year; a few bunches only.
" 4.—Lady.—Tender juicy and sweet, but very few bunches.
" 4.—Emerald.—Sweet, tender, good flavour; fair crop.
" 4.—Saunders' Seedling, No. 3.—A fair crop of very good grapes; sweet, tender and juicy.
" 4.—Eva.—Grape tender and juicy, a very poor crop.
" 6.—Saunders' Seedling.—(Wild seedling with Muscat Hamburg.)—A fair crop of very good grapes; sweet, juicy and tender.
" 6.—Jessica.—A very few bunches; grapes much inferior to other years.
" 6.—Martha.—A fair crop of nice grapes; a little acid, but juicy and of good flavour.
" 8.—Rommel.—Grape juicy, sprightly, pleasant flavour; a few bunches.
" 8.—Pocklington.—Grape pulpy, sprightly, pleasant flavour; a poor crop.
" 13.—Eldorado.—Grape very uneven in size, sweet, skin thick; a very few bunches.
" 13.—Missouri Reisling.—A fairly good crop of juicy tender grapes.
" 13.—Centennial.—A good crop of worthless grapes.
" 13.—Niagara.—A very fair crop of good grapes.
" 13.—Saunders' Seedling.—(Wild seedling with Muscat d'Aout.)—A medium crop of very good grapes, but uneven in size, and many of the grapes dropped off the bunch when ripe.
" 24.—Lady Washington.—Only a few bunches of rather inferior grapes.
" 26.—Elvira.—A fair crop; juicy, tender grapes, but many were imperfect.
" 26.—Noah.—Only a few bunches of very imperfect grapes.
" 29.—Opal.—A few bunches of sour imperfect grapes.

Black or very Dark Blue.

October 4.—Bacchus.—Three or four bunches of poor grapes.
" 4.—Early Victor.—A few bunches of small sweet grapes of rather poor flavour.
" 4.—Florence.—A fair crop of worthless grapes.
" 4.—Cottage.—A small crop of fairly good grapes; sweet and of good flavour.
" 7.—Improved Wild.—A very few bunches of poor grapes.
" 7.—Cynthiana.—A fair crop of worthless grapes.
" 7.—Moore's Early.—A fair crop; grape sweet, pulpy, skin tough.

Black or Dark Purple.

October 9.—Canada.—A fair crop; grape small, sweet, but not of good flavour.
" 10.—Roger's No. 39.—Grape large, sweet and pulpy; a poor crop.
" 10.—Merrimac (Roger's No. 19.)—Grape large, juicy, sweet and of good flavour; a fair crop.
" 10.—Wilder.—A small crop of large, juicy and sweet grapes.

Date of Ripening.

October 12.—Roger's No. 24.—A fair crop; grape pulpy, rather acid, skin tough.
" 12.—Clinton.—A good crop of good grapes.
" 14.—Herbert (Roger's No. 44.)—A poor crop of rather inferior grapes.
" 15.—Naomi.—A very few bunches of worthless grapes.
" 15.—Saunder's Seedling (Clinton with Muscat Hamburg.)—A small crop of very good grapes, juicy and a little acid.
" 15.—Saunder's Seedling (Concord with Delaware.)—A fair crop of good grapes, juicy, sprightly, good flavour.
" 15.—America.—Bunch small; grapes medium in size, juicy, sour, poor flavour; a poor crop.
" 15.—Oriental.—A good crop; grape juicy, sprightly, and of fair quality.
" 15.—Dr. Collier.—Bunch large and loose; grape medium in size, sour, juicy, poor flavour; grape uneven in size.
" 18.—Marion.—A few bunches of very inferior grapes.
" 18.—Hartford.—A few bunches of inferior grapes.
" 20.—Mills.—A small crop of very poor grapes.
" 20.—Highland.—A fair crop, but grapes rather inferior, and a great many imperfect grapes in bunch.
" 20.—Roger's No. 41.—A good crop; grape large, pulpy and of pleasant flavour.
" 22.—Arnold's No. 8.—A few bunches of worthless grapes.
" 22.—Eumelan.—A small crop of very poor grapes.
" 27.—Arnold's No. 2.—A few bunches of poor grapes.
" 27.—Seedling (Clinton with Muscat Hamburg.)—Grape small and acid; a few bunches.

