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Various pagings.

In Sessional paper No. 13, Part I, Dominion lands, pages 61-62 do not exist.

In Sessional paper No. 13, Part II, Dominion lands surveys, pages 54 & 55 are incorrectly numbered pages 55 & 54.

In Sessional paper No. 13, Part IV, Immigration, pages 82, 99 & 122 are incorrectly numbered pages 2, 9 & 12.

In Sessional paper No. 13A, page 37 is incorrectly numbered pages 3.

SESSIONAL PAPERS

VOLUME 10

SECOND SESSION OF THE EIGHTH PARLIAMENT

OF THE

DOMINION OF CANADA

SESSION 1897



See also Numerical List, page 4.

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OF THE
PARLIAMENT OF CANADA

SECOND SESSION, EIGHTH PARLIAMENT, 1897.

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1. Report of the Auditor General, for the year ended 30th June, 1896. Presented 30th March, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 2.

2. Public Accounts of Canada, for the fiscal year ended 30th June, 1896. Presented 30th March, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2a. Estimates of sums required for the service of the Dominion, for the year ending on the 30th June, 1898. Presented 8th April, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
- 2b. Supplementary Estimates for the year ending 30th June, 1897. (For the Militia attending the Queen's Jubilee.) Presented 20th May, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
- 2c. Supplementary Estimates for the year ending 30th June, 1897. Presented 10th June, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2c.* Supplementary Estimate for the year ending 30th June, 1897. (Post Office Department.) Presented 14th June, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2d. Supplementary Estimates for the year ending 30th June, 1898. Presented 18th June, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 2e. Further Supplementary Estimates for the year ending 30th June, 1898. (Intercolonial Railway extension to Montreal.) Presented 23rd June, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
3. List of Shareholders of the Chartered Banks of Canada, as on the 31st December, 1896. Presented 5th April, 1897, by Hon. W. S. Fielding.....*Printed for both distribution and sessional papers.*
- 3a. Report of dividends remaining unpaid and unclaimed balances in the Chartered Banks of Canada, for five years and upwards, prior to 31st December, 1896.
Printed for both distribution and sessional papers.

CONTENTS OF VOLUME 3.

- 4.** Report of the Superintendent of Insurance, for the year ending 31st December, 1896.
Printed for both distribution and sessional papers.
- 4a.** Preliminary statements of the business of Life Insurance Companies in Canada, for the year ending 31st December, 1896. Presented 29th June, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.
- 4b.** Abstract of Statements of Insurance Companies in Canada, for the year ended 31st December, 1896. Presented 5th April, 1897, by Hon. W. S. Fielding.
Printed for both distribution and sessional papers.

CONTENTS OF VOLUME 4.

- 5.** Report of the Department of Trade and Commerce, for the fiscal year ended 30th June, 1896. Presented 25th March, 1897, by Sir Richard Cartwright.
Printed for both distribution and sessional papers.
- 6.** Tables of the Trade and Navigation of Canada, for the fiscal year ended 30th June, 1896. Presented 30th March, 1897, by Hon. W. Paterson.....*Printed for both distribution and sessional papers.*

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- 7.** Inland Revenues of Canada. Excise, &c., for the fiscal year ended 30th June, 1896. Presented 26th March, 1897, by Sir Henri Joly de Lotbinière....*Printed for both distribution and sessional papers.*
- 7a.** Inspection of Weights, Measures, Gas and Electric Light, for the fiscal year ended 30th June, 1896. Presented 26th March, 1897, 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, 1896. Presented 26th March, 1897, by Sir Henri Joly de Lotbinière.....*Printed for both distribution and sessional papers.*
- 8.** Report of the Minister of Agriculture of Canada, for the calendar year 1896. Presented 23rd April, 1897, by Hon. W. Mulock.....*Printed for both distribution and sessional papers.*
- 8a.** Report on Canadian Archives, 1896. Presented 23rd April, 1897, by Hon. W. Mulock.
Printed for both distribution and sessional papers.

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- 8c.** Report of the Director and Officers of the Experimental Farms, for the year 1896.
Printed for both distribution and sessional papers.
- 8d.** Criminal Statistics for the year 1896.....*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, 1896. Presented 9th April, 1897, by Hon. J. I. Tarte*Printed for both distribution and sessional papers.*
- 10.** Annual Report of the Department of Railways and Canals, for the fiscal year ended 30th June, 1896. Presented 5th April, 1897, by Hon. A. G. Blair...*Printed for both distribution and sessional papers.*

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- 11.** Annual Report of the Department of Marine and Fisheries (Marine), for the fiscal year ended 30th June, 1896. Presented 26th May, 1897, by Hon. L. H. Davies.
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, 1896. Presented 26th May, 1897, by Hon. L. H. Davies.
Printed for both distribution and sessional papers.

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- 11b.** Special reports containing notes on the natural history of the lobster, with special reference to the Canadian lobster industry. *Printed for both distribution and sessional papers.*
- 11c.** Discolouration in Canned Lobsters. *Printed for both distribution and sessional papers.*
- 11d.** Report of the joint commission relative to the preservation of the fisheries in waters contiguous to Canada and the United States. *Printed for both distribution and sessional papers.*

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- 11e.** Report of the Chairman of the Board of Steamboat Inspection, etc., for calendar year ended 31st December, 1896. *Printed for both distribution and sessional papers.*
- 12.** Report of the Postmaster General for the year ended 30th June, 1896. Presented 28th May, 1897, by Hon. W. Mulock. *Printed for both distribution and sessional papers.*
- 12a.** Supplement to the Report of the Postmaster General, for the year 1896, with reference to the letting of certain contracts for mail service. Presented 4th June, 1897, by Hon. W. Mulock. *Printed for both distribution and sessional papers.*

CONTENTS OF VOLUME 10.

- 13.** Annual Report of the Department of the Interior, for the year 1896. Presented 12th May, 1897, by Hon. W. Mulock. *Printed for both distribution and sessional papers.*
- 13a.** Summary Report of the Geological Survey Department, for the year 1896. Presented 29th June, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 13b.** Report by Hon. T. Mayne Daly on his visit to Great Britain and Ireland in the interests of emigration to Canada, 1896. Presented 14th April, 1897, by Hon. C. Sifton. *Not printed.*

CONTENTS OF VOLUME 11.

- 14.** Annual Report of the Department of Indian Affairs, for the year ended 30th June, 1896. Presented 5th April, 1897, by Hon. C. Sifton. *Printed for both distribution and sessional papers.*
- 15.** Report of the Commissioner of the North-west Mounted Police Force, 1896. Presented 22nd April, 1897, by Hon. W. Laurier. *Printed for both distribution and sessional papers.*

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- 16.** Report of the Secretary of State of Canada, for the year ended 31st December, 1896. Presented 30th March, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 16a.** Civil Service List of Canada, 1896. Presented 30th March, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 16b.** Report of the Board of Civil Service Examiners, for the year ended 31st December, 1896. Presented 22nd April, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 16c.** Annual Report of the Department of Public Printing and Stationery, for the year ended 30th June, 1896, with a partial report for services during six months ending 31st December, 1896. Presented 29th June, 1897, by Hon. S. A. Fisher. *Printed for both distribution and sessional papers.*
- 17.** Report of the Joint Librarians of Parliament, for the period since the close of the session in October, 1896. Presented 25th March, 1897, by the Hon. The Speaker. *Printed for sessional papers only.*
- 18.** Report of the Minister of Justice as to Penitentiaries of Canada, for the year ended 30th June, 1896. Presented 9th June, 1897, by Hon. C. Fitzpatrick. *Printed for both distribution and sessional papers.*

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19. Report of the Department of Militia and Defence of Canada, for the year ended 31st December, 1896. Presented 8th April, 1897, by Sir Richard Cartwright.
Printed for both distribution and sessional papers.
20. Return to an Order of the House of Commons, dated 28th September, 1896, giving particulars in reference to the Eighth General Election for the House of Commons of Canada. Presented 29th April, 1897.—*Mr. Lavergne* *Printed for both distribution and sessional papers.*
21. Copy of an Order in Council relative to the issue of licenses to United States fishing vessels. Presented 26th March, 1897, by Hon. L. H. Davies. *Not printed.*
22. Statement of Governor General's Warrants issued since last session of parliament, on account of fiscal year 1896-97. Presented 30th March, 1897, by Hon. W. S. Fielding. *Not printed.*
23. Return of Treasury Board Over-Rulings on appeals from decisions of the Auditor General, between the sessions of 1896 and 1897. Presented 30th March, 1897, by Hon. W. S. Fielding.
Printed for sessional papers.
24. General Order of the Exchequer Court. Presented 30th March, 1897, by Hon. S. A. Fisher.
Not printed.
25. Return to an order of the House of Commons, dated 28th September, 1896, for a return of all papers and correspondence regarding the claims of Messrs. Penhallwick, of Edenwold, for destruction of machinery by Indians. Presented 5th April, 1897.—*Mr. Davin* *Not printed.*
26. Return to an address of the House of Commons to his excellency the Governor General, dated 14th September, 1896, for a copy of all correspondence in connection with all grants of land in the town of Revelstoke to J. A. Mara, ex-member for Yale and Cariboo, and the order in council under which the said grants were made. Presented 5th April, 1897. *Mr. Bostock* *Not printed.*
- 26a. Return to an address of the House of Commons to his excellency the Governor General, dated 14th September, 1896, for a copy of all correspondence and the order in council of the 11th July, 1890, by which a grant of land in the town of Revelstoke was made to the Kootenay Smelting and Trading Company. Presented 5th April, 1897.—*Mr. Bostock* *Not printed.*
27. Return to an address of the House of Commons to his excellency the Governor General, dated 14th September, 1896, for a copy of all correspondence in connection with grants of land within the railway belt in British Columbia made by the province subsequent to the date when the lands in the belt passed under control of the government of Canada, and of the orders in council of the 29th March, 1895, and the 6th December, 1895, setting forth the terms of the agreement between the government of Canada and the province of British Columbia, acting on behalf of the grantees. Presented 5th April, 1897.—*Mr. Bostock* *Not printed.*
28. Statement of expenditure on account of miscellaneous unforeseen expenses, from 1st July, 1896, to 24th March, 1897. Presented 5th April, 1897, by Hon. W. S. Fielding. *Not printed.*
29. Statement of all superannuations and retiring allowances in the civil service during year ended 31st December, 1896, giving name, rank, salary, service, allowance and cause of retirement of each person superannuated or retired, also whether vacancy filled by promotion or new appointment, and salary of any new appointee. Presented 5th April, 1897, by Hon. W. S. Fielding. *Not printed.*
30. Statement of the moneys expended in payment of bounties on iron and steel manufactured from Canadian ore, the persons to whom paid, the places at which the iron and steel was manufactured, together with copies of the regulations governing such payments, as required by the Act 57-58 Victoria, chapter 9. Presented 7th April, 1897, by Hon. W. Paterson. *Printed for sessional papers.*
31. Return furnished annually by the Canadian Pacific Railway Company under the provisions of section 8 of 49 Victoria, chapter 9, being a list of all lands sold by that company from 1st October, 1895, to the 1st October, 1896. Presented 13th April, 1897, by Hon. C. Sifton. *Not printed.*
- 31a. Return under resolution of the 20th February, 1882, in so far as the same is furnished by the department of the interior, respecting the Canadian Pacific Railway Company. Presented 13th April, 1897, by Hon. C. Sifton. *Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

32. Return of orders in council which have been published in the *Canada Gazette* and in the *British Columbia Gazette*, in accordance with the provisions of: (1st) Clause 91 of the Dominion Lands Act, chapter 54 of the Revised Statutes of Canada. (2nd) Subsection (d) of section 38 of the regulations for the survey, administration, disposal and management of Dominion lands within the 40-mile railway belt in the province of British Columbia. (3rd) Section 46 of the North-west Irrigation Act. Presented 13th April, 1897, by Hon. C. Sifton..... *Not printed.*
33. Return to an order of the House of Commons, dated 10th May, 1897, for a copy of the evidence taken by Inspector Fletcher when investigating charges made last November against the postmaster of Northfield, British Columbia. Presented 28th May, 1897.—*Mr. Davin*..... *Not printed.*
34. Statement of the affairs of the British Canadian Loan and Investment Company, as on the 31st December, 1896. Presented 20th April, 1897, by the Hon. The Speaker..... *Not printed.*
35. Return to an address of the House of Commons to his excellency the Governor General, dated 12th April, 1897, for copies of all orders in council, reports to council, petitions, memorials or other documents relating to the Manitoba School Question, not already submitted to this House. Presented 20th April, 1897.—*Mr. La Rivière*..... *Printed for both distribution and sessional papers.*
36. Statement of all bonds registered in the department of the secretary of state, since last return (1896) and submitted to parliament in accordance with section 23 of chapter 19, of the Revised Statutes of Canada. Presented 20th April, 1897, by Hon. S. A. Fisher. *Not printed.*
37. Return to an address of the House of Commons to his excellency the Governor General, dated 5th April, 1897, for copies of all correspondence relating to the retirement of Messrs. Bompas, Bischoff & Co., and the appointment of Mr. Charles Russell as solicitor for the Dominion government in London. Presented 22nd April, 1897.—*Mr. Foster*..... *Not printed.*
38. Return to an address of the House of Commons to his excellency the Governor General, dated 28th September, 1896, for copies of despatches, minutes of council, and correspondence relating to the formation of an international customs bureau for Brussels. Presented 26th April, 1897.—*Sir C. Hilbert Tupper*..... *Not printed.*
39. Tariff of fees and expenses for holding elections in the North-west Territories and British Columbia, fixed by the governor in council, under section 121 of the Dominion Elections Act, and amendments to the said tariff. Presented 26th April, 1897, by Hon. W. S. Fielding. . *Not printed.*
40. Return to an order of the House of Commons, dated 30th April, 1897, for copies of instructions to customs collectors *re* tariff resolutions and reciprocal tariff. Presented 30th April, 1897.—Hon. W. Paterson..... *Not printed.*
41. Return to an order of the House of Commons dated 5th April, 1897, for copies of all calls for tenders and specifications for the same and detailed answers thereto made since the last session of parliament in respect of the printing of government notes, stamps, etc., of all correspondence in connection therewith had with the government or any member thereof and with the minister of finance or the officers of his department, copies of all reports made thereon to the minister of finance and to council, together with all minutes to council passed in relation thereto, and a copy of the contract entered into between the government and the successful tenderer. Presented 3rd May, 1897.—*Mr. Foster*..... *Printed for distribution only.*
42. Return to an address of the House of Commons to his excellency the Governor General, dated 5th April, 1897, for a return showing how many convicts were liberated from the different penitentiaries in Canada since the month of July, 1896; giving their names and the dates when they were convicted, and showing why they were liberated, and the names of those who obtained their pardon for them; also the names of those whose sentences were commuted. Presented 5th May, 1897.—*Mr. Bergeron*..... *Not printed.*
43. Return to an order of the House of Commons, dated 28th September, 1896, for copies of all correspondence which has passed between the government and party or parties in reference to the "Montreal, Ottawa, Georgian Bay Canal" scheme; also all papers in connection with any application for financial aid towards this project. Presented 5th May, 1897.—*Mr. Poupore*.. *Not printed.*
44. Return to an order of the House of Commons, dated 28th September, 1896, for copy of all reports, valuations and all other papers relating to lands in the township of South Monagan, county of Peterboro', flooded by reason of the construction of a dam at Hastings, Ontario, and owned by Joseph Clarke and others. Presented 5th May, 1897.—*Mr. Kendry*..... *Not printed*

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45. Return to an order of the House of Commons, dated 2nd September, 1896, for copies of all memorials, reports, correspondence, plans and papers in relation to the construction of a bridge in front of Quebec, or in the vicinity, to connect the Intercolonial Railway with the Canadian Pacific Railway. Presented 5th May, 1897.—*Mr. Langelier* *Not printed.*
46. Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all correspondence between the department of Indian affairs at Ottawa and the officers of the Indian department at Regina and at Winnipeg, respecting the furnishing supplies to the St. Paul Industrial School; also the correspondence between the department at Ottawa and the Hudson Bay Company at Winnipeg. Presented 10th May, 1897.—*Mr. Davin* *Not printed.*
47. Return to an order of the House of Commons, dated 11th May, 1897, for a copy of the opinion of the minister of justice with respect to statutory increases. Presented 11th May, 1897.—*Hon. L. H. Davies* *Printed for sessional papers.*
48. Return to an order of the House of Commons, dated 21st April, 1897, for copies of all documents, correspondence, reports, etc., having reference to the appointment of Thomas E. Anderson to the position of collector of customs in the town of Napanee. Presented 11th May, 1897.—*Mr. Wilson* *Not printed.*
49. Report of the commissioners to examine into the affairs of the Kingston penitentiary. Presented 17th May, 1897, by Sir Richard Cartwright *Printed for distribution.*
50. Statement in pursuance of section 17 of the Civil Service Insurance Act, for the year ending 30th June, 1896. Presented 20th May, 1897, by Hon. W. S. Fielding *Not printed.*
51. Extract from a report of the committee of the honourable the privy council, approved by his excellency on the 23rd January, 1897, referring to the delimitation of the Alaskan boundary. Presented 26th May, 1897, by Hon. C. Sifton *See No. 77.*
52. Contract with Messrs. Petersen, Tate and Company, of Newcastle-on-Tyne, England, for a fast weekly steanship service between Canada and the United Kingdom. Presented 28th May, 1897, by Sir Richard Cartwright *See "Votes and Proceedings," page 393.*
53. Return to an address of the Senate to his excellency the Governor General, dated 13th May, 1897, for copies of all telegrams sent between the 15th and 27th of April last, by the minister of marine and fisheries, to Bernard D. McLellan, or any other person in West Prince, Prince Edward Island, promising grants for harbours, piers or breakwaters in that constituency, different from or in addition to, amounts stated in the Estimates now before Parliament. Presented 1st June, 1897.—*Hon. Mr. Ferguson* *Not printed.*
54. Return to an address of the Senate to his excellency the Governor General, dated 19th May, 1897, for a tabulated statement showing the effects which the commercial treaty between Canada and France has had upon the trade and revenue of the Dominion, as compared with the three years preceding the date upon which the treaty came into force, in so far as relates to the various articles covered by said treaty. Presented 1st June, 1897.—*Hon. Sir Mackenzie Bowell* *Printed for sessional papers.*
- 54a. Return to an address of the Senate to his excellency the Governor General, dated 9th June, 1897, for a detailed statement showing the character, quantity and value of the different articles exported from Canada to France, for the years ending 30th June, 1893, 1894, 1895 and 1896. Presented 17th June, 1897.—*Hon. Sir Mackenzie Bowell* *Printed for sessional papers.*
55. Return to an address of the Senate to his excellency the Governor General, dated 5th May, 1897, for a copy of the contract or charter by which the steamer "Petrel" has been employed for winter navigation between Prince Edward Island and the mainland during the present year, and all correspondence between the department of marine and fisheries, or any officer thereof, and the owners of the said steamer "Petrel" relative to the said contract or charter. Also a statement of all expenses incurred by the government of Canada, in the outfit, repair and maintenance of the said steamer, and in the payment of wages to her officers and men, giving the name of each employee, and the amount paid or to be paid each. Also a statement showing the number of round trips made by the said steamer, between Cape Tormentine and Cape Traverse, or any other port in Prince Edward Island, from the 1st of December, 1896, to the 1st of May of the present year, with the date of such trips. Also a statement of the number of passengers, and the quantity

• CONTENTS OF VOLUME 13—*Continued.*

- of freight carried by the said steamer between the ports aforesaid, and the amount received for carrying such freight and passengers, for the above-mentioned period. And also a statement of number of mails carried by the said steamer, during the same period. Presented 1st June, 1897.—*Hon. Mr. Ferguson*..... *Not printed.*
- 56.** Return to an address of the Senate to his excellency the Governor General, dated 5th May, 1897, for all correspondence which has taken place since the 13th July last between the government of the Dominion and the provincial government of Prince Edward Island regarding certain financial claims of that province upon the federal government.—Presented 1st June, 1897.—*Hon. Mr. Ferguson*..... *Printed for sessional papers.*
- 57.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, papers, correspondence, petitions, etc., relating to the dismissal of J. Albert Verge, fishery officer for the river Restigouche and its tributaries and the waters of the Baie des Chaleurs, and the appointment of Charles Brown in his place. Presented 3rd June, 1897.—*Mr. McAlister*..... *Not printed.*
- 57a.** Return to an order of the House of Commons, dated 5th April, 1897, for copies of all correspondence, papers, petitions, &c., in connection with the dismissal of Angus McPhee as postmaster at Hopefield, in the province of Prince Edward Island. Presented 3rd June, 1897.—*Mr. Martin*..... *Not printed.*
- 57b.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all papers, letters, documents, petitions, etc., relating to the dismissal of A. J. McNeill as postmaster at Stanley Bridge, in Prince Edward Island. Presented 3rd June, 1897.—*Mr. Martin*..... *Not printed.*
- 57c.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, telegrams and papers that have passed between the government and any person or persons in connection with the dismissal of Dr. George Duncan, late quarantine superintendent at Williams Head Station, B.C.—Presented 4th June, 1897.—*Hon. E. G. Prior*..... *Not printed.*
- 57d.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of all documents, reports, affidavits, declarations, papers and correspondence in relation to dismissal of F. X. Smith, late lighthouse keeper at Cape Gaspé. Presented 8th June, 1897.—*Mr. Casgrain*..... *Not printed.*
- 57e.** Return to an address of the House of Commons, to his excellency the Governor General, dated 14th September, 1896, for copies of all orders in council, reports and correspondence respecting the appointment and dismissal of the sub-agents of the department of marine and fisheries at the port of Pictou.—Presented 8th June, 1897.—*Sir C. Hibbert Tupper*..... *Not printed.*
- 57f.** Return to an order of the House of Commons, dated 3rd May, 1897, for a return showing the names of all persons dismissed from the service of the inland revenue department since the first day of July, 1896; also the names of all persons appointed to the service of said department since the first day of July, 1896. Presented 14th June, 1897.—*Mr. Wood (Brockville)*..... *Not printed.*
- 57g.** Return to an order of the House of Commons, dated 17th May, 1897, showing the names and offices or employment of all persons superannuated, dismissed or superceded in the service of the Canadian government under the present administration, giving the reason for superannuation, dismissal or supercession in each case, and the name and age of the officer or employee appointed to the vacancy in each case, and showing whether any inquiry or formal investigation took place in each case and the nature of it, and whether the party affected was given an opportunity of being heard before dismissal or supercession. Presented 15th June, 1897.—*Sir Charles Tupper*..... *See No. 57t.*
- 57h.** Return to an order of the House of Commons, dated 21st April, 1897, showing the names of all persons appointed to the department of customs since the first day of July, 1896, also the names of the offices respectively to which they were appointed and the salaries thereto attached; also the names of all persons in the service of the department of customs whose services have been dispensed with since the first day of July, 1896, with the names of the offices and the salaries attached thereto respectively. Presented 15th June, 1897.—*Mr. Wood (Brockville)*..... *Not printed.*
- 57i.** Supplementary return to 57g. Presented 16th June, 1897.—*Sir Charles Tupper*..... *See No. 57t.*
- 57j.** Return to an order of the House of Commons, dated 6th May, 1897, for copies of all letters and correspondence between the government or any members thereof referring in any way to the dismissal of Mr. W. D. Fairbrother as postmaster at Beamsville, with a copy of the charges and by whom such were made. Presented 18th June, 1897.—*Mr. McCleary*..... *Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

- 57k.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, telegrams, petitions, reports and other communications with respect to the appointment and dismissal of David H. Price, postmaster of Aylmer West, and the appointment of his successor, Frederick Ashbaugh. Presented 18th June, 1897.—*Mr. Ingram*..... *Not printed.*
- 57l.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all correspondence, petitions and reports relative to the dismissal of T. P. Shields, postmaster of Upper Maugerville, and the appointment of Emery Sewel in his place, and in reference to any changes proposed in the location of said post office since 1891. Presented 18th June, 1897.—*Mr. Foster*..... *Not printed.*
- 57m.** Return to an order of the House of Commons, dated 12th April, 1897, for copies of all papers, correspondence, petitions, etc., connected with the dismissal of Alexis Doutre as postmaster at Beauharnois. Presented 18th June, 1897.—*Mr. Bergeron*..... *Not printed.*
- 57n.** Return to an order of the House of Commons, dated 5th April, 1897, for a return giving the names of all postmasters and other persons in the employ of the government in the counties of Kings and York, New Brunswick, who have been dismissed since July, 1896, and all correspondence in connection therewith. Presented 18th June, 1897.—*Mr. Foster*..... *Not printed.*
- 57o.** Return to an order of the House of Commons, dated 17th May, 1897, for a copy of the investigation held in connection with the postmaster's office in Valleyfield, by Mr. Wilfrid Mercier. Presented 18th June, 1897.—*Mr. Bergeron*..... *Not printed.*
- 57p.** Return to an order of the House of Commons, dated 17th May, 1897, for any reports or correspondence, not already brought down, and the reasons for the dismissal of Roderick McLeod and Robert McKay, bridge tenders on the Intercolonial Railway bridge, Pictou, Nova Scotia, and the appointment of Thomas Fraser and A. Thomas in their place and stead. Presented 24th June, 1897.—*Sir C. Hibbert Tupper*..... *Not printed.*
- 57q.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of all papers and documents connected with the dismissal of Mr. John L. Smith as fishery overseer for the district of New Carlisle, extending from Grand Cascapeia river to Paspebiac East; also any recommendations made to any member of the government by letter or otherwise for his dismissal and the recommendation in favour of his successor. Presented 25th June, 1897.—*Sir A. P. Caron*.
Not printed.
- 57r.** Return to an order of the House of Commons, dated 3rd May, 1897, giving all correspondence, evidence, reports and papers respecting the dismissal of the car inspector and car oiler at Stellarton, Nova Scotia, under instructions of the mechanical superintendent, Intercolonial Railway at Moncton, 5th February, 1897. Presented 25th June, 1897.—*Sir C. H. Tupper*..... *Not printed.*
- 57s.** Return to an order of the House of Commons, dated 21st April, 1897, for copies of all papers, petitions, evidence, reports and documents of every nature connected with the dismissal of Andrew Carmichael, postmaster, Spencerville, Ont. Presented 28th June, 1897.—*Mr. Reid*... *Not printed.*
- 57t.** A partial return to an address of the Senate to his excellency the Governor General, dated 9th April, 1897, for a statement showing for each department of the civil service, the names, ages, offices and salaries of such persons employed either in the inside or outside divisions thereof; and of such persons not in the civil service employed by the government in any department, who, since the 13th July, 1896, and in cases where no commission of investigation was appointed, have been removed from office by dismissal, superannuation or otherwise, specifying in each case the manner of, and grounds for such removal, and the length of notice given to the persons removed, and the amount of superannuation or gratuity granted, if any; also showing the name, age, office and salary or remuneration of any and every person appointed to the civil service in the place of, or as a consequence of any such removal. Presented 26th June, 1897.—*Hon. Mr. Kirchhoffer*.
Printed for sessional papers.
- 58.** Return to an order of House of Commons, dated 28th September, 1896, for copies of the contract awarded to Mr. Gédéon Beaulieu, contractor for the building of the post office at Rimouski, of all correspondence between the said contractor and the government, and all other documents in relation thereto. Presented 4th June, 1897.—*Mr. Fiset*..... *Not printed.*

 CONTENTS OF VOLUME 13—*Continued.*

59. Return to an order of the House of Commons, dated 17th May, 1897, for copies of the report made by Mr. Gourdeau, deputy minister of marine and fisheries, on the conference held last November between the steamship companies and shippers of cattle and horses. Presented 4th June, 1897. *Mr. Maclean*. *Printed for sessional papers.*
60. Return to an order of the House of Commons, dated 17th May, 1897, for copies of all correspondence since the 20th July last between the department of marine and fisheries at Ottawa and the officers thereof or others, respecting supplies and repairs of vessels and steamers under the control of that department which are in the habit of visiting the ports of Charlottetown, Georgetown and Pictou, or which are employed either in the protection of the coast fisheries or in the supervision and maintenance of lights, or in the winter steam service between Prince Edward Island and the mainland. Presented 4th June, 1897.—*Sir C. Hibbert Tupper*. *Not printed.*
61. Return to an order of the House of Commons, dated 21st April, 1897, for copies of all letters, petitions, memorials and suggestions received by the government, or any member thereof, since the 23rd June, 1896, to amend the North-west Territories Act with a view of enlarging the powers of the executive of the North-west Territories, and to increase the subsidy of the North-west Territories. Presented 4th June, 1897.—*Mr. Davin*. *Not printed.*
62. Return to an order of the House of Commons, dated 3rd May, 1897, for a copy of returns for Weller Bay while an outpost, *i.e.*, about eleven years: 1. The value of dutiable goods and duty collected. 2. Value of free goods. 3. Total number of vessels entered and cleared. 4. Total salary paid. Presented 8th June, 1897.—*Mr. Corby*. *Not printed.*
63. Return to an order of the House of Commons, dated 10th May, 1897, for a return of all correspondence between officers of the militia and others with the minister of militia and the major-general commanding relating to brevet promotion and General Order 73, 1896. Presented 8th June, 1897.—*Mr. Bain*. *Not printed.*
64. Return to an order of the House of Commons, dated 17th May, 1897, for copies of all correspondence, plans and reports of engineers having reference to making North Harbour, Aspy Bay, Victoria county, N.S., a harbour of refuge. Presented 9th June, 1897.—*Mr. Bethune*. *Not printed.*
65. Return to an address of the House of Commons to his excellency the Governor General, dated 3rd May, 1897, for copies of all papers relating to the release of Daniel Brien Sullivan, committed to jail at Toronto on the 18th November, 1896, including the reports of the police magistrate of the 21st and 27th November, 1896. Presented 9th June, 1897.—*Sir C. Hibbert Tupper*. *Not printed.*
66. Return to an order of the House of Commons, dated 28th September, 1896, for a statement showing the amount of money expended by the Dominion government since the 1st day of July, 1873, for constructing, equipping and subsidizing railways in Canada, with the number of acres of land granted as subsidies, and their estimate value. Also a statement showing separately the part of such expenditure made on railways in each province of the Dominion and the North-west Territory, deducting any sums that may have been charged against any of the provinces of the North-west Territory in their debt account with the Dominion. Presented 10th June, 1897.—*Mr. Martin*. *Printed for sessional papers.*
67. Return to an order of the House of Commons, dated 28th September, 1896, for copies of all letters, correspondence and tenders, the names of the parties tendering, the amounts of their tender, and the names of the parties awarded the contracts for the historical monuments at Lundy's Lane, Chrysler's Farm and Chateauguay. Presented 10th June, 1897.—*Mr. Gibson*. *Not printed.*
68. Return to an order of the House of Commons, dated 17th May, 1897, showing a comparative schedule of prices paid in connection with the military camp at Aldershot, King's county, Nova Scotia, for the seasons of 1895 and 1896 respectively; also all papers, correspondence and instructions respecting the securing of supplies for the said camp in 1897. Presented 10th June, 1897.—*Sir C. Hibbert Tupper*. *Not printed.*
69. Return to an order of the House of Commons, dated 17th May, 1897, for a return showing (under the announced change of organization at the Royal Military College of Canada): 1. A detail of the intended superior and subordinate staffs, their respective emoluments and the conditions of their engagements, inclusive of periods of service and duties to be performed by them respectively. 2. The intended number of classes of cadets in attendance at one time. 3. The allotment and distri-

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- bution of time to class instruction, drills, military and athletic exercises, meals, recreation, etc., specifying subjects and the professors and instructors respectively employed in the several subjects in each class. 4. The amount of deposit to be made by cadets to meet personal charges for a period of three years respectively under the reorganized system and the system hitherto in force. 5. The surplus revenue derived from fees from each cadet, after deduction of messing charges respectively under the reorganized system and the system hitherto in force. 6. A detail of items in the reorganized system and in that hitherto in force in the cases involving either increase or reduction, and the amounts of these differences. 7. The number of eligible applications made prior to the announcement of the reorganization to compete for entrance into the Royal Military College next September. Presented 10th June, 1897.—*Mr. Tyrwhitt* *Not printed.*
- 69a.** Supplementary return to No. 69. Presented 23rd June, 1897.—*Mr. Tyrwhitt* *Not printed.*
- 70.** Return to an address of the House of Commons to his excellency the Governor General, dated 28th September, 1896, for copies of despatches, minutes of council and correspondence relating to the London International Railway Congress, 1895. Presented 14th June, 1897.—*Sir C. Hibbert Tupper* *Not printed.*
- 70a.** Return to an address of the House of Commons to his excellency the Governor General, dated 28th September, 1896, for copies of despatches, minutes of council and other documents relating to the meeting of the International Railway Congress, St. Petersburg, with a copy of papers submitted by the high commissioner for Canada to that congress. Presented 14th June, 1897.—*Sir C. Hibbert Tupper* *Not printed.*
- 71.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of tenders opened the 16th day of March, 1897, for works on section 12 of the Soulanges canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 14th June, 1897.—*M. Clancy*.
Printed for sessional papers.
- 71a.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of tenders opened the 16th day of March, 1897, for works on sections 4, 5, 6 and 7 of the Soulanges canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 14th June, 1897.—*Mr. Clancy* *Printed for sessional papers.*
- 71b.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of tenders opened the 20th day of March for works on the Grenville canal enlargement, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 14th June, 1897.—*Mr. Clancy*.
Printed for sessional papers.
- 71c.** Return to an order of the House of Commons, dated 7th June, 1897, for a statement of all tenders opened the 7th day of May, 1897, for works on the north channel of St. Lawrence river, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 25th June, 1897.—*Mr. Clancy* *Printed for sessional papers.*
- 71d.** Return to an order of the House of Commons, dated 7th June, 1897, for a statement of all tenders opened the 30th day of April, 1897, for works on the Iroquois section, Galops canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 25th June, 1897.—*Mr. Clancy*.
Printed for sessional papers.
- 71e.** Return to an order of the House of Commons, dated 7th June, 1897, for a statement of all tenders opened the 24th day of April, 1897, for works on the Cardinal section, Galops canal, showing the prices of different tenderers for each item and the approximate quantities upon which the tenders were extended, also the lump sum of each tender. Presented 25th June, 1897.—*Mr. Clancy*.
Printed for sessional papers.
- 72.** Return to an order of the House of Commons, dated 9th September, 1896, for: 1. A copy of all reports of the engineers of the department of public works as to the conditions and requirements of the Port Albert harbour made within the last ten years. 2. A statement in detail, with dates, showing all amounts voted by parliament for the improvement of said harbour. 3. A statement showing how much of said sums were expended under contract, and how much otherwise and how; when expended and to whom paid.—Presented 15th June, 1897.—*Mr. Cameron* *Not printed.*

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- 72a.** Return to an order of the House of Commons, dated 28th September, 1896, for: 1. Copy of all reports made by the engineers of the public works department since the 1st day of January, 1890, as to the condition and requirements of the Goderich harbour and of the North breakwater. 2. Statement in detail of all amounts voted for the construction and improvement of said harbour. 3. Statement showing how much has been expended on said harbour since the government of Canada undertook the work as a harbour of refuge. Presented 15th June, 1897.—*Mr. Cameron.*
Not printed.
- 72b.** Return to an order of the House of Commons, dated 17th May, 1897, for copies of all correspondence, telegrams, engineers' reports, etc., relating to the extension of the breakwater at Belle river, in Prince Edward Island. Presented 15th June, 1897.—*Mr. Martin.*..... *Not printed.*
- 73.** Return, in part (departments of the interior and Indian affairs), to an order of the House of Commons, dated 5th April, 1897, giving the names of all commissioners appointed by the government or any of the ministers to hear charges and make investigations into the conduct of civil servants and employees of the government or any of the departments since July, 1896, together with the rate of pay and allowances of each and the length of time each has been employed, and the full amount paid; also copies of all reports made by them to the government, or any member thereof, and copies of the authorization and instructions under which they acted. Presented 16th June, 1897.—*Mr. Foster.*..... *Not printed.*
- 73a.** Supplementary return to No. 73 (department of marine and fisheries). Presented 17th June, 1897.
Mr. Foster...... *Not printed.*
- 74.** Copies of contracts for cold storage accommodation on steamships from Montreal to Great Britain, between the minister of agriculture and various steamship companies. Presented 17th June, 1897, by Hon. S. A. Fisher..... *Not printed.*
- 75.** Return to an order of the House of Commons, dated 3rd May, 1897, for copies of all letters, papers and correspondence relating to the closing in March last of the post office at Oak Bay Mills, Quebec. Presented 18th June, 1897.—*Mr. McAlister.*..... *Not printed.*
- 76.** Return to an order of the House of Commons, dated 3rd May, 1897, for: 1. Copies of all correspondence and other documents relating to the creation of post office inspectorships at Stratford, Barrie and Kingston and the appointment of inspectors and other officials connected with such inspectorships. 2. The number of employees connected with each such office and the salaries paid, and all other expenses of each office. Presented 18th June, 1897.—*Mr. Cameron.*
Printed for sessional papers.
- 77.** Report of Major General Cameron on the proposed convention in reference to a portion of the Alaskan boundary, and memorandum thereon. Presented 19th June, 1897, by Hon. L. H. Davies.
Printed for sessional papers.
- 78.** Return to an address of the House of Commons to his excellency the Governor General, dated 7th June, 1897, showing the correspondence, if any, between this government and the government of the United States in reference to an equalization or readjustment of the coasting laws, rules and regulations in force in the two countries; and in reference to any arrangement or proposal for any arrangement under which Canadian vessels shall be granted by the American government and officials the same privileges as those accorded to American vessels by the Canadian authorities under the laws, rules and regulations now in force. Presented 25th June, 1897.—*Mr. Britton.*
Printed for sessional papers.
- 79.** Return to an order of the House of Commons, dated 7th June, 1897, for copies of all telegrams and letters between the Hon. Clifford Sifton, minister of the interior, and Mr. Charles B. Heyd, M.P., for South Brant, and Mr. Davis, of the county of Haldimand, relating to the appointment or otherwise of Mr. Daniel Lynch, of the village of Hagersville, or Dr. Stuart of the same place, as Indian agent in the room and stead of Dr. Jones of Hagersville. Presented 25th June, 1897.—*Mr. Clancy.*..... *Not printed.*
- 80.** Return to an order of the House of Commons, dated 10th May, 1897, for copies of all papers, correspondence and telegrams relating to charges made affecting the quality of British Columbia salmon sold in the British market. Presented 25th June, 1897.—*Mr. Maxwell.*..... *Not printed.*

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81. Return to an order of the House of Commons, dated 7th June, 1897, for a copy of the advertisement recently published calling for tenders for the carrying of the mail between Danville, in the county of Richmond and St. Camille, in the county of Wolfe, province of Quebec, and of all tenders sent in, giving the names of the tenderers and amount of the tender in each case, the name of the successful tenderer, and the amount at which the contract was let. Presented 28th June, 1897.—*Mr. Ives* *Not printed.*
- 81a. Return to an order of the House of Commons, dated 7th June, 1897, for copies of correspondence and papers cancelling the contract with S. E. Turner, for carrying the mail between Tottenham and Athlone, in the county of Simcoe, province of Ontario. Presented 28th June, 1897.—*Mr. Tyrwhitt* *Not printed.*
- 81b. Return to an order of the House of Commons, dated 17th May, 1897, showing the different mail routes and mail contracts now existing between the town of Annapolis Royal and the town of Liverpool, in the counties of Annapolis and Queen's respectively. The name of each contractor and his bondsmen. The length of each route. The contract price, and whether daily, semi-weekly or tri-weekly. Presented 28th June, 1897.—*Mr. Mills* *Not printed.*
82. Return to an address of the Senate to his excellency the Governor General, dated 21st May, 1897, for a copy of the resignation of S. I. Jones, Esquire, late judge of the county court of the county of Brant, together with all correspondence with any department of the government, in reference to, or in connection therewith; also a copy of all petitions sent to the government praying for the appointment of A. D. Hardy to the position made vacant by the resignation and superannuation of the said Judge Jones. Presented 2nd June, 1897.—*Hon. Sir Mackenzie Bowell* . . . *Not printed.*
83. Return to an address of the Senate to his excellency the Governor General, dated 20th May, 1897, showing the names of all persons who filed claims for fishery bounty, before Stanislaus F. Perry, acting inspector of fisheries for Prince Edward Island, up to the 20th day of April last; also the names of all persons who filed similar claims before James F. White, bounty officer, up to the same date, And also showing the names of all persons who received fishery bounty in the west riding of Prince county, in the months of March and April last. Presented 25th June, 1897.—*Hon. Mr. Ferguson* *Not printed.*

60 Victoria.

Sessional Papers (No. 13.)