Red and Reddish.

October 2.—Delaware.—A fair crop of good grapes, small, sweet and of good flavour.
" 3.—Roger's No. 5.—A small crop; grape large, juicy, sprightly, skin tough.
" 3.—Moyer.—A very few bunches. Grape small, sweet, juicy and pleasant.
" 3.—Wyoming Red.—A fair crop of very good grapes; medium sized, juicy, and of pleasant flavour.
" 5.—Brillant.—A small crop; grape medium size, sweet, juicy and tender.
" 5.—Ulster.—A fair crop; grape sweet, juicy and of good flavour.
" 5.—Vergennes.—A fair crop of pretty good grapes, pulpy, sweet and of good flavour.
" 10.—Buchanan.—A fair crop; grape juicy, sprightly, of good flavour; skin thin.
" 10.—Chasselas De Fontainbleau.—A fair crop; grape medium in size, pulpy, sweet and pleasant.
" 13.—Lindley (Roger's No. 9).—A few bunches; grape juicy and sweet.
" 13.—Salem (Roger's No. 53).—A few bunches; grape large, juicy and sweet.
" 15.—Amber Queen.—A very few bunches of worthless grapes.
" 15.—Massasoit.—A few bunches; grape juicy, sweet and tender.
" 18.—August Giant.—A small crop of fine looking grapes, but acid, juicy and of poor flavour.
" 18.—Agawam.—A small crop; grape tender, juicy and pleasant.
" 18.—Gærtner (Roger's 14).—A few bunches; grape juicy, sweet, tender and of pleasant flavour.
" 18.—Brighton.—A few bunches of poor grapes.
" 18.—Arnold's No. 1.—A good crop of sour grapes.
Jefferson.—A few bunches; grape medium in size; not ripe 31st October.
Catawba.—A good crop; grape large, but bunch loose and open; not ripe 31st October.

SMALL FRUITS.

Nearly all the small fruits were transplanted this spring to a more suitable piece of land. The soil where they had been growing was a dry gravelly knoll and was not suitable, but it was the best land available at the time many of the bushes were received. In consequence of their removal only a small crop was produced this season but there was already a considerable improvement in the size and quality of the fruit.

GOOSEBERRIES.

The only gooseberry bushes that fruited this year were those on the mountain, and as in previous years these were clean and free from mildew both in fruit and foliage. The bushes on the level had been transplanted early in spring and cut back, and did not fruit. The foliage in some varieties was rather badly attacked with mildew. The Bordeux mixture does not appear to be entirely successful here with this form of mildew and other mixtures are being tried, and it is hoped that some more efficient remedy will be found to preserve this desirable fruit.

CURRANTS.

RED AND WHITE CURRANTS.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Verriers (white)	June 25	Vigorous ...	Large	Long cluster; sweet; very fine flavour.	Productive.
La Turmoise (red.)	" 25	" ...	" medium	Cluster, medium in length; good flavour, but rather acid	Fairly productive.
Champagner (white.)	" 25	Moderately vigorous.	Small.....	Cluster, medium in length; sweet; good flavour.	Moderately productive.
Champagner (red.)	" 25	Vigorous ...	Large medium	Cluster, medium in length; rather acid; good flavour.	" "
Admirable (red)	" 25	" ...	"	Cluster, rather long; good flavour; very mild acid.	" "
English Red....	" 25	" ...	"	Cluster, long; fine flavour; acid.	Fairly productive.
Brandenburger (white.)	" 25	" ...	"	Cluster, medium in length; flavour good; mild acid.	Productive.
Red Cherry (German)....	" 25	" ...	"	Cluster, medium in length; sweet; good flavour.	Not productive.
Raby Castle (red.)	" 25	" ...	" medium	Cluster, medium in length; a little acid, but of good flavour.	Moderately productive.
London Red ...	" 25	" ...	" "	Cluster, rather short; not very good.	Not productive.
White Transparent.	" 25	" ...	" "	Cluster, medium in length; a good currant; sweet.	Moderately productive.
La Fertile (red).	" 25	Very vigorous.	"	Cluster, long and full; sweet; of good flavour; one of the best.	Very productive.
Red Cherry....	" 25	Vigorous ...	Medium.....	Cluster, short to medium; fruit rather insipid.	Not very productive.
Red Dutch...	" 25	" ...	Large	Cluster, medium in length; a good currant.	Productive.
White Gondoin	" 25	" ...	" medium	Cluster, medium in length; sweet; good flavour.	Moderately productive.
La Hative.....	" 25	" ...	Medium.. ...	Cluster, long and fairly full; fine quality; not too acid.	Productive.
Knight's Early.	" 25	" ...	"	Cluster, medium in length; flavour good.	Moderately productive.

RED AND WHITE CURRANTS—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
New Red Dutch	June 25	Vigorous	Above medium	Cluster, long and well filled; good flavour; a little acid.	Moderately productive.
Esperen's White	" 26	"	Large	Cluster, medium in length; currant sweet; good flavour	Fairly productive.
Large White	" 26	"	"	Cluster, long and well filled; yellowish white; sweet and very good flavour.	Productive.
Ranker's Red	" 26	"	" medium	Cluster, medium in length; very fine flavour.	Fairly productive.
Chenonceau (red.)	" 26	"	"	Cluster, medium in length; very fine flavour.	Productive.
Ringens (red)	" 26	"	Small	Cluster, short; good flavour.	Moderately productive.
White Cherry	" 26	"	"	Cluster, short; sweet; good flavour.	Not very productive.
La Conde	" 26	"	Medium	Cluster, long and well filled; very good quality.	Productive.
Red Langtraubige.	" 27	"	Large medium	Cluster, medium in length; fine flavour.	"
Beauty of St. Gilles.	" 27	"	"	Cluster, medium in length; rather acid, but of good flavour.	Moderately productive.
Red Dutch	" 27	"	"	Cluster, medium in length; rather acid, but of good flavour.	"
Eyatt's Novo (red.)	" 28	"	Medium	Cluster, medium in length; flavour good, but rather acid	Fairly productive.
White Pearl	" 28	Feeble	Small	Cluster, short; acid.	Not productive.
De la Rochepoze (red.)	" 29	Moderately vigorous.	"	A few inferior currants.	"
No. 51 (white)	" 29	"	"	Cluster, short; acid.	Not very productive.
Large Red	" 29	Vigorous	Medium	Cluster, medium in length; good flavour.	Fairly productive.
Large White Dessert.	July 1	"	Large	Cluster, medium in length; acid, but fine flavour.	" "

BLACK CURRANTS.

Dominion	July 1	Vigorous	Above medium	Fine mild flavour	Productive.
London	" 1	"	Large medium	Mild, sweet, good flavour	"
Success	" 1	"	Small medium	Sweet mild flavour	"
Eagle	" 1	"	Large medium	Flavour a little strong	Fairly productive.
Baldwin	" 1	"	Large	Sweet mild flavour.	Productive.
Prince of Wales	" 1	"	"	A very fine currant; flavour sweet and mild	Moderately productive.
Stewart	" 1	"	Above medium	Flavour good	Productive.
Ruler	" 1	"	Large	Mild sweet flavour.	"
Morton	" 1	"	"	Sweet mild flavour.	"
Beauty	" 3	"	Small medium	Flavour fairly good	Fairly productive.
Ontario	" 3	"	Small	Flavour strong	Moderately productive.
Wood	" 4	"	Above medium	Rather strong flavour	" "
Louise	" 5	"	"	Flavour strong	" "
Bella	" 5	"	Small	Acid, but of good flavour	Productive.
Eclipse	" 5	"	Above medium	" "	Fairly productive.
Pearce	" 5	"	Small	Sweet mild flavour.	" "
Black Naples	" 5	"	Large	" "	Productive.
Ethel	" 7	"	Small	Acid and rather strong flavour	Moderately productive.
Monarch	" 7	"	Medium	Acid, but mild and good flavour	" "
Kentville	" 8	"	Small	Strong flavour	Fairly productive.
Champion	" 8	"	Small medium	Flavour rather strong	" "

Black currant bushes which made vigorous growth but did not produce any fruit this year: Star, Tree Currant, Charmer, Lanark, Cranelle, Ogden's Black, Sterling, Henry, Climax, Oxford, Parker, Middlesex, Lee's Prolific, Manitoba Wild, Victoria Ambrafarbige, Kentish Hero, Gewonliche, Bang Up, Merveille de la Gironde, Lennox, Lewis.