A. 1897

ANNUAL REPORT

OF THE

DEPARTMENT OF THE INTERIOR

FOR THE YEAR

1896

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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

1897

[No. 13—1897.]

Department of the Interior.

To His Excellency the Right Honourable Sir John Campbell Hamilton-Gordon, Earl of Aberdeen, &c., &c., &c., Governor General of Canada, &c., &c., &c.

MAY IT PLEASE YOUR EXCELLENCY :

The undersigned has the honour to lay before Your Excellency the Report of the transactions of the Department of the Interior for the year 1896.

Respectfully submitted,

CLIFFORD SIFTON,
Minister of the Interior.

OTTAWA, 3rd May, 1897.

Department of the Interior.

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ANNUAL REPORT
OF THE
DEPARTMENT OF THE INTERIOR
FOR THE YEAR 1896.

DEPARTMENT OF THE INTERIOR,
OTTAWA, 1st March, 1897.

To the Honourable CLIFFORD SIFTON,
Minister of the Interior.

SIR,—I have the honour to submit the annual report of the Department of the Interior for 1896.

The last report of the department had relation more particularly to the first ten months of the year 1895. It was issued before the end of that year in consequence of the early meeting of parliament, and it was not found possible to bring down the business of the various agencies to the end of the year as had been done previously. The subjoined report therefore covers not only the whole of the calendar year 1896, but also the last two months of 1895.

DEPARTMENTAL CHANGES.

During the year one death took place in the department at headquarters, that of Mr. H. B. D. Bruce. In the outside service there were two deaths,—Mr. T. A. McLean, registrar of land titles at Calgary, and Mr. John Allison, homestead inspector. Mr. Horace Harvey, barrister, of Calgary, was appointed to the vacancy created by the death of Mr. McLean.

At the beginning of the year Mr. Amos Rowe, agent of Dominion lands and Crown timber agent at Calgary, was transferred to the service of the Department of Customs. His duties were assumed by Mr. Wm. Pearce, superintendent of mines.

HOMESTEAD ENTRIES AND SALES.

The following is a comparative statement of the homestead entries and sales which have been made by the several agencies of the department during the year 1896 as compared with the previous year.

Twelve months ending 31st December, 1895.

	No. of entries.	Acres.
Homesteads.....	2,394	383,040
Sales.....		32,485

Twelve months ending 31st December, 1896.

	No. of entries.	Acres.
Homesteads.....	1,857	297,120
Sales.....		33,374

As to sales, I have in previous reports called attention to the fact that the department has not for many years been selling land in the ordinary sense of the term. The odd-numbered sections throughout almost the whole of the surveyed areas have become part of the subsidy of one or other of the railways constructed for the development of the country, and the only moneys now received by the department—apart from the revenue derived from timber, hay and minerals—are the small fees imposed by the law and the regulations in connection with homestead entries, the price of an occasional pre-emption which the holder finds himself unable to take up as a second homestead, and the purchase money of such quarter-sections adjoining their homesteads as settlers who have the means may acquire with the view of increasing their holdings.

IMMIGRANT ARRIVALS.

The whole number of arrivals of immigrants at the ports of Quebec, Halifax, St. John and Montreal, during the year 1896, was 25,478 as compared with 25,788 for the previous year, a decrease of 310. Of the numbers arriving in 1896, 16,835 declared their intention of becoming residents of the Dominion, whereas 18,799 made this declaration in 1895. The persons who signified their intention of making their homes in Manitoba, the North-west Territories and British Columbia, numbered this year 6,214, which is an increase of 843 as compared with the corresponding period in 1895.

The immigration agents at the ports of landing count the number of persons arriving by the ocean steamers, and obtain from each a declaration as to whether he intends to remain permanently in the country or not and the name of the province in which he proposes to remain. No attempt is made to keep trace of immigrants arriving from the United States, except in so far as they become settlers on homestead lands.

In this relation a statement is submitted showing the nationality of settlers taking up homesteads in the years 1895 and 1896, indicating a decrease in the latter year of 537 entries and 1,498 souls. The falling off in the number of ocean arrivals is relatively trifling compared to this, which is however not to be accounted for by any diminution in the proportion of Europeans arriving in the country who made homestead entry. As compared with the previous year the entries made in 1896 show a decrease of 42 in the number made by persons from the older provinces, of 50 in the number made by persons already in the country who had previously had entry, of 58 in the number made by Canadians returned from the United States, and of 310 in the number of entries made by all other classes of settlers from the United States. This makes up a total of

Department of the Interior.

460 entries, and the remainder, 77, represents the actual falling off in entries made by Europeans.

Nationalities.	1895. No. of Entries.	1896. No. of Entries.
Canadians from Ontario.....	363	309
do Quebec.....	60	32
do Nova Scotia.....	17	11
do New Brunswick.....	1	5
do Prince Edward Island.....	3	3
do British Columbia.....	16	4
do Manitoba.....	127	187
do North-west Territories.....	25	19
	612	570
Persons who had previous entry.....	435	385
Canadians returned from the United States.....	106	48
United States.....	452	142
Newfoundland.....	1	2
New Zealand.....	1	
Australians.....	2	
English.....	296	278
Irish.....	31	39
Scotch.....	91	72
French.....	88	64
Belgians.....	17	17
Italians.....	3	2
Austro-Hungarians.....	51	83
Germans.....	59	44
Hollanders.....	2	
Danes—other than Icelanders.....	9	4
Icelanders.....	23	14
Swedo—Norwegians.....	20	7
Russians—other than Mennonites and Poles.....	80	69
Mennonites.....	6	4
Poles.....	9	12
Roumanians.....		1
	2,394	1,857
Number of souls.....	7,054	5,556

The following is a statement giving the number of entries made in the years 1895 and 1896, respectively, by persons coming from the various States and Territories of the American Union :—

States.	1895.		1896.	
	No. of Entries.	No. of Souls.	No. of Entries.	No. of Souls.
California.....	6	16	4	4
Colorado.....	1	2		
Connecticut.....	1	1	1	4
Dakota.....	79	275	36	87
Idaho.....	33	127	8	36
Illinois.....	5	14	5	13
Indiana.....	2	13		
Iowa.....	12	41	4	16
Kansas.....	52	72	7	39
Kentucky.....	3	5		
Louisiana.....			1	1
Maine.....	2	15		
Massachusetts.....	4	9		
Michigan.....	24	96	17	64
Minnesota.....	107	387	17	65
Missouri.....	2	2	2	4
Montana.....	5	8	10	33
Nebraska.....	47	156	17	57
New Hampshire.....	2	9	1	2
New Jersey.....			2	6
New York.....	12	46	6	10
Ohio.....	6	13	2	3
Oklahoma.....	1	1	1	6
Oregon.....	20	88	6	17
Pennsylvania.....	6	16	2	11
Rhode Island.....			1	2
Tennessee.....	1	4	1	1
Texas.....	2	5	2	13
Utah.....	30	114	14	43
Vermont.....	5	11	1	1
Washington.....	68	182	16	53
Wisconsin.....	13	40	6	17
Wyoming.....	7	44		
	558	1,912	190	608

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The following statement shows the number of homestead and pre-emption entries reported in each year since 1874, and the number and proportion of those entries which have been cancelled for non-fulfilment of the conditions of entry.

Departmental Year ending	HOMESTEADS.			PRE-EMPTIONS.		
	Number of Entries.	Number cancelled.	Per-centage.	Number of Entries.	Number cancelled.	Per-centage.
31st October, 1874	1,376	889	64	643	61	95
do 1875	499	303	60	391	229	58
do 1876	347	153	44	263	135	51
do 1877	845	457	54	594	355	9
do 1878	1,788	1,377	77	1,580	930	58
do 1879	4,068	2,045	50	1,729	1,457	84
do 1880	2,074	679	32	1,004	494	49
do 1881	2,753	937	34	1,649	785	47
do 1882	7,483	3,485	46	5,654	3,129	55
do 1883	6,063	1,818	29	4,120	1,616	39
do 1884	3,753	1,130	30	2,762	1,041	37
do 1885	1,858	597	32	653	414	6
do 1886	2,657	812	30	1,046	423	40
do 1887	2,036	459	22	585	239	40
do 1888	2,655	668	25	454	219	48
do 1889	4,416	1,639	37	1,355	692	49
do 1890	2,955	794	26	371		
do 1891	3,523	934	26			
do 1892	4,840	1,322	27			
do 1893	4,067	899	22			
do 1894	3,209	648	20			
31st December, 1894	3,174	683	21			
do 1895	2,394	301	12			
do 1896	1,857	45	2			

Statement showing the number of letters patent issued by the department in each year since 1874, and the number of those issued which have since been cancelled in each year.

Year.	Number issued.	Number cancelled.
Departmental Year ending 31st October, 1874	536	6
do do 1875	492	4
do do 1876	375	4
do do 1877	2,156	13
do do 1878	2,597	32
do do 1879	2,194	57
do do 1880	1,704	41
do do 1881	1,768	11
do do 1882	2,766	11
do do 1883	3,591	16
do do 1884	3,837	24
do do 1885	3,277	18
do do 1886	4,570	17
do do 1887	4,599	26
do do 1888	3,275	34
do do 1889	3,282	30
do do 1890	3,273	20
do do 1891	2,449	35
do do 1892	2,955	27
do do 1893	2,936	16
do do 1894	2,753	15
do do 31st December, 1894	2,682	16
do do 1895	2,118	12
do do 1896	2,665	20

CORRESPONDENCE.

The following statement shows the number of letters received and sent by the department in each year since its establishment :—

Departmental Year ending 31st October.	Letters received.	Letters sent.	Total.
1874.....	3,482	4,150	7,632
1875.....	1,974	2,189	4,163
1876.....	2,256	3,097	5,353
1877.....	3,137	3,677	6,814
1878.....	4,642	6,009	10,651
1879.....	5,586	6,179	11,755
1880.....	8,222	9,940	18,162
1881.....	13,605	15,829	29,434
1882.....	25,500	30,300	55,800
1883.....	27,180	33,500	60,680
1884.....	27,525	33,386	60,911
1885.....	33,970	43,997	77,967
1886.....	60,964	67,973	128,937
1887.....	47,845	60,890	108,735
1888.....	43,407	52,298	95,705
1889.....	48,316	50,500	98,816
1890.....	36,200	36,008	72,208
1891.....	38,000	36,267	74,267
1892.....	41,990	42,203	84,193
1893.....	50,794	48,145	98,939
1894.....	48,619	50,840	99,459
Calendar year ending 31st December, 1894.....	47,558	50,508	98,066
From 1st January to 31st October, 1895.....	38,065	41,480	79,545
do 1st November to 31st December, 1895 (two months).....	6,723	8,027	14,750
Calendar year 1896.....	45,342	47,053	92,395

The number of registered letters received during the year was 1,632, and the number sent 4,037.

OPERATIONS OF THE TOPOGRAPHICAL SURVEYS BRANCH.

The surveys made by this branch of the department were of three kinds. There were the usual township subdivision surveys for laying out land for settlement, the irrigation surveys for investigating the supply of water and its application to the land in the western part of the territories, and the boundary surveys having for object the elucidation of various matters in connection with the International boundaries of Canada.

SUBDIVISION SURVEYS.

Surveys were actively prosecuted in the Lake Dauphin district, two parties being at work in charge of Messrs. P. R. A. Belanger, and E. W. Hubbell, respectively. This district is one of the best parts of Manitoba: the land is of good quality, wood and water are found in abundance, and, with the building of a railway, a large and prosperous settlement is assured in the near future.

The surveys in Prince Albert district were in charge of Mr. Thomas Fawcett. He subdivided five townships, renewed some old surveys and established the outlines of several townships with a view to their subdivision next season.

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Mr. J. E. Woods was employed in the Edmonton district. He surveyed the Victoria and Lobstick settlements, the trail between Victoria and Beaver Creek, renewed the corners in old townships and subdivided new ones.

Mr. T. W. Chalmers surveyed the townships set apart for the half breed colony near Saddle lake. At the request of the board of management the land was laid out into lots of eighty acres.

In Southern Alberta Mr. F. W. Wilkins made traverses of Willow and Beaver creeks and the north branch of Sheep creek for the purpose of ascertaining the areas of the quarter sections fronting on these streams. The balance of his work consisted in the subdivision of townships.

The surveys needed in the British Columbia belt were made by Mr. John Vicars. As observed in previous reports, these surveys are very much scattered and their progress is comparatively slow.

Some minor surveys requiring a few days' work only were made at various places in Manitoba, the North-west Territories and British Columbia, by local surveyors.

SETTLEMENT SURVEYS COMPLETED TO DATE.

Hereunder will be found the usual table of subdivision or settlement survey work completed each year since the commencement of the surveys, with the result of last season's operations added:—

—	Acres.	Number of Farms of 160 Acres each.
Previous to June, 1873	4,792,292	29,952
In 1874	4,237,864	26,487
1875	665,000	4,156
1876	420,507	2,628
1877	231,691	1,448
1878	306,936	1,918
1879	1,130,482	7,066
1880	4,472,000	27,950
1881	8,147,000	50,919
1882	10,186,000	63,662
1883	27,234,000	170,212
1884	6,435,000	40,218
1885	391,680	2,448
1886	1,379,010	8,620
1887	643,710	4,023
1888	1,131,840	7,074
1889	516,968	3,231
1890	817,075	5,106
1891	76,560	476
1892	1,395,200	8,720
1893	2,928,640	18,304
1894	300,240	1,876
1895	406,240	2,539
1896	506,560	3,166
Total	78,752,495	492,199

INTERNATIONAL BOUNDARY SURVEYS.

BOUNDARY ACROSS LAKE ERIE.

The boundary line across lake Erie is described by the commissioners appointed under article VI. of the Treaty of Ghent as a line running "southerly and westerly along the middle of lake Erie, in a direction to enter the passage immediately south of Middle island." In 1893 difficulties arose in respect of the fisheries in this body of water, and a request was received from the Department of Marine and Fisheries for such information as would enable their overseers to ascertain up to what point in the lake they might enforce the fishery regulations of Canada; but on investigation it was found that no precise survey had been made of the north shore of the lake, and the definition of the middle line was in consequence impossible. The United States shores of the great lakes were surveyed by the United States lake survey with all the precision of the highest geodetic processes, and in the course of this work triangulation stations were placed on the Canadian shores in the narrow portions of the lakes wherever operations on the United States side would thus be facilitated. In such places also the soundings have been carried to the Canadian side and the shore line traced. Along the wider portions of the lakes, however, this has not been done, and along the north shore of lake Erie from Dunnville to Point Pelee there is a stretch of 160 miles the location of which on our maps depend upon the Crown lands surveys of individual townships, unconnected by any precise scheme of survey, or upon fragmentary marine surveys.

The survey of this portion of the shore line has been made by Mr. Klotz of this department during last summer. A word of explanation may be given as to the method by which the survey was made, and the reasons which led to the adoption of this method. As already stated, the surveys of the United States shores were made in a most accurate manner, being based upon a primary triangulation of precision. To obtain equal accuracy along our shores a triangulation having sides of 20 miles or more in length would be required to serve as a framework to which the topographical survey of the shore should be connected. A further advantage of such a triangulation would be that, at slight additional expense, it could be continued across the peninsula to the southern and eastern shores of lake Huron, thereby connecting the surveys of the two lakes. Such a triangulation, moreover, besides serving the present purpose, would have afforded a useful basis for a topographical survey of the whole of the western peninsula of Ontario, a work of the highest usefulness not only for general geographical purposes but for engineering operations generally, such as railway locations, aqueducts, drainage works, water-power and water supply. These latter objects are, doubtless, more of local or provincial character than of importance to the Dominion generally, but such prospective benefits are worthy of consideration when public money is being expended. However, after an examination of the ground, the Surveyor-General and the Chief Astronomer both reported that owing to the general flatness of the country between lake Erie and lake Huron, a triangulation having sides of a proper length and approaching near enough to the lake shores to serve the immediate purpose of the survey could not be made without incurring a disproportionate expense (so far as that purpose was concerned) in the erection of high observing stations. The practical choice, therefore, lay between a triangulation of very short sides following the sinuosities of the shore of lake Erie, or a traverse survey with theodolite and steel tape. The latter

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method was adopted as being, in the opinion of the technical officers of the department, the more accurate. The survey consisted of two parts, — one following the main highways parallel with the lake, which afforded the advantage of long straight courses and consequent high precision, and a traverse following the shore of the lake and connected every few miles with the road survey. The initial and terminal points of the survey are both former stations of the United States lake survey, one at Grand River and the other at Kingsville. At Port Stanley, which is about midway between these points, a further check was obtained by astronomical observations for latitude and longitude. The whole survey was under the direction of Mr. Klotz, of this department.

SOUTHERN BOUNDARY OF ONTARIO, FROM LAKE SUPERIOR TO LAKE OF THE WOODS.

Article II. of the treaty entered into in 1783 between Great Britain and the United States describes the portion of the boundary line referred to here as follows :—

“ Through the middle of said lake (Huron) to the water communication between that lake and lake Superior ; thence through lake Superior northward of the Isles Royal and Phelipeaux, to the Long lake ; thence through the middle of said Long lake, and the water communication between it and the lake of the Woods, to the said lake of the Woods ; thence through the said lake to the most north-western point thereof,” &c. This description is vague from the want of particularity as to the course of the line between the several objective points, especially as the country to the north-west of lake Superior is intersected in every direction by rivers and lakes. A dispute also arose as to the identity of the Phelipeaux islands and the Long lake, so by article VII. of the Treaty of Ghent, 1814, it was determined to appoint commissioners “ to fix and determine according to the true intent of the said treaty of peace of 1783, that part of the boundary between the dominions of the two powers which extends from the water communication between lake Huron and lake Superior to the most north-western point of the lake of the Woods.” The commissioners, Anthony Barclay and Peter B. Porter, appointed under this article, reported on the 23rd October, 1826, upon their proceedings under their commission, to the effect that they agreed upon the course of the line through lake Superior to a certain point opposite to the north-eastern point of Isle Royale, and that they also agreed as to the course of the line westerly from a certain point at the foot of the Chaudière falls at the eastern end of Rainy lake to the north-west angle of the lake of the Woods. They submitted maps showing in detail the result of the surveys and explorations made by them in the intervening region, and in their report, while expressing their inability to agree as to this part of the line, they recite the proposals and counter proposals they had made in the attempt to agree upon a line.

In the first place the United States commissioner proposed that the line should follow the river Kaministiquia through Dog lake and river to the height of land of Hudson's bay ; thence along the river Savanne, through Mille lac, Sturgeon lake and river Maligne, lac la Croix and lake Namecan, to the point agreed on at the Chaudière falls. This proposed line follows very closely what has since been known as the Dawson route, and it is doubtless this proposition which has led some, unacquainted with subsequent negotiations and ignorant of the effect of the treaty of 1842, to believe that the Dawson route is the actual boundary. Her Majesty's commissioner made a counter proposition that the line should pass to the north of and close to Isle Royale and through the middle of lake Superior to Fond du Lac, an estuary of the St. Louis river

upon which the city of Duluth, in Minnesota, is now situated ; thence up the St. Louis river and its tributary, rivièrè des Embarras, to the height of land ; thence across the height of land portage to the Vermillion river ; thence down the Vermillion river to lake Namecan ; thence through lake Namecan to the objective point at Chaudière falls.

Unable to decide between these two lines, which include a very large tract of disputed territory, the commissioners reported that a second proposition was made by the United States commissioner, as follows :—

To proceed from the point agreed upon near the north-east end of Isle Royale to the mouth of Pigeon river ; to ascend the Pigeon river to the junction with Arrow river ; thence to proceed by Arrow river and the most direct and continuous water communication to lake Namecan and Rainy lake.

This was met by a proposition from Her Majesty's commissioner to proceed as follows :—

Up Pigeon river through the Fowl lakes to the lakes of the height of land between lake Superior and lake of the Woods, through lake Saisaginaga, Cypress lake, lac du Bois Blanc, lac la Croix, little Vermillion lake and lake Namecan, with their connecting lakes, straits, streams and portages, to the agreed point in Rainy lake. The route thus proposed by Mr. Barclay is stated with the fullest detail in the report of the commissioners dated 23rd October, 1826.

The difference between the second propositions of the two commissioners is trivial¹ compared with that between their first propositions. The exact purport of the United States commissioner's second proposition, however, does not clearly appear either from the text of the report or the commissioners' maps, but it is likely that its chief departure from the British commissioner's proposition lay in its including within the United States the large peninsular tract of land commonly known as Hunter's island.

The Ashburton Treaty of 1842 decides the question. Article II. of that treaty, after giving a particular description, not necessary to be quoted here, of the course of the line from the water communication between lake Huron and lake Superior to a point north of Isle Royale continues thus :—“ and from the last mentioned point, south-westerly, through the middle of the sound between Isle Royale and the north-western main land, to the mouth of Pigeon river, and up the said river, to and through the north and south Fowl lakes, to the lakes of the height of land between lake Superior and the lake of the Woods ; thence along the water communication to lake Saisaginaga, and through that lake ; thence to and through Cypress lake, lac du Bois Blanc, lac la Croix, Little Vermillion lake, and lake Namecan and through the several smaller lakes, straits or streams, connecting the lakes here mentioned, to that point in lac la Pluie, or Rainy lake, at the Chaudière falls, from which the commissioners traced the line to the most northwestern point of the lake of the Woods ; thence” The lakes and rivers here named are the same as those proposed, as recited above, by Mr. Barclay, the British commissioner under the Treaty of Ghent, with the exception that in Mr. Barclay's proposition the line was to follow the course of the several portages and carrying places, even where such were the means of communication from one point of a river to another point of the same river ; whereas in the treaty of 1842 the portages are not named—the line must in general follow the lakes, straits or streams. Mr. Barclay also described the line with the fullest detail as to its course with reference to the numerous islands situated in the lakes. These islands are not mentioned in the treaty.

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But this lack of detail is supplied by the plenipotentiaries of 1842, Lord Ashburton and Mr. Webster, who traced upon Barclay and Porter's maps of 1826 their intended boundary line, which they certified on the face of the maps as "agreed to by treaty," thus putting their intention beyond all doubt. Certified copies of these maps with facsimiles of the signatures of the plenipotentiaries are of record in the Department of the Interior.

The question as to the correctness of the adopted location of this part of the boundary line made its appearance about a year ago through certain newspapers, voicing, as it appears, the claim of some Minnesota lumbermen that Coleman's and Hunter's islands lie within the limits of the United States. The matter was brought to the official notice of the government of Canada through the British Embassy at Washington by the Acting Secretary of State of the United States, who proposed joint action towards the marking of this portion of the boundary line in accordance with the treaty of 1842.

It may be well to explain here that Coleman's island is an island lying in lac la Croix, and its possession has never been claimed by Canada. It is clear, however, that if by Hunter's island in these despatches is meant the large tract known on our maps by that name, the treaty places the whole of it within the limits of Canada.

The treaty line, in fact, is very definite as to all main features. There was a possibility, however, that doubt as to the ownership of small islands might arise in case of omission or other error being found in the survey under the Treaty of Ghent. To determine whether such errors or omissions exist, and to afford a basis for the direction of the investigations of the commission proposed by the United States, Mr. A. J. Brabazon, of the Alaska survey staff, was detailed to follow the course of the boundary line along the rivers and lakes from Pigeon river to the Chaudière falls. This service he performed last summer, travelling with canoes, and making a track survey with micrometer measurements in places where the same was necessary. His report contains much valuable information as to the unambiguity of the treaty description when interpreted by the maps of 1826.

BOUNDARY BETWEEN BRITISH COLUMBIA AND THE STATE OF WASHINGTON.

The British Columbia government having made a complaint as to the lack of marks on the international boundary line along the southerly limits of that province, but especially between the 116th and 118th degrees of west longitude, on the 7th of December, 1893, an Order in Council was passed and duly communicated to the provincial government, pointing out that the government of Canada was then spending a considerable sum of money yearly with a view to the delimitation of the boundary between British Columbia and the territories of the United States in Alaska, and suggesting, in view of this state of things, that the action proposed by the government of the province might reasonably be deferred until the Alaska boundary had been definitely determined and the services of the experts in the employment of the government of Canada, who were then engaged in the last mentioned work, could be utilized. The completion of the first stage of the Alaska work by the submission of the commissioners' report and maps rendered it possible to detail Messrs. McArthur and Saint Cyr, of the boundary commissioner's staff, for the purpose of making the necessary surveys and investigations.

It seems, however, that there is a complication on this part of the 49th parallel, over and above that due to the mere lack of monuments. It appears that for a considerable distance in the Boundary creek and Grand Prairie regions there is evidence of two lines having been surveyed, marked, and cut out. These lines are about one hundred yards apart; both, it is stated, are equally well cut out, and were apparently run about the same time. But the monuments on the northern line are pulled down very completely, while those on the south line are standing in good condition. To the east of Boundary creek the monuments are in ruins on the south line and are standing on the north line, while at Boundary creek there are monuments standing on both lines. At Grand Prairie the land is being farmed by United States citizens up to the north line. There is nothing of record here in connection with the survey of the international boundary which would throw any light upon this complication; and the condition of affairs is one which may possibly lead to grave trouble, especially in view of the fact that this portion of the boundary is in the immediate neighbourhood of the recently discovered rich mineral deposits of the Kootenay mining region.

To fully ascertain the meaning of this duplication of lines it will be necessary to obtain from the Imperial authorities a copy of the field notes of the line which was surveyed by the Royal Engineers, in concert with a United States commission, about 35 years ago. Mr. Johnston, chief geographer of this department, was sent to England last June to procure copies of the field notes and descriptions of this, as well as of other portions of the line between Canada and the United States. The lack of the original survey records of those portions of the boundary which have been defined, not by natural features, but by artificial monuments, is seriously felt when a re-establishment of the line or, as in this case, a supplementary determination is desired. Mr. Johnston's unfortunate illness, however, rendered his return necessary before his object had been accomplished. In the meantime the services of Messrs. McArthur and Saint Cyr have been utilized towards making a connection between the Dominion lands surveys of the railway belt at Revelstoke and the boundary line at the place mentioned. Their triangulation when finished will serve not only to define the astronomical position of the points in question, but will also afford points of connection for the explorations of the geological survey in the Kootenay mining region. Unfortunately, on account of the excessive quantity of smoke from bush fires and unfavourable weather in the early part of the season, their survey has not been completed. The terminal point is near the town of Nakusp, about midway between Revelstoke and the boundary line. Another season's work will be necessary to complete the connection.

ALASKA COAST STRIP.

The boundary of Canada on the west, dividing British Columbia and the North-west Territories from the territory of Alaska, is defined by the Treaty of St. Petersburg, concluded between Great Britain and Russia in 1825. The articles of this treaty which relate to the line of demarcation are Nos. III. and IV., as follows:—

III. The line of demarcation between the possessions of the high contracting parties upon the coast of the continent and the islands of America to the north-west, shall be drawn in the manner following:—

Commencing from the southernmost point of the island called Prince of Wales island, which point lies in the parallel of 54 degrees, 40 minutes, north latitude, and between

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the 131st and the 133rd degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast, as far as the point of intersection of the 141st degree of west longitude (of the same meridian); and, finally, from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the frozen ocean, shall form the limit between the Russian and British possessions on the continent of America to the north-west.

IV. With reference to the line of demarcation laid down in the preceding article, it is understood;

1st. That the island called Prince of Wales island shall belong wholly to Russia.

2nd. That wherever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of ten marine leagues therefrom.

Towards the delimitation of the boundary thus described no action whatever was taken during the Russian occupation. In 1867 Alaska was purchased by the United States, and a few years afterwards the discovery of gold in the Cassiar district of British Columbia attracted a considerable mining population and led to difficulties as to jurisdiction along the valley of the Stikine river, which, flowing in the lower part of its course through United States territory, is the most direct route to the Cassiar mines.

The Canadian government has repeatedly represented the desirability of having a survey made of the boundary line in order to avoid conflicts of jurisdiction. These representations date as far back as 1872. Nevertheless, with the exception of the establishment of a provisional boundary on the Stikine river in 1877 by Mr. Joseph Hunter, acting under instructions from the government of Canada, an action to which the government was compelled for the avoiding of serious complications—nothing was done for a quarter of a century after the purchase of Alaska by the United States. In the meantime the increasing population in the neighbourhood of the boundary, both on or near the coast and in the interior on the Yukon river and its tributaries, directed attention to the possible dangers of doubtful jurisdiction; and in July, 1892, a convention was entered into at Washington between Great Britain and the United States providing for a joint survey of that portion of the region in question lying to the east of the 141st meridian. Article one of this convention reads as follows:—

The high contracting parties agree that a coincident or joint survey (as may be found in practice most convenient) shall be made of the territory adjacent to that part of the boundary line of the United States of America and the Dominion of Canada dividing the territory of Alaska from the province of British Columbia and the North-west Territory of Canada, from the latitude of 54° 40' north to the point where the said boundary line encounters the 141st degree of longitude westward from the meridian of Greenwich, by commissioners to be appointed severally by the high contracting parties, with a view to the ascertainment of the facts and data necessary to the permanent

delimitation of the said boundary line in accordance with the spirit and intent of the existing treaties in regard to it between Great Britain and Russia and between the United States and Russia.

Application will be made without delay to the respective legislative bodies for the appropriations necessary for the prosecution of the survey, and the commissioners to be appointed by the two governments shall meet at Ottawa within two months after said appropriation shall have been made, and shall proceed as soon as practicable hereafter to the active discharge of their duties.

The respective commissions shall complete the survey and submit their final reports thereof within two years from their first meeting.

The commissioners shall, so far as they may be able to agree, make a joint report to each of the two governments, and they shall also report, either jointly or severally, to each government on any points upon which they may be unable to agree.

Each government shall pay the expenses of the commission appointed by it.

Each government engages to facilitate in every possible way any operations which, in pursuance of the plan to be agreed upon by the commissioners, may be conducted within its territory by the commission of the other.

The high contracting parties agree that, so soon as practicable after the report or reports of the commissioners shall have been received, they will proceed to consider and establish the boundary line in question.

In pursuance of the terms of this article Mr. W. F. King, chief astronomer of this department, on the recommendation of the government of Canada, was appointed by Her Majesty as her commissioner. Mr. T. C. Mendenhall, superintendent of the United States coast and geodetic survey, was appointed by the president to represent the United States. The commissioners held their first meeting in Ottawa on the 28th November, 1892, and proceeded to make arrangements for the commencement of the survey in the following year. Under the option allowed them by the convention of making either a coincident or joint survey, the commissioners decided in favour of a joint survey, sending independent survey parties into different parts of the territory to be surveyed, and making provision at the same time for each commissioner to observe and verify the work of the other.

Speaking generally, the work of the United States party was confined to the principal rivers and their immediate neighbourhood, while the Canadian parties made a photo-topographic survey of the mountainous regions lying between the rivers. In this way the whole coast was covered, from Behm canal to mount St. Elias, the distance back from the coast varying according to the topography of the country, but generally extending as far back as the highest mountains visible from the sea.

By the supplementary convention of the 3rd February, 1894, the time for the completion of the work and the submission of the reports of the commissioners, which by the former convention would expire two years from the date of the first meeting of the commissioners—that is to say, on the 28th November, 1894—was extended to the 31st December, 1895. Accordingly, on the last-mentioned date, a joint report was made by the commissioners. This report is signed by General W. W. Duffield, who on the 1st July, 1895, had replaced Mr. Mendenhall as United States commissioner, and by Mr. King.

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It should be understood that this joint report does not purport to define or prescribe the course which the boundary line should follow ; that was not the intention of the convention. The duty of the commissioners was merely to supply accurate topographical data upon which may be based future operations for the permanent marking of the line, and this the commissioners have done in the topographical maps which accompany their report. The report of the commissioners was laid before parliament at its next succeeding session, and a copy has been transmitted to Her Majesty's government.

ALASKA—141ST MERIDIAN.

The survey by the commissioners under the convention of 1892 terminates at the 141st meridian, in the vicinity of the commanding peak of mount St. Elias. Here the line of demarcation turns north, and follows the meridian for some 650 miles to the Arctic Ocean.

Some fifteen years ago this region was almost entirely unknown and unoccupied, and was looked upon as a sub-arctic waste. The discovery of gold, however, on the tributaries of the Yukon river, by a few adventurous prospectors, speedily attracted a considerable population of miners. This has especially been the case in the last five years, and at present there is a population of several thousands, of which a large part is grouped in the immediate vicinity of the intersection of the Yukon river by the boundary line, and along some of the tributaries of the Yukon in that neighbourhood. The later history of the Yukon district, so far as regards the explorations made by the government of Canada, and the measures taken in the years 1894 and 1895 towards the establishment of law in the district, were detailed in my last annual report. As stated in that report, Mr. William Ogilvie was sent out, in the summer of 1895, to make such surveys of building lots, mining claims, etc., as were urgently required, and also for the purpose of producing the 141st meridian from the point established by him in 1887-88 north and south as far as was necessary to furnish a conventional line of jurisdiction throughout the region at present occupied by the miners. In this the government followed the precedent set in 1877 as to the provisional boundary on the Stikine river already referred to. Mr. Ogilvie has surveyed some sixty miles of the line. His determination, of course, will have no permanent value as an international landmark, unless and until it is agreed to by the United States. The United States government was duly informed of the action being taken, and was invited to co-operate in the determination of either a provisional or a permanent boundary through the mining district. In view of the fact, however, that everything indicates that the whole course of the line, from the St. Elias range of mountains for an indefinite distance northward, passes through a country exceedingly rich in mineral deposits, the United States government expressed a preference for a joint survey to lay down the whole extent of the meridian, with the possible exception of the extreme northerly portion, and negotiations to that end have been and are now in progress. The congress of the United States a year ago made an appropriation of \$75,000 towards the expense of the proposed survey ; provision for the survey has also been made by the parliament of Canada ; so that, if an agreement is reached between the governments interested, the work can be initiated as soon as the season permits.

The principal drawback to the development of this region is the difficulty of access. Small parties of miners make their way from the head of Lynn canal across the coast

range and down the Yukon river; all heavy freight, however, has to go by sea to the mouth of the Yukon, and thence by steamboat up the river nearly 2,000 miles before Canadian territory is reached. A route entirely through Canadian territory and one by which it would be possible to carry freight is much to be desired. Such a route has been suggested to start from Taku river or the Stikine and thence by pack or wagon trail to reach lake Teslin, which is the main source of the Yukon river and from which there is said to be uninterrupted navigation to the boundary line and indeed to the mouth of the Yukon. An exploration having as one of its objects the investigation of this matter was pushed by Mr. Ogilvie in the winter of 1894-95 from the Taku river behind the coast mountains. This expedition, however, had only a negative result, the severity of the winter preventing its completion. An appropriation was asked and obtained from parliament at its last session to defray the expense of explorations in this region to be made this season.

It was intended that Mr. Ogilvie should return by what is known as the Dalton route to test its feasibility as a means of access to the Yukon district, but a severe snow storm which commenced on the 25th September prevented him from setting out and he was forced to remain at Fort Cudahy for the winter. His whereabouts for a few months caused some anxiety to the department. He was quite willing to attempt the perilous journey out during the winter were it not for the heavy expense which would be incurred in the purchase of the necessary outfit of dogs, &c., and decided that the money could be more wisely spent in making a survey of the Klondak river.

Reports have from time to time been received from him, all of which contain accounts of extraordinary finds of gold in the district. Along the banks of the Klondak river and creeks which are tributary to it, discoveries are reported of simply fabulous value. For example, in his last report, dated 23rd January, Mr. Ogilvie states "it is beyond doubt that 3 pans on different claims on Eldorado creek turned out \$204, \$212 and \$216 * * * * * there are many running from \$10 to \$50." When it is taken into consideration that with proper sluicing appliances one man can handle one thousand pans in a day, some idea may be formed of the enormous profits to be obtained. But it should be mentioned by way of caution that Mr. Ogilvie's statements represent not what he has seen or knows from personal observation, but what has been reported to him by others.

Mr. Ogilvie estimates that there are in the Klondak district about 1,000 claims of 500 feet in length each. A claim of this length, and of average width and depth of pay-dirt, yielding \$5 to the pan, would produce \$4,000,000 worth of gold.

Valuable quartz mines are also reported as having been discovered in various parts of the district.

Although but little has as yet necessarily been done in the way of development of these recently discovered mines, owing to the difficulty of access and the scarcity and dearth of labour and provisions, sufficient information has been received to prove beyond a doubt that this portion of Canadian territory contains gold mines of great richness. An immense influx of prospectors is looked for during the coming season, and, with the opening up of necessary transport facilities, this region bids fair to become one of the great gold producers of the world.

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BOUNDARY LINE EAST OF ST. LAWRENCE RIVER.

The southern boundary of the province of Quebec and the eastern boundary of New Brunswick, separating these provinces from the states of New York, Vermont, New Hampshire and Maine, was, so far as regards the portion between the St. Lawrence river and the source of the St. Croix river, defined by the Ashburton Treaty of 1842, and was marked out by an international commission a few years afterwards. While a portion of this boundary follows natural features, viz., the St. John river and some of its tributaries, the greater part is artificial; that is, it depends for its definition upon the monuments placed by the commission, and for its permanence to a large extent upon their durability.

The boundaries between the state of New York and surrounding states being almost entirely monument-marked lines, that state has for a considerable period adopted a plan of inspection of its boundaries every three years in order that lost or broken monuments may be replaced. In the year 1890 the Canadian government was invited to send a representative to accompany their commissioner on his inspection of the boundary between New York and the province of Quebec, that is the 45th parallel, from the St. Lawrence river to the Richelieu river. Mr. King, chief astronomer of this department, was in accordance with this request sent to go over the line in company with the New York commission. His report on the state of the monuments will be found in the annual report of this department for the year 1890. He found that almost one-half the monuments were either lost, thrown out of place, or badly damaged. These monuments were hollow pillars of cast iron, not well adapted to withstand the rough usage many of them had evidently encountered.

There is no reason to suppose the condition of the monuments is any better along the remainder of the line; in fact, after a lapse of fifty years, it is to be expected that many of them will have been lost or displaced. In this case again, for the proper examination of the line, the original field notes are necessary. Mr. Johnston was to have procured these when in England, but as before stated he was obliged to return without accomplishing anything.

THE EASTERN BOUNDARY OF NEW BRUNSWICK.

From the monument established at the source of the St. Croix river by the commissioners under the fifth article of the Treaty of Ghent, the boundary line follows the St. Croix river to its mouth near the town of St. Andrews in New Brunswick. No dispute is known to exist with regard to any portion of this line. Between the mouth of the St. Croix river and the open ocean, the line passes among the numerous islands in Passamaquoddy bay, at the western end of the bay of Fundy. The ownership of these islands was determined in 1817 by the commissioners appointed under the fourth article of the Treaty of Ghent, but the actual position of the line in the waters of the bay was not then determined. The marking of this line was, by the second article of the convention of 1892, placed in the hands of the same two commissioners as the Alaska boundary; but these commissioners have not yet come to a final agreement.

ASTRONOMICAL WORK.

For the purpose of more accurately determining the astronomical positions of various parts of the boundary line, observations were made by Mr. King, the chief astronomer

assisted by Mr. Klotz, for the determination of the difference of longitude of Winnipeg and Port Stanley from Ottawa—Ottawa itself being connected with Montreal, which is probably the best determined point in North America, by observations taken early in the summer by Mr. King, in conjunction with Prof. McLeod of McGill University. The observations at Port Stanley serve as a check upon the survey of the north shore of lake Erie, while those at Winnipeg will give the absolute longitudes of some ten or twelve astronomical stations in the west which had been connected with Winnipeg by observations taken between the years 1885 and 1888. Among these stations is Revelstoke, the initial point of the survey commenced by Messrs. McArthur and Saint-Cyr, hereinbefore referred to.

BOUNDARY BETWEEN ONTARIO AND MANITOBA.