RASPBERRIES.—RED AND YELLOW RASPBERRIES.

Name.	Date of Ripening.	Growth of Bush.	Size of Fruit	Quality.	Productiveness.
Carter's Prolific	June 10	Vigorous			
Hornet	" 15	"	Large	Round, dark red, good flavour, but soft.	Productive.
Lord Beaconsfield	" 15	"			
Crimson Beauty	" 20	Moderately vigorous.	Medium	Round, bright red, not very good flavour.	"
Franconia	" 25	Vigorous	"	Round, dark red, fair flavour, soft.	"
Hansell	" 27	Moderately vigorous.	Small	Round, dark red, good flavour, rather soft	Very productive.
Col. Wilder	" 27	"	Above medium.	Round, pale yellow, flavour good, sweet.	Productive.
Red Herrenhauser	" 28	Vigorous	Medium	Round, dark red, fairly good flavour, rather soft.	Fairly productive.
Spineless Yellow	" 28	"	"	Pale yellow, fair flavour, soft	Productive.
Clarke	" 28	"	Small to medium.	Light red, good flavour, but soft and crumbly.	"
Champlain	" 28	Moderately vigorous.	Above medium.	Round, yellow, sweet and of pleasant flavour, soft.	"
Heebner	" 28	Vigorous	Large	Sweet, good flavour, moderately firm.	Very productive.
Golden Queen	" 28	"	"	Round, yellow, a very good berry, good flavour and firm.	Productive.
Turner	" 28	"	Small	Red, good flavour, but soft and crumbly.	Moderately productive.
Marlboro'	" 28	"	Large	Red, of good flavour and moderately firm.	"
Antwerp	" 28	"	Small	Round, dark red, fair flavour, soft.	Very productive.
London	" 30	"	Large	Round, red, very good flavour, firm; promises to be as good as the Cuthbert.	Productive.
Queen of the Market	July 1	"	Very large	Dark red, sweet, firm	"
Queen Victoria	" 1	"	Medium	Soft, crumbly, insipid	Moderately productive.
Duke of Brabant	" 1	"	"	Round, light red, sweet, good flavour, firm.	"
Cuthbert	" 1	"	Large	A very good berry, red, sweet, and good flavour, firm, and continues in bearing a long time.	Productive.
Belle de Fontenay	" 1	"	"	Long, conical, dark red, fairly firm.	Moderately productive.
Fastolf	" 1	"	"	Roundish conical, purplish red, of fine quality.	"
White Antwerp	" 1	"	Above medium.	Round, yellowish white, sweet, soft.	"
Paragon	" 3	"	Large	Round, bright red, good flavour, firm.	Productive.
Muskingum	" 4	"	Above medium.	Round, dark red, good flavour, firm.	Moderately productive.
Thompson	" 5	"	"	Round, bright red, good flavour, moderately firm.	"
Cromwell	" 8	"	Medium	Juicy, sweet, firm	Fairly productive.
Chili	" 8	"	"	Round, light red, large drupes, crumbly, of poor flavour.	Not very productive.
Arnold's Hybrid	" 8	"	"	Dark red, sweet and pleasant flavour, but soft.	Moderately productive.

The following raspberries are growing thriftily, but did not bear any fruit this year:—Large Yellow, New Fastolf, Beehive, Autumn Surprise, Yellow Antwerp, Barnet, Sarah, Malta, Shaffers Colossal, Carman, Oregon Late, Senator, Garnet, Craig, Garfield, Percy, Muriel, R. B. Whyte, Early Ohio, Miller, Billard's Perpetual, Lemercier, Conrath, American Yellow, Sugar of Metz, Knevett's Giant, Prince of Wales, Nonpariel, Brinckle's Orange, Phœnix, Elvira, Fanny, Royal, Mary, Saunder's Large Red, Lady Anne, Sharpe, Pauline, Herrenhaus, Red Perpetual, Battler's Giant, Sir John, Carleton, Empire, All Summer, Cariboo Wild and Columbia.

BLACK CAP.

Name.	Date of Ripening.	Growth.	Size of.	Quality.	Productiveness.
Lovett	July 4	Vigorous	Medium	Good quality, firm	Productive.
Older	" 4	"	Large	"	"
Palmer	" 5	"	Above medium	"	"
Kansas	" 6	"	Medium	"	"
Cromwell	" 8	"	"	"	"
Ada	" 9	"	Above medium.	"	"
Gregg	" 10	"	Large	Very good quality	"
Progress	" 10	"	Medium large	Sweet and good quality, firm.	"
Jackson's May King.	" 10	"	Medium	Good quality, firm	"

The following varieties are thrifty, but did not fruit this year: Nemaha, Lotta, Mamm. Cluster, Smith's Prolific, and Hopkins.

STRAWBERRIES.

The first part of the strawberry season was favourable. The plants were strong and healthy, and the crop good, but after the second picking, we had long continued warm heavy rains, which spoiled at least half of the remaining crop, as the berries were too soft for shipping.

STRAWBERRIES—VARIETIES FRUITED.

Name.	Date of Ripening.	Growth of Plant.	Size of Berry.	Quality.	Productiveness.
Hautbois	June 1	Fairly vigorous.	Small medium	Sweet; fairly good flavour; soft.	Not productive.
Daisy	" 1	Vigorous	Large	Good flavour; firm; stem stout, but not strong.	
Smith's Seedling	" 2	"	Medium	Insipid and rather soft; stem strong.	Fairly productive.
Philip's Seedling	" 3	"	Large; irregular in shape.	Not very good quality; stem stout.	Productive.
Omega	" 3	"	Large	Good flavour; firm; stem long and fairly strong.	"
Chairs	" 3	"	" medium	Good flavour; firm, and continues long in bearing.	"
Van Deman	" 3	"	" "	Fine flavour and good shipper	"
Warfield	" 4	"	Above "	Very good flavour; firm; continues long in bearing.	"

STRAWBERRIES—VARIETIES FRUITED.

Name.	Date of Ripening.	Growth of Plants.	Size of Berry.	Quality.	Productiveness.
Beder Wood....	June 4	Moderately vigorous.	Large medium..	Good flavour	Productive.
Alexander II....	" 4	Fairly vigorous.	Medium.....	Very good flavour.....	Moderately productive.
Madame Joseph Deboise.	" 5	Vigorous...	Large	Of good flavour, but not firm; stem slender.	Productive.
Iowa Beauty....	" 5	" ...	" medium ..	Good quality; firm.....	"
Maxwell.,.....	" 6	" ...	Medium..	Fairly good flavour; stem strong and fairly long.	"
Alpha.....	" 7	" ...	"	Good quality.....	"
Parker Earle....	" 7	" ...	Large	"	Largest crop of al our berries this year.
Beebe's Seedling, No. 3.	" 7	" ...	"	Good flavour and firm.....	Not very productive.
Beebe's Seedling, No. 2.	" 8	" ...	"	" "	" "
Sir Joseph Paxton.	" 8	" ...	Medium to large.	Fairly good flavour; stems long and rather slender.	Not productive.
Dr. Hogg.....	" 8	" ...	Rather small....	Sweet; pleasant flavour.... ..	" "
Brandywine	" 8	" ...	Large	Good flavour; firm....	" "
Imp. Jucunda...	" 8	" ...	Above medium..	Bright red berry of good flavour; firm, and long, strong stem.	Productive.
Eleanor	" 8	" ...	Medium.....	Sweet; stem weak.....	Fairly productive.
Arrow.....	" 8	" ...	Large medium..	Rather sweet; good flavour; firm	" "
Eclipse.....	" 8	" ...	Ir'gular in shape; medium.	Good flavour.....	Productive.
Weston.....	" 9	" ...	Large & irregular in shape.	Acid, but of good flavour; stem short and strong.	"
Mary	" 9	" ...	Large	Good flavour; a little acid; stem medium in length and weak.	Not very productive.
Anna Kennedy..	" 9	" ...	Medium.....	Medium in flavour; firm.	Fairly productive.
Beverly	" 9	" ...	Above medium..	Good quality; fairly firm.....	Productive.
Tennessee	" 9	Feeble.... .	Small	Inferior quality.....	Not productive
Empress Eugenie	" 10	Moderately vigorous.	Large medium..	Good flavour.....	Fairly productive.
Bonny Lass. ..	" 10	Vigorous...	Medium to large.	Good flavour, but irregular in shape.	Productive.
Lovett's Early ..	" 10	" ...	Small to medium	Fair flavour; stem long and strong.	Not productive.
Michigan.	" 10	" ...	Large	Good flavour.....	" "
	" 10	Feeble.....	Small.....	Inferior berry.....	" "
Tubbs	" 11	Fairly vigorous.	Large medium..	Fair flavour, but rather soft; stem short and medium strong.	Fairly productive
Bisel 1..... ...					
Windsor Chief...	" 12	Vigorous...	Above " ..	Acid, but of good flavour; stem strong; stands up well.	" "
Yale.....	" 12	" ...	Medium.	Acid; not very good flavour; seedy.	Not productive.
Pine Apple.....	" 12	" ...	" to large.	Mild and insipid in flavour; stem strong and long.	Productive.
H. W. Becher..	" 12	" ...	Large medium .	Fine flavour and firm....	Not productive.
Greenville	" 13	" ...	Above " ..	A firm, handsome bright red berry; of good flavour; long, strong stems.	Productive.
Timbrel	" 13	Not very vigorous.	Large " ..	Good flavour and firm.....	Not very productive.
Laxford Hall....	" 16	Feeble.....	Small to medium	Poor flavour; many imperfect berries.	Not productive.