Amongst other matters coming before you for consideration after your accession to office was that relating to the boundary between the provinces of Ontario and Manitoba. On the 28th October, 1893, an Order in Council was passed, pointing out that since the decision of the Imperial Privy Council was rendered in regard to this boundary no steps have been taken to determine its position on the ground. It was mentioned that the greater part of the boundary consists of the Albany river, the English river, and the lakes and waters connecting them, and that in regard to this part, which is a natural boundary, no delimitation by survey was requisite for the present; but that from the north-west angle of the lake of the Woods to the English river the line is geographical, and as even then berths were being licensed by the governments of both Canada and Ontario in comparatively close proximity to where this line would be found to lie, the opinion was expressed that the provinces of Ontario and Manitoba should join with the Dominion in appointing a commission for the purpose of effecting the necessary survey during the then ensuing season—that is to say, the season of 1894. The authorities of both provinces mentioned were communicated with accordingly. The government of Ontario agreed to the proposal, but the government of Manitoba took the ground that, not being the owners of the timber, the minerals or the public lands, they did not appear to be sufficiently interested in the immediate delimitation of the boundary to warrant the incurring of any expenditure at that time. On the 30th June, 1894, an Order in Council was passed, the contents of which were duly communicated to the government of Ontario, reciting the conclusion arrived at by the government of Manitoba, proposing that Ontario and the Dominion should join in the work, and suggesting a conference during the recess for the purpose of agreeing upon some scheme for the making of the proposed survey. The Ontario authorities had made provision for their share of this work in accordance with the original proposal, and had so intimated to this department, but no answer was ever received to the communication based upon the later Order in Council.

By your instruction, correspondence has been reopened with the government of Ontario with a view, if possible, to have the necessary delimitation made during the coming season.

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IRRIGATION.

The question of the growth of cereal, root, and fodder crops, in the large portion of the North-west Territories comprised within the limits of what is known as the arid region, has now passed entirely beyond the experimental stage, and the results during the past year, in the way of crop production on irrigated lands, in the extension of existing canals and ditches, and the construction of new systems, have been of a most gratifying and encouraging character. At the date of my report last year there were 121 ditches and canals in operation, comprising a total length of about 300 miles. At the close of the current year the number of completed ditches and canals had increased to 157, comprising a total length of some 350 miles. These completed systems are capable of irrigating 65,000 acres, and although only a portion of this area was irrigated during the season of 1896, the cultivated area is being rapidly extended, and from present indications the coming season will see the larger part of the irrigable area under crop.

The season of 1896 was a very favourable one for irrigation. The rainfall during the summer months was above the average, but came too late in the season, and those who were able to irrigate their crops during the early dry period secured a growth which non-irrigated crops did not reach. The wet spell about mid-summer assisted very materially the non-irrigated crops, but those which had been previously irrigated had the advantage up to the time of harvest.

The continued warm and dry weather at harvest time rapidly matured the crops, and very satisfactory results were obtained. So far the water used in irrigation has been largely devoted to the growth of fodder, hay being the chief consideration in connection with stock raising, in which the larger number of our irrigators are engaged. Good grain crops, both as regards quality and quantity, were however obtained from irrigated lands during the past season, and in many instances the grain which was cut green for fodder would have ripened and given good returns had the owners been desirous of obtaining grain instead of fodder.

Following the practice inaugurated last year, we have obtained from each irrigator a concise statement of the results from irrigation during the past season, and have condensed this information in the form of a short bulletin which has been issued to all ditch owners or users of water, and to those interested in irrigation. This bulletin is given herein with Mr. Dennis's annual report, and the results both as to quantity and quality of crops produced are shown to be of a most encouraging character.

The mining development in the different districts of British Columbia now affords a good market for oats and hay, and irrigators have realized very satisfactory returns from their past season's crops.

ADMINISTRATION OF THE IRRIGATION ACT.

The rapid increase in the number of ditches in operation and in applications for authorizations to construct new ditches, has resulted in a considerable increase in the volume of business in the irrigation office of the department at Calgary. The facts regarding the work of this office during the past year are fully dealt with in Mr. Dennis's annual report; and it is gratifying to note from the remarks therein contained that those interested in irrigation are evincing every readiness to comply with the provisions

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of the Irrigation Act and the regulations regarding water rights, and that this important subject is being dealt with without the large crop of disputes and litigation which has characterized the use of water in irrigation elsewhere on this continent.

The administration of the Irrigation Act during the past year has proved the necessity of a few minor amendments to permit of the smooth and expeditious working of its provisions. The proposed amendments have lately been submitted for your consideration.

IRRIGATION SURVEYS.

The irrigation surveys during the past year, which were continued under Mr. Dennis' superintendence, were on a somewhat more exhaustive scale than during the previous year. Three parties were employed under charge of Messrs. A. O. Wheeler, James Gibbons and A. C. Talbot, Dominion land surveyors. Mr. Wheeler continued the operations commenced during the previous season in the foothill country and on the eastern slope of the Rocky mountains, and, although his work was very much impeded by smoke resulting from forest fires on the west slope of the Rocky mountains and in the Selkirk range, much valuable information was obtained regarding the topography, distribution of timber, and the water supply in a district which forms the main watershed of the arid region.

Mr. Gibbons worked in the central portion of the arid region, his efforts being specially directed to obtaining some knowledge of the topography and hydrography of the northern and eastern slopes of the Cypress hills, this information being needed in connection with the administration of water rights in the Maple Creek district, where the number of ditches in operation is rapidly increasing. Mr. Gibbons also made an exploration in the latter part of the season to determine the feasibility of diverting water from the South Saskatchewan river to the Regina plains.

Mr. Talbot extended the line levels and topographical work in the district lying north of the city of Calgary and south of the Red Deer river, and also located the canal designed to divert water from the Red Deer river to the Rosebud river for the reclamation of the large areas lying north-east of that city, at present badly in need of water for domestic and stock-watering purposes. Some fifty miles of location were also added by this party to the Bow river canal, so as to prove definitely what areas the water to be supplied from this source would serve to irrigate.

The season's irrigation surveys have been made the subject of a special report, and so soon as we get the results of the work properly assembled in plans, schedules, statements, &c., the detailed report for the year will be issued.

The general report on irrigation and irrigation surveys during 1895 has lately been issued; but as it is evident from the large number of applications for it which have been received that the special edition of 1,500 copies would soon become exhausted, it is now reprinted as an appendix to this report, and will I believe be found to add greatly both to its interest and to its value.

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TIMBER, MINERAL AND GRAZING LANDS.

The revenue from the above sources for the calendar year 1896 was \$88,809.26. This does not include sales of lands containing minerals. The revenue for the year 1895 was \$92,339.82.

TIMBER.

The timber dues received amounted to \$69,646.25, being less than those received for last year by \$3,504.48. Of the revenue derived from timber, \$18,793.96 was for bonuses, ground rents, royalties, and dues on timber cut from lands in the railway belt in the province of British Columbia, being a decrease of \$4,791.96 compared with the previous year. The total revenue received from timber in Manitoba and the North-west Territories up to the 1st of January, 1897, was \$1,128,126.25, and the total revenue from timber within the railway belt in British Columbia up to the same date was \$294,450.55.

During the year 34,817,909 feet of lumber were manufactured from timber cut under license in Manitoba, the North-west Territories, and within the railway belt in the province of British Columbia. In the Winnipeg agency, which comprises Manitoba and portions of Assiniboia and Saskatchewan, the following quantities of lumber were sold:—

Canadian pine (from lake of the Woods).....	42,000,000
do (from Fort William)	2,000,000
Canadian spruce (manufactured in Manitoba).....	15,418,185
United States pine and oak	11,957,740
British Columbia products (approximately).....	10,000,000

Pine and spruce are selling in the Winnipeg market at \$19 and \$17 per thousand feet B.M. respectively.

Approximately 69,000 cords of wood were sold at Winnipeg, the price for car lots being at the rate \$4 per cord for tamarack and spruce, and \$2.50 for poplar. The price of cord-wood last year was about fifty cents higher than the previous year.

Following is a comparative statement of the average prices of lumber within the several Crown timber agencies during the past twelve years. The cost of this article to the settler has been very much reduced within that time:—

Agency.	1885.	1894.	1895.	1897.
	Per M.	Per M.	Per M.	Per M.
Winnipeg.....	\$13.50 to \$25	\$17	\$17 to \$19	\$16.45
Brandon	20 to 22	15	15	13.45
Whitemouth	11 to 12	.....	10	12
Calgary.....	25 to 30	8 to 16	8 to 16	8 to 16
Fort McLeod.....	.....	10	10 to 16	13 to 16
Lethbridge .....	.....	9 to 16	.....	.....
Prince Albert.....	30 to 45	10 to 25	8 to 25	8 to 25
Edmonton.....	25 to 30	18	13 to 16	11 to 12
British Columbia .....	.....	10	7 to 9	8 to

GRAZING AND STOCK-RAISING.

Last winter in Alberta was favourable for cattle, but the months of March and April were cold and stormy, with the result, no doubt, of a certain loss of calves, and injury to the cattle.

The shipments of beef were two months later than formerly.

A fair trade in cattle was carried on with the inhabitants of the Kootenay and other districts in British Columbia, and it is likely the development of the mining industry will increase this business.

The beef supplied to the mining districts in British Columbia has been furnished by Canadians, but mutton, poultry and dairy products have been imported from the United States.

The prices for cattle on the range varied from \$27 to \$42 per head.

There were shipped last year from the North-west Territories west of Moosomin, approximately, the following number of head of cattle :—

To Great Britain	17,935
To British Columbia	1,931

The sum of \$11,127.69 was received for grazing lands during the calendar year 1896, as compared with \$11,771.17 for 1895. This decrease in revenue was caused by some of the largest leaseholders relinquishing their leases in compliance with the request made by the government, in order that the lands embraced within the tracts might be opened for homestead entry and scheduled to railway companies as a portion of their land subsidies. All the old leases which did not provide for the withdrawal of lands for the above mentioned purposes were terminated on the 31st of December last. The majority of the persons and companies holding the old leases have accepted the offer made to them, namely, that they might purchase ten per cent. of their leaseholds. This will afford them sufficient holdings in fee simple on which to continue their operations.

The total number of ranches is increasing, but the areas leased have been much smaller during the last few years, none of the tracts exceeding 6,000 acres. As a rule the lessees are settlers who acquire limited tracts adjoining or in the neighbourhood of their homesteads. The total number of leases now in force is 236, covering an area of 257,983.39 acres.

The leases for grazing purposes of Dominion lands in Manitoba the North-west Territories, and in the railway belt in British Columbia, are for a term of twenty-one years, at a yearly rental of two cents an acre, and they provide that any portion of the land leased may be withdrawn for homestead and for railway purposes. As it was found that applications were being made for leases, for grazing purposes, of lands which proved in some instances to contain hay required for the stock of the ordinary farmer, it was thought advisable to insert a clause giving the lessee the first right upon making application to obtain a free permit each year to cut a sufficient quantity of hay for his own use, the Minister of the Interior retaining the right to issue permits to others. This ensures to the settlers who are engaged in mixed farming the hay supply which they have been accustomed to rely upon, over and above the product of their own holdings.

Department of the Interior.

A list of the lessees of grazing lands and the areas of each leasehold may be found in the annual report of the clerk in charge of the timber, mineral, and grazing lands branch.

HAY.

The dues received from the 1st of January to the 31st December last were \$6,500.07 as compared with \$8,202.75 in 1895. The total number of permits issued by the agents to cut hay was 243. Two leases were issued to cut hay on Dominion lands.

MINERALS OTHER THAN COAL.

Only one location containing minerals other than coal was sold last year. The total area of mining locations sold up to the 1st of January, 1897, was 2,470.77 acres, from which was realized the sum of \$13,450.71.

The total amount received for mining lands in the railway belt in British Columbia to the 1st of January, 1897, was \$5,536.70. No sales were made during last year. One hundred and forty-three entries were granted through the various agencies of the department, eighty-eight of them being for gold locations in the Yukon country: twenty for gold; one for gold, silver and copper; seven for gold and silver; three for gold and copper; seven for stone; one for salt, in Manitoba: eight for gold; five for gold, silver and copper; and one for silver, in the North-west Territories: two for gypsum in the railway belt in British Columbia.

COAL MINING LANDS.

The revenue from coal lands during the calendar year 1896 was only \$168.26. The total area sold up to the 1st of January was 15,211.47 acres, and the total amount received therefor was \$156,431.79, over \$10 per acre on the average.

On the 11th of November, 1895, an Order in Council was passed authorizing the issue of permits to mine coal for domestic purposes. It was found that settlers living at a distance from coal mines being worked by persons who had purchased the same either from the Crown or from other sources were taking coal from Dominion lands for their own use, and for the use of others, without permission; that they were not as a rule in a position to purchase in accordance with the provisions of the regulations; and that, as they could not obtain permission to mine coal by paying a royalty, they took the coal without authority. It was considered that it would be a hardship for the settlers if action were taken against them in the only way provided for by law, especially as many of them were willing to pay dues, and that some regulations should be adopted whereby they might obtain permission to mine on Dominion lands. The order above referred to provides that the permits issued shall be for a term of one year, and that the royalty for anthracite coal shall be twenty cents per ton, for bituminous coal fifteen cents per ton, and for lignite coal ten cents per ton. Regulations governing the size of locations, manner of staking them, time within which application shall be made to the agent after the location has been marked out, &c., were approved by an Order in Council dated the 9th of February, 1897.

Coal mining continues to be carried on in the North-west Territories with energy, especially at Anthracite and Canmore, and the output at the Lethbridge colliery was

quite up to last year's figures. A considerable quantity was also mined at Edmonton in Alberta and in the Souris district in Assiniboia.

The following prices were received for coal at Winnipeg, being a slight reduction from last year:—

American anthracite on car.....	\$9 50
Canadian anthracite (North-west).....	9 00
American soft coal on car.....	7 00
Canadian soft coal (Lethbridge).....	6 25
Canadian soft coal (Souris).....	3 50

The following statement shows the sales of coal between Rat Portage and Moose Jaw for the winter of 1895-96.

	Tons.
American anthracite.....	24,000
Canadian anthracite.....	12,000
American bituminous coal.....	800
Canadian soft coal (Lethbridge) east of Brandon.....	11,000
Canadian soft coal (Souris).....	13,000

SCHOOL LANDS.

MANITOBA.

No auction sales of school lands have been held in Manitoba since the date of my last report, as after consultation with the government of the province it was decided that in view of the low prices then ruling for grain it would not be in the interests of the school endowment fund to put any of these lands in the market, although a considerable number of applications have been made to purchase them.

The total area of the province of Manitoba is estimated to be 41,002,240 acres, exclusive of water, and as the school sections comprise about one-eighteenth of this area they may be assumed to contain approximately 2,277,900 acres.

Of this area 87,658.43 acres have been disposed of by sale at public auction from time to time. Deducting from this the acreage which has reverted to the school endowment through cancellations, and the conversions of sales into homesteads under the Act 56 Vic., cap 18, and 58-59 Vic., cap. 34, and the setting apart of other lands in lieu thereof, the acreage disposed of under sale at the present time is 86,058.60 acres, representing a capital sum of \$664,019.75, or an average price of \$7.71 per acre.

The total amount received on account of these sales to the 31st December, 1896, after deducting the amounts refunded owing to conversion of sales into homesteads and overpayments on final instalments, is \$481,204.36, \$415,364.17 being on account of principal, and \$65,840.19 for interest, leaving the balance of principal still outstanding on the date mentioned \$248,655.58.

A considerable portion of this outstanding balance is past due, but as it bears interest at 6 per cent per annum, and as only $3\frac{1}{2}$ per cent is allowed when the payments are funded, it has been the policy of the department not to press for the principal so long as the payments of interest are kept up, and in this you have expressed your concurrence.

Department of the Interior.

From the accompanying statement of the revenue and expenditure on account of Manitoba school lands for the fourteen months between the 31st October, 1895, and the 31st December, 1896, it will be seen that the balance to the credit of the Manitoba school lands fund on the latter date was \$430,984.45.

The net revenue for the same period from sales, timber, hay and grazing, after deducting for refunds, was \$56,766.02.

The amount charged against the fund for cost of management, expenses, &c., is \$970.03, or less than 2 per cent of the revenue for the same period.

The net receipts from sales only, for the year ending the 31st December, 1896, was \$50,969.93, as compared with \$41,116.01 for the previous twelve months.

NORTH-WEST TERRITORIES.

No auction sales of school lands in the Territories have been held since the date of my last report, as it was considered that the demand for these lands was not sufficient to warrant their being offered at the present time.

A few small parcels have, however, been sold in Assiniboia for railway right of way, under the provisions of the Railway Act, which enables railway companies to acquire the land necessary for this purpose on terms to be fixed by the Governor in Council, our practice in regard to school lands being to have the areas required valued, and to sell them to the company, with the approval of the Governor in Council, at the valuation.

The lands disposed of heretofore by public auction in Alberta and Assiniboia have all been paid for in full, with the exception of one sale in Assiniboia.

With a view of rendering re-adjustment easier should the present provisional districts be changed, or a new province constituted, it has been deemed advisable to keep the revenue from the school lands distinct for each district; and accordingly the receipts for each district have been funded separately, and a separate account kept in connection therewith.

The revenue and cost of administration have, so far, been almost entirely on account of Alberta and Assiniboia school lands, no sales having been held in Athabasca and Saskatchewan, the only revenue from these districts being a small sum from hay and timber in Saskatchewan.

It was, therefore, decided that the cost of administration could fairly only be charged against Alberta and Assiniboia.

You will observe from the accompanying statements that these districts have been charged with \$469.80 and \$469.78, respectively, on this account from the fourteen months from the 31st October, 1895.

The balance to the credit of the several provisional districts on the 31st December, 1896, was as follows:

Alberta.....	\$ 56,186 36
Assiniboia.....	5,642 03
Saskatchewan.....	849 99

MANITOBA School Lands Fund.

—	DR.	CR.
	\$ cts.	\$ cts.
Balance, 31st October, 1895.....		375,196 39
Sales, 14 months ending 31st December, 1896.....		54,833 30
Timber, hay and grazing, 14 months ending 31st December, 1896.....		1,932 72
Interest to 31st December, 1896.....		21,191 89
Cost of management at Ottawa, 14 months to 31st December, 1896.....	939 60	
Expenses, being examinations, valuations, auctioneer's fees, printing, advertising, &c.....	30 43	
Interest paid to Manitoba government to 31st December, 1896.....	21,199 82	
Balance, 31st December, 1896.....	430,984 45	
	453,154 30	453,154 30

ASSINIBOIA School Lands Fund.

—	DR.	CR.
	\$ cts.	\$ cts.
Balance, 31st October, 1895.....		5,494 89
Sales, 14 months ending 31st December, 1896.....		32 31
Timber, hay and grazing, 14 months ending 31st December, 1896.....		294 29
Interest to 31st December, 1896.....		290 32
Cost of management at Ottawa, 14 months ending 31st December, 1896.....	469 78	
Balance, 31st December, 1896.....	5,642 03	
	6,111 81	6,111 81

ALBERTA School Lands Fund.

—	DR.	CR.
	\$ cts.	\$ cts.
Balance, 31st October, 1895.....		53,207 14
Hay, timber and grazing, 14 months ending 31st December, 1896.....		604 39
Interest to 31st December, 1896.....		2,844 63
Cost of management at Ottawa, 14 months ending 31st December, 1896.....	469 80	
Balance, 31st December, 1896.....	56,186 36	
	56,656 16	56,656 16

SASKATCHEWAN School Lands Fund.

—	DR.	CR.
	\$ cts.	\$ cts.
Balance, 31st October, 1895.....		751 36
Hay and timber, 14 months ending 31st December, 1896.....		58 35
Interest to 31st December, 1896.....		40 28
Balance, 31st December, 1896.....	849 99	
	849 99	849 99

REPORT OF THE DEPUTY MINISTER.

STATEMENT showing Receipts on account of Dominion Lands from 1st July, 1872, to 30th June, 1896.

Fiscal Year.	Homestead Fees.	Pre-emption Fees.	Improvements.	SALES.		Map sales, Office and Registration Fees, &c.	Surveyors' Examination Fees.	Miscellaneous, including Trust.	Inspection, Cancellation and Sundry Fees.	Timber Dues.	GRAZING LANDS.		HAY PERMITS, MINING FEES, STONE QUARRIES, &c.		Rocky Moun- tains Park of Canada.	COLONIZATION LANDS.		Gross Revenue.	Refunds.	Net Revenue.
				Cash.	Scrip.						Cash.	Scrip. &c.	Cash.	Scrip.		Cash.	Scrip.			
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1872-73.	6,960 00			19,170 20						109 25								26,239 45		26,239 45
1873-74.	7,310 00			19,834 75				125 50		2,710 55								29,980 80		29,980 80
1874-75.	11,510 00			13,666 90						2,335 25								27,641 15		27,641 15
1875-76.	4,680 00			3,478 94	320 00					387 00								8,865 94		8,865 94
1876-77.	2,250 00			1,085 86	136,955 16	4 00				320 00								140,755 02		140,755 02
1877-78.	14,540 00			2,794 86	120,159 54		180 00			1,620 00								139,584 40		139,584 40
1878-79.	17,690 00			4,998 39	210,904 84	81 00	310 00	13 70		410 00								234,732 93		234,732 93
1879-80.	41,255 00	10,241 43		45,708 97	81,685 86	245 40	580 00	183 25	1,780 00	25,121 46								206,801 37	4,636 08	202,165 29
1880-81.	20,450 00	10,801 75	269 00	71,170 17	70,828 30	985 40	420 00	37 58		32,028 34						354,036 17		206,990 54	5,038 22	201,952 32
1881-82.	54,155 00	39,843 90	1,758 00	1,240,328 27	50,590 84	3,036 45	890 00	58 10		58,753 14	2,245 00			40 00				1,805,734 87	10,687 55	1,795,047 32
1882-83.	73,015 00	54,725 00	7,114 91	516,092 21	33,638 40	3,109 50	890 00	501 77		90,066 46	22,844 43			913 91				1,051,403 60	8,746 05	1,042,657 55
1883-84.	41,580 00	28,810 00	2,596 11	424,863 36	40,919 67	1,289 55	530 00	45,766 53	1,713 45	147,983 10	11,370 60			640 90				1,001,776 67	9,220 50	992,556 17
1884-85.	25,645 00	17,100 00	2,328 75	199,275 32	45,875 60	1,621 82	370 00	50,068 57	2,685 00	87,474 99	17,089 75			815 63				451,564 65	12,070 85	439,493 80
1885-86.	26,110 00	14,371 00	1,101 50	76,140 41	214,657 97	1,339 34	360 00	20,070 00	5,025 00	64,820 31	29,562 51	3,131 08		1,284 83				457,973 95	63,389 12	394,584 83
1886-87.	19,614 00	6,887 93	1,971 55	48,175 76	337,640 19	1,171 39	240 00	44,561 00	7,778 40	94,964 55	5,922 47	23,023 28		1,570 40				588,532 80	19,543 16	568,989 64
1887-88.	23,691 00	4,830 00	1,918 35	52,238 36	313,522 67	1,660 75	240 00	20,591 41	12,078 53	90,290 00	2,297 69	16,802 63		80 00				569,986 68	6,277 66	563,709 02
1888-89.	39,460 00	10,550 00	4,128 48	57,513 16	318,238 57	1,410 16	220 00	10,389 57	20,402 50	84,642 95	1,365 57	9,021 63		80 00				594,088 04	5,226 23	588,861 81
1889-90.	35,920 00	8,580 00	3,250 54	54,896 85	228,744 47	2,099 07	190 00	3,316 23	20,232 50	102,902 71	3,079 55	16,193 77		160 00				462,536 26	8,209 74	454,326 52
1890-91.	29,164 10		6,302 61	91,664 98	171,425 14	1,854 78	88 00	7,951 05	14,712 50	106,461 35	3,726 80	17,222 60						460,990 76	7,195 27	453,795 49
1891-92.	46,994 00		6,472 31	108,901 01	97,822 41	2,147 31	135 00	29,898 49	23,104 50	105,865 24	6,380 80	11,542 39						452,151 08	15,291 39	436,859 69
1892-93.	37,689 74		7,113 50	93,671 67	77,231 18	975 20	82 00	18,509 35	22,014 00	81,290 51	5,740 79	7,687 86						392,324 43	18,314 97	374,009 46
1893-94.	36,462 26		3,497 76	53,254 71	27,840 96	973 11	40 00	13,457 09	11,097 00	74,079 20	5,353 72	8,628 00						250,069 12	4,544 01	245,525 11
1894-95.	29,664 88		3,567 90	37,293 71	23,269 62	695 99		6,271 77	6,566 90	61,923 47	7,071 86	6,255 90						202,983 10	4,365 99	198,617 11
1895-96.	18,278 00		3,163 15	46,373 98	46,929 65	610 78	50 00	21,679 31	6,810 50									227,694 93	8,368 79	219,326 14
	664,087 98	206,741 01	56,554 42	3,282,592 80	2,649,201 04	25,440 00	5,815 00	293,550 27	156,740 78	1,381,586 57	138,144 31	158,996 81	58,525 65	320 00	25,184 32	857,461 08	30,460 50	9,991,402 54	211,125 58	9,780,276 96

Department of the Interior.

IMMIGRATION.

The work of the immigration branch at headquarters is referred to in the report of the clerk in charge, which forms the preface of part IV.

The regular agents of the immigration branch of our service have been greatly assisted in their work by various volunteers. These, for the most part, have been gentlemen who have visited our country either as delegates under the auspices of the government and the transportation companies, or on their own account, and it is gratifying to observe the favourable and enduring impression which Canada seems to have made upon them, and their willingness to say a good word for it on all possible occasions. I may refer particularly in this connection to Mr. William Weeks, of Chippenham, who was one of the tenant farmer delegates in 1893, and who since his return to England has been untiring in his efforts on our behalf. He has been instrumental in sending out 80 men and boys, who have settled west of Winnipeg, and who are all satisfied and write letters home to that effect; and it appears that he is preparing to send out this spring about 80 or 100 more men and boys, from 16 to 30 years of age, besides two or three married couples.

Early in the month of June we had the pleasure of seeing Messrs. J. and Hedley Smith, who made a tour of Canada, and on their return to the old country published an account of their experiences in the *Haddingtonshire Courier*, which, reprinted in pamphlet form, has proved a most valuable contribution to our immigration literature. Mr. J. Smith is factor to Lady Seafeld, so far as relates to her Strathspey, Birnie and Rothes estates, and Mr. Hedley Smith is factor to the Right Hon. Arthur J. Balfour, First Lord of the Treasury.

The Rev. Alexander Grant, the well-known Baptist minister of Winnipeg, paid a visit to England early in the year, and he very kindly and patriotically delivered a series of lectures in England and Scotland, which were an excellent advertisement for the Canadian North-west.

Your predecessor, the Hon. T. Mayne Daly, also visited Great Britain, and his report forms an appendix to part IV. of this volume.

The outcome of the visit of Prof. Josef Oleskow to this country in 1895 has been important. Prof. Oleskow occupies the chair of agriculture in the University of Lemberg, in the Austrian province of Galicia, a province which I understand is very thickly populated with people of the small farmer class. The professor was accompanied by one of these small farmers, and their impressions of Canada were so favourable that since their return to Galicia the professor has been instrumental in sending out a considerable number of farmers who have formed colonies in the Edmonton district in the North-west Territories, and in the neighbourhoods of lake Dauphin and Dominion City in the province of Manitoba. The people sent out under Prof. Oleskow's auspices are for the most part desirable settlers and doing well; but some other parties of Galician immigrants have arrived, who although apparently frugal and industrious are miserably poor, and they as you are aware have had to be helped by the department. It is expected, however, that it will not be necessary to continue this help, as the people show a disposition to settle down to work and become independent.

It is to be anticipated that the new regulations relating to the cattle quarantine will have a beneficial effect on our immigration business in the United States, as the old

regulations were undoubtedly a stumbling block to many who contemplated removing to our North-west from the northern and western states, and who desired to take their cattle with them.

The colony of Scandinavians from the United States at Bella Coola in the province of British Columbia appears from all accounts to be making steady progress, and no doubt the experiment will prove a permanent success.

One of the important events in the early part of the year 1896 was the holding of a great immigration convention at Winnipeg, which was attended by representatives from all parts of Western Canada between Port Arthur and the Pacific coast. One result of this convention was the formation of the western immigration association, whose work and influence I have no doubt will greatly aid the operations of the Immigration bureau.

An unpleasant incident of the year was the emigration of a number of residents of the province of Quebec to Brazil. The Brazilian agents who promoted this movement worked with such energy and success, and at the same time with such secrecy, that they were able to influence nearly a thousand people in the manner they desired before it was possible for the department to take any effective steps towards putting a stop to the movement. In the end, however, we were able to turn aside about six hundred of the people from their purpose, and the number who actually embarked for Brazil was thus reduced to about four hundred. The disastrous results of the movement are well known. The people were all disappointed in their expectations, and many of them have had to be brought back in a dire state of poverty and distress, at the expense of the government of Canada.

CROPS IN MANITOBA AND NORTH-WEST TERRITORIES.

Notwithstanding the unfavourable weather of last season, particularly during seeding-time, the results of the year's work in Manitoba cannot be regarded as otherwise than satisfactory. The total yield of wheat is reported by the December bulletin of the Department of Agriculture of Manitoba as 14,371,806 bushels. The yield of oats was, according to the same authority, 12,502,318 bushels; of barley 3,171,747 bushels; of flax, rye and pease 334,781 bushels, or a total grain crop of 30,045,871 bushels.

The quantity of potatoes and roots grown was nearly four million bushels. Although this is scarcely one-half of the enormous crop of 1895, it is a fair average; and the higher prices realized, taken together with the lessened cost of harvesting, are said to have rendered last year's operations fully as remunerative as those of the preceding year. My information is that of the total product of wheat only 10 per cent. was affected by frost and only 5 per cent rejected.

It may not be out of place to give here the figures inserted in last year's report, compiled from the Manitoba government crop statistics and brought down to date, regarding the yield of wheat, oats and barley in the province during the past fourteen years.

Department of the Interior.

WHEAT.

Year	Acreage.	Yield per acre.	Total Yield.
1883	260,842	21·80	5,686,355
1884	307,020	20·11	6,174,182
1885	357,013	20·80	7,429,440
1886	384,441	15·33	5,893,480
1887	432,134	27·7	12,351,724
1888*			
1889	623,245	12·4	7,201,519
1890	746,058	19·65	14,665,769
1891	916,664	25·3	23,191,599
1892	875,990	16·5	14,453,835
1893	1,003,640	15·56	15,615,923
1894	1,010,186	17·	17,172,883
1895	1,140,276	27·86	31,775,038
1896	999,598	14·33	14,371,806

OATS.

1883	215,431	44·	9,478,964
1884	133,044	30·55	4,064,494
1885	157,026	40·53	6,364,263
1886	161,030	25·15	4,048,904
1887	155,176	46·2	7,265,237
1888*			
1889	218,744	16·8	3,415,104
1890	235,534	40·2	9,513,443
1891	305,644	48·29	14,762,605
1892	332,974	35·	11,654,090
1893	388,529	25·28	9,823,935
1894	413,686	28·8	11,907,854
1895	482,658	46·73	22,555,733
1896	442,445	28·25	12,502,318

BARLEY.

1883	60,281	30·	1,898,430
1884	40,936	32·83	1,363,928
1885	52,189	29·	1,113,481
1886	69,565	18·70	1,300,865
1887	56,110	34·31	1,925,231
1888*			
1889	80,238	13·1	1,051,551
1890	66,035	31·33	2,069,415
1891	89,828	35·6	3,197,876
1892	97,644	29·	2,831,676
1893	114,762	22·11	2,547,653
1894	119,528	25·87	2,981,716
1895	153,839	36·69	5,645,036
1896	127,885	24·8	3,171,747

* No statistics collected in 1888.

As to the Territories, reliable authorities fix the following as the approximate results of the year's work :

	Bushels.
Wheat.....	1,500,000
Oats.....	1,250,000
Barley.....	200,000
Total	2,950,000

LIVE STOCK.

The number of beef cattle exported from Manitoba is given at 13,833 ; the number of hogs shipped to Winnipeg and other points at 25,384 ; and the poultry disposed of by farmers at something over 200,000 head.

The exports from both Manitoba and the Territories, including some shipments from Alberta to points in British Columbia, are reported to be as follows :

Horses.....	626
Cattle.....	34,867
Sheep.....	9,927
Hogs.....	3,192
Total.....	48,612

An accurate index of the general feeling as to the prospects for the future is to be found in the fact that a very much larger area has been prepared for crop than in any previous year. This may be accounted for partly by the rise in prices, and partly no doubt by the stimulating influence of the local demand which is springing up in the mining districts of North-western Ontario and British Columbia.

NORTH-WEST TERRITORIES.

Part V. of this blue book is the annual report of His Honour the Lieutenant-Governor of the North-west Territories. In the opening sentence his honour states that "a bountiful harvest of wheat, barley, oats and root crops, together with enhanced prices of cereals, and increased demand for cattle at remunerative figures, inspired noticeable hope and contentment throughout the Territories during the latter portion of the year." In spite of severe snow storms, which occasioned considerable loss of stock in some localities, the cattle trade, in consequence of this increased demand, was on the whole satisfactory, a ready market being found, not only in the east, but also in British Columbia, and the outlook in this branch of business is stated to be most encouraging.

Reference is made to a number of creameries which have been established at various points in the Territories, particularly Moosejaw, Indian Head, Prince Albert and Regina. The one at Moosejaw, since its establishment in May, 1895, has produced 70,000 pounds of butter, at an average price of 19½ cents at the railway station. A great future seems to be in store for this industry.

The various matters relating to the administration of the Territories are referred to under their respective headings in his honour's report, which also includes the usual tabulated statements.

Department of the Interior.

DISTRICT OF KEEWATIN.

Part VI. is the report of His Honour Lieutenant-Governor Patterson on matters relating to the district of Keewatin.

With the exception of a suspected case of infanticide, and one of petty larceny, no crime has been reported as occurring within the district during the year. This remarkable state of affairs, and the respect for law and authority among an aboriginal people scattered over so vast an extent of territory, his honour attributes chiefly to the prohibition of the traffic in intoxicating liquors, and to the self-denying zeal and devotion of the missionaries of the various Christian denominations, as well as to the wisdom and prudence of the officers of the Hudson's Bay Company.

No epidemic was reported in the district, from which it is inferred that the food supply of the Indians, often precarious—consisting as it does of deer and fur-bearing animals—was abundant during the year.

His honour's predecessor, the late Sir John Schultz, during his term of office, called the attention of the department to the illegal traffic carried on by American whalers who were in the habit of wintering at Marble island in Hudson's bay. These people introduced intoxicating liquors among the Indians, and traded with them, giving them in exchange for valuable furs goods which they brought into the country free of customs duty. No recurrence of this offence has been reported during the past year.

ROCKY MOUNTAINS PARK.

Part VII. is the report of the superintendent of the Rocky Mountains Park. No new roads were opened within the park, or old ones extended, during the year, the operations under this head being confined entirely to effecting repairs which length of time and usage had rendered necessary.

The spring freshets were not of more than ordinary volume, and no trouble was experienced from this source; nor were there any forest fires in the park or its immediate neighbourhood.

Although there was a falling off of visitors—the number registering at the Cave and Basin being 2,410 as compared with 2,699 for 1895—the superintendent reports that the business of the Canadian Pacific hotel was better than usual, which would indicate either that the visitors were of a wealthier class than in previous years, or that they remained for a longer time.

RAILWAY CONSTRUCTION.

During the year 100·74 miles of railway were constructed in Manitoba by the Lake Manitoba Railway and Canal Company, and in British Columbia 68·9 miles were constructed.

The mileage of each railway up to the 31st December, 1896, is as follows:—

MANITOBA AND NORTH-WEST TERRITORIES.

	Miles.
Main Line Canadian Pacific Railway, from eastern boundary of Manitoba $1\frac{1}{2}$ miles west of Ingolf, to Hector, eastern boundary of British Columbia.	1,065·50
Emerson Branch—Winnipeg junction to Emerson.	64·80
Selkirk Branch—Winnipeg to West Selkirk.	22·50
Stonewall Branch—Air line junction to Stonewall.	18·20
Gretna Branch—Rosenfeldt to Gretna.	14·
Pembina Mountain Branch—Winnipeg junction to Manitou	101·10
Souris Branch and extensions.	411·50
Manitoba South-western Colonization Railway.	215·20
Alberta Railway—Dunmore to Lethbridge.	109·50
Alberta Railway—Lethbridge to Coutts on International Boundary.	64·62
Calgary and Edmonton Railway.	295·07
Great North-west Central Railway.	50·93
Manitoba and North-western Railway.	234·50
Saskatchewan and Western Railway.	15·47
Northern Pacific and Manitoba.	265·12
Qu'Appelle Long Lake and Saskatchewan Railway.	253·96
Lake Manitoba Railway and Canal Company.	100·74
Winnipeg Great Northern Railway.	40·
Total.	3,342·71

BRITISH COLUMBIA.

Canadian Pacific Railway Main Line—Hector to Vancouver.	515·90
Branch Lines—New Westminster.	8·20
do Vancouver to Coal Harbour.	1·20
do Mission junction to Mission.	10·10
do Three Forks to Sandon.	4·20
do Revelstoke to Arrow Lake.	27·80
Columbia and Kootenay Railway.	28·50
Nakusp and Slocan Railway.	36·90
Shuswap and Okanagan Railway.	51·
Esquimalt and Nanaimo Railway.	78·
Kaslo and Slocan Railway.	31·80
Nelson and Fort Sheppard.	59·40
Victoria and Sydney.	16·26
	869·26

Grand total of mileage of railways constructed in Manitoba, the North-west Territories and British Columbia. 4,211·97

I have the honour to be, sir,

Your obedient servant,

A. M. BURGESS,

Deputy Minister of the Interior.

Department of the Interior.

PART I

DOMINION LANDS

Department of the Interior.

No. 1.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE COMMISSIONER OF DOMINION LANDS,
WINNIPEG, MAN., 19th January, 1897.

To the Honourable CLIFFORD SIFTON,
Minister of the Interior, Ottawa.

SIR,—I have the honour to submit for your information the following report, with the accompanying statements, regarding the work of my office and matters of interest connected therewith, for the fourteen months ending the 31st ultimo, which have elapsed since my last report. I also transmit the report of Mr. Pearce, Superintendent of Mines.

Statistical statements, setting forth various details of the work and furnishing other information in tabulated form, have been prepared, and may be referred to under the following headings:—

1. Work performed in my own office.
2. Work of the homestead inspectors.
3. Return of immigrant arrivals and departures at the Immigration Hall, Winnipeg, under my charge.
4. Record of immigrants accommodated at Government immigration buildings in Manitoba and the North-west territories.
5. Labour demand and supply.
6. Statements as to settlers' effects, values, etc.

I have with regret to record the death, during the past year, of two old and valuable officers of the department, that of Mr. W. H. Stevenson, late local agent at Regina, and of Mr. John Allison, homestead inspector. Mr. Stevenson, who was referred to in my last report as having been superannuated on account of failing health, died at Morden, Manitoba, early in April last. Mr. Allison died at Winnipeg in November; he had been in the service of the department for over eleven years, during the last ten of which he occupied the position of homestead inspector. His duties were always performed in a prompt and satisfactory manner, and his personal character was such as to gain the esteem of all with whom he came in contact.

SUB-AGENCIES.

Offices for the transaction of general land business were opened last spring at Maple Creek, Assiniboia, and Beaver Lake, Alberta, for the convenience of settlers. The work of these offices, however, did not prove large, and in October it was deemed advisable to close them and return the records to the local offices at Regina and Edmonton, respectively.

STATEMENT NO. 1.

It will be observed by the statement of work performed in my office that while there has been a slight increase in some of the branches, generally speaking, the figures are about the same as the previous year; during both these years the number of new settlers who have arrived in the country and taken up land is comparatively small, and consequently the volume of work performed will give a fair idea of what may be looked

upon as the ordinary requirements of the office in connection with the administration of this branch of the department under existing circumstances, and is about an average year as compared with the last ten years. At the same time, the expenditure incurred for office maintenance is considerably under the average, the cost during the past year being less than that of any of the ten years. This is largely due to a reduction in the staff, which has been rendered possible by means that have been adopted for curtailing the work without impairing its efficiency.

Statement No. 2.—Sets forth the details of the work performed by the homestead inspectors, and while the number of reports made is not so large as during some previous years, the number of applications for patents received is larger than in any former year, and the evidence required in connection with these applications is taken in a large majority of the cases by the inspectors. The system which was adopted some years ago of enabling settlers to make their applications for patent before these officials on payment of the small fee of \$5, thus avoiding the expense (in many instances a considerable item) of visiting the office of the local agent of Dominion lands with their witnesses, has proved a great boon, and has very generally been taken advantage of. During the period covered by this report the amount collected for fees of this description is \$5,650, which, together with fees collected for the inspectors' services in examining and reporting upon lands that have been under process of cancellation, has largely reduced the cost of maintaining this important service.

The remainder of the statements attached to this report refer mainly to matters of immigration, which will be dealt with later on under a special heading.

AGENTS' RETURNS.