METEOROLOGICAL RECORD.

—	Date of Highest Temperature.	Degrees	Date of Lowest Temperature.	Degrees	Rainfall.	Snowfall.	Sunshine.
1896.					Inches.	Inches.	H. M.
December	10th	53	16th	22	10·70	None.	19 18
1897.							
January	11th, 20th, 22nd and 31st	50	27th	18	5·74	4½	59 24
February	26th	61	17th	29	1·61	6	41 18
March	31st	57	11th	10	5·31	26	108
April	16th	85	3rd	32	3·12	None.	118 18
May	26th	93	23rd	28	4·42	"	225 18
June	27th	84	18th, 23rd	40	12·06	"	114 18
July	31st	85	31st	43	4·58	"	198 36
August	16th	97	22nd	40	1·13	"	283 18
September	24th	89	27th	32	6·50	"	140 48
October	6th	78	14th	30	6·23	"	128 30
November	1st	67	28th	10	4·55	9	36 54
					65·95	45½	1,474
Totals for 1896					63·47	75½	1,417 27

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 30th JUNE, 1897.

CENTRAL EXPERIMENTAL FARM—EXPENDITURE, 1896-97.

Live stock	$	144 27
Feed for stock, including veterinary services		699 25
Seed grain, seeds, trees, &c.		1,273 25
Implements, tools, hardware and supplies		890 99
Drainage and drain tiles		88 06
Manure and fertilizers		477 57
Travelling expenses		1,340 92
Exhibition expenses		1,061 50
Blacksmithing, harness supplies and repairs		143 11
Bee supplies		177 62
Salaries		1,842 57
Wages, farm work, including experimental work with grain and other farm crops; also, salaries of farm foreman and Director's assistant in experimental work		5,836 31
Wages, care of stock		2,446 49
Chemical department		762 88
Botanical and entomological department		1,128 28
Horticultural department		4,300 43
Poultry department		1,558 19
Forestry department and care of grounds		1,791 15
Arboretum		849 65
Office help, correspondence branch and messenger service		2,948 86
Printing and stationery		648 41
Seed testing and care of greenhouses		876 02
Dairy department		741 99
Museum		26 94
Contingencies		375 42
" books and newspapers		212 86
" telegrams and telephones		152 40
	$	33,095 39

EXPERIMENTAL FARM, NAPPAN, N.S.—EXPENDITURE, 1896-1897.