As has already been stated, the number of new settlers taking up lands has fallen off considerably during the past two years; this has been due, largely, to the low price of grain, and the depression which has been world-wide in extent. The immigrant arrivals from Great Britain have been practically nil, and those from the continent very limited in number. The majority of the new homesteaders have come in from the United States. A comparison of the entries granted at the several local agencies would indicate that during the past year the greater number have located in the Dauphin district, a short description of which will be given further on; while the Winnipeg, Souris, Little Saskatchewan and Edmonton districts come next in order and have held their own as compared with the previous year or two. During the past few months quite a number of Austrian (Ruthenian) settlers have arrived in the country; these people are, with some unfortunate exceptions, in possession of limited means, and while they have in some instances been handicapped considerably by their arrival here at an unfavourable season of the year, they appear to be physically well adapted to the country, and it is hoped will prove desirable settlers. A number of the earlier arrivals have located in south-eastern Manitoba, where it is expected they will be joined by others of the same nationality, and the indications point to a successful colony. Some have gone on to the Edmonton district where a similar colony was established two years ago.

RAILWAY EXTENSION.

During the past season a line of railway has been constructed from a point on the Manitoba and North-western near Gladstone to the Dauphin district, and it has been so far completed as to admit of being operated for a distance of some eighty-four miles, reaching the vicinity where the Dauphin post office and land office are situated. These offices have been, or are about being removed to the present terminus of the railway. The construction of this road will prove a most important factor in the settlement of this district, and be of the greatest benefit to those already located there.

The Dauphin country is most admirably adapted to mixed farming, indeed, the inducements to go there have proved so inviting that it has been largely settled notwithstanding the drawbacks incident to the distance it has hitherto been from railway communication. Now that these have been overcome there is not the slightest doubt

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but that it will become one of the most populous and thriving portions of the province. The district embraces an area of, say, 3,000 square miles, or 1,920,000 acres, and contains lands suitable for all kinds of agricultural pursuits, mixed farming and ranching; lakes stocked with fish; forests of tamarac, spruce and poplar; deposits of salt and gypsum, as well as indications of petroleum; while as a sporting-ground for huntsmen it is probably unexcelled in the province. The country is well drained and watered by the Turtle, Ochre, Vermillion, Wilson, Valley, Fork, Pine and Duck rivers, as well as numerous tributary streams. Wood for all purposes, including fuel, is abundant, and in many localities the peavine, the most nutritive of any of the wild prairie grasses, grows luxuriantly; the water is clear and cool, and cattle thrive to a wonderful extent, so that the ranching industry has been most successful. The crop yields have also been very encouraging; it is claimed that a fair average for wheat might be placed at some 23 to 25 bushels to the acre, while cases have been known where it has gone over 40 bushels to the acre. Oats range from 50 to 75 bushels; barley from 25 to 35 bushels. Tender vegetables such as tomatoes, squash and water-melons are said to ripen in the open air. Schools and churches have been established wherever practicable and, taken altogether, there are few parts of the country that present greater inducements to the intending settler.

THE COUNTRY GENERALLY.

Reports from every direction go to show that, generally speaking, this great country of Western Canada was never in a more healthy state than at present, nor its people in a more hopeful and prosperous condition. While crop returns for the past season would indicate that the average yield of grain has not been so heavy, nor the harvest so abundant as last year, the wheat crop has been of a high grade, No. 1 or No. 2 hard, and the cost of harvesting and threshing has not exceeded one half of saving last year's crop. Moreover, the price received by farmers for this year's crop has realized to them as large returns as they received from the immense crop of last season. The oats and barley have not been so favourable, in fact rather disappointing, in so far as while the growing fields gave promise of an unusually heavy yield, the grain was prevented, by rust or blight, from maturing properly.

CROP REPORTS.

I regret it has been found impossible to obtain figures as to the crop yield in the territories. In some places the results were most satisfactory, while in others, notably in some parts of the Edmonton district, and along the line of the Calgary and Edmonton railway, the reports are not so favourable.

In the Prince Albert district the wheat on summer fallow and new land, and indeed in every case where the farming was well done, is reported as extra heavy, and the sample No. 1, with no damage from frost. Oats were good, but late, and there was considerable damage by frost; barley a good crop; garden and field roots very fine; there was also a plentiful supply of hay. There has been in this district a steady increase in cattle-raising with a decided improvement in the quality. Horses are being imported from the West, cattle being shipped in exchange, and attention is called to the necessity of farmers raising horses of the right kind. The lumber industry is progressing; two good mills have been in operation during the season and have cut about 3,000,000 feet b.m.; these mills have provided employment for a large number of men, both winter and summer. The fisheries on the lakes north of Prince Albert have also employed men and horses; a partial report shows that some 350,000 lbs. of excellent white-fish and lake trout have been shipped to United States markets.

In the Regina district the grain is stated to be of exceptional quality, and the harvest an abundant one. The shipment of cattle to European markets has increased to a remarkable extent, and this industry is now one of the most lucrative in the territories.

The dairying interest has received a fresh impetus, and the prices realized for butter and cheese are reported greatly in advance of last year. The sum of \$15,000 was placed

in the supplementary estimates last session and voted by Parliament for the establishment and maintenance of creameries in the North-west territories, and the results already have been most beneficial to farmers interested in this direction.

The yield of grain in the Edmonton district is estimated as follows :—

Wheat.....	150,000 bushels.
Oats.....	200,000 “
Barley.....	50,000 “

The area of land sown to crop in this district was less than in 1895, but the sample shipped already is said to be greatly superior to last year's crop. The potato crop was excellent both as to quantity and quality. Cattle have done well and there has been a normal increase. It is estimated that there are in the district about 24,000 head of cattle, 16,000 horses, 12,000 hogs and 3,000 sheep.

The crop in central Alberta, the Calgary district, is reported to have been very good and the greater portion of it successfully harvested.

Stock-raising is one of the chief industries of this district, and those engaged in it are obtaining very satisfactory results. During the past year the following neat cattle were shipped :—

To Great Britain.....	17,935
To British Columbia.....	1,931

BRITISH COLUMBIA.

The grain crop in British Columbia is reported to have turned out better than was expected. I have not been able to obtain figures as to the total yield, but the following averages per acre are given :—

Wheat.....	30 to 40 bushels.
Oats.....	80 “
Barley.....	80 “
Pease.....	40 to 50 “

Potatoes and roots only yielded half a crop, and fruit crop was light.

Creameries and cheese factories are increasing in number, but it is claimed they are still unable to supply the demand. Stock of all descriptions is steadily on the increase.

PROVINCE OF MANITOBA.

The following interesting statistics are taken from the *Crop Bulletin*, issued by the Provincial Department of Agriculture and Immigration, dated the 14th December, 1896.

	Area under crop.	Average yield per acre.	Total yield.
	Acres.	Bushels.	Bushels.
Wheat.....	999,598	14.33	14,371,806
Oats.....	442,445	28.25	12,502,318
Barley.....	127,885	24.8	3,171,747
Flax.....			259,143
Rye.....			52,255
Pease.....			23,383
Total grain crop.....			30,045,871
Potatoes.....	12,260	160	1,962,490
Roots.....	6,715	282	1,898,805
Total potatoes and roots.....			3,861,295

Department of the Interior.

STOCK IN THE PROVINCE.

Horses	95,140
Cattle.	210,507
Sheep	33,812
Hogs.....	72,562

DAIRY PRODUCTS.

Butter disposed of by farmers during the year is placed at 1,469,025 lbs., the average price realized being 11½ cents per lb. Creamery butter, manufactured at factories, is estimated at 776,000 lbs. Total butter product 2,245,025 lbs. The return from the cheese factories give an output of 986,000 lbs.

It is reported that the area now ready for seeding next season totals up 969,130 acres, which is much in excess of the previous year.

PRAIRIE FIRES.

While there were a number of disastrous fires, and fears were entertained that they would be very destructive on account of the luxuriant growth of grass, the estimated loss in the province is placed at \$50,000, only a little more than one-third the amount given for last year.

EXPORT OF STOCK.

The following figures showing the number of horses, cattle, sheep, etc., shipped by the Canadian Pacific railway company, during the past year, will be of interest.

Horses.....	291
Cattle.....	36,955
Sheep.....	15,390
Hogs.....	1,324

I also give the following statistics with regard to cattle, dairy products, etc., carried over the Manitoba and North-western railway:—

Cattle.....	9,432
Sheep.....	471
Hogs.....	3,230
Butter.....	759,520 lbs.
Cheese.....	94,350 "

TOBACCO CULTURE.

In my last report I mentioned having distributed tobacco seed which had been procured from Havana for purposes of experiment in this country. Owing to the lateness of the distribution, and the backwardness of the season, it was not altogether a success, although there was every reason to believe that the leaf with proper precautions in the earlier stages could be grown to advantage. A fresh supply of seed was obtained, but again somewhat late in the year. A sample of the leaf grown south-east of Regina was, however, submitted to Mr. Johnston R. Gordon, of New York, a dealer in tobacco, and it is gratifying to read his opinion on it. "The leaves are very fine grained and very silky, and it is a great pity I did not send you the seed earlier. There has been an exceptional crop of tobacco grown in Connecticut this season, but no leaves which I have seen excel those sent me in colour and quality. I would heartily advise those growers who made the attempt this year to try it again another season." I have a sufficient supply of seed left over from last year for our present needs and a distribution will be made in good time to admit of the seedlings being raised under glass ready for planting out at the earliest opportunity.

SALES OF LAND.

Land sales by the Canadian Pacific railway company and other land corporations have been large, considerably in excess of former years, the area disposed of by the above mentioned company alone being nearly 100,000 acres.

MINING.

The development of mines, principally gold, has been receiving great attention both in the Kootenay district of British Columbia, in Manitoba, and in the Lake of the Woods country to the east of that province. There can be no doubt as to the richness of the deposits, and much has been done in the way of the formation of companies, the issue of stock, etc., for working these mines. The new towns of Rossland and Trail, in the Kootenay district, the former with a population already of from 5,000 to 6,000, and the latter probably upwards of 1,500, bear evidence of the progress being made. It is claimed that the rapid growth of these towns, although of course to a certain extent due to the excitement which is always created by the opening of gold mines, is not of a boom nature, and that their stability and progress is assured.

SEED GRAIN.

Last spring it was decided, in consequence of representations as to loss by failure of crop made by settlers in the Prince Albert district and in the neighbourhood along the line of the Calgary and Edmonton railway, to grant them a seed grain advance, limiting the quantity supplied to any one settler to 100 bushels, and taking as security from each obligant a bond with two sureties, which provides that the advance is a charge against any Dominion lands for which any of the obligants now holds, or may hereafter obtain, homestead entry.

The duty of making distribution and deciding as to the persons entitled to share in it was entrusted to the North-west mounted police force, who have detachments stationed at all the principal points of distribution. Members of the staff of this department were detailed to assist in making out and obtaining signatures to the bonds given by the settlers, which on completion of the distribution were forwarded here for registration. Payment for the grain was made through this office on the certificate of the commissioner of the police force, by whom the purchases were made, the expenditure being as follows:—

Cost of 72,256 bushels grain	\$21,776 50
“ sacks	233 00
Freight paid C.P.R. on grain	3,559 82
	<hr/>
	\$25,569 32

Expenses of management:—

Railway fares and travelling expenses	\$1,590 03
Telegrams	216 34
Allowance to police for work overtime	249 97
Postage, etc.	191 43
Advertising	58 80
	<hr/>
	2,306 57
Flour and provisions supplied for relief of destitute immigrants in Alberta, for which no securities were taken .	3,360 21
	<hr/>
	\$31,236 10

Department of the Interior.

Securities were taken from the settlers for the approximate cost of the grain, after adding the cost of freighting to its destination, and securities have been received for—

	Wheat.	Oats.	Barley.	Potatoes.	Total.	Value.
	Bush.	Bush.	Bush.	Bush.	Bush.	\$ cts.
No. 1592	15,821	32,134	11,832	131	59,918	22,484 09
Sales for cash.	2,783	2,285	3,069	5	8,142	2,950 67
Sale to police not yet paid for.		4,281			4,281	1,019 11
	18,604	38,700	14,901	136	72,341	\$26,453 87

This statement affords the best evidence of the accurate and efficient performance of this work by the police force, as securities or cash have been received for every bushel of grain purchased. The securities were made out with much care, and comparatively few errors occurred in describing the lands affected by these obligations.

Advances of seed grain have been made during the past ten years in various districts of the North-west territories, as follows :—

Year.	Number of advances.	Total bushels supplied.	Cost of grain.
1886	345	11,406	\$10,887 00
1887	2,282	119,698	77,141 60
1890	1,460	39,455	29,999 95
1894	1,495	93,992	49,261 52
1895	3,107	103,424	53,419 24
1896	1,592	59,918	22,484 09
	10,281	337,893	\$243,193 40

According to the records of this office, the advances still outstanding are as follows :—

Year.	Number of outstanding advances.	Secured by	
1886-87 and 88.	407	lien	\$14,019 53
1886	249	bond	9,452 60
1890	486	lien	9,490 44
1890	370	bond	7,932 64
1894	958	lien	28,535 75
1894	453	bond	17,370 59
1895	2,734	bond	48,320 75
1896	1,555	bond	21,960 80
Total.	7,210		\$157,033 10

The advances in the three last mentioned years were largely made in newly settled districts where patents had not been earned by the farmers who received seed, and in such cases the delivery of certificate of recommendation being withheld until the advance is paid, makes this portion of the liability to the Government fairly secure.

The advances of 1887 and 1890 are, however, now long overdue, and, so far as concerns those for which a bond is held, the department has no security other than the personal obligation of the three obligants.

In a number of cases it has been learned that these obligants are dead or have left the country, and I would recommend that steps be taken either to obtain payment or such collateral security as will make ultimate re-payment reasonably secure.

There are also 795 advances to settlers in Manitoba on grasshopper relief mortgages of 1876, the principal amount due being \$34,291.31, which bears interest at 6 p.c. from 1st January, 1878.

By statute of the legislature of Manitoba these are a statutory mortgage on the lands affected by registration in the office of the Dominion lands agent here, and the rights of the Government are protected as far as possible by lodging a caveat with the Land Titles offices forbidding transactions with the lands affected by these mortgages, except subject to the Government's claim. It seems desirable that an attempt should be made to realize on these long-standing securities at an early date.

TIMBER RESERVATIONS.

The importance of preserving our wooded lands, especially in the province of Manitoba, has been referred to in previous reports. This subject I consider to be one of the greatest importance, looking to the future welfare of the country. Although no final and definite action has yet been taken, the matter has not been lost sight of, and arrangements are being perfected for the setting apart of permanent timber reservations, which I trust will be completed at an early date.

FOREST FIRES AND GAME POISONING.

A year or two ago I called attention to the great necessity of providing some effective means for ascertaining promptly the origin of bush and prairie fires and of enforcing adequate penalties against persons found guilty of starting them. This matter has again been brought to notice during the last year, loud complaint having been made by Indians and others in the North-west against unscrupulous men who are charged with setting fires, and with laying poison in the pursuit of game, the result not only being disastrous to the Indians in driving out the game, fur-bearing animals, etc., by the fires, and the loss of their dogs by poison, but of far reaching consequences in the destruction of valuable timber. I would suggest that some vigorous action be taken through the mounted police to effectually put a stop to both practices.

SCHOOL LANDS.

Notwithstanding the efforts that have been made to prevent illegal occupation and cultivation of school lands, trespass of this nature is still being practiced, and not a little damage is being done to surrounding lands through the spread of weeds from off abandoned cultivation. It is considered of the greatest importance that some more stringent measures should be taken to prevent this evil, and that something should be done to destroy the weeds on lands which have already been cultivated. Many complaints have been made by settlers in the neighbourhood of these lands of damage to their farms through this cause, and under existing circumstances they are rendered powerless to help themselves.

HALF-BREED SCRIP CLAIMS.

As was pointed out in my last report the work in connection with half-breed scrip claims has practically been completed, although there are still some unsettled cases to be dealt with, and an arrangement was entered into with Mr. Roger Goulet by which he still devotes a portion of his time to these matters. While the recognized claims have, as stated, received attention, there are still a number of half-breeds to be dealt with where the Indian title has yet to be extinguished. Most of these are probably living at Lesser Slave lake, Peace river and Athabasca; there are also some at different Hudson's bay company's posts along the Mackenzie river and the route to

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the Hudson's bay, also along the Hudson's bay itself. It is probable those half-breeds in the localities mentioned who have not already received scrip in the ceded territory may be accounted for by their having gone to these places to join their relatives, and, very likely, therefore, some may be found in other places outside of ceded territory. I have not been able to obtain much information about the half-breeds in the district of Keewatin.

With regard to this question I am of opinion it would be better before deciding to issue scrip that these half-breeds should be given an opportunity of taking treaty, as if they are offered scrip in the first place, a great many Indians, or rather half-breeds who are living as Indians, will try to prove up, and they are held to be far better off in treaty. At the same time there are, of course, a number of half-breeds there who cannot be classed as Indians, but probably the majority, while they are to all intents and purposes Indians, might be able to establish their claims to be considered as half-breeds, and the issue of scrip to them would, it is thought, only have a demoralizing effect, and in a short time leave them in a much worse condition than at present.

It is important that the settlement of all such claims should receive early attention, and I would recommend they be inquired into and adjusted by Mr. Goulet without loss of time; he has an intimate knowledge of the claimants and of their past history, and is exceptionally well qualified to investigate the claims. Postponement will only increase the difficulty in deciding who are and who are not entitled.

AMENDMENTS TO THE ACT.

A number of amendments to the Dominion lands Act have been made by Parliament during the past few years, but, although these have been placed in convenient form for office use, they have not been consolidated in one statute. It is, I think, very desirable that this consolidation should be effected at an early date.

FUTURE PROSPECTS.

The outlook at the present time is most encouraging. The advanced price of grain last fall has been the means of placing the farmers generally in a better position financially than they have enjoyed for some years, and reports from almost every quarter indicate great hopefulness and confidence in the future. The expedition with which the last harvest was gathered in, together with the favourable fall weather, has enabled farmers to get ready for next year's operations, and the area to be sown in crop will doubtless be very large. There has been an inclination in every quarter not to depend altogether upon grain, but to devote attention to mixed farming. The settlers are profiting by the experience they have gained in the past, and the best results are anticipated. This state of affairs must have a most beneficial effect in inducing people to come to the country. It is a well recognized fact that a prosperous and contented settler is one of the best and most successful factors in promoting immigration. It may not be amiss to quote here a short extract from a letter received from one of these settlers located in Alberta, whose statements are borne out by the evidence of many others residing in different portions of the country:—

“I will say that I am at a loss to know why a country like this has not become densely populated ere this; we have a fine climate, a rich and productive soil, and large deposits of mineral wealth, in fact we have everything but an overplus of good industrious people, and the only reason I can give for this deficiency is that people of other countries do not know the advantages of the inhabitants of this country. We can raise everything necessary to sustain life, and have some to sell to buy luxuries with. We can do it with less labour and half the capital of those living in European provinces or the United States.”

IMMIGRATION.

Judging by the returns of immigrants accommodated at the buildings provided for the purpose at different points in Manitoba and the North-west Territories, there has been a falling off in the arrivals during the past year. On the other hand, it is beyond doubt that a better class of people, having means or farming experience, have come to us. Many have friends already settled here who have induced them to immigrate, and their advice and assistance will be of incalculable advantage, and remove half the obstacles that usually beset the path of the new settler.

An increase of eighty per cent is noticed in the German speaking immigrants, which, considering the difficulties placed in the way of diffusing knowledge of this country by continental governments, may be accepted as highly satisfactory. Good results may be anticipated from the visit of a delegate from Schleswig Holstein, who was so satisfied with what he saw as to purchase a farm near Balgonie with a view to settling on it with his family next spring. It is probable that many of his countrymen will follow him.

There has been a decrease in the number of Germans from South Russia, which may be attributed to the opening by the Russian Government of vast territories to settlement; but unless the laws are changed with relation to aliens, their departure must be only a question of time.

There is every indication of a steady movement in this direction from Austria, including Slavs, Galicians and Ruthenians. These last settlers, though generally possessing but limited means, are industrious and frugal, have in them the elements of success, and should be encouraged as much as possible.

A few Hungarians have come out this year, and have nearly all joined the Otthon colony, founded by the Reverend John Kovaks, in townships 24, ranges 4, 5 and 6, west of the second meridian.

Many of the Germans who have arrived here from the United States are not recorded in our returns, they having travelled by wagon overland, by the "Soo" line, or through from British Columbia. Inquiries continue to be received from different parts of the States, and an increase may be anticipated next year.

German immigration from Chili and Brazil continues, though slowly, in consequence of the expense of the journey and loss in exchange owing to depreciated currency. The present route of travel is an unnecessarily long and expensive one; if it were possible to overcome this defect it is almost certain that a very large number of people would come over here, they being at present much dissatisfied with their surroundings.

The records of the Winnipeg immigration hall show an increase in Scandinavian arrivals from Norway and Sweden of thirty per cent over last year; the number from the United States, however, is less, due doubtless to difficulties experienced in Alberta by those already settled there. These people usually rely upon getting employment to help them through the first year or two, and made a mistake in expecting it in a new locality. Those who arrived in Winnipeg have done fairly well, and but little difficulty has been experienced in providing them with work. The development of the gold mines at Rat Portage has created a demand for labour that in the near future may prove an important factor in attracting immigration.

There has recently been a tendency exhibited by Scandinavians to settle singly amongst English and Canadians, instead of together as heretofore. The advantage of such a course is unquestionable; they quickly learn our language and methods of farming, and rapidly adapt themselves to the requirements of the country.

As might be expected in a new land, a few settlers are disappointed and think they might do better elsewhere, and from time to time we hear of homesteads being abandoned, the owners believing stories which reach them from the States, where the winter is not so rigorous. From one or two German colonies in eastern Assiniboia a number went to Texas; it was not long, however, before they realized the mistake they had made, and those who could returned, wiser for their experience, and the rest will follow as soon as they can raise funds. Wages in that state are very low, men receiving only

Department of the Interior.

35 cents a day, whilst provisions are expensive, the land difficult to work, and the climate unhealthy.

There was no Icelandic immigration during the past season. These people require different treatment from other nationalities, who can generally find their way to Canada, if convinced of the advantage of so doing. The Icelanders, on the other hand, seldom have the funds, money being very scarce with them, and they depend upon their friends for assistance. What has also had the effect of preventing a great many from coming is the action of the Danish Government which views with alarm the number of people who leave the shores of that already not over populated island. Emigration has been practically prohibited, and in the meantime no passages are being booked. It is probable, however, that some means may be found for overcoming the difficulties which at present exist.

COLONIES.

In the absence of a special report on each colony, which could only be obtained by a visit of inspection, I have thought it well to glance briefly at the condition of such as I have direct information upon. On the whole the result is most encouraging; the people are getting firmly established and are overcoming the troubles and hardships inseparable from pioneer life. The recent bountiful harvests of 1895 and 1896, combined with improved prices, have largely helped to produce this result. It is gratifying to see how quickly the majority of foreign settlers learn the English language, after which the process of assimilation is rapidly completed.

GERMANS.

The Germans in Assiniboia harvested an excellent crop last year, and with fair prices are in a far better condition now than they have ever been before. With them and the Hungarians and Bohemians evidence of better times is seen in their houses and other buildings. The original sod dwellings are disappearing, good log or frame houses with shingled roofs take their place, stone being occasionally used in their construction. The people are rapidly becoming not only self-supporting but capable of furnishing supplies for market. Sometimes in eastern Assiniboia as many as forty or fifty teams may be seen following one another laden with grain, roots and vegetables of all kinds, bound for the market towns of Wolseley, Grenfell or Whitewood, as the case may be.

The German colony in township 10, range 2, W. 4th M., is increasing steadily, and now contains fifteen families. Very little grain is grown owing to the dryness of the locality, but stock-raising is successfully carried on, a ready market for dairy produce, cheese and poultry being found in the neighbouring town of Medicine Hat. Several of the original colonists, who left in the early days, have announced their intention of returning in the spring.

As an instance of successful development the Esterhaz colony may be quoted. To-day it number 600 souls, as against 470 in 1894; 1,000 head of cattle as against 550; and 4,000 acres of cultivation as against 1,500. No doubt more favourable comparisons might be made, but this will suffice to show what the people are doing.

RUTHENIANS.

A number of settlers from Austria, called Ruthenians, have come out recently, some at the instance of Professor Oleskow, but many on their own account; they appear to be closely allied with the Galicians, several parties of whom from time to time arrive here. They speak a language difficult to interpret, very few strangers having heard it. Their circumstances are poor, many being entirely without means.

A number arrived here after winter had set in, and, as it was impossible to send them away from the immigration building in a practically destitute condition, it has devolved

upon the department to accommodate and feed a few of them until the spring or until they can be otherwise provided for. This is accordingly being done and the cost is but trifling. This, however, is a condition which was never contemplated, and steps should be taken to prevent it occurring again. Our agents at points of embarkation should be instructed to watch for any contemplated movement on the part of the Ruthenians and be empowered to prevent them from coming here unless provided with the necessary funds to carry them over at least a year or two.

A new colony has been formed in townships 2, ranges 6 and 7, east. Some thirty-three families composed of 131 souls have settled there, and their numbers will be increased in the spring. So soon as their lands were selected they proceeded to them and erected small but comfortable houses, with good stables. Hay was put up for their stock, a limited acreage broken for next year, and every preparation made for the approach of winter. They announce their intention of keeping cows, with a view, ultimately, to establishing a creamery, their lands being well adapted for the purpose, though somewhat low for grain-growing.

Another Ruthenian settlement of about fifteen families has been established near lake Dauphin; there is also one near Grenfell, and some twenty families have purchased small holdings near St. Norbert, not far from Winnipeg.

In the Brandon district a Danish settlement of twenty-five souls has been started, having 740 acres under crop, with 97 head of stock, and in the vicinity of Oak lake is a colony of French and Belgians, numbering 393 souls, having 6,106 acres under crop and 505 head of stock.

In the Edmonton and Wetaskiwin districts the following colonies are reported.

Nationality.	Number of homesteads.	Number of souls.	Number of acres cropped.	Number of head of stock.
German.....	306	1,576	7,840	2,058
Austrian.....	40	270	320	200
Scandinavian.....	186	760	3,652	1,156
Belgian.....	35	112	460	380
Moravian.....	33	413	780	358
French.....	9	30	180	30

MENNONITES.

In the Prince Albert district there are reported to be at least 1,000 souls in the Mennonite settlement, between townships 40 and 44, ranges 3 to 6, W. 3rd M., with 1,000 head of stock and 800 horses, besides 1,500 sheep and pigs. Many of them have relied too much upon grain raising, and have not succeeded as well as those who have gone in more for stock; the people are well satisfied, and have large, well-built houses; they derive considerable benefit from the creamery at Saskatoon, which pays cash for their cream. Rosthern and Hague, Mennonite villages, are prospering, and no doubt these people will succeed as well in Saskatchewan as others of their religion have done in Manitoba.

FRENCH.

The French settlement of some thirty families at Duck lake is improving, though the people, having but little capital, progress but slowly. A great improvement is discernible in their condition since last winter.

At St. Louis de Langevin and Domremy there are 47 homesteads, 160 souls, all from France. Having some money they have been able to make a better start, but the poor crop last year told against them.

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In Manitoba, the French colony of St. Léon contains 59 families of 355 souls, mostly in good circumstances. They have 3,000 acres under crop, but suffered last summer from a severe hail-storm; they have about 700 horses and cattle. Great improvement is apparent during the last year or two in the buildings and manner of farming. The settlements of Notre-Dame de Lourdes, Bruxelles and St. Alphonse contain mostly Belgians who are doing fairly well; they make but little attempt, however, to learn the English language, and are consequently at some disadvantage in this respect, particularly in business matters.

About 15 French families are settled in townships 6, 7 and 8, ranges 6, 7 and 8, W. 2nd M., who are making excellent progress, accumulating horses and cattle. They have an average of about fifty acres of grain to each homestead, and this would be speedily increased if the market were nearer. At present they have to draw their wheat forty miles, to Alexander station.

St. Raphael and St. Maurice are French settlements between townships 5 and 7, ranges 30 to 34 W.; the people are industrious and doing well.

Colonization by French Canadians in Alberta appears to have been successfully carried out under the administration of Bishop Grandin. There are at present colonies at the following points:—Edmonton, St. Albert, Morinville, Beaumont, St. Peter, Rivière Qui Barre, Fort Saskatchewan, Stony Plain and Vigreville. Their population consists of 480 families, 1944 souls in all. Last year 5,553 acres were broken and 11,357 acres sown in crop, realizing therefrom 244,865 bushels of grain and 37,406 bushels of vegetables. Of stock the colonies number 1,830 horses, 4,313 head of cattle, 3,502 pigs and 2,135 sheep.

This result, the outcome of five years' work, is most encouraging, and speaks well for the French colonists.

ICELANDERS.

The Icelanders in townships 5 and 6, ranges 13 and 14, W., continue to increase their stock, for the raising of which their land is well adapted. Where the farms are suitable for cultivation they have brought a fair acreage under crop. They are well spoken of by their neighbours, and are regarded as contributing in no small degree to the prosperity of that district.

At the Narrows, on lake Manitoba, 23 families of Icelanders, containing 149 souls, have located. They are raising stock, and have 43 horses, 556 cattle and 315 sheep, besides pigs. Their cultivation is, however, very limited, but they are steadily progressing and are contented and hopeful. In the winter they fish on the lake, and dispose of their catch at Westbourne and amongst their neighbours. The location is a decidedly favourable one, with wood, water, good grazing, and abundance of fish all the year round.

The colony established in 1891 in townships 36 and 37, ranges 1 and 2 W. 5th M., is reported on favourably. Little grain is grown, but the people are doing well in cattle and sheep. Every advantage is taken of the creamery which is a source of much profit to them. Large quantities of hay are put up, and they manufacture all their wool.

In the Olds district, township 32, range 1, W., 5 M., there are 196 families. A few of these suffered from hail, and having no stock find themselves compelled to seek work elsewhere; the rest, who have cattle, are comparatively unaffected by it.

SCANDINAVIANS.

The settlement of New Scandinavia, townships 17 and 18, ranges 17 and 18, W.P.M., is prospering; it numbers 323 souls, divided over 80 homesteads. They have 155 horses, 726 cattle, 300 sheep, and 614 acres of cultivation. The locality seems to suit these people admirably, and their progress is most marked. Each year sees an increase in their stock, better buildings and more land cleared of bush. Churches have been built, and

the schools which have been established are attended regularly; English is taught and the children all speak it. As evidence of the prosperity of the colony, it may be mentioned that the trade derived from it in the adjoining town of Minnedosa is estimated at from \$16,000 to \$18,000, and is steadily growing.

HUNGARIANS.

The Hungarian settlement at Huns valley, township 16, range 16, W., contains 25 families, 123 souls; they have 50 horses, 230 cattle, and some 385 acres of cultivation. Their progress, though slow, is steady, and they contrive to make a comfortable living. They were almost all without means on arriving here, and their present position speaks for their industry. Some few left for the States, but those of them who have not returned are anxious to do so. A school and church have recently been erected in the colony.

MORMONS.

The Mormon colony at Lee's creek, in southern Alberta, townships 1 and 2, ranges 24 and 30, W. 4, contains about 200 families, and their number is increasing every month; they have two creameries, two cheese factories, a saw-mill, and a grist-mill. They export a large quantity of butter and cheese, and supply Lethbridge and Macleod with dairy produce and vegetables. They possess large herds of cattle and sheep. These people are industrious and law-abiding doing much to develop the resources of the country, and are a decided acquisition as immigrants; they are practical exponents of the advantages of irrigation, most of their crops, which are remarkable for both quantity and quality, being raised in this way.

JEWS.

The attempt of the late Baron de Hirsch to establish a colony for his Jewish co-religionists did not prove successful, owing to their being unacquainted with farming matters and their natural inclination for trading and city life. During the past two seasons, however, the crops in the colony have been excellent, and those settlers who remained are doing well. It has been stated by Mr. Mendels, vice-president of the Young Men's Hebrew Benevolent Society of Montreal, who has control of the colony, that the society intends placing a number of settlers on lands near Hirsch next spring.

SHEHO LAKE COLONY.

The Sheho lake colony, composed of settlers from the United States, is progressing favourably; the people appear well satisfied, though they feel that without railroad extension their production must be limited to what they can realize upon under existing circumstances. Those of the original colonists who returned to the States write expressing their regret at having done so, and if it were possible would come back to Sheho, where the present settlers have demonstrated the productiveness of the country. Their houses are well built and comfortable, the outbuildings are ample. Hay is abundant and well saved, and they are now beginning to realize on their herds of excellent cattle, a large number of which were sold this year. Their vegetable crops were most productive. There has been a great abundance of wild fruit in that locality, and it may be mentioned that in one house alone over 200 quarts were preserved. Although far from Yorkton these people contrive to transmit their cream there so as to benefit by the creamery at that point. There are at present in the colony 18 families having 304 acres under crop; 131 horses; 878 head of stock, and 94 pigs. Some of the original settlers abandoned their lands on account of the distance from the railway, and are now doing well in Yorkton.

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SMALL-POX.

In the month of November a case of small-pox developed in Winnipeg in a party of newly arrived Ruthenians. All necessary precautions were at once taken to prevent the spread of the disease, and infection was by this means restricted to five persons altogether. Of these one, the patient first attacked, died, the others recovered. The immigration hall was placed in quarantine for nearly four weeks, during which time the inmates, consisting of 73 persons, had to be fed and provided for by the department. Mr. James Reid, caretaker, remained with them, and the result of his management was most satisfactory.

In this connection I would lay particular stress on the fact of this case having developed after arrival here, and the necessity for a strict enforcement of the quarantine regulations at the point of debarkation.

MIXED FARMING.

There is abundant evidence throughout the country that settlers have adopted the principle of mixed farming with advantage to themselves and the community at large. The operations of the creameries have been greatly appreciated and butter has been exported from Manitoba and the North-west territories in large quantities to British Columbia, and even to Japan. There is, moreover, a steady demand for creamery butter in the larger towns far in excess of the supply. Elsewhere will be found figures as to the quantity produced. It has been shown that under proper management a return of \$40 may be counted on from each cow, and an impetus has been given to the improvement of breed, which the exhibitions throughout the country are doing much to encourage. The day is not far distant when scrub cattle will have disappeared and their place taken by a good grade, costing less to keep and yielding richer and more abundant milk, and turning out steers for beef which fed on our nutritious grass will prove profitable to the raiser and satisfactory to the consumer. From every agency reports are being received of the amount of stock being shipped to the European markets, and this trade is steadily on the increase. Heretofore our settlers have to a great extent imported pork and bacon. The raising of pigs is now receiving attention, and farmers find themselves able to dispose of a surplus each winter. Curing establishments are springing up, and a supply of excellent bacon is placed on the market, although at present in small quantities. The factories still find it necessary to import pork from the east, but this no doubt will cease shortly.

There is a wide field open to the North-west farmer in the raising of poultry. It has been long since demonstrated that ducks and fowls succeed here with a minimum amount of care, but there is very little done towards supplying the home markets. The inclination is to grow wheat, and in doing so many lose sight of the value of a good poultry yard. Every winter a large quantity of poultry is imported from the East, and there is a demand in the larger towns of which our settlers should avail themselves. One difficulty appears to be the proper preparation of the birds, which are not handled as carefully as in Ontario. If farmers could only be got to recognize the valuable adjunct they possess in poultry they would devote some of their energy to it.

WATER.

The want of water in parts of Assiniboia continues to seriously restrict farming operations and is a source of discontent with many foreign settlers who have taken up lands in localities where the deficiency is most felt. It is hoped that the territorial Government will continue its efforts to furnish adequate wells by means of boring machines.

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

H. H. SMITH, *Commissioner.*

1.—STATEMENT of work performed in the Office of the Commissioner of Dominion Lands for the fourteen (14) months ended 31st December, 1896.

YEAR.	Letters received.	Letters sent.	CANCELLATION BY LAND BOARD ORDERS.		Application for Patents, approved and pending.	HALF-BREED SCRIP CLAIMS.			Number of Homestead Inspectors' Reports.	Number of Authorities issued for entries to be made through Agents.	RECEIPTS.					Cheques issued.	
			Carred Out.	Refused or Pending.		Applications received.	Recommended.	Disallowed.			Relief Mortgages.	Seed Grain Advances.	School Lands.	Patent Fees.	Maps, &c.		
1895-96	34,250	36,740	256	294	2,944	*31	23	8	3,273	1,000	%	871 57	5,799 62	7,719 91	5,650 00	59 50	537

* Involving \$6,800—
 Recommended \$ 5,040
 Disallowed 1,760
 \$ 6,800

COMMISSIONER'S OFFICE,
 WINNIPEG, 2nd January, 1897.

Department of the Interior.

2.—STATEMENT showing the work of the Homestead Inspectors for the fourteen months ending the 31st day of December, 1896.

Name of Inspector.	Number of Inspections made.	Number of Applications for Patent received.	Number of miles travelled.
Thomas H. Aikman.....	246	155	5,386
John Allison (11 mos.).....	290	91	5,685
W. H. Allison.....	449	231	4,741
J. J. Arsenault.....	374	171	5,560
John Coleman.....	492	37	5,335
Geo. J. Cox.....	249	82	4,754
R. S. Park.....	496	219	7,291
John Rogers.....	358	95	4,953
J. R. Thompson.....	319	75	5,510
Totals	3,273	1,156	49,215

3.—RETURN of Immigrant Arrivals and Departures at the Winnipeg

(Not accommodated in

Month.	FROM EASTERN CANADA					VIA OCEAN TRAVEL.					VIA UNITED STATES.					Total Arrivals.	English.	Irish.
	Adults.		Children			Adults.		Children			Adults.		Children					
	M.	F.	M.	F.	Total.	M.	F.	M.	F.	Total.	M.	F.	M.	F.	Total.			
1895.																		
November.....																		40
December.....																		13
1896.																		
January.....																		2
February.....																		20
March.....																		39
April.....																		41
May.....																		33
June.....	12	6	6	7	31	359	132	72	62	625	108	44	44	36	232	888	33	
July.....																		8
August.....																		39
September.....																		9
October.....																		9
November.....																		1
December.....																		1
Totals.....																		254

(Accommodated at the

1895.																			
November.....																			34
December.....																			2
1896.																			
January.....																			3
February.....																			8
March.....																			32
April.....																			120
May.....																			51
June.....	65	32	85	57	239	1053	546	475	468	2542	177	115	134	101	527	3308	35	3	
July.....																			21
August.....																			25
September.....																			4
October.....																			32
November.....																			7
December.....																			4
Totals.....																			378
Grand totals.....																			632

COMMISSIONER'S OFFICE,
WINNIPEG, January 2nd, 1897.

Department of the Interior.

Agency for the fourteen months ending the 31st of December, 1896.

(the Immigration Building.)

	NATIONALITIES.									TRADES OR OCCUPATIONS.								DESTINATION.			Total.
	Scotch.	Germans.	Scandinavians	French.	Belgians.	Americans.	Canadians.	Austrians.	Others.	Total.	Farmers.	Farm Labourers.	General Labourers.	Mechanics.	Clerks and Traders.	Female Servants.	Not classified.	Total.	Manitoba.	N. W. T.		British Columbia.
.....	21	7	2	...	14	5	...	3	92	20	39	3	...	...	...	30	92	52	33	7	92
...	16	4	2	...	5	15	...	...	55	10	1	...	...	1	1	42	55	36	18	1	55
.....	13	11	5	...	...	...	...	...	29	5	6	...	...	...	3	15	29	11	12	6	29
.....	2	4	1	...	4	...	...	5	19	6	3	...	...	...	2	8	19	12	...	...	19
1	3	12	12	...	...	17	...	...	65	22	24	5	...	1	3	10	65	34	25	6	65
.....	16	46	...	...	4	6	...	13	124	19	51	11	1	1	6	35	124	51	61	12	124
13	38	32	7	23	...	5	...	9	168	32	27	20	...	5	13	71	168	119	32	17	168
7	21	13	1	13	1	...	...	8	97	21	17	9	...	...	4	46	97	65	27	5	97
.....	7	19	2	...	...	5	...	5	46	8	7	10	...	3	2	16	46	28	16	2	46
.....	1	13	2	...	...	...	...	...	57	2	44	2	...	1	1	7	57	48	5	4	57
.....	5	27	...	...	...	...	...	3	44	9	1	7	...	1	3	23	44	31	7	6	44
.....	10	25	...	...	...	...	...	1	45	5	1	1	...	...	2	35	45	20	25	...	45
20	3	12	...	...	...	...	...	1	37	4	4	1	...	1	2	24	37	15	6	16	37
5	...	1	...	...	...	...	...	4	10	...	...	5	1	...	...	4	10	5	4	1	10
46	156	226	34	36	28	54	...	52	888	163	225	75	3	13	43	366	888	527	278	83	888

(Immigration Building.)

.....	53	22	18	3	5	7	...	3	145	37	25	1	...	6	1	75	145	69	74	2	145
.....	18	40	...	12	...	12	...	...	84	28	4	...	...	1	...	51	84	48	36	...	84
1	16	2	6	...	1	1	...	3	33	10	5	1	...	...	5	12	33	27	6	...	33
.....	8	6	8	1	...	15	...	...	46	6	11	...	...	...	2	27	46	24	17	5	46
1	38	8	19	8	...	66	...	2	176	44	37	1	3	1	8	82	176	136	40	...	176
12	77	66	12	8	2	62	...	...	360	46	135	7	...	5	19	148	360	285	75	...	360
3	163	43	92	13	...	308	13	689	142	67	28	...	12	16	424	689	429	259	1	689	
11	107	23	10	3	...	1	89	...	279	56	43	20	...	2	13	145	279	250	29	...	279
10	135	28	38	2	...	37	99	17	390	83	43	11	1	9	15	228	390	356	34	...	390
1	117	16	9	19	...	29	102	1	319	68	55	4	...	12	7	173	319	250	62	7	319
.....	55	16	9	1	13	21	76	...	197	35	9	9	...	9	3	132	197	103	94	...	197
.....	50	10	4	1	...	51	41	...	189	28	19	1	...	1	9	131	189	165	21	3	189
20	50	1	12	10	...	13	155	...	268	65	8	1	...	2	6	186	268	206	59	3	268
.....	69	8	1	...	...	6	34	11	133	22	9	4	2	1	8	87	133	113	16	4	133
59	956	289	238	81	21	321	904	50	3308	670	470	88	6	61	112	1901	3308	2461	822	25	3308
105	1112	515	272	117	49	375	904	102	4196	833	695	163	9	74	155	2267	4196	2988	1100	108	4196

4.—RECORD of Immigrants accommodated at Immigration Buildings in Manitoba and the N. W. Territories for the fourteen months ending 31st December, 1896.

	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
Brandon	121	115	17	28	95	10	10	3	5	7	10	4	88	5	54
Calgary	31	2	5	27	37	144	169	70	50	61	54	82	38	21	1,115
Edmonton						36	182	11	10	48	37	58		10	532
Minnedosa															
Prince Albert	2		5		2	1	18				2				30
Red Deer					6	2									8
Regina						11	15					1			23
Winnipeg	145	84	33	46	176	360	680	279	300	319	197	189	268	133	3,308
Duck Lake							15								15
Total	289	201	60	101	316	564	1,098	363	455	435	301	334	394	169	5,090

Department of the Interior.

5.—LABOUR Demand and Supply for the fourteen months ending 31st December, 1896.

AGENCY.	November.		December.		January.		February.		March.		Apr.		May.		June.		July.		August.		September.		October.		November.		December.		
	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	Demand.	Supply.	
Battleford																													
Brandon	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Calgary	1	1																											
Edmonton																													
Estevan	1																												
Lake Dauphin																													
Lethbridge																													
Minnedosa																													
Prince Albert																													
Red Deer																													
Regina																													
Wetaskiwin																													
Winnipeg	17	11	27	20	35	17	49	27	100	53	291	172	157	129	139	76	179	126	126	91	76	41	30	32	28	21	41	25	
Yorkton																													
Kamloops																													
N. Westmunster																													
Total	20	15	28	22	36	21	49	37	112	74	308	204	165	144	139	87	181	143	130	102	76	45	31	41	31	26	43	27	

6.—RETURN of Settlers' Effects recorded at Customs Ports of Entry in Manitoba and the North-west Territories for the year ending the 31st of October, 1896.

PORT OF ENTRY.	HORSES.		CATTLE.		SHEEP.		PIGS.		MACHINERY.	OTHER EFFECTS.	TOTAL VALUE.
	No.	Value.	No.	Value.	No.	Value.	No.	Value.			
Lethbridge											
St. Mary's	569	8,957 00	582	8,178 00					518 00	1,865 00	1,865 00
Coatic's	1,260	10,502 00	32	568 00					35 00	10,734 00	28,387 00
Macleod	47	355 00							20 00	3,969 00	15,046 00
Gretna	*202	10,040 00	70	1,000 00	6	18 00	37	152 00	3,110 00	15,096 00	29,416 00
North Portal	156	6,440 00	64	1,100 00			10	52 00	1,730 00	3,375 00	12,697 00
Calgary	25	890 00	4	90 00					450 00	2,384 00	13,382 00
Killarney	112	5,343 00	10	149 00	1	2 00	2	8 00	1,281 00	11,952 00	9,167 00
Crystal City	33	1,650 00							682 00	1,326 50	3,658 50
Deloraine	29	1,585 00							808 00	2,393 50	2,928 00
Brandon									2,241 00	2,757 00	2,757 00
Emerson	71	3,077 00	21	351 00	130	260 00	10	62 00	5 00	3,650 00	9,641 00
Carberry	2	100 00								370 00	475 00
Portage la Prairie										2,937 00	2,937 00
Virdean										2,935 00	2,935 00
Regina										1,649 00	1,649 00
Prince Albert										705 00	705 00
Winnipeg										29,024 00	29,024 00
										Total value..	167,155 50

* Including 3 mules.

COMMISSIONER'S OFFICE,
WINNIPEG, January 2nd, 1897.

Department of the Interior.

No. 2.

OFFICE OF THE SUPERINTENDENT OF MINES,

CALGARY, ALBERTA, 31st October, 1896.

H. H. SMITH, Esq.,
Commissioner of Dominion Lands,
Winnipeg, Man.

SIR,—I herewith have the honour to report through you, for the information of the Minister of the Interior, for the departmental year ending this date.

Between the 1st and 13th November, 1895, I visited Winnipeg, Maple Creek, Lethbridge and the Brown ranch company.

18th November to 20th December. The greater portion of the time inspecting stock-watering and shelter reservations.

January 1st to 22nd, absent in Winnipeg, Acting Commissioner during your absence.

February 1st to 6th, visited Kamloops to report upon dispute concerning right to the use of water for irrigation purposes.

February 23rd to 29th, attended immigration convention at Winnipeg.

June 18th to 20th, visited Revelstoke in connection with squatters' claims at that point.

July 4th to 11th and 22nd to 25th, inspecting portions of the ranching district.

August 3rd to 4th, visited Illecillewaet in connection with a dispute regarding the purchase of land at that point.

19th of August to 1st September, absent on personal business.

12th September to the 21st, visited Selkirk, Winnipeg and Whitemouth, at the latter point to report on matters arising out of survey and right-of-way for the Canadian Pacific railway company, and water supply for operating the railway at that point.

CROPS.

Throughout the western portion of the territories (you will no doubt have reports from parties who can speak from personal knowledge as to the remaining portion of the territories) the crops during the past season were very good, and the greater portion was harvested in good condition. Hail caused injury in some few localities, and in the most southerly portion of Alberta, owing to very dry weather in the latter half of June and first half of July, it appeared that except where irrigated the crop would be a total loss. About the middle of July the weather turned very showery and cool, which continued through the greater portion of August; the consequence was that the grain took a second growth, which made it very late, and although a good deal of feed may be obtained, the quality of the grain will not be first class. These conditions did not obtain to nearly the same extent in central Alberta, and the result there is a good crop both as regards quantity and quality.

IRRIGATION.

Mr. Dennis, the Chief Inspector of Surveys, who has charge of all irrigation surveys and matters appertaining to enterprises connected with irrigation, will no doubt report fully on this head, both as to works proposed, in course of construction and completed, and the crop results from irrigation, so that it is only necessary for me to state briefly that the outlook for irrigation enterprise is very bright, only curtailed by difficulty of obtaining the necessary capital. The results of the works now constructed fully warrant the carrying into effect of the various irrigation enterprises contemplated. It might be well to add that the wisdom of initiating the irrigation surveys two years ago and carried on since is fully sustained by practical demonstration. As the best

endorsement of such a policy may be noted the adoption by the irrigation branch of the United States geological surveys department of some of the features initiated by Mr. Dennis, such having been carried into effect by an act of Congress of the last session—notably the establishment of bench marks connected with the system of surveys, thereby giving precision and, at the same time, convenience for reference. This course has also met with the emphatic approval of the whole of the scientific press which has alluded to it. Very flattering notices of our irrigation act have from time to time appeared from some of the very best authorities in the United States, notably from such men as Elwood Mead, Esq., chief engineer of irrigation for the state of Wyoming, than whom probably no one has given the general subject so much study, or is so well qualified to speak with authority. He is largely the author of the irrigation laws of the state of Wyoming, which laws are undoubtedly better than those of any other state. He deplors that this state has not more nearly conformed to our system. It appears difficult, however, sometimes impossible, to induce legislators to go far enough in the first place to protect both the public and those using or desiring to use the water; secondly, to control it in such a way that it will give the greatest benefit to the largest number, and, by clearly defining the rights of the various parties, prevent litigation, which latter evil is the greatest obstacle in the way of successful irrigation on this continent; in many districts it has totally blighted all such enterprises.

INCREASE OF THE GRAZING AREA THROUGH IRRIGATION AND ARTESIAN WATER SUPPLY.

In a report made many years ago I drew attention to the feasibility both from a financial and engineering point of view of diverting the waters of the High river into the Little Bow, thereby increasing the volume of the latter, and also the pasturage tributary thereto by at least one million acres. There is not a portion of the grazing district in which the natural conditions are better adapted for stock than along said river. It is generally conceded by cattlemen that during the limited portion of the year when that district is sufficiently watered it is simply impossible to keep stock out of it. This period may be computed as not more than $2\frac{1}{2}$ months. These lands will not become occupied for many years, except perhaps under a system of irrigation which is unlikely to come into effect for a long time yet, owing to the small volume of water cheaply available, which would render such a scheme doubtful at present. But there is no doubt as to the feasibility of providing sufficient water for stock throughout the grazing district tributary thereto, and that at a very moderate outlay of capital. All that would be required is to turn a certain quantity of the water of the High river into the bed of the Little Bow and to regulate it so that there will not be floods, but only sufficient for stock watering purposes throughout the entire season. It might be that a company could be organized, which in consideration of say a ten years lease of that district would undertake the scheme. No injustice would probably be done any interest during that time. Provision for arbitration as to the amount of recompense might be inserted if it should be found necessary to cancel the lease before the expiration of the time granted.

Some time ago I directed attention to the advisability of making certain tests in order to determine the chances of obtaining artesian water supply throughout portions of the North-west for stock watering purposes. The geological department, to which my suggestion was referred, agreed as to the advisability of at least making the experiment, and I think it is one which merits serious attention, if it should prove as feasible as seems possible. The increased stock capacity and production would be enormous if the tests demonstrated what is probable.

DAIRYING.

I may perhaps be permitted to state that during the past few years I have most emphatically urged the importance of developing the dairy industry in southern Alberta. I am much gratified to believe that this development is now beginning under favourable auspices.

Department of the Interior.

The aid contemplated to be furnished by the Government to dairying enterprises will, it is anticipated, greatly stimulate this industry, one to which the country is in a marked degree so well adapted. To those not conversant with the conditions, it would seem almost inexplicable why the foot-hill country had not developed much faster on those lines. Want of capital and ignorance of the subject on the part of the vast majority who have the labour within their family to attend to cows have prevented them embarking in the enterprise. To those who have the capital the labour requisite is difficult to obtain and expensive to retain. Further, the small stockowners are doing very well with their cattle in allowing the cows and calves to run together, and when it is considered that a calf in the autumn is worth \$10 to \$12 (as high as \$17 has been paid for first-class ones) it is not surprising that they have not undertaken dairying. It might be briefly noticed that by some it is contended that the introduction of irrigation on a considerable scale, coupled with the hamlet system of settlement, is probably the system of settlement best calculated to succeed; the dairy products and also pork and poultry raising would be greatly stimulated. In short, the conditions which would then be brought into being would make those irrigated portions ideal locations for the purposes named.

HANDLING OF HOGS, DAIRY AND POULTRY PRODUCE, ETC.

There is a movement now on foot to establish a concern of considerable magnitude and one of very great advantage to at least the western portion of the territories. I refer to the establishment at Calgary of a pork curing establishment, including also the handling of poultry, dairy products, vegetables, fruits, etc.; also possibly the slaughtering of beef and mutton. It is proposed to work out the scheme somewhat as follows. There are at Calgary now, probably, the best facilities for slaughtering, storing and shipping dead meat, combined with the necessary cold storage for the same, existing at any point in Canada west of lake Superior. Everything is constructed upon the most modern approved principle. There is also a fairly well equipped pork curing establishment in connection therewith, which, if the scheme goes into effect, could be cheaply enlarged to any reasonable extent, certainly to as large a one as will be necessary for some years.

The principal object of the scheme is the pork curing business, thereby giving a good and continuous market at all seasons of the year to all hog product.

It is intended to have small cold storage depots at some of the larger points throughout the western territories, so that perishable articles such as butter, eggs, etc., may be collected and shipped in carload lots; at the smaller points, collections can be made as often as twice a week by refrigerator cars, and stored at Calgary. At points in British Columbia, such as Nakusp and Revelstoke, cold storage warehouses are also to be erected which will be supplied in carload lots, and from them distributed wherever there is a demand, thus preserving to the highest degree attainable the quality, and minimizing the freight charges. The company proposed is known as the Stone & Co., Limited, capital \$50,000, and some of the best men in the district have identified themselves with the enterprise, and it would appear that the outlook for success is very promising. It is also more than probable that a considerable dead meat trade between this point and many portions of British Columbia by the establishment of this enterprise could be successfully prosecuted during a large portion if not during the whole of the year.

PRAIRIE FIRES.

An attempt is being made by the undersigned to obtain as far as possible accurate data regarding the probable loss during the past season by prairie fire. I had hoped to have had it in time for this report, but it is not available. I trust it may be shortly. The immediate object in view is this: assuming prairie fires could be largely or wholly prevented, to what extent could the cost of so doing be justified?

HAIL INSURANCE.

If no steps have been taken by the Manitoba government and that of say North and South Dakota where the conditions are somewhat similar to those of the North-west, to collect statistics regarding damage by hail, would it not be well that such should be obtained? If those statistics, fairly reliable, were obtained, extending over ten years, a scheme of hail insurance might be instituted, which would be fairly equitable and safe for the company and the insured. It would probably be found that some districts enjoyed a fair immunity from loss, while in others the reverse was the case.

CATTLE.

The past winter and spring were up to the 1st March all that was desirable for cattle ranging, excepting that almost the entire month of February was too warm. The result was that cattle shed their hair, and as the months of March and April proved very cold and stormy, although the total loss was small, the calf crop was no doubt very seriously injured and the cattle ran down very low in condition. From the middle of May to the 1st July the flies were very much worse than they had been during any season for the past ten years. The result was that beef fit for shipment was from one to two months later than usual, and when shipments were fairly started, between the telegraphers' strike and the heavy movement of grain, the cattle were not shipped out as rapidly as they have been heretofore, so that the closing shipments to Europe were very late. As will be seen from the statistics there is a considerable trade with the Kootenay and other districts in British Columbia, a trade which is likely to greatly develop and which will bring in its train a considerable amount of winter feeding. This trade will take a class of beef cattle, good quality in itself but not of a class for which there is sufficient demand in the English market to enable good prices to be paid therefor on the range, so that such openings of that class will prove of very considerable benefit to our stock growers. Fortunately, that market gives promise of a very rapid and permanent increase in its requirements.

So far beef for the mining points in British Columbia have been supplied by Canadians, but I think largely the cured bacon, mutton, poultry and probably a considerable portion of the dairy products have come from Washington and Oregon. The construction of the Crows Nest Pass railway would throw all the beef supply required in east and west Kootenay into our grazing territory at prices likely considerably increased and might enable it to largely, if not wholly, supply the balance, that is mutton, poultry and dairy products, a condition that it is extremely desirable should be attained. The prices obtained on the range during the past season were about the same as during 1895, namely, \$40 to \$42.50 for four-year-olds, good cows and 3-year-olds \$33.00 to \$37.50. Others \$27 to \$32. They were probably classified considerably closer that is with a higher average in each class this year than the year previous. There were shipped out of the territories west of Moosomin during the past year the following neat cattle:

To Great Britain	17,935
To British Columbia	1,931
Stockers shipped in	16,000
Driven into Southern Alberta from Northern Alberta and Saskatchewan	2,000
Driven into Southern Alberta and Western Assiniboia from Eastern points	500

Of the 20,000 cattle shipped out probably 12,000 came from Southern Alberta and Western Assiniboia, of which Southern Alberta would probably furnish 85 per cent.

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If the quarantine regulations could be safely done away with, the beef growing of the ranching portion of the territories would become largely devoted to maturing, and breeding would largely cease. It is much better situated for maturing than for breeding. Care, however, is necessary in making regulations on this head to prevent eating out by an influx of American cattle. The probability of eating out is already manifested most pronouncedly along the Milk river in eastern Alberta and Assiniboia and to the south of the Cypress hills and Wood mountain, and in a few points to the north thereof. On the 5th November a meeting was to be held by the stockmen regarding this subject at Maple creek which the writer purposes attending and reporting upon fully. The framing of the regulations to prevent the eating out of the grazing districts and protect our own stock interest against cattle being run in from the Western States has been the subject of a recent report, but which is too lengthy to be more than referred to in this.

HORSES.

In my report of 1894 I called attention to the probability, if horses were allowed free grazing, that a considerable injury to the grazing industry would ensue. I am happy to be able to state in that portion of southern Alberta lying north of township 9 and south of township 24, there are to-day probably not 30 per cent of the horses there were two years ago, and the owners are striving as fast as possible to exchange them for cattle in Manitoba and other portions of the territories. What remain are of a much better class than those which have gone out. It is unfortunate that the remaining portions of Alberta and western Assiniboia have not also tried to rid themselves of this comparatively worthless stock. I still think that one of the best courses to adopt regarding horses is to place a high rate for pasturage. It would at least stimulate a riddance of the inferior animals, as it would not pay to keep them owing to the cost of pasturing. At present, it practically costs nothing, and they destroy by eating and tramping considerable pasturage which might and will no doubt be very valuable in connection with the pasturage of stock which possess some value. There were taken out of the portion of Alberta mentioned during the past twelve months probably 4,000 horses, the majority of which were exchanged for cattle mostly in Manitoba. Several carloads of horses have been shipped to Belgium for military purposes, and it is thought with fair prospect of profit. A heavy Clydesdale brings a fair price, being worth at maturity, when weighing 1,400 to 1,600 pounds, about \$75. It is difficult to understand why parties who were breeding largely Clydesdale and had a fine stock of mares and stallions should abandon the business because sales were slow or well nigh impossible for a year or two. All the expense had been incurred, and for the future and until fresh stallions were required horses could be bred and reared till four years of age for \$20 apiece; but they seem to have become panic stricken and promptly shut down on breeding.

INFERIOR HORSES BROUGHT IN BY ALLEGED IMMIGRANTS BUT REALLY HORSE DEALERS.

There is a traffic which has been carried on for the past three years to a much larger extent than is generally supposed, namely: a man brings a band of horses to the boundary. We will assume he has 80 head. Obtains four others and with himself obtains free entry as an intending settler. The men will frequently disappear as soon as entry is effected. Before possibly he has left the boundary ten miles he commences selling, and, when sold out, returns and starts another band in charge of another man. Now if this practice could be stopped without throwing an obstacle in the way of immigration it would be well to do so, as it is demoralizing to the trade.

SHEEP.

The low price of wool, 7 to 8 cents per pound, seems to have placed a damper on this industry, and, coupled with the compulsory slaughter of sheep in England at

port of disembarkation, owing to the scab scare, has prevented much increase in this industry during the past season. If the breeders would stimulate the local market, furnishing good mutton at reasonable prices, it would be, no doubt, a great advantage. Between the butchers and breeders the people in the country pay from 10 to 15 cents per pound for mutton, and that usually very inferior. Why such a price should be maintained it is difficult to see.

The mutton for Kootenay and most of British Columbia has heretofore been largely if not wholly obtained from Washington and Oregon because of two conditions: first, the low price of sheep in those states; secondly, their more ready access, which means lower freight rates to the points to be supplied. With a slight rise in the sheep market in the United States, coupled with the construction of the Crows Nest Pass road, the trade would be largely if not wholly, supplied from our territories. If such should be the result, the benefits to the territories, through the stimulating of the sheep industry, would be most marked.

SHEEP vs. CATTLE.

There has been some grumbling by cattle men against sheep in the Maple creek district. The grievance as yet is a very slight one, but if not looked after might soon become serious. It is certain to culminate sooner or later unless some provision be made for keeping the two classes grazing on the public domain separated. There has been in modern times no considerable extent of grazing territory at all suitable for both classes of grazing where such disputes have not been hot and frequent. In many cases in the United States and some in New Zealand and Australia, these disputes have led to loss of both human life and property, and care should be taken to prevent any conflict, or, if this is not possible, to minimize the same.

HOGS.

There is probably no investment which will make such speedy and remunerative returns as a judicious expenditure of a few hundred dollars in the purchase of well bred boars to be distributed among those breeding or being in a position to breed pigs in Alberta. This is particularly applicable to northern Alberta, and it may be also to portions of Saskatchewan and Assiniboia. Pigs increase very rapidly, and even if the female is not first class the breed will rapidly be improved by a judicious crossing with well bred males. Each dollar thus invested would yield a hundred fold within two years. It costs less to rear and feed the well bred pig up to nine months of age than an inferior one, and at that age the well bred one will be worth at least double. Further, the trade in pork has assumed such a phase that pigs must be specially bred to meet the same.

BULLS.

It is unfortunate that such an inferior class of cattle predominates in northern Alberta. The local press, particularly the *Edmonton Bulletin*, drew attention to this subject in a very pronounced manner; but so far as can be observed from this point no steps are taken to improve the same. Until he saw it himself, the writer believed that there were no such inferior cattle in America as have been brought into northern Alberta by the settlers from Nebraska, Kansas, Oregon, &c. They probably were so poor that they could only be disposed of for a very small figure there, if for anything at all. Certainly they were not worth bringing with them, and nothing has been done since their arrival to improve them. The settlers as a class are not cattle breeders. It would cost them very little to buy old bulls from off the large ranches, bulls too old to be of value on the range, but fit for two or three years of breeding of say 20 to 25 cows. These bulls could be bought for from \$20 to \$25 apiece, and they are animals as well

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bred as any in Canada. The large ranchmen would encourage this trade, taking young cattle in lieu, thereby in the near future obtaining a much superior class of stockers than at present.

WOLVES.

The action of the North-west assembly in paying a bounty for wolves proved very good policy, and it is regrettable it has not been more generally adopted and not confined as at present to about thirty per cent of the stock grazing districts. Probably the advisability of reverting to the policy of making it applicable over at least the whole of the grazing portion will shortly go into effect. Many hundred wolves were destroyed and a large proportion of the bounty was paid out to Indians which, no doubt, was of great benefit to them, as the Indian who will engage in that pursuit has sufficient industry in his composition to warrant the advisability of aid being given him. It is probable that each wolf killed means about two calves or colts saved, so that it is certainly a wise expenditure of \$5 for destroying one.

COAL MINING.

This industry is slowly progressing. Considerable coal was shipped from Canmore to the trail smelter to be utilized in roasting ; but it is rumoured that the heat proved too intense for the kind of furnace adopted and that the concern has changed its grates and is using wood. The use of wood, however, can only be adopted for a comparatively short period owing to the cost of procuring a supply. The consumption of the Canmore coal is steadily increasing for railway locomotives and stationary boilers, and retains its high reputation in that regard. At Anthracite, owing to the increase in price of American hard coals in eastern Manitoba, the output has been considerably increased. With the railway connection made between the Calgary and Edmonton railway and the Canada and Great Falls, and the latter changed to a broad gauge, as seems probable within the near future, a very large and profitable market would no doubt be obtained in the North-western states.

For the year ending 31st October the coal output was about as follows :—

Lethbridge	120,000	tons.
Canmore	60,000	
Anthracite	20,000	
Edmonton and Okotoks.....	4,000	Estimated, of which 675 were
Knee Hill	2,000	“ [shipped away by Ry.
Souris	9,000	“
Other points.....	10,000	“

At Lethbridge the output has considerably increased, both in the consumption in Manitoba and the territories, and also at Great Falls, Helena, Butte and Anaconda in the United States.

The output from local mines is increasing from year to year. The Edmonton coal mines probably lead by a very considerable quantity ; but as there are no means of ascertaining the exact quantity of output it must be only an estimate. Knee Hill creek mines probably come next and then the various points enumerated in previous reports.

COKE.

That there exist large deposits of coal suitable for making a high grade of coke along the foot-hills of the mountains, from some distance north of the Bow river, south to the Old Man's river, there can be no doubt ; but the manufacture of such has not been called into being on account of lack of capital, which naturally hesitates, awaiting to see whether the Crows Nest Pass railway will be constructed, and whether the

deposits of coal near the route of that railway through the Rocky mountains would prove valuable for coking purposes. So far as can be learned, no thorough test (one by ovens is necessary) has yet been made. If it does not prove as good as hoped for, a large supply of the necessary coals can be found at no considerable distance therefrom, so that with the construction of that railway a plentiful supply of coke and at cheap rates is assured for the Kootenay district, which must prove a strong factor in its profitable development.

PLACER MINING.

During the past year considerable discussion has been going on regarding the possibility of profitably working the benches in the valley of the North Saskatchewan river for gold. This is the only point in the territories where any considerable attention has been paid to placer mining; what has been accomplished has been solely by the old style of hand washing. The various scows and dredges devised have not as far as I can learn been successful. It is probable that the benches in the valley alluded to would prove very profitable if water in sufficient quantities could be led thereto under pressure as has been done in many other places. The fall to the river, however, is so slight that in order to obtain head enough it would be necessary to take out the ditch a hundred miles above where it was required, which would be altogether too expensive a matter. There is therefore no immediate prospects of working it out by means of hydraulics. However, it is possible machinery may be had which will profitably extract the gold, and it is probable many efforts will be made to bring such into operation during the coming season.

QUARTZ MINING.

The attention which has been directed particularly to the Kootenays in British Columbia has created quite a large army of prospectors which will increase rapidly year by year so long as the prospects are favourable, and there would seem to be no question as to that. The field of operation for these prospectors is rapidly widening and extending, and during the latter portion of the past season a considerable number had crossed the summit and were operating on the territories' side of the water shed of the Rocky mountains, so that we may anticipate that if there prove to be minerals on the east slope, and I can see no good reason why there should not be, valuable discoveries may be made within the next season or two.

STOCKWATERING AND SHELTER RESERVATIONS.

The charge is frequently made that the area of these reservations is excessive and that there are many more of them than necessity calls for, also that many of them have no water at all. Of course, any one desiring to settle would naturally like to do so on a spring or open stream, and when a request is made it is invariably accompanied by the statement that there is no stockwatering at that point, or that, if he is allowed to settle there, he will take good care that there is plenty of access for stock to water. Regarding the first assertion, it is in 95 per cent of cases erroneous; but even if it were true, it would not necessarily follow that the reservation should not be maintained, for though the intending settler personally might not prevent stock travelling, grazing and watering as was desirable, he might be succeeded in a short time by one who would do so. It is anticipated that within the next decade there will be four times the number of stock that there is to-day, and these reservations have been made with that end in view, so that although there might be an excess of them at the present time such would not be the case a few years from now, so that if even the stockmen, large or small, in any neighbourhood petitioned to have the number or area of these reservations reduced, it might not be good policy to grant their petition. I find that the total area of the grazing district in Alberta, south of township 35, may be esti-

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mated to contain 17,438,210 acres, and the area now reserved is equal to 140,000 acres. It will thus be seen that these reservations only represent $\frac{1}{4}$ of 1 per cent of the total area of the grazing district. Through the construction of irrigation works and the raising of winter fodder thereby, and realizing that the capacity of our ranges is only limited to the extent to which the winter fodder is available, he who predicts an increase of our ranch stock by four times its present number within the next ten years could not be called over sanguine. The second statement usually made, namely, that the applicant will see that free access is given stock to water on the land he desires, could not be entertained for a moment. It is not in human nature to stand by and see range cattle rubbing down your fences without taking measures to prevent it and that means chiefly running them off with dogs, and in one run of a mile or two more flesh is lost than can be put on in two weeks. Frequently cattle are absolutely ruined from the effects of dogging them. Of course if no fences were put up by these squatters and no dogs kept, no great injury might be done to the cattle by reason of a squatter residing near a spring.

Range cattle will not go near any place where dogs are kept and every settler keeps one or more. Another thing is, that during hot weather it may be observed that after drinking they invariably lie down, and as it is the habit of range stock to graze in considerable bands, from 100 up to several thousand, a very considerable area is required to allow cattle free access to the water; otherwise, the stronger animals will prevent the weaker ones from getting at it, and as they will not graze any considerable distance away from water during hot weather, the necessity for larger reservations becomes still more apparent, as a small area would soon be completely eaten off and the quality of the cattle would thus deteriorate instead of improve. The whole extent of what is known as the grazing district of the North-west territories would be valuable for cattle grazing were it not for the scarcity of water in places at certain seasons of the year. These parts are for that reason of very little use, at least the value is not one tithe of that with a plentiful supply of water at any time. It is, therefore, the duty of the department to preserve as far as possible those watering places that are still available.

As to the charge that many of these reservations contain no water, this may be perfectly true in some cases, and still they may be extremely useful for the purpose of shelter and as furnishing access to valleys and bottoms where pasture and water is abundant. Such is absolutely essential unless the industry is to be completely annihilated. It is nothing unusual after a storm has been raging for a few hours to see large herds of cattle huddled together in narrow valleys, and it is certainly desirable that there should be plenty of room, otherwise the stronger will drive the weaker animals to the wall and either totally kill or seriously injure them. Many of these reservations contain neither shelter nor water in themselves; but by reason of their positions they hold the key to valuable pasturage, water or shelter. In the Porcupine hills and other grazing districts the surface of the ground assumes an almost mountainous character, and although in the summer time cattle will graze up and over the ridges of these hills into the valleys beyond, in the winter time they will not do so, owing to the snow drifting on the east and south slopes immediately under the crests to such a depth that they cannot cross, therefore, the only means of access to the valley under such conditions is by following them up. These valleys are invaluable for stock during hard winters, in fact, in any winter, and while severe storms are raging they are essential to prevent the loss of large numbers. There are many points in those hills where a single settler taking up his location as he particularly desires it would mean the loss in a hard winter of from 250 to 1,000 head of cattle. Placing their value at \$25 each, it will illustrate the damage done. It may naturally be asked, why is the small stockman so objectionable to the larger one? The answer is this. The large man allows his stock to roam at large, therefore, he, in his own interest, must keep the range in such a condition, that cattle will have the freest possible access to all parts thereof. On the other hand the small man for the first few years, and until his band becomes of such size as to make it necessary to do the same as the former, lets them run in a narrow valley or around some fine spring or other open winter water where they are herded in proximity

to his buildings, and in this manner often monopolises an excessive area of land absolutely vital for winter feed. It thus happens that while there is not much objection to the large operator settling there, the mode of settlement adopted by the smaller one is decidedly objectionable and injurious to the public interest. It has been asserted by those who probably best understand the situation that if settlement had been absolutely prohibited in all those portions valuable for winter pasture the country would have gained by such a policy. No one objects to settlement by men, large or small, in the cattle district, where all take equal chances; but when, from extreme selfishness or other motive, parties insist upon taking up locations choice in themselves, and if occupied very injurious to the stock industry and the public interest generally, it is only natural that hostility should be aroused. The cry is raised that the large stockmen are trying to crush the smaller ones. The larger stockmen have never objected to settlement, if the settler will only leave free access to all the winter grazing, shelter and water, for his stock, essential to their welfare, in fact, to the very existence of all. In many places a settler by squatting in a narrow valley, possibly only a quarter of a mile wide, may, by erecting a fence across the same, or even across a portion of the same and keeping dogs, prevent all access to the whole of the valley during the winter time when it is vital to prevent stock perishing. Those valleys contain from 500 up to 5,000 acres of invaluable pasture. As a matter of fact it is not even necessary for him to fence, as, by keeping one or two good dogs, the same end is attained. While such would be a very desirable state of affairs for the individual residing there, it is not in the public interest that it should be permitted. Instead of there being an excess of such points reserved, it would have been decidedly in the interest of the cattle industry and the public generally if more such places, which are now settled upon, had been reserved long ago. It was foreseen at the start that there would be considerable agitation against the reservation of these favoured points by individuals and the friends of those who desired to obtain the same; but it was hoped that through the ejection of a few squatters and a firm attitude on the part of the department in the matter of maintaining these reservations, the clamour against them would soon cease and every one would begin to realize that it is as much in the interest of the small stockman as in that of the larger one that measures of this nature should be adopted while the industry is yet in its infancy and while it is possible to protect vested interests in so doing, and it is asserted that if the squatters now in possession be ejected, the trouble will be ended; if not, the flood-gates for illegitimate settlement will be wide open and official encouragement will be given to a class of people whose ideas should at least not be encouraged.

As the result of representations made by the stockmen and on their behalf, the undersigned was detailed in the year 1886 to select sites along the bottoms of streams, which it would be advisable to reserve for stockwatering and shelter purposes. The district then inspected with a view to making those reservations was necessarily very much smaller than that over which they now extend partly on account of surveys having been made and partly owing to a very considerable area being under lease for grazing purposes. If those reservations had not been made then, the present condition of affairs would have been similar to that now existing along the Waterton river, where during the winter season a large portion of that stream is inaccessible for stock. During the summer time stock can go to water in many places where they would not attempt to go in the winter season on account of snow drifting, etc. Not only are these places desirable for watering purposes, but also for shelter. There is one point on the Waterton river where the fencing of two settlers in connection with the natural features wholly prevents access to the same for five continuous miles, and, what is worse, the fencing ends in a cut bank, so that when cattle strike the same, drifting in an easterly direction, probabilities are that they will break their necks falling over the cut bank, and the pasture of about 25,000 acres is cut off from its natural supply of water and shelter. If these settlers in the grazing district would keep their fences within reasonable bounds there might be no objection to them; but squatters, often on the leaseholds of others, will, by fencing, control several hundred, often thousand, acres, and if an attempt be made to restrain them with reason, the cry is raised of persecution by government officials in the interest of larger stockmen or possibly out of pure whim, caprice or cussedness.

Department of the Interior.

There is one thing about the report of 1885 which strikes me rather forcibly, namely, that at this time it was stated that nearly all the settlement was along the bottoms of streams. This held good at the time and those whose interests were bona fide intended to devote their energies chiefly to the growth of cereals and vegetables, the demand for which exceeded the local production, and the prices were good. It was then thought that the bottoms were the best points in which to conduct the experiment ; experience has shown that such an idea was a mistaken one, as the benches owing to a more retentive subsoil require not more than one-half the moisture the bottoms do. All have now abandoned the idea of making a livelihood by such means except through irrigation. Those who since desired to squat on springs proposed to make their livelihood wholly out of stock.

All of which is respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

WM. PEARCE,
Superintendent of Mines.

No. 3.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INSPECTOR OF AGENCIES,
OTTAWA, 31st December, 1896.

SIR,—I have the honour to submit, through you, for the information of the Honourable the Minister of the Interior, a report on the work of my office for the past twelve months.

On 28th February I left Ottawa to make my half-yearly inspection of the agencies of the department, after having arranged the plans and provided for the erection of the Dominion immigration building at Halifax.

I was absent from Ottawa until the 23rd May.

During my absence I inspected the Dominion lands and Crown timber offices at Calgary, New Westminster, Edmonton and Prince Albert, and the Dominion lands offices at Kamloops, Wetaskiwin, Regina and Winnipeg. In addition to the inspections I arranged for the transfer of records from Regina to Maple Creek, and for the opening of an office at that point. The opening of this office resulted in increased business and revenue to the department.

As the immigration season was advancing I returned to Ottawa with the intention of inspecting the immigration buildings and offices at Quebec and Montreal, but was unable to do so owing to the Minister's desire that I should take charge of Banff park during the superintendent's absence. I left Ottawa on 13th June to carry out his instructions.

My work at Banff was concluded in August, and to save expense in returning to Ottawa I made my fall inspections and visited the offices at New Westminster, Kamloops, Calgary, Edmonton and Red Deer. The Lethbridge agent was absent on leave and I had therefore to pass his office over.

From Calgary I went to Maple Creek and inspected the office there. I then inspected the offices at Estevan, Regina, Brandon, Minnedosa, Yorkton and Lake Dauphin.

In some districts, owing to the train service, it was necessary to put in many hours during the night and on Sundays to make connections.

As a rule I found the outside service of the department doing its utmost to keep matters in an efficient state.

On account of the incomplete period covered by the statement of work which accompanied my report of last year, two statements are submitted covering the calendar years 1895 and 1896, from which it will be seen that though there has been a falling off in entries there has been a considerable increase in correspondence and other work.

In addition to the inspection work and matters referred to me for examination and report, two thousand seven hundred and eleven returns were examined and checked.

I have the honour to be, sir,

Your obedient servant,

J. M. GORDON,

Inspector of Dominion Lands and Immigration Agencies.

H. H. SMITH, Esq.,
Commissioner Dominion Lands,
Winnipeg, Man.

Department of the Interior.

STATEMENT giving an outline of the Work performed at the several Dominion Lands Agencies during the Calendar Year ending 31st December, 1896.

AGENCY.	Homestead Entries.	SALES.		ENTRIES CANCELLED.		Mining Locations Recorded.	Hay Permits Issued.	Applications for Homestead Patent Approved.	LETTERS.		Returns to Head Office.
		Pre-emptions.	General.	Homesteads.	Pre-emptions.				Received.	Sent.	
Battleford.....	8		+2	11	6		84	9	397	782	80
Beaver Lake*.....	2			6				8	27	63	12
Calgary.....	68	2	12	68	14	11	67	74	2,144	2,388	691
Coburn.....	31	2	5	49	20		49	97	1,637	1,324	140
Edmonton.....	127	4	11	87	4	9	139	221	2,699	3,409	151
Kamloops.....	48	+21	+1 15	17		2	14	36	1,240	1,302	76
Lake Dauphin.....	394	1	3	69	5	1	103	77	82,030	81,667	192
Leithbridge.....	82	1	+3 7	27	2		23	24	1,371	1,103	59
Little Saskatchewan.....	120	2	2	90	21		118	140	2,310	2,197	60
New Westminster.....	43	+19	4	3		1		34	1,380	1,798	49
Prince Albert.....	58	1	3	44	9	3	110	72	2,253	1,293	101
Qu'Appelle.....	173	11	12	125	62		290	280	5,027	5,317	83
Red Deer.....	69		1	65	5	1	87	113	3,481	2,830	75
Souris.....	281	13	14	193	82	1	575	451	9,183	8,636	91
Swift Current.....	24			8	1		8	3		443	93
Touchwood.....	68		1	53	18		89	66	1,676	1,677	97
Wetaskiwin.....	63			90			15		1,217	1,467	63
Winnipeg.....	198	4	39	85	55	34	473	160	7,103	7,086	118
Totals.....	1,887	81	135	1,090	304	63	2,244	1,948	46,198	44,782	2,231

* This agency was only open during the months of June, July, August and September. † Town site. ‡ Homesteads sold. § Circulars included.

J. M. GORDON,
Inspector of Dominion Lands Agencies.

STATEMENT giving an outline of the Work performed at the several Dominion Lands Agencies during the Calendar Year ending 31st December, 1895.