Live stock	$	6 75
Feed for stock, including veterinary services		100 15
Seed grain, seeds, trees, &c.		154 53
Implements, tools, hardware and supplies		228 78
Draining and drain tiles		97 80
Manure and fertilizers		252 04
Travelling expenses		148 46
Exhibition expenses		163 98
Blacksmithing, harness supplies and repairs		62 42
Salaries, including proportion of salaries for general work, Ottawa		3,194 84
Wages, farm work, including experimental work with farm crops, fruit trees, vines, &c		1,635 39
Wages, care of stock		700 20
Chemical department		445 02
Botanical and entomological department		411 25
Poultry department		3 55
Forestry department, including care of grounds		243 80
Office help		
Seed grain distribution		276 74
Contingencies (including postage, $32.04)		49 22
" printing and stationery		25 43
" books and newspapers		3 50
" telegrams		
	$	8,203 85

EXPERIMENTAL FARM, BRANDON, MANITOBA—EXPENDITURE, 1896-97.

Live stock	$	347 35
Feed for stock, including veterinary services		57 95
Seed grain, seeds, trees, &c		219 21
Implements, tools, hardware and supplies		366 04
Draining		8 00
Travelling expenses		121 10
Exhibition expenses		218 80
Blacksmithing, harness supplies and repairs		251 40
Salaries, including proportion of salaries for general work, Ottawa		2,474 84
Wages, farm work, including experimental work with farm crops, fruit trees, vines, &c		3,476 99
Wages, care of stock		636 50
Chemical department		445 02
Botanical and entomological department		411 25
Forestry department, including care of grounds		281 50
Poultry department		55 40
Office help (including delivery of mail, $111)		392 69
Seed grain distribution		750 38
Tree distribution		211 03
Contingencies, (including postage, $33.06)		195 13
" printing and stationery		101 28
" books and newspapers		21 85
" telegrams and telephones		40 12
	$	11,083 83

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.—EXPENDITURE, 1896-97.

Live stock	$	14 25
Feed for stock, including veterinary services		30 10
Seed grain, seeds, trees, &c		242 20
Implements, tools, hardware and supplies		626 54
Manure and fertilizers		
Travelling expenses		13 90
Exhibition expenses		34 00
Blacksmithing, harness supplies and repairs		214 65
Salaries, including proportion of salaries for general work, Ottawa		2,474 84
Wages, farm work, including experimental work with farm crops, fruit trees, vines, &c		2,953 88
Wages, care of stock		1,178 62
Chemical department		445 02
Botanical and entomological department		411 25
Poultry department		79 37
Forestry department, including care of grounds		378 00
Office help		493 80
Seed grain distribution		493 20
Tree distribution		262 16
Contingencies, (including postage, $88.28)		182 95
" printing and stationery		47 06
" books and newspapers		4 00
" telegrams		3 83
	$	10,583 62

EXPERIMENTAL FARM, AGASSIZ, B.C.—EXPENDITURE, 1896-97.

Live stock		
Feed for stock, including veterinary services		$ 117 18
Seed grain, seeds, trees, &c		212 84
Implements, tools, hardware and supplies		260 69
Draining and drain tiles		
Manure and fertilizers		61 13
Travelling expenses		44 40
Exhibition expenses		90 90
Blacksmithing, harness supplies and repairs		87 64
Salaries, including proportion of salaries for general work, Ottawa		2,474 84
Wages, farm work, including experimental work with farm crops, fruit trees, vines, &c		2,257 10
Wages, care of stock		443 25
Chemical department		445 02
Botanical and entomological department		411 25
Poultry department		16 40
Forestry department		52 50
Office help		100 00
Seed grain distribution		129 78
Tree distribution		7 69
Clearing land		805 30
Contingencies (including postage, $58.14)		106 76
" printing and stationery		23 59
" books and newspapers		23 50
" telegrams		2 95
		$ 8,174 71

SUMMARY.

Central Experimental Farm		$ 33,095 39
Nappan "		8,203 85
Brandon "		11,083 83
Indian Head "		10,583 62
Agassiz "		8,174 71
Seed grain distribution		3,532 15
Forest tree and tree seed distribution		109 54
Printing bulletins and distribution of bulletins and reports	$ 4,216 91	
Less special sum in estimates for this item	4,000 00	
		216 91
		$ 75,000 00
Special vote to replace chemical apparatus and supplies destroyed by fire in the laboratory		$ 1,000 00

SUMMARY OF STOCK, MACHINERY, IMPLEMENTS, &c., ON HAND 31ST DECEMBER, 1897.