AGENCY.	Homestead Entries.	SALES.		ENTRIES CANCELLED.		Mining Locations Recorded.	Hay Permits Issued.	Applications for Homestead Patent Approved.	LETTERS.		Returns to Head Office.
		Pre-emptions.	General.	Homesteads.	Pre-emptions.				Received.	Sent.	
Battleford	3		+3	3	1		78	11	278	543	63
Beaver Lake*	47			30			1	8	213	322	101
Calgary	103	2	9	67	15	5	177	52	1,887	1,607	360
Coteau	36	2		73	11		70	84	2,032	1,573	78
Edmonton.	204	6	8	89	7	1	49	154	2,282	2,259	70
Kamloops	48	+19		13		1	8	24	1,178	1,142	57
Lake Dauphins	266										
Lethbridge	118		+111	22	4	2	27	22	1,141	976	62
Little Saskatchewan.	167	4	5	189	34		170	124	2,622	2,623	59
New Westminster	19	+33		5		1		68	2,422	2,274	48
Prince Albert	119	4	1	48	8		86	52	1,184	1,157	49
Red Deer	180	5	6	105	63		361	243	5,111	5,109	57
St. Appelle	214		4	94	7		125	86	1,680	1,391	54
Swift Current	278	9	8	229	77		690	348	9,657	8,941	69
Touchwood.	16			5			14	6	241	359	54
Wetaskiwin.	98	1	3	71	24		236	65	1,975	2,150	54
Winnipeg.	314	6	5	174			14	12	1,251	1,870	50
	155		+117	89	13	3	549	145	6,911	6,954	64
Totals	2,394	91	99	1,315	264	13	2,655	1,504	42,035	41,250	1,349

* This agency was closed on the 30th September. † Homesteads sold. ‡ Town site. § Lake Dauphin does not make a return showing work performed. Homestead and sales entries are reported through the Little Saskatchewan office.

J. M. GORDON,
Inspector of Dominion Lands Agencies.

Department of the Interior.

No. 4.

TIMBER, MINERAL, GRAZING AND IRRIGATION.

DEPARTMENT OF THE INTERIOR,
OTTAWA, 5th February, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the sixteenth annual report of the Timber, Mineral, Grazing and Irrigation branch of the Department of the Interior. Statements prepared by Mr. Frs. Loyer, book-keeper of this branch, show that the revenue derived from the Crown timber, grazing, hay and mineral lands, but exclusive of sales of mineral lands, during the calendar year 1896, amounted to \$88,809.26. The revenue for the calendar year 1895 was \$92,339.82. The above amounts include the dues received for timber, grazing, and hay cut on school lands.

The statements in question, lettered A, B and C, together with reports of the Crown timber agents at Winnipeg, Man., Calgary, N.W.T., Edmonton, N.W.T., Prince Albert, N.W.T., and New Westminster, B.C., are appended hereto.

For the sake of reference and comparison, statements lettered D and E showing both by departmental and fiscal years the revenue received from timber, mineral, grazing and hay lands from the year 1872 up to the 1st of January, 1897, not including sales of mineral lands, have also been prepared and will be found at the end of this report.

The statements referred to in the preceding paragraph do not include the revenue from school lands, but statement lettered F appended hereto shows the revenue from this source for the fiscal year 1895-96, and statement lettered G shows the total revenue up to the 30th June, 1896.

The total revenue of the Winnipeg office for the calendar year 1896 amounted to \$36,349.15, being an increase of \$4,350.06 as compared with the revenue of the corresponding year.

The prices of pine lumber and spruce within the Winnipeg agency were \$19.00 and \$17.00 per thousand feet B.M. respectively. There are 29 mills in operation within the agency cutting under Government license.

The revenue received from the British Columbia Crown timber agency during the year was \$18,793.96, being a decrease of \$4,791.96. Of the amounts collected the sum of \$2,758.75 has been received as bonuses for licenses to cut timber on fifteen berths put up to public competition. The total area acquired was about 10.43 square miles, averaging a bonus of \$264.50 per square mile.

The total quantity of lumber manufactured for the year amounted to 13,712,594 feet B.M. as compared with 10,042,087 feet B.M. for last year, and sold at the rate of \$7.00 to \$9.00 per thousand.

There are 11 mills within this agency operating under license from the Dominion Government.

The total amount of dues collected within the Calgary agency during 1896 amounted to \$3,754.65, being a decrease of \$3,257.48 as compared with last year.

The price of lumber at Calgary was from \$8 to \$16, and at Fort McLeod \$10. Ten saw mills were operating within this agency last year under Government license.

The total amount of dues collected within the Edmonton agency during the year amounted to \$3,145.96, being a decrease of \$272.77 as compared with last year. The price of lumber at Edmonton during the year was \$8 to \$16 per thousand feet B.M. The agent reports two saw-mills in operation within this agency.

Lumber sold at Prince Albert from \$8 to \$25 per thousand feet. There are three saw-mills in this agency cutting timber under license.

Saw-mill returns received at the head office gave the following quantities of building material as having been manufactured and sold during the year within the five agencies :—

	Manufactured.	Sold.
Sawn lumber.....	34,817,909	32,545,721
Shingles.....	3,615,948	3,438,839
Laths.....	338,083	450,375

One hundred and thirty-six licenses to cut timber over a total area of 2,678.51 square miles were prepared during the year. The areas licensed in the province of Manitoba, the three provisional territorial districts, and on Dominion lands in the province of British Columbia, are as follows :—

	Sq. Miles.
Manitoba.....	658.79
Alberta.....	1,308.15
Assiniboia.....	95.00
Saskatchewan.....	246.54
British Columbia.....	370.03

The number of applications received during the year 1896 to cut timber was 84, of which 56 were for licenses and permits to cut timber in Manitoba and the North-west territories, and the remainder to cut timber on Dominion lands in British Columbia.

Within the past year forty-eight berths have been cancelled, owing to the persons to whom they were granted not having complied with the provisions of the regulations, or by request of the owners thereof. The total area of these berths was approximately 1,193.31 square miles. The number of berths still in force under license and permit in the province and territories is 293, and on Dominion lands in British Columbia 155.

Department of the Interior.

The following statements show the timber limits either licensed or authorized to be licensed within the several Crown timber agencies:—

WINNIPEG AGENCY.

Limit.	License.	Name.	Locality.	Area. Sq. Miles.	Date of Last Mill Return.
1	Lease 10	D. E. Sprague	Roseau and Pine Rivers	8.20	Qr. 30th Sept., 1896.
2	do	do	do do	4.30	Qr. 30th do 1896.
40 or L 6	6	R. W. Gibson	Bird-Tail Creek	13	Qr. 30th do 1896.
14	90	A. Ferguson	Shell River	50	Not operating.
15a	91	do	do	11.25	do
15	91	do	do	38.75	do
16	21	D. Ross	Near Whitemouth River.	120	Qr. 31st Dec., 1896.
23	92	A. Ferguson	Shell River	50	Not operating.
25a	233	do	do	25	do
25	233	do	do	25	do
26a	122	H. B. Mitchell	do	5.83	Qr. 30th June, 1896.
26b	122	do	do	3	Qr. 30th do 1896.
26c	Not issued	do	Lake Winnipeg	10	Qr. 30th do 1896.
26d	do	do	Near Sand River	9.63	Qr. 30th do 1896.
26	122	do	Shell River	3.13	Qr. 30th do 1896.
27a	140	Asessippi Milling Co.	do	11.50	Qr. 30th do 1896.
27b	140	do	do	3.75	Qr. 30th do 1896.
27	140	do	do	5.06	Qr. 30th do 1896.
28a	140	do	do	1	Qr. 30th do 1896.
28	140	do	do	25.75	Qr. 30th do 1896.
48	112	H. B. Mitchell	Little Boggy Creek	33.50	Qr. 31st Dec., 1896.
92	Not issued	M. K. Dickinson	Little Swan River	50	Not operating.
356	do	V. B. Wadsworth	Red Deer River	50	do
544	113	Wm. Robinson	Bad Throat River	5.60	Qr. 31st Dec., 1896.
546	Not issued	Imperial Bank of Can.	do	49.14	Not operating.
547	97	J. A. Christie	Tp. 33, R. 3, W 2nd M.	42.25	Qr. 1st May, 1896.
551 D	173	Chas. Geikei	Tp. 23, R. 19, W 1st M.	18	Qr. 30th June, 1896.
554	124	D. E. Sprague	Two Islands in White-mouth Lake.	2	Qr. 30th do 1896.
567, No. 1	196	P. McArthur	Fairford River	2.69	Qr. 31st Dec., 1896.
567 do 3	196	do	do	8	Qr. 31st do 1896.
567 do 4	196	do	do	13.40	Qr. 31st do 1896.
567 do 5	196	do	do	17.10	Qr. 31st do 1896.
567 do 6	196	do	do	17.82	Qr. 31st do 1896.
568	Not issued	T. T. W. Bready	Tp. 18, R. 7, E. P. M.	16.88	Now operating under permit.
571	do	Jas. Shaw	Tps. 25-26, R. 25, W. P. M.	40	Qr. 31st Dec., 1896.
575	220	John Watson	Tps. 22-23, R. 20 W. P. M.	18	Qr. 30th Sept., 1896.
578	Not issued	D. H. Harrison	Tp. 23, R. 18, W. P. M.	14	Qr. 30th do 1896.
580	do	H. B. Mitchell	Black Bear Island	3	Not operating.
Part 581	179	H. Roberts	Tp. 19, R. 19, W. P. M.	2	Qr. 31st Dec., 1896.
do 581	178	J. A. Christie	do	16	Not operating.
585	152	Geo. Kerr	Tp. 8, R. 7, Tp. 17, R. 17, Tp. 18, R. 16, W. P. M.	0.75	Qr. 30th Sept., 1896.
587	Not issued	David Ross	Whitemouth River	16	Qr. 30th do 1896.
592	174	Geo. W. Erb	Tp. 18, R. 3, E. P. M.	4.50	Qr. 30th June, 1896.
603	201	do	do	2	Qr. 30th do 1896.
605	228	Drake & Co	do	10.70	Qr. 30th do 1896.
609	Not issued	McRae, Rochester & Charette.	Part on shore of Long Lake.	50	Not operating.
613	207	I. & H. McCorquadales.	Tps. 2, R. 20-21, W. P. M.	2	Qr. 31st Dec., 1896.
615	217	F. A. Fairchild	Tps. 18-19, R. 19, Tp. 19, R. 20, W. P. M.	7.93	Qr. 31st do 1896.
618	Not issued	J. A. Christie	Tps. 21-22, R. 21, W. P. M.	6	1st May, 1894.
619	216	Freiser, Reimer & Co.	Tp. 4, R. 9, E. P. M.	12.46	Qr. 30th Sept., 1896.
621	Not issued	Wm. Robinson	Bad Throat River	16.51	Qr. 31st Dec., 1896.
22, No. 1	218	do	Black River	14	Qr. 31st do 1896.
22 do 2	Not issued	do	do	0.88	Qr. 31st do 1896.
2 do 3	do	do	do	3.10	Qr. 31st do 1896.

WINNIPEG AGENCY—Continued.

Limit.	License.	Name.	Locality.	Area.	Date of Last Mill Return.
				Sq. Miles.	
622 do 4	Not issued	Wm. Robinson.....	Black River	1.08	Qr. 31st do 1896.
622 do 5	do	do	do	1.10	Qr. 31st do 1896.
624 do 1	237	D. E. Sprague.....	Between Lake of the Woods and White-mouth Lake.	5	Qr. 30th Sept., 1896.
624 do 2	237	do	do	22.75	Qr. 30th do 1896.
624 do 3	237	do	do	1.60	Qr. 30th do 1896.
624 do 4	237	do	do	3	Qr. 30th do 1896.
624 do 5	237	do	do	3	Qr. 30th do 1896.
625	212	Frank L. Engman.....	Tp. 18, R. 17, W.P.M.	1.50	Qr. 31st Dec., 1896.
629	Not issued	John Pollock.....	Tp. 33, R. 3, Tp. 34, R. 4, W.P.M.	10.83	Qr. 30th Sept., 1896.
632	do	C. Jones	Lake Winnipeg.....	4	Not operating.
662	do	J. A. Christie.....	Tp. 21, R. 21, W.P.M.	2	do
670	do	do	do	1	do
672	do	Isaac Riley.....	Near Humbug Lake	3	Qr. 31st Dec., 1896.
676	do	Frank L. Engman	Tp. 19, R. 18, W.P.M.	4	Not operating.
700	do	Hooker & Co	Punk Island	4	do
702	do	H. B. Mitchell.....	Lake Winnipeg.....	2	Qr. 30th Sept., 1896.
703	do	Isaac Riley	do	3	Qr. 30th do 1896.
704	243	W. J. Manning	Tp. 19, R. 1, E.....	9	Qr. 30th do 1896.
705	242	John D. McArthur	Tp. 21, R. 27, W.P.M.	1	Not operating.
712	Not issued	J. A. Christie.....	Tp. 34, R. 3, W.2nd M.	2	15th May, 1896.
713	do	do	Tp. 34, R.2-3, W.2nd M.	7	Not operating.
716	do	Wm. Robinson	Black River.....	25	Qr. 30th Dec., 1896.
721	244	Finnson, Eyeoltson & Co.	Tp. 23, R. 3, E.P.M....	50	Qr. 30th June, 1896.
722	245	Finnson, Eyeoltson & Co.	do do	3.25	Qr. 17th Sept., 1896.
726	Not issued	J. A. Christie.....	Tp. 33, R. 1, Tp. 34, R. 2, W.2nd M.	7	Qr. 1st May, 1896.
728	do	P. McArthur	Tps. 29, R. 8-9, W.P.M.	21	Not operating.
733	do	Mackenzie, Mann & Co.	Shoal River	7.30	do
734	do	do	Swan Lake.....	10	do
735	do	do	do	9	do
736	do	do	do	10	do
737	do	do	do	8.80	do
741	do	The Fairchild Co	Tp. 19, R. 20, W.P.M.	2	do
742	do	J. D. McArthur.....	Tp. 30, R. 30, W.P.M.	6	do
744	do	P. McArthur	Tps. 29, R. 12-13, W.P.M.	10	do
745	do	Wm. Robinson	Bad Throat River.....	8	do
747	do	Drake & Co	Little Moose Island...	8	do
751	do	J. A. Christie.....	Tp. 30, R. 30, W.P.M.	6	do
752	do	do	Tp. 20, R. 22, W.P.M.	6	do
754	do	S. T. Thomas	Tp. 18, R. 3, E.P.M....	1	do
756	do	Wm. Robinson	On W. side L. Winnipeg	10	do
759	do	H. B. Mitchell.....	Lake Winnipeg.....	50	do
		Total		1,291.07	

Department of the Interior.

PRINCE ALBERT AGENCY.

Limit.	License.	Name.	Locality.	Area.	Date of Last Mill Return.
				Sq. miles.	
9 Block 1	Lease 15	Geo. Burn	Red River	6 00	30th June, 1896.
9 do 2	do	do	do	6 04	do
9 do 3	do	do	do	1 87	do
66 or "A"	Lease 14	Edward Murphy	Pelican Lake	101 00	Not operating.
	33	Geo. Burn	Near Junction Rabbit Creek.	47 83	30th June, 1896.
	49	do	Little Red River	50 00	do
245	80	do	Fox and Upper Rabbit Creek.	50 00	do
320		do	Sandy Lake	50 00	do
474	79	do	West end Salt Channel	0 39	None.
563	Not issued	Pas Band of Indians	Little Red River	0 25	31st March, 1896.
564	do	D. Shannon	N. Saskatchewan River	2 00	Not operating.
595	do	Moore & Macdowall	Tp. 52, R. 1, W. 3rd M.	6 00	30th Sept., 1896.
598	192	Jas. Sanderson	Stony Lake	35 00	Not operating.
616	225	do	do	3 59	do
616 A	225	do	do	4 12	30th Sept., 1896.
633	230	Jas. Sanderson	Tps. 51-52, R. 1, W. 3rd M.		
	Lease 15	Geo. Burn	District of Saskatchewan.	10 19	30th June, 1896.
691		do	Tp. 23, R. 4, W. 3rd M.	5 00	Not operating.
698	Not issued	Moore & Macdowall	Stony Creek	6 00	31st Dec., 1896.
708	do	D. L. Shannon	Near Sandy Lake	49 00	Not operating.
710	do	do	Near Junction Rabbit Creek.	3 60	do
714	do	do	Tp. 50, R. 13, W. 3rd M.	6 00	do
720	do	J. G. Oliver	Tps. 52, Rgs. 1 and 2, W. 3rd M.	9 00	do
729	do	Jas. Sanderson	do		
		Total		452 88	

EDMONTON AGENCY.

Block 5	Lease 15	Geo. Burn	Red River	8 55	30th June, 1896.*
do 6	do	do	do	17 50	do *
39	52	O. R. Fraser	N. Saskatchewan River	45 84	31st Dec., 1896.
302	83	Geo. Burn	do	3 75	30th June, 1896.*
496	87	do	do	50 00	31st Oct., 1895.
627	231	Fraser & Co	Tps. 49-50, R. 5, W. 5th M.	8 24	31st Dec., 1896.
631*	229	D. Wm. McKenzie	Tp. 42, R. 25, W. 4th M.	0 25	30th Sept., 1896.
653	223	Walter & Humberstone	Tps. 51, Rgs. 26 and 25, W. 4th M.	4 25	do
645	Not issued	Wm. Short	Tps. 51 and 52, R. 27, & Tp. 51, R. 28, W. 4th M.	6 00	31st March, 1896.
646	do	D. R. Fraser	Tp. 50, R. 4, W. 4th M.	5 00	31st Dec., 1896.
674	do	P. Otterwell & Co	District of Alberta	9 00	30th June, 1896.
727	do	John Hall	Tp. 57, R. 24, W. 4th M.	0 50	Not operating.
		Total		158 88	

* This limit formerly situated within the boundaries of the Calgary Agency. * Returns made through the Prince Albert Agency.

CALGARY AGENCY.

Limit.	License.	Name.	Locality.	Area.	Date of Last Mill Return.
				Sq. miles.	
34	30	Jas. Walker.....	Bow River.....	42 29	31st October, 1895.
36 No. 1	99	Peter McLaren.....	S. Fork of Old Man Rv.	3 00	31 December, 1896.
36 No. 2	99	do.....	do do ..	5 25	do
36 No. 3	99	do.....	do do ..	5 48	do
36 No. 4	99	do.....	do do ..	3 75	do
36 No. 5	99	do.....	do do ..	10 00	do
36 No. 6	99	do.....	do do ..	2 80	do
36 No. 7	99	do.....	do do ..	7 40	do
36 No. 8	99	do.....	do do ..	1 20	do
36 No. 9	99	do.....	do do ..	1 44	do
36 No. 10	99	do.....	do do ..	5 67	do
36 No. 11	99	do.....	do do ..	3 90	do
36a No. 1	117	do.....	Middle Fork of Old Man River.	28 13	do
36a No. 2	117	do.....	do do ..	8 25	do
36a No. 3	117	do.....	do do ..	8 75	do
36a No. 4	117	do.....	do do ..	2 73	do
36a No. 5	117	do.....	do do ..	2 25	do
80	45	North-west Coal and Navigation Co.	Near South Fork Old Man River.	50 00	30th September, 1896.
105	39	Alberta Lumber Co...	Red Deer River.	47 00	30th June, 1895.
106	36	do.....	do.....	47 75	do
179	86	Peter McLaren.....	Middle Fork of Old Man River.	50 00	Not operating.
185	37	Alberta Lumber Co...	Red Deer River.....	48 75	30th June, 1895.
186	38	do.....	do.....	47 70	do
*199	46	do.....	S. S. Clearwater Lake.	51 24	do
*200	46	do.....	do do ..	50 21	do
*203	46	do.....	do do ..	50 40	do
*240	46	do.....	do do ..	49 91	do
*242	46	do.....	do do ..	50 04	do
252	115	Peter McLaren.....	Red Deer River.....	47 85	Not operating.
253	114	do.....	do.....	50 00	do
292	183	Chas. Beck.....	North Fork High River	47 08	do
318E	88	Eau Claire and Bow River Lumber Co.	Bow River.....	16 50	1st May, 1896.
318F	88	do.....	do.....	16 00	do
318H	88	do.....	do.....	6 00	do
318I	88	do.....	do.....	4 00	do
318J	88	do.....	do.....	5 63	do
380	93	The Earlof Norbury and T. B. H. Cochrane...	West of 5th M. Tps. 27, 28, 29, R. 5, Tps. 27, 28 R. 6.	5 00	Not operating.
417K	88	Eau Claire and Bow River Lumber Co.	Bow River.....	7 50	1st May, 1896.
*425	50	Alberta Lumber Co...	S. S. Clearwater Lake.	35 25	Not operating.
455	Not issued	P. McLaren.....	Red Deer River.....	48 93	do
468	111	Jas. Quinn.....	Little Red River.....	50 00	do
533 ORN	118	North Western Coal and Navigation Co.	Bow River.....	50 00	30th Sept. 1896.
550 1 O	126	G. H. Lewis.....	do.....	9 37	Not operating.
550 1 P	126	do.....	do.....	18 00	do
552	Not issued	La Corporation Episcopale Catholique Romaine de St. Albert and Mgr. Goupart.	Cascade River.....	5 00	do
559	128	D. Morrison.....	Near S. F. of Sheep Riv.	3 41	31st March, 1896.
569	170	J. Lineham.....	S. Fork Sheep River..	21 33	30th June, 1896.
573	Not issued	Dept. of Indian Affairs.	Tp. 9, R. 3, W 4th M..	11 35	None.
579	213	Wm. D. Lineham.....	North Fork High River	33 33	Not operating.
582	Not issued	Dept. of Indian Affairs.	Belly River.....	6 50	None.
583	143	R. G. Belvidere.....	T. 1, Rgs. 27, 28 W 4th M	4 00	31st December, 1896.
593	Not issued	M. S. Cross.....	Vicinity of Pincher Ck.	7 00	Not operating.
594	190	John Lineham.....	S. Fork Sheep River..	6 13	30th June, 1896.
606	Not issued	A. W. Cottingham...	N. Fork Old Man River	3 00	31st December, 1895.
755	Not issued	Chas. Billings.....	Tp. 24, R. 5, W. 5th M.	1 00	Not operating.
		Total area.....		1,197 45	

*Limit formerly situated within the Edmonton agency.

Department of the Interior.

NEW WESTMINSTER AGENCY.

Limit.	License.	Name.	Locality.	Area.	Date of Last Mill Return.
Aa, Ab	119	Yorkshire Guarantee & Securities Corporation (Lt.)	South of Cheam Indian Reserve.	680 acres	31st March, 1896.
B	102	British Columbia Mill, Timber & Trading Co.	Tp. 7, Lot 362, G. 1, New West.	3,480 do	30th June, 1896.
H	108	do	Tp. 2, Lot 33, Bk. 5, R. 2, W. 6th M.	1,120 do	do
K	107	Grant & Kerr	Tp. 2, Dist. New West.	360 do	30th Sept., 1896.
L	109	British Columbia Mill, Timber & Trading Co.	Tp. 7, New West.	640 do	30th June, 1896.
M	159	H. West.	Stave River.	541 do	do
O	184	British Columbia Mill, Timber & Trading Co.	Tp. 39 North, Dist. New West.	1,600 do	do
Q	141	Grant & Kerr	Tp. 1, Dist. New West.	640 do	30th Sept., 1896.
R	120	The British Columbia Timber & Electric Co.	Tp. 2, Rgs. 1 & 2, Dist. New West.	2,720 do	Not operating.
T	121	H. T. Thrift	Tp. 7, Dist. New West.	320 do	do
W	138	Dobbie, Davidson & Strathy.	Tps. 4, 2, 12, Dist. New West.	10,704 do	do
X	197	Thos. L. Briggs	Tp. 13, East of Coast M	4,800 do	do
Y No. 1	182	Mossom Boyd Co.	Upper and Lower Lillooet Lakes.	3'20 sq.m.	do
Y No. 2	182	do	do	2'50 do	do
Z No. 1	154	Davidson, Henderson & Strathy.	Tp. 15, East of Coast M	7'22 do	do
Z No. 2	154	do	do	5'75 do	do
3	103	W. C. Wells	Kicking Horse River	2'00 do	30th Sept., 1896.
5	134	J. B. & T. S. Rielly	Kicking Horse River and Beaver Ck.	10'00 do	do
14	204	Columbia River Lumber Co.	Columbia River	49'23 do	31st Dec., 1896.
15	204	do	do	42'30 do	do
16	200	Jas. W. Bryson	do	15'55 do	do
17	Not issued	Hon. Geo. Bryson	do	16'50 do	do
18	do	John Dill	do	50'00 do	Not operating.
19	do	Columbia River Lumber Co.	do	25'00 do	31st Dec., 1896.
20	142	T. & J. Long	Blue Water River	34'55 do	Not operating.
23	Not issued	T. H. Allan	Illecillewaet River	10'00 do	do
25	do	D. Ward	Columbia River	50'00 do	do
27	130	Columbia River Lumber Co.	do	1'00 do	31st Dec., 1896.
29	202	W. C. Wells	Tp. 25, R. 19, W. 5th M	13'16 do	30th Sept., 1896.
30	130	Columbia River Lumber Co.	Columbia River	4'40 do	31st Dec., 1896.
32	Not issued	Geo. Goodwin	Illecillewaet River	640 acres	Not operating.
33 No. 1	146	Brunette Saw Mill Co.	Stave River and Stave Lake.	1,024 do	31st Dec., 1896.
33 No. 2	146	do	do	2,803'20 do	do
33 No. 3	146	do	do	342 do	do
33 No. 4	146	do	do	155 do	do
36	123	Thos. W. Patterson	Tp. 39, G. 1, Dist. New West.	1,371'20 do	Not operating.
38	169	Wm. Caldwell	Coquitlam and Gold Ck	14'50 sq.m.	do
40 No. 1	Not issued	Columbia River Lumber Co.	Stony Creek	6'25 do	31st Dec., 1896.
40 No. 2	do	do	do	4'00 do	do
42	177	do	Columbia River	8'50 do	do
43	162	E. A. Willmott & Co.	Tps. 4 and 5, R. 28, W. 6th M.	1,685 acres	Not operating.
44 No. 1	167	Brunette Saw Mill Co.	Bks. 12, 3, 4, Prov. B.C.	396'70 acres	31st Dec., 1896.
44 No. 2	167	do	do	650 do	do
44 No. 3	167	do	do	500 do	do
44 No. 4	167	do	do	659'81 do	do
44 No. 5	221	do	Lillooet River	160 do	do
45	Not issued	Shushwap Milling Co.	Spallumcheen River	24'50 sq.m.	30th Sept., 1896.
47	205	Columbia River Lumber Co.	Blackwater Creek	22'66 do	31st Dec., 1896.

NEW WESTMINSTER AGENCY—Continued.

Limit.	License.	Name.	Locality.	Area.	Date Last Mill Return.
48 No. 1	Not issued	Knight Bros.	Near James Lake ...	3,500 acres	Not operating.
48 No. 2	do	do	do		
48 No. 3	do	do	do		
49	133	Stein & Robinson.	Tp. 23, R. 2, W. 6th M.	560 do	31st Dec., 1896.
50 c	155	McLaren & Ross.	Chilliwack River.	10'50 sq.m.	Not operating.
51	Not issued	Grant & Kerr.	Tp. 2, G. 2, N. West. Dist.	640 acres	30th Sept., 1896.
52	157	E. A. Wyk.	Tp. 39, New West. Dist.	876'30 do	Not operating.
54	Not issued	H. V. Edmunds.	Tp. 2, R. 29, W. 6th M.	1,120 do	do
55	do	Ross & McLaren.	Tps. 19, 22, 25, East Coast M.	15,900 do	do
57	150	Huntingd'n Lumber Co	Tp. 16, Dist. N. West. .	1,920 do	Qr. 31st Dec., 1896.
58	137	Thos. W. Patterson. .	Tp. 39, Dist. N. West. .	480 do	Not operating.
61	153	Yorkshire Guarantee & Securities Corporation (Ltd.)	Tps. 2 and 3, R. 29, W. 6th M.	130'33 do	31st March, 1896.
63 No. 1	194	Jos. Martin & Sons. .	Harrison Lake.	960'64 do	Not operating.
64	184	Shuswap Milling Co. .	Illecillewaet River. .	947'20 do	30th Sept., 1896.
65	Not issued	Columbia River Lumber Co.	Wait-a-bit Creek.	27 sq.m.	31st Dec., 1896.
66	180	do	Sec. 24, Tp. 20, R. 10, W. 6th M.	542 acres	do
67	Not issued	Chas. H. Carrière.	Hospital Creek.	960 acres	Not operating.
68	195	Brunette Saw Mill Co.	Tp. 6, R. 7, W. 7th M.	2,670 do	31st Dec., 1896.
69	149	E. A. Wyld.	Tp. 39, W. Coast M. .	354 do	Not operating.
70	Not issued	Columbia River Lumber Co.	Columbia River.	50 sq.m.	30th Dec., 1896.
71	163	Genelle Bros.	Tp. 22, Rgs. 10, 11, W. 6th M.	2,560 acres	30th June, 1896.
72	186	do	Salmon Arm of Shuswap Lake.	4'79 sq.m.	do
73	Not issued	Columbia River Lumber Co.	Columbia River.	18 do	31st Dec., 1896.
74	do	do	do	27 do	do
77	148	T. J. Hammill.	Tp. 39, Dist. New West.	384 acres	Not operating.
78	165	Genelle Bros.	Tp. 21, R. 10, W. 6th M.	2,118 do	30th June, 1896.
79	198	T. L. Briggs.	Tps. 3, 4, Rgs. 3, 4, W. 7th M.	2,240 do	Not operating.
80	172	T. J. Hammill.	Tp. 4, R. 4, W. 6th M.	149 do	do
81	Not issued	Huntingdon Lumber Co.	Tp. 16, New West. Dist.	960 do	Qr. 31st Dec., 1896.
83A	do	McLaren Ross Lumber Co.	Railway Belt B. C. . .	362 do	Not operating.
83B	do	do	do do	680 do	do
85	do	S. Barber.	Columbia River.	79 sq.m.	do
86	do	Royal City Planing Mill Co.	New West. District. .	420 acres	30th June, 1896.
87	do	do	Tps. 2 & 38, R. 1, W. .	640 do	do
88	185	Genelle Bros.	Columbia River.	4'22 sq.m.	do
89	Not issued	S. Barber.	do	3 do	Not operating.
90	156	Brunette Saw Mill Co.	N. R. 1, New West. Dist. Lots 14, 15, 22, 23, 24, 25, 26, 27, Blk. 5.	2 do	31st Dec., 1896.
91	191	Martin Bros.	Tributary Harrison L.	1 do	Not operating.
94	210	Thos. W. Patterson. .	Tp. 39, W. Coast M. .	480 acres	do
96	188	Brunette Saw Mill Co.	Stave River.	640 do	31st Dec., 1896.
98	Not issued	Royal City Planing Mill Co.	Near Stave Lake.	400 do	30th June, 1896.
99	do	do	Tp. 41, New West. Dist.	1'25 sq.m.	do
101	198	T. L. Briggs.	Tps. 3, 4, W. 7th M. .	160 acres	Not operating.
103	189	H. West.	Stave River.	163 do	30th June, 1896.
104	Not issued	J. F. Armstrong.	Columbia River.	160 do	Not operating.
105	do	Columbia River Lumber Co.	do	6 sq.m.	31st Dec., 1896.
106	do	H. R. Stephen.	Stave River.	3,450 acres	Not operating.
108	do	Geo. A. Keffer.	Near source Shuswap River.	64'75 sq.m.	do
110	do	Thos. W. Patterson. .	Tp. 39, Dist. New West.	384 acres	do
111	211	do	do do	640 do	do
112	Not issued	Fred. Robinson. . .	Columbia River.	3 sq.m.	do

Department of the Interior.

NEW WESTMINSTER AGENCY—*Concluded.*

Limit.	License.	Name.	Locality.	Area.	Date Last Mill Return.
				Sq. miles.	
113	Not issued	Fred Robinson.....	Columbia River.....	3 sq. m.	Not operating.
114	do ..	Genelle Bros.....	do	9 do	30th June, 1896.
116	do ..	Fred. Robinson..	Beaver River.....	4 do	Not operating.
117	do ..	do	do	4 do	do
118	do ..	do	Columbia River....	9 do	do
119	219	Jos. Genelle.....	Salmon Arm of Shuswap Lake.	393 acres	30th June, 1896.
120	234	W. H. Kendall..	Burrard Inlet, Tp. 6, R. 7, W. 7th M.	813 do	30th Sept., 1896.
122	215	Brunette Saw Mill Co.	Tp. 21, East of Coast M.	320 do	31st Dec., 1896.
123	Not issued	Fred. Robinson..	Tp. 23, R. 2, W. 6th M.	240 do	Not operating.
125	do ..	Brunette Saw Mill Co.	Near Burrard Inlet...	530 do	31st Dec., 1896.
127	do ..	Genelle Bros.....	Columbia River.....	1,920 do	Not operating.
128	do ..	do	do	640 do	do
129	do ..	Peter Genelle & Co...	Tp. 22, R. 10, W. 6th M.	2,120 do	do
130	224	E. B. Knight.....	Four Small Islands in Fraser River.	1,500 do	do
131	Not issued	C. J. Major.....	Tp. 39, W. of Coast M.	627 do	do
134	do ..	Peter Genelle & Co...	Tp. 22, R. 10, W. 6th M.	176 do	do
136	246	Geo. Finney.....	Adjacent to Bonaparte Indian Reserve.	873'60 do	30th Sept., 1896.
138	Not issued	J. W. McRae.....	Tp. 18, E. of Coast M.	985 do	Not operating.
139	do ..	Jas. Genelle.....	Tps. 22 & 23, R. 11 & Tp. 23, R. 10, W. 6th M.	1,120 do	do
140	do ..	Jos. Genelle.....	Tp. 24, R. 8, W. 6th M.	960 do	do
141	do ..	do	Tps. 21 & 22, R. 8, W. 6th M.	960 do	do
143	do ..	Brunette Saw Mill Co.	Pitt Lake.....	160 do	do
144	do ..	Arthur Thretheway...	Harrison Lake.....	216 do	do
145	do ..	Jas. Thretheway....	do	216 do	do
147	do ..	Brunette Saw Mill Co.	Pitt Lake.....	160 do	do
148	do ..	Canadian Co-operative Society.	Stave Lake.....	960 do	do
150	do ..	J. R. Wren.....	do	320 do	do
153	do ..	Jas. A. Magee.....	Fish River and Coyd Creek.	320 do	do
154	do ..	do	do	320 do	do
155	do ..	do	do	640 do	do
158	do ..	Albert McLaren	Chilluweyuk River....	440 do	do
159	do ..	do	do	600 do	do
160	do ..	do	do	720 do	do
161	do ..	do	do	560 do	do
162	do ..	do	do	440 do	do
163	do ..	do	do	320 do	do
164	247	Geo. Finney.....	Tp. 21, R. 26, W. 6th M.	80 do	do
Total area.....				920'76 sq. m.	

MINING LANDS OTHER THAN COAL.

Returns from the Dominion lands agents show that during the past year 135 entries were made for mining locations other than coal in Manitoba and the North-west territories. Of this number twelve entries were granted for quartz claims and 76 for placer claims in the Yukon district. Only twenty acres were sold during the year. The sum of \$1,439 was received in payment of fees for entry and for the registration of assignments. The total area of mining locations sold up to the 1st of January, 1897, was 2,502.53 acres, which realized \$13,568.21.

All minerals with the exception of coal and stone on Dominion lands within the railway belt in the province of British Columbia are administered by the provincial government under the mining laws of that province. This is in accordance with an arrangement between the Government of Canada and the provincial government of British Columbia, and ratified by Orders of His Excellency the Governor General in Council dated the 11th and 28th of February, 1890. This agreement may be terminated at any time by either government. Under this agreement 119.38 acres were transferred to the provincial government, and the total amount received therefor was \$623.30.

Under authority of an Order in Council dated 25th of August, 1891, petroleum lands were withdrawn from the operations of the mining regulations. The area of a location containing mica was increased from about 20 acres to 160 acres under the authority of an Order in Council dated the 14th of February, 1896.

COAL MINING LANDS.

The number of applications received during the year was 33. The revenue for the year derived from the sale of coal lands was \$238.26. The total area of coal lands sold up to the 1st of January, 1897, was 15,566.96 acres, and the total amount received therefor was \$156,821.79.

IRRIGATION.

Immediately following the reports of the Crown timber agents may be found the report of Mr. J. S. Dennis, chief inspector of surveys, who, in addition to being in charge of irrigation surveys, was delegated in the spring of 1895 to receive applications to divert water for irrigation and other purposes under the North-west Irrigation Act, to report upon the same to this department, and to perform all outside work required in connection therewith. Attached to Mr. Dennis' report is a bulletin issued by him of the results of irrigation last year which is very interesting and shows that the lands irrigated are on the whole producing large crops.

GRAZING LANDS.

The total number of leases of grazing lands other than school lands in force on the 1st January, 1897, was 236, covering an area of 257,983.39 acres.

Department of the Interior.

The following schedule shows the names of the lessees, the numbers of their ranches, and the area covered by each lease:—

Ranch No.	Name.	Area in Acres.	Ranch No.	Name.	Area in Acres.
141	P. McLaren	7,500 00	460	Samuel Fletcher	1,286 00
244	A. McLeod	960 00	461	H. Prince & A. Beliveau	960 00
329	Lachlan Collie	306 50	463	Wm. Collie	128 00
331	F. Murray-Honey and Lewis Parsons	5,280 00	465	J. G. Collins	1,280 00
333	R. G. Robinson	1,120 00	467	Geo. Lane	2,240 00
334	Wm. Collie	160 00	468	J. W. & F. W. Ings	720 00
341	G. J. Gagen and W. A. H. a Court	5,600 00	470	E. D. Mackay	1,280 00
344	A. T. Wallace	1,920 00	471	Hugh McAlpine	3,032 00
347	Jeremiah M. J. Muhvihill	259 00	472	R. G. Robinson	3,840 00
348	Leeson & Scott	1,920 00	474	Ed. Fearon	5,742 00
349	John G. Collins	1,280 00	475	Jas. Warnock	1,280 00
350	L. G. McDonald	320 00	479	John Cheeseman	160 00
351	Samson & Harford	27,200 00	480	Frederick S. Smith	320 00
354	Sibbald & Alford	640 00	481	E. Jaunet & De Seysalle	2,210 00
355	Wm. Grahame	477 00	482	Sarmia Ranching Co. (Ltd.)	3,838 00
357	F. W. Peacock	129 65	485	John Harvey	320 00
365	Neil Hanson	640 00	486	John Lawrence	1,440 00
368	Thos. Johnson	1,920 00	490	S. W. Hungerford	640 00
369	J. & W. Potts	741 00	491	Jas. Hargrave	3,044 00
373	John Cooil	1,280 00	492	Emiel Griesback	77 00
374	L. C. Brown	640 00	494	Jos. Martin	640 00
377	John Cheeseman	320 00	496	J. H. Beom	1,220 00
378	J. R. Craig	2,560 00	498	John Biddle	320 00
380	R. G. Robinson	800 00	500	Thos. Hourd	1,970 00
392	Joseph Dugan	347 75	503	Donald Gunn	1,280 00
393	W. H. Moodie	56 00	505	Phillip Williams	640 00
395	John Cooil	480 00	506	R. J. Christie	480 00
398	John Harvey	597 50	507	A. Middleton	1,920 00
400	Ronald Greig	2,560 00	510	Cornelius Peters	160 00
401	J. P. Tully	532 00	511	Cheeseman Bros.	1,920 00
402	Chas. E. Stevens	160 00	514	Edward Henry	1,280 00
403	Mrs. H. Surrey	640 00	515	C. D. Urquart	552 72
405	G. W. Quick	1,200 00	516	Wm. Stothers	960 00
406	Jas. Nicholson	2,560 00	517	C. Perrenoud	640 00
408	J. S. Rose	2,560 00	520	Henri de Soras	960 00
410	Jas. Hastie	640 00	521	Jonathan Gillie	1,853 00
413	H. A. Greeley	2,000 00	523	Xavier Gougen	640 00
414	A. T. Wallace	640 00	524	Wm. Sinclair	320 00
415	S. T. Fawcett	800 00	525	P. Burns	640 00
416	David Bertran	1,124 00	527	H. M. Morris-Read	619 00
419	A. T. Wallace	1,260 00	528	Wm. Wilkins	160 00
424	John Cumberland	960 00	529	John Himsworth	1,120 00
426	Fred. W. Fisher	289 00	531	Alex. Glennie	320 00
427	H. A. Sibbald	320 00	533	Jas. Grayson	160 00
430	D. W. Newbury	640 00	536	John H. McNeil	160 00
431	Couture & Bourre	1,920 00	537	F. Shackleton	647 00
432	Henry Hamilton	2,240 00	538	Willard V. Hill	1,126 00
433	Ed. Heffer	640 00	539	C. Kettles	320 00
436	Arthur Trent	1,280 00	540	L. C. Brown	800 00
437	Solyne Lajoie	320 00	542	Hamilton Moorehead	640 00
438	J. R. Davis	2,576 00	543	D. McIntosh	288 00
439	Wm. R. Abbott	1,440 00	544	Johann Broeske	160 00
443	McKay & Balding	2,560 00	54	C. Duck	166 00
444	Wm. Stothers	610 00	547	R. E. Boner	640 00
445	Wm. Trent	1,920 00	549	B. Prince	640 00
446	H. H. Fauquier	320 00	551	J. S. White	160 00
448	Walter B. Elliott	640 00	552	Chas. I. Morgan Jones	720 00
451	Thos. Monkman	445 00	554	Hugh Munro	640 00
452	Lethbridge Sheep Ranch Co.	2,561 00	555	T. J. Armstrong	320 00
454	Chas. W. May	160 00	556	Sigurjon Johnson	160 00
455	Donald McLean	2,088 50	557	W. S. Bilton	640 00
456	Heow & Duhaime	1,724 77	558	W. T. Warner	730 00
457	Max de Quezeize	2,082 00	559	Louis N. Blache	640 00
458	Rev. John McDougall	2,952 00	561	John Stewart	640 00
459	Henri de Soras	1,742 00	562	J. G. Farr	320 00
			563	Johann Krause	320 00
			566	Thos. Minnaugh	1,063 00

LESSEES OF Grazing Lands—*Concluded.*

Ranch No.	Name.	Area in Acres.	Ranch No.	Name.	Area in Acres.
567	Edward Hagell	640 00	649	Wm. McCaw	960 00
568	D. H. Cox	640 00	650	J. Bassett	320 00
569	G. J. Radinzel	160 00	651	Claudiniere & Clements	640 00
570	D. A. Best	325 00	652	Andrew Cumberland	320 00
571	R. J. Christie	160 00	654	Chas. W. May	320 00
573	Johann Doerksen	320 00	655	Rev. Leo Gaetz	640 00
574	J. D. McLeod	297 00	660	John Dovell	1,280 00
575	D. Matheson	640 00	663	Arthur Hassett	320 00
576	Miles Hogarth	320 00	674	Chas. Lees	960 00
577	Geo. R. Hammond	640 00	681	J. L. Thompson	640 00
582	Wm. N. Janes	640 00	682	H. Bowen	251 00
583	Wm. McMillan	648 00	685	D. R. Tucker	1,760 00
584	Frank Hourd	809 00	687	Leslie Hill	480 00
585	Thos. Kerr	640 00	688	Joseph McDonald	640 00
586	David Wilson	640 00	690	Wm. Moore	640 00
589	Napoleon Pamerlean	480 00	692	Robt. McCordick	320 00
590	D. W. Coleman	828 00	693	J. Hunter	160 00
591	Wm. McDonald	651 00	695	Wm. Brownlee	800 00
592	E. H. Botterel	160 00	699	J. H. McNeil	480 00
595	Jas. Quigley	639 00	700	Max de Quezeize	320 00
596	Rev. John McDougall	1,440 00	703	R. Beatty	160 00
597	Johann F. Unger	160 00	705	R. W. Cowan	1,280 00
600	Jas. Tooke	640 00	706	Jos. Lawford	640 00
601	Wm. Archibald	1,653 00	707	Thos. Pearson	160 00
602	E. D. Harrison	640 00	708	Jos. Burgess	480 00
604	Boyd Ranching Co.	4,880 00	710	Geo. & Robt. Cann	320 00
606	Robert B. Warner	975 00	712	D. W. Skinner	1,280 00
607	Jos. Burgess	320 00	713	J. T. Krahn	160 00
608	H. M. Morris-Reade	640 00	714	J. A. W. Fraser	640 00
609	W. Y. Hemmingway	320 00	715	Gordon & Ironsides	1,600 00
610	John McDonell	3,040 00	717	R. B. Irvine	160 00
611	J. H. McNeil	160 00	718	John McEben	640 00
613	John Cumberland	1,906 00	719	A. N. Bennett	160 00
615	Benjamin Long	160 00	720	Jas. Monkman	149 00
616	Mrs. A. A. Daig	160 00	722	M. T. Bambridge	640 00
618	John Scarrow	320 00	724	Alex. Middleton	320 00
619	Chas. Blair	2,516 00	728	Wm. T. Clements	640 00
620	W. R. Jefferson	480 00	731	David White	480 00
622	G. L. Weatherald	320 00	733	Jas. E. Wilson	320 00
624	Jas. H. Wallace	1,280 00	734	Jas. Johnson	480 00
628	Donald Murray	326 00	735	S. F. Allen	480 00
631	Wm. Sanders	1,280 00	736	V. J. Beaupré	1,600 00
632	Sandford McNeil	320 00	741	E. Lader	640 00
633	R. A. Cowan	1,040 00	742	Peacock & Vavasour	640 00
638	C. D. Urquhart	320 00	744	Rev. John McDougall	640 00
639	Alfred Lloyd	960 00	747	C. H. Clements	160 00
640	Wm. Boyd	320 00	749	J. D. Norrish	480 00
642	August Welke	160 00	753	John Harvey	640 00
643	Thos. Kerr	320 00	754	Ronald Hewat	640 00
644	R. T. Young	320 00			
647	G. F. Hirst	320 00			
				Total area	257,983 39

Department of the Interior.

The total number of leases of school lands in the North-west territories for grazing purposes in force on the 1st January, 1897, was thirty-two, containing a total area of 11,984·00 acres. The names of the lessees and the numbers of their ranches are as follows :—

Ranch No.	Name.	Area in Acres.	Ranch No.	Name.	Area in Acres.
473	Rev. John McDougall.....	640 00	605	H. Gruner.....	197 00
478	F. W. Godsall.....	605 00	612	J. C. C. Bremner.....	80 00
493	Hall Bros.....	640 00	623	Dept. of Indian Affairs.....	640 00
497	J. H. Beom.....	640 00	626	D. McIntosh.....	320 00
499	Chas. Knight.....	640 00	653	James R. Dyer.....	320 00
504	W. C. H. Parby.....	160 00	664	Thos. Clarke.....	160 00
509	W. E. Smith.....	320 00	665	Ricardo & Bevan.....	303 00
518	Wm. Brealey.....	640 00	666	G. H. Elliott.....	160 00
526	P. Burns.....	640 00	668	Geo. Tranter.....	160 00
530	Alex. Glennie.....	320 00	676	G. H. Jamieson.....	160 00
548	W. H. Minhinnick.....	40 00	679	Jas. Johnson.....	640 00
550	John N. West.....	160 00	684	John Boyd.....	160 00
564	Wm. N. Janes.....	320 00	696	A. C. Fraser, jr.....	640 00
587	W. Julius Hyde.....	640 00	697	Chas. Spalding.....	160 00
593	Hull Bros. & Co.....	640 00	721	Chas. E. Morris.....	160 00
594	Daniel McIntosh.....	320 00			
598	Z. N. Johnson.....	359 00		Total area.....	11,984 00

The total number of leases of school lands in Manitoba for grazing purposes in force on the 1st January, 1897, is twenty-three, containing a total area of 5,158·50 acres. The names of the lessees and the numbers of their ranches are as follows :—

Ranch No.	Name.	Area in Acres.	Ranch No.	Name.	Area in Acres.
560	John Clark.....	160 00	656	Murdock McLean.....	160 00
578	James Cathrea.....	480 00	659	J. S. Jackson.....	640 00
580	M. H. Fieldhouse.....	160 00	667	Wm. McKinnon.....	320 00
581	John T. Slater.....	160 00	669	C. W. Gimley.....	160 00
621	J. C. Lewis.....	320 00	673	Colin McIver.....	38 50
627	Joseph Petch.....	480 00	677	W. J. Rowe.....	160 00
634	J. R. Armitage.....	160 00	678	Noble Jordan.....	160 00
636	The Viscount d'Aubigny d'Assy.....	320 00	698	A. McAulay.....	160 00
637	H. A. Delf.....	160 00	701	J. Meyul & G. Johnson.....	160 00
641	J. Thordarson.....	160 00	730	H. G. Winslow.....	160 00
646	Daniel McCurdy.....	160 00	755	Samuel Chittick.....	160 00
648	J. M. Cameron.....	160 00			
				Total area.....	5,158 50

HAY.

The following statement shows the names of the persons who hold leases of Dominion lands for hay purposes :—

Ranch No.	Name.	Area in Acres.	Ranch No.	Name.	Area in Acres.
342	Samuel Perry	40 00	487	W. H. Gray.	40 00
440	Jonathan Rose	40 00	489	Frank L. Engnan.....	40 00
447	Alex. McIntyre	40 00	512	James T. Potts	20 00
450	Jas. Gilchrist.....	30 00	535	Leonard Hornett	6 00
469	D. M. Finlayson	37 50	614	Joseph Dugan, jun.....	40 00
477	Walter Bradley	40 00	629	Wm. Moffatt	40 00
483	Wm. Thomson.....	20 00		Total area.	433 50

Four leases of school lands for hay purposes have been issued, the following being the names of the lessees :—

Ranch No.	Name.	Area in Acres.	Ranch No.	Name.	Area in Acres.
361	H. Anticknap.....	160 00	462	R. C. Brumpton.....	160 00
404	Gagen & a'Court.....	320 00	534	Chas. Moore.....	58 00
				Total area.....	698 00

The following is a statement of the office work performed from the 1st of January, 1896, to the 1st of January, 1897 :—

Number of letters sent	8,090
do pages of memoranda and schedules	1,606
do plans and sketches prepared	106
do of notices inviting tenders for timber berths sent	11,008

Timber—

Number of berths applied for	84
do berths acquired by public competition, including permits	69
do licenses for timber berths prepared (in duplicate)	134
Instructions issued for survey of timber berths.....	16
Number of returns of surveys of timber berths received and examined.....	6
do returns of saw-mills received and verified... ..	248
do permits to cut timber issued by agents, also entered and checked.....	3,341
do accounts kept posted	289
do timber seizures entered and checked.....	180

Department of the Interior.

Grazing—

Number of applications for grazing lands received	405
do leases of grazing lands authorized to be issued	158
do do issued	137
do leases of hay lands authorized to be issued	2
do do issued	2
do applications for hay lands	27
do accounts kept posted ;—Grazing 289, Hay 20	309
do hay permit forms used by the Dominion lands agents, also entered and checked over at this office	2,438

Mining—

Number of accounts kept posted	5
do applications for coal locations received	33
do coal locations of 320 acres and less sold	1
do do reserved for prospecting	14
do applications for mining locations other than coal	71
do new entries and renewals for mining locations granted by Dominion lands agents, other than coal	65

Irrigation—

Number of applications <i>re</i> irrigation entered	92
do memorials examined and recorded	90
do plans do do	128
do authorizations for construction of ditches issued	111
do of assignment of irrigation, application examined and recorded	3
do of irrigation licenses issued (in triplicate)	25

I have the honour to be, sir,

Your obedient servant,

G. U. RYLEY,

Clerk in charge.

(A)—STATEMENT of Receipts on account of Crown Timber on Dominion lands for the calendar year, 1896.

Month.	Bonus.	Ground Rent.	Royalty on Returns of Sales.	Permit Fees and Dues.	Seizures, Dues and Fines for Trespass.	Miscellaneous.	Totals.
1896.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January							7,623 39
February							3,252 61
March							5,734 75
April							3,427 18
May							4,464 56
June							3,851 90
July							6,942 59
August							3,390 51
September							4,349 71
October							7,763 56
November							8,040 26
December							10,503 60
							69,344 62
School lands							301 63
Grand total							69,646 25

(B)—STATEMENT of Receipts on account of Grazing, Hay, Mineral and Irrigation on Dominion lands for the calendar year 1896.

Month.	GRAZING LANDS.		Hay Lands.	Mining Fees.	Stone Quarries.	Coal Lands.	Irrigation.	Totals.
	Cash.	Scip.						
1896.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January	513 64	240 00	303 40	35 00				1,092 04
February	366 18	1,229 20	137 95	18 00				1,751 33
March	434 67		176 26	10 00				620 93
April	827 37		544 08	32 00	1 25			1,404 70
May	118 60	700 00	497 95	15 00		0 50		1,332 05
June	297 16	1,010 00	925 15	25 00				2,257 31
July	461 41		1,357 55	10 00		25 00		1,853 96
August	166 27		493 30	45 00				704 57
September	428 28		111 50	55 00				594 78
October	529 06	1,360 00	72 95	1,102 00				3,064 01
November	245 85	260 00	38 50	40 00	10 00	6 75	4 00	605 10
December	909 65	240 00	155 95	52 00	15 00	1 75	32 00	1,406 35
Dominion Lands	5,298 14	5,039 20	4,814 54	1,439 00	26 25	34 00	36 00	16,687 13
School Lands	790 35		1,685 53					2,475 88
Totals	6,088 49	5,039 20	6,500 07	1,439 00	26 25	34 00	36 00	19,163 01

Department of the Interior.

C.—STATEMENT of Receipts for Timber, Grazing and Hay, on school lands for the calendar year 1896.

Month.	Timber.	Grazing	Hay.	Total.	Province of Manitoba.	NORTH-WEST TERRITORIES.			Total.
						Assini- boia.	Alberta.	Sas- katche- wan.	
1896.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January	36 62	30 28	82 30	149 20	47 72	43 90	52 28	5 30	149 20
February	34 25	25 60	119 90	179 75	137 65	33 10	. . . . .	9 00	179 75
March	62 95	116 78	23 20	202 93	173 43	25 50	. . . . .	4 00	202 93
April	1 25	55 20	364 80	421 25	311 30	27 80	78 15	4 00	421 25
May	37 25	108 40	237 68	383 33	318 73	35 50	21 10	8 00	383 33
June	0 25	130 97	358 00	489 22	300 30	46 20	130 12	12 60	489 22
July	2 75	84 78	335 15	422 98	255 83	50 00	99 70	17 45	422 98
August . . . . .	. . . . .	41 58	138 40	179 98	129 50	4 50	44 98	1 00	179 98
September	7 46	51 65	5 00	64 11	31 16	1 60	30 85	0 50	64 11
October	55 25	28 00	12 10	95 35	95 35	. . . . .	. . . . .	. . . . .	95 35
November	41 60	80 11	5 70	127 41	94 50	0 80	32 11	. . . . .	127 41
December	22 00	37 00	3 00	62 00	48 20	1 00	12 80	. . . . .	62 00
	301 63	790 35	1,685 53	2,777 51	1,943 67	269 90	502 09	61 85	2,777 51

D.—STATEMENT of Receipts on account of Timber, Grazing, Hay, Minerals and Irrigation on Dominion lands, commencing with the departmental year, 1872-73, and ending the calendar year, 1896.

From 1st Nov. to 31st Oct., each year.	Timber Dues.		Grazing Lands.		Hay Lands.		Mining Fees.	Rents and Bonuses from Coal Lands.	Royalty from Stone Quarries.	Rent from Mill Site (Scrip.)	Irrigation	Totals.	
	\$	cts.	Cash.	Scrip.	Cash.	Scrip.							\$
1872-73.	662	05										662 05	
1873-74.	2,347	00										2,347 00	
1874-75.	2,146	00										2,146 00	
1875-76.	387	00										387 00	
1876-77.	320	00										320 00	
1877-78.	1,820	00										1,820 00	
1878-79.	3,388	15										3,388 15	
1879-80.	31,339	95										31,339 95	
1880-81.	44,524	35										44,524 35	
1881-82.	75,781	26	10,123	60								85,904 86	
1882-83.	150,712	27	18,778	83								169,490 10	
1883-84.	93,765	86	10,642	50								104,407 36	
1884-85.	63,533	84	20,342	74								83,875 58	
1885-86.	70,827	70	26,723	72	20,613	29						118,179 71	
1886-87.	77,871	91	11,528	77	28,018	33	135	20				109,337 11	
1887-88.	91,538	24	5,988	42	20,260	41	481	60				117,827 25	
1888-89.	76,203	83	1,635	08	16,802	63	3,289	57				80,928 51	
1889-90.	102,032	58	3,056	05	9,541	63	8,235	67				112,866 30	
1890-91.	104,385	73	2,383	73	14,196	37	5,844	58				112,669 01	
1891-92.	98,967	06	4,659	59	19,914	02	5,369	40				108,909 07	
1892-93.	98,795	71	5,379	33	8,228	05	5,276	88				107,479 97	
1893-94.	77,322	85	6,479	99	12,668	14	4,592	27				84,063 25	
1894, Nov. and Dec.	12,840	14	1,935	36			337	19				14,112 69	
1895, Jan. to Oct. 31, incl.	57,883	66	2,701	58	4,171	85	5,526	51				60,282 60	
1895, Nov. and Dec.	13,735	04	3,257	40	1,232	85	132	99				14,357 28	
Calendar year 1896.	69,344	62	5,298	14	5,039	20	4,814	54				74,496 50	
	1,422,576	80	140,884	83	160,856	81	53,976	90	2,795	46	160	00	1,786,792 34

Department of the Interior.

E.—STATEMENT of Receipts on account of Timber, Grazing, Hay and Minerals on Dominion Lands, commencing with the fiscal year 1872-73 and ending the 30th June, 1896.

FISCAL YEAR.	Timber Dues.		GRAZING LANDS.		HAY LANDS.		Mining Fees.	Rents from Coal Lands.	Royalty from Stone Quarries.	Rent from Mill Site, Scrip.	Totals.
	\$	cts.	Cash.	Scrip.	Cash.	Scrip.						$	cts.	$	cts.
1872-73	109	25									109 25
1873-74	2,710	55									2,710 55
1874-75	2,335	25									2,335 25
1875-76	387	00									387 00
1876-77	320	00									320 00
1877-78	1,620	00									1,620 00
1878-79	325	00									325 00
1879-80	25,121	46									25,121 46
1880-81	32,028	34									32,028 34
1881-82	58,753	14	2,245	00				40	00		61,038 14
1882-83	90,066	46	22,844	43				880	00		113,824 80
1883-84	147,983	10	11,370	60				498	90		159,994 60
1884-85	87,474	99	17,089	75				232	40		105,380 37
1885-86	64,820	31	29,562	51	3,131	08		40	00		98,708 73
1886-87	65,111	74	14,242	77	39,487	67					120,492 58
1887-88	91,964	55	5,922	47	23,023	28					126,264 03
1888-89	90,230	00	2,207	69	16,802	63		14	00		113,246 87
1889-90	84,642	95	1,305	57	9,021	63		39	80		104,212 23
1890-91	102,902	71	3,079	55	16,193	77		87	50		130,964 47
1891-92	106,461	35	3,726	80	17,222	60		190	30	160	130,964 47
1892-93	105,865	24	6,380	80	11,542	39		67	70		133,027 60
1893-94	81,230	51	5,740	79	7,687	86		374	53		100,062 31
1894-95	74,079	20	5,353	72	8,628	00		206	24		93,280 46
1895-96	61,923	47	7,071	86	6,255	90		23	05		81,064 74
	1,381,586	57	138,144	31	158,996	81		2,761	96	160	1,737,573 34

F.—STATEMENT of Receipts on account of Timber, Grazing and Hay on school lands for the fiscal year 1895-96.

MONTH.	Timber Dues.		Grazing Lands.		Hay Lands.		Totals.		NORTH-WEST TERRITORIES.						Totals.		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	Assiniboia.	Alberta.	Saskatchewan.	\$	cts.	\$	cts.	\$	cts.
1895.																	
July			37	32	400	10	438	67	80	62	139	65	438	67			
August	1	00	1	60	623	35	634	95	256	70	31	30	634	95	23	70	
September			22	40	35	00	57	40	9	70	19	30	57	40			
October	41	06	48	00	44	75	133	81	14	00			133	81	25	00	
November	19	25	148	44	4	50	172	19	46	04	102	40	172	19			
December	35	50	1	60			37	10	0	10			37	10			
1896.																	
January	36	62	30	28	82	30	149	20	43	90	52	28	149	20	5	30	
February	34	25	25	60	119	90	179	75	33	10			179	75	9	00	
March	62	95	116	78	23	20	202	93	25	50			202	93	4	00	
April	1	25	364	80	364	80	421	25	27	80	78	15	421	25	4	00	
May	37	25	108	40	237	68	383	33	318	73	21	10	383	33	8	00	
June	0	25	130	97	358	00	489	22	46	20	130	12	489	22	12	60	
	279	63	726	59	2,203	58	3,299	80	619	16	574	30	3,299	80	91	60	

Department of the Interior.

G.—STATEMENT of Receipts on account of Timber, Grazing, Hay and Stone Quarries on school lands, commencing with the fiscal Year 1883-84, and ending 30th June, 1896.

Fiscal Year.	REVENUE CLASSIFIED BY DISTRICTS.						Totals.			
	Timber Dues.	Grazing Lands.	Hay Lands.	Stone Quarries.	Totals.	REVENUE CLASSIFIED BY DISTRICTS.				
						Manitoba.		Assiniboia.	Alberta.	Saskatchewan.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	
1883-84.....	36 50				36 50	36 50				36 50
84-85.....	136 00				136 00	136 00				136 00
1885-86.....	1,238 11				1,238 11	1,238 11				1,238 11
1886-87.....	940 26				940 26	940 26				940 26
1887-88.....	1,333 99				1,333 99	1,333 99				1,333 99
1888-89.....	695 86				695 86	695 86				695 86
1889-90.....	919 10			17 50	936 60	936 60				936 60
1890-91.....	489 22		2,578 72		3,067 94	2,478 39		313 35	195 05	3,067 94
1891-92.....	270 81		1,659 41		1,930 22	1,539 17		251 80	99 80	1,930 22
1892-93.....	831 50		1,769 45		2,600 95	2,060 85		335 30	135 60	2,600 95
1893-94.....	530 13	32 38	2,115 15		2,677 66	1,836 88		447 55	338 48	2,677 66
1894-95.....	617 72	203 14	2,063 41		2,884 27	2,065 17		371 11	407 59	2,884 27
1895-96.....	279 63	726 59	2,293 58		3,299 80	2,014 74		619 16	574 30	3,299 80
Totals.....	8,318 83	962 11	12,479 72	17 50	21,778 16	15,899 07	3,771 72	1,750 82	356 55	21,778 16

SCHEDULE A.

STATEMENT of Receipts from Crown Timber Agency, Winnipeg, for the 14 months ended 31st December, 1896.

Month.	Bonus.	(Ground Rent.	Royalty.	Permit Dues, Dominion Lands.	Seizure Dues, Dominion Lands.	Timber cut on Schools Lands.	Coal Mines.	Stone Quarries.	Hay cut in trespass on Dominion Lands.	Totals.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1895.										
November		483 49	415 81	791 79	116 74	19 25		5 17		1,832 25
December		76 80	389 36	1,006 38	118 80	35 50			5 70	1,582 54
1896.										
January		274 18	290 95	1,348 14	35 70	36 62				1,985 59
February		201 50	191 94	1,483 41	109 60	34 25				2,025 95
March		300 26	129 71	2,231 19	743 65	57 95			10 00	3,467 51
April		136 91	523 30	1,188 38	48 00	1 25		1 25	25 93	1,925 02
May		30 00	6 95	1,322 26	6 25	27 25				1,332 71
June			13 25	839 41		0 25				912 91
July			684 47	839 06	13 80	2 75	25 00			1,565 08
August		263 12	548 38	498 07	35 33					1,341 90
September		625 64	273 38	1,034 74	45 14	7 46			1 50	1,987 86
October		70 38	5,155 92	5,056 00	101 65	65 50				10,456 54
November		372 82	73 77	626 35	73 00	31 35				1,177 29
December		971 73	85 51	1,468 85	104 75	14 75				2,646 98
Collections at Head Office	8 29 4,442 46	3,806 83 1,329 35	8,732 80	19,794 12	1,552 41 25 00	334 13 25 00	25 00	6 42	43 13	34,303 13 5,821 81
	4,450 75	5,136 18	8,732 80	19,794 12	1,577 41	359 13	25 00	6 42	43 13	40,134 94

E. F. STEPHENSON,
Crown Timber Agent.

Department of the Interior.

C.—GENERAL OFFICE RETURN for the time ending the 31st December, 1896.

Description of Work.	Number.	COMPARED WITH LAST YEAR.		Remarks.
		Increase.	Decrease.	
Number of letters written.....	8,016			NOTE—As this Return includes a period of 14 months, a comparison with the preceding year has not been made.
Number of circulars sent.....	1,083			
Number of letters received.....	8,179			
Number of circulars received.....	113			
Number of mill returns received.....	141			
Number of seizures made.....	136			
Number of permits issued.....	3,110			

E. F. STEPHENSON,
Crown Timber Agent.

SCHEDULE A.

STATEMENT of Receipts on account of Crown Timber at the Edmonton Crown Timber Agency for the fourteen months ending 31st December, 1896.

Month.	Bonus.	Ground Rent.	Royalty on Sales.	Permit Fees and Dues.	Seizures, Dues and Fines for Trespass.	Totals.	Amounts collected at Head Office.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1895.							
November.....				12 75		12 75	
December.....			36 07	17 25		53 32	
1896.							
January.....		269 60	156 60	74 20		500 40	629 74
February.....				40 75	44 50	85 25	
March.....		21 25		142 39	28 59	192 23	55 00
April.....		25 00	75 20	116 46	21 50	238 16	
May.....				79 75	47 27	127 02	
June.....			182 70	85 87	7 70	276 27	
July.....			73 77	37 87	38 00	149 64	2 50
August.....			60 60	188 11	32 83	281 54	
September.....				1 00		1 08	
October.....			206 77	1 25	3 00	211 02	
November.....				20 28		20 28	
December.....				110 91	15 00	125 91	250 00
Totals—Edmonton.....		315 85	791 71	928 84	238 39	2,274 79	937 23
—Calgary and Head Office.....	30 00	882 24			25 60	937 24	
Totals.....	30 00	1,198 09	791 71	928 84	263 39	3,212 03	

R. A. RUTTAN,
Crown Timber Agent.

SCHEDULE B.

SHOWING the Saw-Mills in the Edmonton Crown Timber Agency under Government License, during the year 1896.

Name of Owner or Owner and Assignee.	Where Situated.	Kind of Power.	Number of horse-power.	Commenced operations in.	Description of timber.	Logs cut at. No. of Limits.	Quantity of lumber manufactured, 12 months ending 31st October, 1896.	Quantity of lumber sold, 12 months ending 31st October, 1896.	Date of last Mill Return forwarded to Head Office.	Remarks.
D. R. Fraser.....	Edmonton.....	Steam..	30	1880	Spruce..	39, 627 & 646	247,590	414,015	Sept. 30.	801,815 ft. B. M. of manufactured lumber carried over from 1895.
Walter & Humberstone..	South Edmonton..	do ..	60	1895	do ..	653	292,341	670,343	Sept. 30.	527,086 ft. B. M. manufactured lumber carried over from 1895.
							539,131	1,084,358		

MEMO.—20 Mill Returns received during the year.

R. A. RUTTAN,
Crown Timber Agent.

Department of the Interior.

DOMINION LANDS OFFICE,
CALGARY, January 9th, 1897.

A. M. BURGESS, Esq.
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to inclose the following statements for the fourteen months ended the 31st of December, 1896.

Schedule "A," statement of receipts on account of Crown timber.

Schedule "B," general office return.

Schedule "C," showing the saw-mills in the Calgary Crown Timber Agency operating under Government license during the year.

I am, sir, your obedient servant,

WM. PEARCE,
Crown Timber Agent.

(A.)—STATEMENT of Receipts from Crown Timber for the fourteen months ended December 31, 1896.

Month.	Bonus.	Ground Rent.	Royalty on Returns.	Permits on Dominion Lands.	Seizures, Dues and Fines for Trespass.	Total Collected at Calgary.	Total Collected at Head Office.	Grand Total.
1895.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
November.....		36 93	491 70	30 75		559 38	141 27	700 65
December.....		110 86	34 81	118 71		264 38		264 38
1896.								
January.....		146 07	151 86	4 50		302 43	357 37	659 80
February.....		32 45	34 25	89 50	5 00	161 20	253 00	414 20
March.....		2 72		27 25	25 00	54 97		54 97
April.....			36 16	18 25		54 41	15 00	69 41
May.....			49 56	3 00		52 56	250 00	302 56
June.....				2 00		2 00	810 45	812 45
July.....			50 42	2 00		52 42		52 42
August.....			187 61	21 50		209 11		209 11
September.....				0 75		0 75	6 36	7 11
October.....			88 44	348 07		436 51	5 35	441 86
November.....			94 72	4 75		99 47		99 47
December.....			20 42	31 75		52 17	604 12	656 29
		329 03	1,239 95	702 78	30 00	2,301 76	2,442 92	4,744 68
LESS—\$25 dues on seizures transferred to the Edmonton Agency.....								25 00
Total.....								4,719 68

WM. PEARCE,
Crown Timber Agent.

SCHEDULE B.

GENERAL Office Return of the Calgary Crown Timber Agency for the fourteen months ended 31st December, 1896.

Description of Work.	Number.	Compared with last Year.		Remarks.
		Increase.	Decrease.	
Number of letters written	3,285	1,839	.....	Including Dominion lands. do do
do received	2,416	835	.....
Number of free permits issued	155	.....	39	
do due permits issued	24	11	.....
do mill returns received and verified	31	13	.....

WM. PEARCE,
Crown Timber Agent.

Department of the Interior.

SCHEDULE C.

Showing the Saw-Mills in the Calgary Crown Timber Agency operating under Government License during the year 1896.

	Name of Owner or Assignee.	Where Situated.	Kind of Power.	Horse Power.	Commenced Operations.	Description of Timber.	Logs cut at
1	Alberta Lumber Company.	Red Deer River.	Steam.	125	1890.	Spruce and fir.	Red Deer River.
2	Eau Claire and Bow River Lumber Co.	Calgary	do	65 used, can work to 175	1887.	Fir, spruce and yellow pine.	Kananaskis River.
3	James Walker.	Kananaskis	do	60	1883.	Spruce and fir.	do
4	Hon. Peter McLaren.	Mill Creek (Mountain Mill).	Water.	20	1882.	do	Mill Creek.
5	Hon. Peter McLaren.	Macleod (Macleod Mill).	Steam.	40	1888.	do	Old Man's River.
6	Charles Ora Card.	Cardston	do	25	1891.	do	St. Mary's River.
7	John Lineham.	Dewdney.	do	50	1890.	do	Sheep Creek.
8	A. W. Gillingham.	North Fork, Old Man's River.	do	25	1894.	do	Old Man's River.
9	Donald Morrison.	North and Middle Fork Sheep Creek.	do	25	1885.	do	Sheep Creek.
10	D. W. McKenzie.	Ponaka.	Steam.	25	1894.	Spruce and poplar.	Battle River.

SCHEDULE C.—Showing the Saw-Mills in the Calgary Crown Timber Agency, &c.—*Concluded.*

Quantity of Lumber Manufactured.	Lumber on hand 31st October, 1895, sold and manufactured during period between 31st October, 1895, and 31st December, 1896.	Shingles manufactured during period between 31st Oct., 1895, and 31st Dec., 1896.	Shingles on hand, 31st Oct., 1895, sold and manufactured to 31st Dec., 1896.	Laths manufactured during period ended 31st Dec., 1895.	Laths on hand, 31st October, 1895, sold and manufactured to 31st December, 1896.	Date of last Return.
Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	
1	.....	.....	.....	.....	.....	30th June, 1895.
2	968,458	On hand 2,848,121 Sold 1,426,070 Manufactured 968,458 On hand 525,905	.....	.....	On hand 114,275 Sold..... Manufactured 129,150	1st May, 1896. 31st October, 1895.
3	.....	.....	.....	.....	.....	.....
4	233,738	On hand 251,153 Sold 207,956 Manufactured 233,738	.....	.....	.....	31st October, 1896.
5	273,581	On hand 148,312 Sold 157,941 Manufactured 273,581	.....	.....	On hand 17,000 Sold 11,000	do
6	7,250	On hand 83,790 Sold 26,694 Manufactured 7,250	.....	.....	.....	31st December, 1895.
7	491,489	On hand 484,398 Sold 625,887 Manufactured 491,489	On hand 69,800 Sold 5,098 Manufact'd 4,498	.....	.....	30th June, 1896. 31st December, 1895.
8	.....	On hand 294,927 Sold 15,114	.....	.....	.....	.....
9	111,890	On hand..... Sold 97,890	.....	.....	.....	31st March, 1896.
10	239,988	On hand 10,000 Sold 104,119 Manufactured 239,988	On hand..... Sold 16,500 Manufact'd 200,000	.....	.....	30th September, 1896.
2,326,394	Sold 2,661,701	204,498	Sold 21,598	165,658	Sold 11,000	

Department of the Interior.

SCHEDULE A.
 SHOWING the Saw-Mills in Prince Albert Agency operating under Government license during the year 1896.

Name.	Kind of Power.	Horse Power.	Capacity per 12 hours.	Commenced operations.	Description of Timber.	Logs, where cut.	Quantity of Lumber manu- factured during the year.	Quantity of Lumber sold dur- ing the year.	Quantity of Shingles manu- factured.	Quantity of Shingles sold.	Quantity of Laths manufac- tured.	Quantity of Laths sold.	Date of last return.
Moore & Macdowall.	Steam.	75	35,000	1876	Spruce, pine, tamarack and poplar.	On limits north of North Saskatchewan River and Lily Plain.	568,908	651,802	357½	272	272	30th June, 1896.	
James Sanderson	Steam.	50	15,000	1890			2,251,897	228,120	115	115	126	30th Sept., do	
D. L. Shannon	Steam.	45	15,000	1890			2,820,805	1,120,610	188	188	126	31st Dec., do	
							2,000,532	640½	323	398			

SCHEDULE B.
 GENERAL office return for the 14 months ending 31st December, 1896.

Description of Work.	Number.
Permits issued at Prince Albert.....	288
do Battleford.....	100
Seizures made at Prince Albert.....	18
do Battleford.....	6
Mill returns received.....	12

JNO. McTAGGART, Crown Timber Agent.

CROWN TIMBER OFFICE,
NEW WESTMINSTER, B.C., 25th January, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa, Ont.

SIR,—I have the honour to submit my report for the 14 months ending 31st December last, of timber and other matters within my agency (the Forty Mile Belt in this province.)

I regret to say that although the foreign demand for our timber is good, the prices are still much below what they should be. The local demand, however, is improving materially in consequence of the development of the very valuable mines in the vicinity of the towns of Rossland, Trail, Nelson, Sandon, New Denver, Kaslo, Nakusp, Grand Forks, Greenwood, Anaconda, Midway and Boundary Falls, and also on account of the increase of the salmon, sturgeon and halibut fisheries, there being no less than 6 new canneries now being erected in and about the city of New Westminster on the Fraser river.

In referring to my report of last year it is gratifying to know that within the past twelve months there have been millions of dollars invested in mining enterprises in the vicinity of these towns, and everything indicates a steady genuine mining boom of even greater magnitude than ever existed in Australia or South Africa, as within the past twelve months the mines already developed have been visited by mining experts from Great Britain and most of the European countries, who, without exception pronounce them exceedingly rich, and we have thousands of them now being developed equally as rich as those which are now turning out their millions in gold, silver, copper and cinnabar.

The revenue from our timber lands in the Forty Mile Belt for the calendar year 1896 was \$18,793.96 as compared with \$23,585.92 the revenue for the calendar year 1895.

The whole respectfully submitted.

I have the honour to be,

Your obedient servant,

T. S. HIGGINSON,

Crown Timber Agent.

Department of the Interior.

DEPARTMENT OF THE INTERIOR.

SURVEYS AND IRRIGATION,
CALGARY, 31st December, 1896.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the following report upon the work of this office during the past year. My report for 1895 having been closed on the 31st October, the remaining months of that year are included in the operations reported upon herein.

The work of the office during the period mentioned may be summarized as follows:—

Number of letters received	1,761
Number of letters sent	2,546
Number of applications for water rights received and recorded.	96
Number of special reports prepared.	22
Number of special reports prepared and printed on mimeograph	3,500
Number of certificates for licenses issued	42
Number of abstracts of title to lands affected by water applications prepared	422
Number of affidavits taken	25
Number of priorities schedules prepared and forwarded for approval	40
Number of ditch inspections and examinations into disputes regarding water rights made.	28
Number of original plans, sketches and estimates for general report prepared.	98
Number of blue prints of plans made.	96

The rapid strides which the irrigation principle is making in this portion of the territories is indicated by the large increase in the work of this office as mentioned above. At the date of my last report 120 ditches were constructed and in operation, of which number licenses for 67 had been issued under the provisions of the Irrigation Act. The number of ditches in operation has now increased to 157, and the number of applications for licenses to 140. In addition to the applications for licenses for constructed ditches we have also during the past year put through 16 applications for authorizations to construct new systems, several of which are of considerable magnitude. It will therefore be seen that those interested in irrigation are evincing every readiness to comply with the provisions of the law regarding water rights, and now that these provisions are generally understood the consensus of opinion is that their enforcement will do much towards placing irrigation enterprise upon a sound basis.

In the early part of the year I made a trip through the Maple Creek district where numerous ditches had been constructed, and after visiting the ditch owners and discussing with them the provisions of the law they all took the necessary steps to have their rights properly recorded. I also at that time visited the Lethbridge and Macleod districts to examine into and report upon certain disputes regarding water rights.

In August I visited Jackfish lake near Battleford, where several small ditches had been constructed, and after seeing the owners I was able to make arrangements to have the necessary applications for licenses made as provided by the Irrigation Act. At frequent intervals during the summer I made short trips to inspect ditches under construction, but my duties in the office, and frequent absences on trips of supervision of the season's irrigation surveys, left little time for close inspection of the work being carried on in the way of ditch extension.

The past season was a particularly favourable one for irrigation, and all those owning ditches or using water therefrom have secured bountiful crops from irrigated land. The favourable results obtained have, I think, convinced the most skeptical of the benefits of irrigation, and the object lesson afforded at so many widely separated points in the territories by good crops on irrigated lands, while crops on adjacent unirrigated lands failed, has firmly implanted confidence in the benefits of irrigation in the minds of the settlers, and has renewed interest in the subject in many unlooked for quarters.

After the close of the harvest season I sent a short form of inquiry to each irrigator asking for information regarding the returns obtained, and I am now condensing the information received for issue in form of a bulletin, so as to provide for an interchange of ideas and results among those engaged in irrigation. The response by irrigators has been very satisfactory, and this year's bulletin will, from present indications, make a very favourable showing in every way. The system of issuing an annual bulletin was commenced last year, and the information supplied therein has received many favourable comments from those interested in the subject of irrigation development.

The North-west Irrigation Act.

The administration of the provisions of the Irrigation Act during the past year has proved the law to be well suited to the establishment of irrigation enterprise on a sound basis, and the ready compliance with its provisions evinced by those who have constructed or contemplate constructing irrigation ditches, as referred to above, proves that the wisdom of having water rights accurately defined and controlled is acknowledged by all. In two or three instances ambiguity in some of the provisions of the Act have been brought out during the past year, and I have therefore, under your instructions, forwarded a memorandum of needed amendments for presentation at the next session of Parliament, to correct these difficulties.

North-west Irrigation District Ordinance.

At the last session of the Legislative Assembly of the North-west territories, this Ordinance was amended so as to give the Lieutenant-Governor authority to amend the boundaries of a district after it had been formed so as to leave out the lands of those who might petition against inclusion therein, and some minor amendments were also passed regarding the limits of the bonded debt and the lands to be taxed for construction and maintenance of the irrigation works. With these amendments the law becomes much more workable, and if its provisions are strictly enforced irrigation districts will have a much better chance of successfully carrying out the construction of irrigation undertaking than was possible under the original Ordinance.

Constructed Ditches.

Very marked progress was made during the past year in the construction of some of the larger ditches which have been authorized.

The Calgary Irrigation Company extended their main canal and laterals for a distance of some thirty miles, and now have upwards of sixty miles of ditch in operation.

Mr. John Heron and his associates at Pincher creek completed the construction of their ditch heading in that stream and extending south-east for about four miles.

The pioneer ditch owned by Mr. C. O. Card and his Mormon associates, heading in Lee creek, near Cardston, was completed and will be ready for the supplying of water next season.

Messrs. Finlay & McDougall made substantial progress in the construction of the extensive ditch which they have in hand heading in High river, and Mr. R. A. Wallace added considerably to the length of his ditch heading in the same stream.

Many of the minor ditches have been lengthened and improved, and in the large majority of cases are in good condition to begin next season's operations.

Department of the Interior.

Irrigation Surveys.

Our irrigation surveys during the past season were on a somewhat more extended scale than during the previous year. Three parties were employed under charge of Messrs. A. O. Wheeler, James Gibbons, and A. C. Talbot, Dominion Land Surveyors, respectively. Mr. Wheeler continued the operations commenced during the previous season in the Foothill country and on the eastern slope of the Rocky mountains, and although his work was very much impeded by the smoke resulting from forest fires on the west slope of the Rocky mountains and in the Selkirk range, much valuable information was obtained regarding the topography, distribution of timber, and the water supply in a district which forms the main watershed of the arid region.