CENTRAL EXPERIMENTAL FARM, OTTAWA.

15 Horses		$ 1,065 00
3 Ayrshire cattle		130 00
3 Guernsey "		550 00
4 Jersey "		200 00
7 Canadian "		200 00
14 Grade "		323 00
3 Yorkshire swine		60 00
3 Berkshire "		70 00
3 Tamworth "		60 00
5 Poland China swine		78 00
2 Chester white "		40 00
14 Grade swine		80 00
Farm machinery		1,849 00
Farm implements		644 50
Vehicles, including farm wagons and sleighs		810 00
Hand tools, hardware and sundries		1,033 00
Harness		314 55
Dairy department, machinery, &c		832 00
Horticultural department, implements, tools, &c		281 90
Forestry " "		419 70
Botanical " "		7 00
Poultry " 241 fowls		261 00
" " implements, furnishings, &c		83 50
Bees and apiarian supplies		259 30
Chemical department, apparatus and chemicals		2,133 95
Books in several departments		333 58
Greenhouse plants, supplies, &c		1,138 50
Office furniture and stationery		1,301 00
Furniture at Director's house		1,270 00
		$ 15,828 48

EXPERIMENTAL FARM, NAPPAN, N.S.

6 Horses		$ 400 00
3 Guernsey cattle		605 00
2 Holstein "		100 00
2 Ayrshire "		320 00
27 Grade "		1,073 00
2 Yorkshire swine		35 00
3 Berkshire "		21 00
2 Tamworth "		28 00
8 Grade "		30 00
46 Fowls		31 00
Vehicles, including farms wagons and sleighs		365 00
Farm machinery		475 00
" implements		198 00
Hand tools, hardware and sundries		296 75
Harness		126 10
Furniture for office, reception room, and bedroom for visiting officials		274 78
		$ 4,377 63

EXPERIMENTAL FARM, BRANDON, MANITOBA.

10 Horses	$	750 00
3 Ayrshire cattle		175 00
2 Durham "		150 00
5 Holstein "		250 00
10 Grade "		215 00
1 Chester White swine		15 00
3 Tamworth "		48 00
2 Berkshire "		38 00
60 Fowls		55 50
Bees and apiarian supplies		70 20
Vehicles, including farm wagons and sleighs		500 00
Farm machinery		996 00
" implements		565 00
Hand tools, hardware and sundries		623 09
Harness		215 50
Furniture for reception room and bedroom for visiting officials		154 55
" supplies and books for office		192 40
	$	5,013 24

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

14 Horses	$	1,665 00
1 Ayrshire		75 00
8 Durham cattle		585 00
1 Polled Angus		75 00
15 Holstein cattle		760 00
16 Grade cattle		440 00
15 Yorkshire swine		163 00
4 Berkshire "		61 00
17 Tamworth "		130 00
4 Grade "		43 00
115 Fowls		115 00
Bees and apiarian supplies		36 50
Vehicles, including farm wagons and sleighs		510 00
Farm machinery		1,314 00
" implements		682 50
Hand tools, hardware and sundries		448 40
Harness		210 75
Furniture for reception room and bedroom for visiting officials		251 50
" supplies and books for office		203 15
	$	7,768 80

EXPERIMENTAL FARM, AGASSIZ, B.C.

6 Horses	$	800 00
5 Durham cattle		390 00
6 Ayrshire "		300 00
6 Holstein "		450 00
2 Grade "		40 00
6 Dorset horned sheep		60 00
2 Berkshire swine		50 00
2 Tamworth "		50 00
53 Fowls		46 00
Bees and apiarian supplies		35 95
Vehicles, including farm wagons		250 00
Farm machinery		600 00
" implements		205 50
Hand tools, hardware and sundries		207 00
Harness		100 50
Furniture for reception room and bedroom for visiting officials		251 00
" supplies and books for office		100 00
	$	3,935 95

W. H. HAY,
Accountant.

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