Mr. Gibbons worked during the season in the central portion of the arid region, his efforts being specially directed to obtaining some knowledge of the topography and hydrography on the northern and eastern slopes of Cypress hills, this information being needed in connection with the administration of water rights in the Maple creek district, where the number of ditches in operation is rapidly increasing. Mr. Gibbons also made an exploration in the latter part of the season to determine the feasibility of diverting water from the South Saskatchewan river to the Regina plains.

Mr. Talbot extended the line levels and topographical work in this district and also located the canal designed to divert water from the Red Deer river to the Rosebud river for the reclamation of the large areas lying north-east of this city at present badly in need of water for domestic and stock watering purposes. Some fifty miles of location was also added during the season by this party to the Bow river canal so as to prove definitely what areas the water to be supplied from this source would serve to irrigate.

The season's irrigation surveys have been made the subject of a special report to the Surveyor General, and so soon as we get the results of the season's work properly assembled in the shape of plans, schedule statements, &c., the detailed report of operations for the year will be issued.

In the latter part of September it was my painful duty to report the sudden death of Mr. G. A. J. Macdonald, my assistant in this office. Mr. Macdonald had been associated with me in the work from the time of the opening of the office, and it was largely owing to his energy and ability that we were able to keep up with the press of work. The vacancy was filled by the appointment of Mr. S. Chivers-Wilson of Edmonton.

I have the honour to be, sir,

Your obedient servant,

J. S. DENNIS,

Chief Inspector.

SURVEYS AND IRRIGATION.

Compiled by J. S. Dennis, D.T.S.

BULLETIN No. 2.

Following the practice inaugurated last year, information has been obtained during the past two months from the different ditch owners and users of waters in Alberta and Assiniboia, regarding the returns from irrigated crops during the past season, and this information has been summarized herein, so as to provide for an interchange of information and ideas among those interested in the subject of irrigation.

The season of 1896 was, on the whole, a very favourable one for irrigation. The rainfall during the summer months was above the average, as will be seen from the statement of average temperature and precipitation given further on, but this rainfall came too late in the season to advance the growth of the early crops, and those who were able to irrigate their crops during this early dry spell secured a growth which non-irrigated crops did not reach. The wet spell about midsummer assisted very

materially the non-irrigated crops, but those which had been previously irrigated had the advantage of increased growth and strength, and they maintained this advantage up to time of harvest. The continued warm and dry weather at harvest time rapidly matured the crops, and very satisfactory results in returns from grain crops were obtained.

So far the water used in irrigation has been largely devoted to the growth of fodder crops, hay being the chief consideration in connection with stock raising in which the larger number of our settlers are engaged. Good grain crops, both as regards quantity and quality, were however obtained from irrigated lands during the past season, and in many instances the grain crops which were cut green for fodder would have ripened and given good returns had the owners been desirous of obtaining grain instead of fodder.

The returns from different irrigators during the past season, are, for convenience of reference summarized under the following heads:—

Wheat.

A very small area was sown with wheat on irrigated farms, and the grain on a considerable portion of this area was cut green for feed. Very satisfactory results were, however, obtained from the grain which was allowed to ripen, the average return having been about $32\frac{1}{2}$ bushels per acre, the larger part of which was a good sample, and well up to requirements for milling purposes.

Barley.

Barley, like wheat, has so far been grown by irrigators largely for green feed, but considerable of the crop last season was allowed to ripen, from which an average return of something over 40 bushels to the acre was obtained. The grain in most cases showed a good sample, but was somewhat discoloured owing to being poorly harvested.

There is at all times a market for good barley, much of that now used for malting purposes at Calgary and at other points in Alberta having to be imported, and irrigators would do well to pay more attention to the growth of this crop.

The heavy growth of straw in this crop during the past season is shown by the returns of from 2 to 3 tons to the acre returned by some irrigators as their fodder crop.

Oats.

This grain, like both wheat and barley, is largely grown for fodder purposes, but last season much of the crop was allowed to ripen and yielded an average return of 45 bushels to the acre, several fields showing returns as high as 80 bushels per acre. The grain was a splendid sample, much of it weighing forty pounds and over to the bushel, and owing to the keen demand which there has been for oats for the British Columbia market good prices have been realized.

The grain cut green for fodder purposes yielded an average return of something over three tons of hay per acre, some irrigators having secured as much as five tons per acre from particular areas.

Oats are a certain crop every year under irrigation, and in the future irrigators will no doubt find that it will pay better to allow their crop to ripen, and to depend on the fodder crops proper mentioned below, rather than to cut their oats green for feed.

Timothy.

Timothy seems to be specially adapted for growth under irrigation, as it will stand any amount of water, and does not suffer like most crops from over irrigation. The yield from meadows last fall shows a return of a little over $2\frac{1}{2}$ tons to the acre, and as

Department of the Interior.

the area embraced in this estimate includes many new meadows there turn is very satisfactory.

Attention is directed to the experiment mentioned in the returns from Mr. Wm. Edgar of sowing timothy on the native sod, after it has been roughly cultivated with a disc harrow. Mr. Edgar has certainly obtained very satisfactory results by this method, particularly when the small amount of seed sown (4 lbs. per acre) is noted.

The extraordinary crop (2 tons to the acre) obtained by Mr. J. W. Ockley from timothy planted on June 10th and cut on August 31st is worthy of mention. This crop was watered twice.

Bromus inermis.

This grass, more commonly known under the short name Bromus will from present indications become the fodder crop of our arid region, its suitability for this climate and growth under irrigation having now been satisfactorily proved. During the past season Mr. W. R. Hull obtained a return of nearly four tons to the acre from the third season's crop of this grass, the growth averaging nearly six feet in height, and other returns of $3\frac{1}{2}$ tons per acre have been secured from the second year's crop. The grass makes most excellent hay, and meadows properly cared for will return large yields for many years. Bromus should be planted on well pulverized and clean land, being sown with oats or some other grain; information as to quantity of seed to be sown is given below. Care must be exercised in irrigating this crop, as it will not, like timothy, stand too much water.

Pease and Rye.

Small areas of both of the above were grown under irrigation during the past season, and returned satisfactory yields. Pease do exceptionally well in this district under irrigation, and promise a sure and bountiful crop which should, in conjunction with the raising of hogs, give a good return.

Native Grasses.

The yield of hay from the large majority of irrigated areas of native grasses was of an unsatisfactory character. The native grasses, particularly on uplands, are the product of existing arid conditions, and while the growth can be forced by the artificial application of water it will, in the end, pay irrigators to break up the land and plant some other fodder grass from which a bountiful yield, under irrigation, is assured.

Vegetables.

Irrigated gardens at all points in the arid regions produced excellent crops, and many cases are noted where repeated failures to grow vegetables under ordinary conditions have been followed by splendid returns when irrigation has been resorted to. Exceptionally large yields of potatoes are noted in several cases, and all ordinary vegetables, including pease, beans, asparagus, cabbage, cauliflowers, beets, carrots, turnips, lettuce and celery have been very successful. The lettuce, cauliflower, celery and asparagus grown in this district will compare favourably with any grown in Canada. In the Maple Creek district good crops of corn, tomatoes, pumpkins and melons were obtained.

Number of Irrigations.

The number of irrigations for any particular crop must, of course, be more or less dependent upon the character of the season, but the experience so far obtained indicates that if the ground is properly cultivated two irrigations are sufficient for grain crops,

the first of which should not be applied until the grain has attained a strong and vigorous growth. Irrigation to bring the grain up should not be resorted to unless absolutely necessary. Timothy will stand, and in fact seems to thrive under, frequent waterings, and bromus also requires several waterings.

Meadow lands seem to give the best results from fall irrigation, and if cultivated land is very dry, the application of sufficient water late in the fall to give seed a good start in the spring is advisable. Gardens should be watered as the appearance of the vegetables warrants, but water should not be applied after vegetables approach full growth.

Planting Fodder Crops.

Timothy should be sown on well-cultivated ground with grain crop in the spring, about ten pounds (10 lbs.) of seed to the acre being sufficient. Plant with oats or some other grain crop, and if good stand is obtained, irrigate after grain is cut. The results obtained by Mr. William Edgar, referred to above, would seem to justify the experiment of planting timothy on sod in some instances.

Bromus should be sown with grain crop in the spring on well cultivated land, the usual quantity of seed being about ten pounds (10 lbs.) to an acre. It is planted with oats, barley, or some other grain crop and, as a rule, does not make a very good showing the first year. If ground is moist do not irrigate in fall.

Timothy and Bromus seed may be obtained from any wholesale seed dealer in eastern Canada, the average price being: Timothy, 4 to 6 cents per pound; Bromus, 15 cents per pound; these prices being for considerable quantities. A limited quantity of Bromus seed can, it is understood, be obtained from the experimental farm at Indian Head, Assiniboia.

Table of Prices current at Calgary.

Wheat, 1st quality.....	65 cents per bushel.
Barley, 1st quality, malting.....	37 do
Barley, 2nd quality.....	30 do
Oats.....	30 do
Timothy, baled.....	\$10.50 per ton.
Bromus, baled.....	\$10.50 do
Native hay.....	\$5.50 to \$6 per ton.
Oats, barley or wheat (cut green for feed).....	\$5 to \$6 per ton.

There has been an active market for all the above, in fact the demand has exceeded the local supply.

STATEMENT of Temperature and Rainfall at certain points in Southern Alberta and Western Assiniboia, during the months May to September inclusive, during 1895 and 1896.

Place.	Average Temperature, May to Sept., 1895.	Average Temperature, May to Sept., 1896.	Rainfall, May to Sept., 1895, inclusive.	Rainfall, May to Sept., 1896, inclusive.
Calgary.....	54.8	55.5	9.86	8.12
Pincher Creek.....	55.7	56.1, 3 mos.	12.28	6.28, 3 mos.
Medicine Hat.....	61.2	61.2	8.05	9.33
Swift Current.....	59.3	58.9	8.96	9.32
Regina.....	57.8	57.3	4.54	14.31

J. S. DENNIS,
Chief Inspector.

CALGARY, 26th January, 1897.

Department of the Interior.

INFORMATION FROM IRRIGATORS.

G. ANDERSON, Junr., Tp. 21, Rge. 3, W. 5th, 70 acres irrigated. Two irrigations, June 1st and Sept. 1st.

Crop:—Oats, 2 acres, cut green, 5 tons. Native Grasses 68 acres, 50 tons. Vegetables destroyed by cut worm. Soil, light sandy loam. Part of meadow was not cut owing to snowstorm. Crop was not heavy.

G. ANDERSON, Senr., Tp. 21, Rge. 3, W. 5th, 15 acres irrigated. Two irrigations, June 1st. and Augt. 15th.

Crop:—Native Grasses 15 acres; Yield 15 tons. Soil light Sandy loam. Crop good, but laid by snow.

ALEX. AIRD, Tp. 20, Rge. 4, W. of 5th., 40 acres irrigated. Two irrigations, 1st May and 15th July.

Crop:—Native Grasses 40 acres; Yield 50 tons. Soil, black sandy loam. Harvest, August 1st.

GEORGE BELL, Tp. 21, Rge. 3, W. 5th. 60 acres irrigated. Irrigated June 9th.

Crop:—Hay, 60 acres; Yield 50 tons. Soil, sandy on gravel. No hay could be grown without irrigation. Thinks meadows should be irrigated in early Spring.

Mrs. JANIE BRODERICK, Tp. 18, Rge. 28, W. 4th., 30 acres irrigated. One irrigation end of July. Hay irrigated last Fall.

Crop:—Oats, 15 acres; Yield, 600 bushels. Potatoes 2½ tons to acre. Harvest, Grain September. First time for five years I have had a garden. Potatoes under irrigation yielded four times former crop. Owing to scarcity of lumber was late getting water on to land. The irrigated oats stood nearly 5 feet high and those not irrigated did not grow at all.

BLAKE and MILES, Tp. 9, Rge. 1, W. 5th., 21 acres irrigated. First irrigation May 15th, last irrigation July 20th.

Crop:—Oats, 12 acres cut green, 16 loads; Timothy, 9 acres, poor, 7 tons. Vegetables medium. Harvest; Grain September 6th to 8th; Hay, July 20th; Vegetables Oct. 5th. Ditches not completed, therefore crop not so good as might be. Timothy running out.

S. BROUARD, Tp. 8, Rge. 25, W. 4th. 30 acres irrigated. Two irrigations, early in June and late in July.

Crop:—Wheat, 2½ acres, 50 bushels; Oats, 20 acres, 700 bushels; Native Grasses, 7½ acres, 7 tons. Harvest; Grain, end of September; Hay, end of August; Wheat, an uneven crop. Part of Oats cut for green feed. Owing to location of ditch result is not so satisfactory as it would be if ditch was more satisfactorily located.

D. BRANIFF, Tp. 11, Rge. 23, W. 3rd. 230 acres irrigated. Two irrigations, April 12th and October.

Crop:—Wheat, 4 acres, 40 bushels; Oats, 20 acres, 600 bushels; Native Grasses, 160 acres, 100 tons; Vegetables, 4 acres, 500 bushels. Harvest; Grain, August and September; Hay, July to October; Vegetables, October 20. Creek low when water was most wanted. Good plan to irrigate in Spring and Fall where water is scarce in summer. Irrigation banishes gophers.

H. F. COOK, Tp. 1, Rge. 26, W. 4th. 35 acres cultivated. No irrigations.

Crop:—Oats, 35 acres, cut for hay. Too cold for grain or vegetables to ripen. Sufficient rain this season, so did not irrigate.

COCHRANE RANCH, Tp. 5, Rge. 26, W. 4th. 170 acres irrigated. Irrigations: Grass, two; Grain, one. Grass, 1st June and 12th July. Grain, 15th July.

Crop:—Oats, 32 acres, 90 tons, cut green; Native Grasses, 137 acres, 70 tons; Vegetables, 1 acre, 550 bushels. Soil, light sandy loam. Harvest; Grain, 8th August; Hay, 27th July; Vegetables, 1st October. Early part of season cold and unfavourable. Large part of meadows watered not good enough to cut.

H. D. CRITCHLEY, 20 acres irrigated. Five irrigations; from 20th June to 20th August.

Crop:—Oats, 20 acres, 50 loads, cut green. Harvest; 1st September. Vegetables very fair crop. Irrigate in Fall and before Spring sowing if possible. It is not advisable to irrigate very young grain. Irrigate on dull days or at night.

CARDSTON COLONY; Tp. 3, Rge. 25, W. 4th. Two irrigations.

Crop:—No record of yield kept. Supplies drawn all summer. Yield doubled by irrigation. Variety of garden crops. Works not completed for irrigating grain lands. Verdict in favour of irrigation.

CALGARY IRRIGATION Co., Tp. 24, Rge. 3, W. 5th. 140 acres irrigated. Irrigated May 11th to 30th.

Crop:—Native Grasses 140 acres 173 tons. Harvest in August. Lands unfenced, consequently best results not obtained, as hay was destroyed by cattle. Acreage is estimated. Harvest greatly interrupted by broken weather.

CANADIAN LAND & RANCHE Co., Tp. 12, Rge. 22, W 3rd. 150 acres irrigated. Irrigated from May 1st to June 15th.

Crop:—Native Grasses, 225 tons. Soil sandy. Harvest August and September.

CANADIAN LAND AND RANCHE Co. Tp. 13, Rge. 19, W 3rd. 80 acres irrigated. Irrigated from May 1st to June 15th.

Crop :—Native Grasses, 100 tons. Soil sandy. Harvest August and September.

O. A. CRITCHLEY, Tp. 24, Rge. 2, W 5th. 75 acres irrigated. Irrigated May 31st.

Crop :—Wheat, 25 acres, 70 tons ; Oats, 40 acres, 100 tons ; Oats, 10 acres, 300 bushels. Harvest September 5th. Small portion of crop not reached by water was completely burnt up and yielded nothing.

JEAN CLAUSTRE, Tp. 10 Rge. 24, W 3rd. 20 acres cultivated. No irrigations.

Crop :—Native Grasses, 20 acres, 40 tons. Found water too cold last year. Intend to make a reservoir to hold water so that sun may warm it next season.

A. E. BANNISTER, Tp. 22, Rge. 28, W. 4th. 50 acres irrigated. Three irrigations from 1st June till middle of July.

Crop :—Native grasses, 50 tons. Vegetables all kinds, good crop. Harvest ; Hay, July. After cutting, pasture grass proved good feed for fattening steers off at end of September.

DIXON BROS., Tp. 11, Rge. 26, W. 3rd. 3 acres irrigated. Irrigated at intervals, 3rd year.

Crop :—Oats, about 240 bushels. Harvest September. Cut on green side, and will not be threshed. If allowed to ripen would yield about 80 bushels to the acre.

MRS. ANNIE DOWLING, Tp. 22, Rge. 3 W. of 5th. Two irrigations in June and August.

Crop :—Oats, 9 acres, 45 loads, cut for hay. Harvest 6th September. First year of irrigation. Ditch not completed in time to get water on where most needed.

W. B. ELLIOTT, Tp. 26, Rge. 4, W. 5th. 50 acres irrigated. Irrigated from May 25th till June 27th.

Crop :—Wheat, 2 acres, 42 bushels ; Barley, 4 acres, 132 bushels ; Oats, 14 acres, 610 bushels ; Rye, 6 acres, cut green ; Native grasses, 20 acres, 5 tons ; Potatoes, 1 acre 45 bushels. Harvest ; Grain, August and September ; Vegetables, October 6th. Small vegetables first sown failed on account of frost and worm. Potatoes crippled by frost 23rd June and 24th July.

WILLIAM EDGAR, Tp. 22, Rge. 3, W. 5th, 125 acres irrigated. Four irrigations. First in Fall of 1895 ; last, end of July, 1896.

Crop :—Oats, 1 acre, 80 bushels ; Oats, 14 acres, cut green, 40 loads ; Timothy, 30 acres, 45 tons ; Native Grass, 80 acres, 100 loads. Soil, deep loam. Harvest ; Grain, 14th September ; Hay, 30th August. Timothy sown on grass in 1894 (4 lbs.) crop now in first class condition. Recommends that Timothy be sown in this way.

C. W. S. ELTON, Tp. 8, Rge. 1, W. 5th. 28 acres irrigated. Irrigated July 1st to August 4th.

Crop ; Oats, 14 acres, 561 bushels ; Oats, 14 acres, 28 tons, cut green. Harvest ; Grain, September 18th ; Hay, August 26th. 14 acres oats threshed yielded 40 bushels to the acre weighing over 40 lbs. to the bushel. Green feed was three to five feet high. Season so excessively dry that much of grain did not germinate until after irrigation. Would have irrigated sooner but ditch was not completed in time.

H. H. FAUQUIER, Tp. 10, Rge. 25, W. 3rd. 25 acres irrigated. Irrigated about July 12th.

Crop :—Wheat, 2 acres, 3 large loads ; Barley, 1 acre, 1 large load ; Oats, 20 acres, 27 loads ; Potatoes, 1 acre, 260 bushels. Harvest, middle of August. Wheat and Barley not yet threshed. All vegetables were very good. Rain fell in spring and latter part of summer, which made one irrigation sufficient.

JOSEPH FISHER, Tp. 21, Rge. 3, W. 5th. 80 acres irrigated. Two irrigations from beginning of June to latter part of July.

Crop :—Native grasses, 80 acres, 100 tons. Soil, loam with gravel subsoil. Water supply insufficient. 100 acres lying low moistened by the water produced best hay.

JOHN FURNAN, Tp. 1, Rge. 26, W. 4th. 31 acres irrigated. Irrigated from April 15th to middle of June.

Crop :—Oats, 9 acres, not threshed ; Timothy, 22 acres, 2½ tons per acre. Soil, black loam. Harvest ; hay, August 1st ; grain, September 15th. Country no use without irrigation. Oats, too heavy ; timothy, 2 to 2½ tons to the acre.

W. M. GUNN, Tp. 9, Rge. 2, W. 5th. 28 acres irrigated. One irrigation, June 10th.

Crop :—Oats, 10 acres, 407 bushels ; Oats, 18 acres, 35 tons, cut green ; Vegetables, ½ acre, 3½ tons. Harvest ; Grain, September 25th ; Hay, September 29th ; Vegetables, October 1st to 10th. Grain grew 6 ft. 6 in. high, a little too rank for threshing, but fine for feed.

CAPT. M. GARDNER, Tp. 24, Rge. 4, W. 5th. Irrigated in patches. Irrigations, Timothy, May 22nd and June 1st ; Oats, July 18th and August 6th.

Crop :—Oats, 27 acres, 54 tons ; Timothy, 2 acres, 3½ tons. Harvest, Oat-hay commenced August 31st. Would only have had half a crop without irrigation, and no timothy. Crop is hardly a fair estimate, as was delayed in cutting irrigated hay until after first snow and frost came.

COLIN GONGE, Tp. 9, Rge. 26, W. 4th. 6 acres irrigated. Three irrigations ; two weeks apart.

Had 35 acres under cultivation. Cut it green for hay. Had more from the 6 acres which were irrigated than from the 29 acres not irrigated, though did not get water on the land until late in June.

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HIGH RIVER HORSE RANCHE Co., Tp. 18, Rge. 29, W. 4th. 20 acres irrigated. One irrigation, 1st July.

Crop :—Wheat, 20 acres, 20 tons, cut green. Harvest 15th August. First time water has been applied. System of laterals not completed. Result satisfactory.

W. R. HULL, Tp. 22, Rge. 1, W. 5th. 325 acres irrigated. Two irrigations. From beginning of June to latter part of July.

Crop :—Wheat, 7 acres, 255 bushels ; Barley, 8 acres, 370 bushels ; Oats, White, 14 acres, 667 bushels ; Oats, Black, 3 acres, 185 bushels ; Timothy Bromus, mixed, 160 acres, 535 tons ; Bromus, 33 acres, 128 tons ; Native Grasses, 25 acres, 40 tons ; Vegetables, no estimate of quantity but all first class crop. Soil, sandy and black loam. Harvest ; Grain, about 25th August ; Hay, about 15th August. Also had about 100 acres under grain, principally oats and wheat, which was cut for green feed and which yielded 375 tons of feed.

FRASER & McKINNON, Tp. 21, Rge. 2, W. 5th. 300 acres irrigated. Irrigated twice. 1st June and 25th July.

Crop :—Native grasses, 300 acres, 200 tons. Harvest, August and September. Water should have been turned on a month earlier, but feared the weather was too cold. Have come to the conclusion that land with gravel subsoil cannot be hurt by early watering.

F. A. JACKSON, Tp. 21, Rge. 3, W. 5th. 50 acres irrigated. Irrigated whenever sufficient water in Creek.

Crop :—Native Grasses, 12 tons hay. Soil, clay loam. Had hay elsewhere, so only cut a small portion of irrigated meadow. Harvest in September.

JONES & SMART, Tp. 19, Rge. 15, W. 3rd. 150 acres irrigated. Irrigated ; March, April, June and July.

Crop :—Oats, 10 acres, 10 tons ; Native Grasses, 20 tons ; Vegetables, $\frac{1}{2}$ acre, 75 bushels of Potatoes. Harvest ; Hay and Oats, July ; Vegetables, October. Have not a sufficient supply of water to expect good results on grass land for a number of years.

GLENGARY RANCHE, Tp. 12, Rge. 29, W. 4th, 135 acres irrigated. Three irrigations. 1st June to 20th July.

Crop :—Wheat, 5 acres, cut green ; Oats, 70 acres, cut green ; Rye, 10 acres, cut green ; Timothy, 35 acres, 70 tons ; Vegetables, 3 acres, grand crop. Harvest ; Grain, September ; Hay, August ; Vegetables, October. Grain was sown on breaking about end of May. Promised to be heavy crop, but severe snowstorm early in September flattened it so that it did not recover.

H. S. LOTT, Tp. 24, Rge. 2, W. 5th. Irrigations frequent from May 15th to August 1st.

Crop :—Oats, 10 acres, 679 bushels ; Oat-hay, to the acre, 5 tons ; Timothy, 24 acres, 6 tons ; Native Grasses 100 tons ; Vegetables, good. Grain crop irrigated. Warm weather in February drew frost from the ground. Did not require more than 5 tons Oat-hay. Soil black loam. Harvest ; Grain first week of September ; Hay ; end of July.

GEORGE LANE & Co., Tp. 14, Rge. 29, W. 4th. 100 acres irrigated. Several irrigations.

Crop :—Native Grasses, 100 acres, 100 tons. Hay extra good quality. Third year of irrigation, and think there is improvement.

P. LACHANCE, Tp. 8, Rge. 25, W. 4th. 60 acres irrigated. Irrigated 17th May.

Crop :—Wheat, 7 acres, 200 bushels ; Oats, 24 acres, 800 bushels ; Native Grasses, 1 $\frac{1}{2}$ acres, 2 tons ; Potatoes 1 $\frac{1}{2}$ acres, 250 bushels ; Green Oats 26 acres, 30 tons. Harvest ; Wheat, 3rd September ; Oats, 20th August ; Hay, 20th August ; Vegetables, 15th October. Land under wheat irrigated twice. Other lands once. Potatoes were irrigated last year.

LEEDS, ELLIOTT & Co., Tp. 12, Rge. 28, W. 4th. 25 acres irrigated. Irrigated from July 1st till August 1st.

Crop :—Wheat, 10 acres, Barley, 4 acres, Oats, 50 acres, Rye, 8 acres, not threshed. Bromus 2 acres, left to seed down. Native Grasses 2 acres left to seed down. Potatoes $\frac{1}{2}$ acre 400 bushels. Ice carried away flumes in Spring making irrigation late. What was watered was simply wonderful. Grain that was apparently burnt to the ground grew 3 feet in 20 days after being irrigated ; native grasses also showed similar growth. Had it not been for the water would have had nothing. Green feed went about 3 tons to the acre.

A. A. LINDQUEST, Tp. 1, Rge. 26, W. 4th. 25 acres irrigated. Irrigated 1st July.

Crop :—Timothy, 20 tons ; Potatoes 1 ton. Harvest ; Hay 25th August ; Vegetables 20th October.

W. R. LEES, Tp. 6, Rge. 1, W. 5th. 22 acres irrigated. Irrigated from June 24th to June 29th.

Crop :—Wheat, 3 acres, 90 bushels ; Barley, 5 acres, 90 bushels ; Oats, 6 acres, 240 bushels ; Oats and Timothy, 8 acres, 16 tons. Harvest August 5th to September 20th. Owing to bad weather during harvest a great deal of grain was lost. Oats weighed 46 lbs. to the bushel.

WM. MOORE, Tp. 10, Rge. 25, W. 3rd 90 acres irrigated. Two irrigations, 1st May and 1st June.

Crop :—Native Grasses, 90 acres, 70 tons. Harvest 1st August. Creek dried up early in June, therefore could not make a success.

W. R. MOSELEY, Tp. 22, Rge. 3, W. 5th. 15 acres irrigated. Irrigated from 22nd June till 6th July.

Crop :—Oats, 6 acres, 30 loads ; Rye Grass, 7 acres, 14 loads. Soil, black loam. Harvest; Grain, 12th August; Hay, 18th August. Irrigation a great benefit.

C. MCCARTHY, Tp. 10, Rge. 23, W. 3rd. 15 acres irrigated. Two irrigations, potatoes only, 1st July and 15th July.

Crop : Oats, 14 acres, 700 bushels ; Potatoes, 1 acre, 300 bushels. Harvest ; Grain, 15th September ; Potatoes, 1st October. Land is situated on a low bend of Creek and oats did not need irrigating. Left water on potatoes about 12 hours, or until land was well soaked.

J. W. OCKLEY, Tp. 22, Rge. 3, W. 5th. 95 acres irrigated. Three irrigations from 20th June to September.

Crop : Timothy, 15 acres, 30 tons ; Bromus, 15 acres, 10 tons ; Native grasses, 72 acres. Garden Soil, sandy loam. Harvest; Hay, July and August ; Vegetables, October. The Bromus was mostly sowed this season and made good stand for next year. The old stand of same was a good crop of 3½ tons to the acre. Timothy was sown on 10th June, cut 31st August, yield, 2 tons per acre. A wonderful crop on first season.

M. OXARART, Tp. 6, Rge. 27, W. 3rd. Irrigated at intervals, eighth year.

Crop :—Oats, 25 acres, 800 bushels ; Native Grasses, 300 acres, 350 tons. Vegetables, good crop. Harvest from 1st July to 1st September.

R. PATTERSON, Tp. 8, Rge. 25, W. 4th, 25 acres irrigated. Irrigated 15th May.

Crop ;—Oats, 5 acres, 10 tons ; Native Grasses, 20 acres, 25 tons. Harvest ; Hay, 1st August ; Oats, 25th August. Grain irrigated once. Hay continuously. Had better results from grass land which was irrigated last year. The place has been used as a pasture for last twelve years and no hay had ever been cut on it before.

WILLIAM PEARCE, Tp. 24, Rge. 1, W. 5th. 35 acres irrigated. Irrigations, Oats, 3 ; Barley, 4 ; Timothy, 4 ; May 20th to August 1st.

Crop :—Barley, 6 acres, 270 bushels ; Oats, 10 acres, 600 bushels ; Oats and Pease mixed, 8 acres, 10 tons ; Pease, 2 acres, 40 bushels ; Timothy, 8 acres, 20 tons ; Bromus, ½ acre ; Vegetables, 3 acres. Soil, light loam. Harvest, July 20th to September 8th. Owing to inferior seed, about half oats went 40 bushels to the acre ; balance, 80 bushels to the acre. Oats and pease made very high grade feed ; both fairly matured ; first ploughing being rough, made irrigation difficult, and portions are so gravelly nothing will grow. Owing to inadequate threshing appliances 25 per cent of pease were not threshed, and a large quantity was used as green pease for table use. Four acres of timothy seeded down previous year with barley equalled 3 tons to the acre ; balance seeded with wheat, very thin ; in places, none. Benefits of irrigation last season were very marked.

CHARLES PRIDDIS, Tp. 22, Rge. 3, W. 5th. 7 acres irrigated. Two irrigations, Fall, 1895 ; Spring, 1896.

Crop :—Native Grasses, 10 loads. Harvest, July. Will have a good deal more under water this year. Seeded to Timothy.

SAMSON & McNAUGHTON, Tp. 24, Rge. 2, W. 5th. 76½ acres irrigated. Irrigated June 3rd to August 10th.

Crop :—Wheat, 6 acres ; Barley, 6 acres ; Oats, 14½ acres. Cut green. About 2 tons to acre of feed. Native Grasses, 50 acres, 60 tons.

SHEEP CREEK IRRIGATION Co. Tp. 20, Rge. 1, W. 5th. 1,200 acres irrigated. Five irrigations from 1894 to 1896.

Crop :—Wheat, 10 acres, green feed ; Oats, 20 acres, 800 bushels ; Native Grasses, 200 tons. Harvest, September 10th. Only got about 100 acres properly irrigated, as were finishing main ditch and did not complete it until July this year.

C. B. SHELDON, Tp. 11, Rge. 25, W. 3rd. 25 acres irrigated. Three irrigations from June 10th to July 20th.

Crop :—Native Grasses, 10 tons.

ROBERT TURNER, Tp. 31, Rge. 3, W. 5th. 60 acres irrigated. Two irrigations, June and August.

Crop :—Native Grasses, 60 acres, 80 tons. Soil, black loam. Harvest, September.

A. T. WALLACE, Tp. 10, Rge. 24, W. 3rd. Irrigations, 1st April. No water after 15th July.

Crop :—Oats, 7 acres, cut green ; Native Grasses, 10 acres, 20 tons. First season. Harvest ; August 17th. If irrigated in Fall would have had better crop. Potatoes good crop, not irrigated.

JOSEPH T. WAITE, Tp. 20, Rge. 4, W. 5th. 40 acres irrigated. Irrigated at intervals all summer.

Crop :—Oats, 2 acres, 4 tons ; Native Grasses, 40 acres, 45 loads. Soil gravelly. Harvest ; Hay latter end of August. Oats produced by soakage only. Irrigation was not complete owing to want of laterals, but crop increased one half by water applied.

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R. A. WALLACE, Tp. 19, Rge. 28, W. 4th. 300 acres irrigated. Irrigated from June 10th till July 15th.

Crop :—Wheat, Barley and Oats, mixed, 40 acres, 150 tons, green feed ; Bromus, $\frac{1}{10}$ th acre, good ; Native Grasses, 260 acres, 250 tons ; Vegetables, $\frac{1}{2}$ acre, good. Soil, sandy loam. Harvest ; Grain, September 1st to 15th ; Hay, July 25th to September 15th. Spring, cold, making growth slow especially of grass cut in 1895. Would prefer to irrigate in fall, so that water need not be put on until grass and grain is well up.

GEORGE T. YOUNG, Tp. 22, Rge. 3, W. 5th, 103 $\frac{1}{2}$ acres under irrigation. Irrigated from end of May to 1st June.

Crop :—Oats, 3 $\frac{1}{2}$ acres, 18 loads ; Native Grasses, 100 acres, 200 tons. Harvest, 20th July. Irrigation has at least doubled the production of hay on this slough.

J. C. WARREN, Tp. 21, Rge. 3, W. 5th. 40 acres irrigated. Irrigated from 15th June to 1st July.

Crop :—Native Grasses, 40 acres, 50 tons. Harvest, August. Did not get sufficient water owing to breach in dam.

CALGARY HYDRAULIC Co., Tp. 24, Rge. 1, W. 5th. 100 acres irrigated. One irrigation each to Wheat, Barley and Oats, 26th June and 28th July.

Crop :—Wheat 40 acres, 570 bushels ; Barley 30 acres, 898 bushels ; Oats 30 acres, 1,780 bushels. Harvest 18th September.

MAUNSELL BROS., Peigan Reserve, 5 acres irrigated. Two irrigations, 21st June, and 16th July.

Crop :—Oats, 5 acres, 21 loads. Harvest, September 12th. Crop nearly killed by drought before we got water on the land.

A. S. MCKAY, Tp. 24, Rge. 2, W. 5th. 25 acres irrigated. Two irrigations, 8th June, 12th July.

Crop :—Wheat, 8 acres, 216 bushels ; Oats 12 acres, 635 bushels ; Rye $\frac{1}{2}$ acre, 10 bushels ; Vegetables 2 acres very fair ; Potatoes, 300 bushels to the acre. Harvest, August and September.

T. P. McHUGH, Tp. 22, Rge. 19, W. 4th. 50 acres irrigated. Four irrigations from May 15th to August 15th.

Crop :—Oats, 50 acres, 3500 bushels. Harvest, September 20th.

A. C. NEWSON, Tp. 21, Rge. 3, W. 5th. 120 acres irrigated. Irrigated weekly from June 1st to July 20th.

F. W. PECCOCK, Tp. 11, Rge. 25, W. 3rd. 50 acres irrigated. Two irrigations, 15th June and 7th July.

Crop :—Native Grasses, 60 tons. Harvest, August. Not enough furrows to distribute water properly or result would have been better.

W. H. QUAIL, Tp. 12, Rge. 29, W. 4th. 30 acres irrigated. Irrigated June 20th to July 20th.

Crop :—Oats, 20 acres, 60 tons ; Alfalfa, 3 acres seeded last year ; Bromus, 1 acre seeded last year ; Potatoes, $\frac{1}{4}$ acre, 100 bushels. Harvest, August. Think hay land can be irrigated with advantage in the Fall and earlier in the Spring than for a green crop.

D. RILEY, Tp. 18, Rge. 20, W. 4th. One acre irrigated. Two irrigations, 1st and 15th August.

Crop :—Potatoes, 1 acre, 200 bushels. Harvest October 10th. In former years the largest quantity of potatoes raised off the same ground without irrigation was 50 bushels.

C. C. SHORT, Tp. 18, Rge. 29, W. 4th. 50 acres irrigated. Irrigated from the 20th June to 15th July.

Crop :—Wheat, 10 acres, 335 bushels ; Oats, 40 acres, 2,200 bushels. Harvest August 20th to September 20th.

S. W. SHAW, Tp. 23, Rge. 1, W. 5th. $\frac{1}{2}$ acre irrigated. Irrigations as needed.

Crop :—Peas, $\frac{1}{4}$ acre ; Turnips $\frac{1}{4}$ acre, 9 tons. Peas a splendid crop. All used green.

R. WALSH, Senr., Tp. 22, Rge. 3, W. 5th. 16 acres irrigated. Three irrigations.

Crop :—Oats, 10 acres, 40 tons ; Native Grasses 6 acres, 15 tons. Harvest, August and September Did not give irrigation a fair trial this year, as water by irrigation was not badly needed, this being first crop.

J. W. McLAUGHLIN, Tp. 19, Rge. 29, W. 4th. 91 acres irrigated. Irrigated from May 9th to July 10th.

Crop :—Wheat 7 acres, 200 bushels ; Oats 25 acres, 900 bushels ; Oats 25 acres, 80 loads green feed ; Rye 30 acres, 30 loads ; Potatoes 4 acres, 1,600 bushels. Harvest ; Grain, 28th August ; Hay, 20th August ; Potatoes, October. Should irrigate in fall on summer-fallow. Part of wheat irrigated previous year went 40 bushels to the acre.

SUPPLEMENTARY.

SAMUEL HOWE, Tp. 19, Rge. 3, W. 5th. 120 acres irrigated. Two irrigations, 10th June and 28th July.

Crop :—Rye, 18 acres, 35 tons ; Native Grasses, 100 acres, 160 tons ; Vegetables, $\frac{1}{2}$ acre, 80 bushels Potatoes. Harvest ; Grain, 5th August ; Hay, 8th August. Without irrigation would not have been able to raise half the crop.

JOHN QUIRK, Tp. 21, Rge. 4, W. 5th. 220 acres irrigated. Irrigated all summer from 1st June to 1st August.

Crop :—Rye, 15 acres, 25 tons ; Native Grasses, 200 acres, 200 tons ; Potatoes, $\frac{1}{2}$ acre 60 bushels. Harvest, Grain ; 1st August ; Hay, 5th August. Without irrigation would not have been able to cut any hay on the land.

JOHN WARE, Tp. 20, Rge. 4, W. 5th. 90 acres irrigated. Fifth year, first irrigation 1st May, 1892, last irrigation 1st May, 1896.

Crop :—Wheat, 3 tons to the acre ; Oats, 2 tons to the acre ; Native grasses, 2 tons to the acre. Harvest, 6th August.

JOHN NELSON, Tp. 8, Rge. 1, W. 5th. 180 acres irrigated. Two irrigations, 15th May and 15th July.

Crop :—Oats, 16 acres, 500 bushels ; Peas, $\frac{1}{2}$ acre 700 lbs. ; Native grasses, 50 acres, 65 tons ; Cabbage, 1 acre, 3 $\frac{1}{2}$ tons ; Potatoes, 1 $\frac{1}{2}$ acres, 6 tons ; Turnips, $\frac{1}{2}$ acre, 3 $\frac{1}{2}$ tons. Harvest ; Peas, 1st August ; Oats, 28th August ; Hay, 15th August ; Vegetables, 30th September.

N. W. MOUNTED POLICE, Police Reserve, Stand-Off. 128 acres irrigated. Two irrigations, 4th and 13th July.

Crop : Native grasses, 128 acres. Pasture. Vegetables, 4 acres, 10,000 lbs. Harvest ; Vegetables, 8th October. Beets, turnips, mangolds and potatoes, good crop. Grass also good where the water was put on.

Department of the Interior.

No. 5.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH, OTTAWA, 28th January, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior.

SIR,—I have the honour to submit the following report referring to the accounts of this Department.

One set of statements covering twelve months ending 31st December, 1896, marked A, B, C, D, E, F, G and H, showing the revenue of the department under several headings for that period; and one set covering twelve months ending 31st December, 1895, marked A1, B1, C1, D1, E1, F1, G1 and H1, showing revenue for that period are hereto appended.

A comparison of revenue by agencies on account of Dominion lands, statements marked A and A1, shows an increase of \$24,186.19 in 1896 over the year 1895.

A comparison of total revenue under all headings shows an increase of \$30,577.17 in 1896, over 1895, viz.: the total revenue for 1896 being \$322,082.42, and the total revenue for 1895 being \$291,505.75.

Expenditure.

Separate accounts are kept in this branch for every item of expenditure in connection with moneys appropriated by Parliament for this department, viz.: for the survey and sale of Dominion lands; for civil government; for immigration; ordnance lands; expenses of government in the North-west Territories and in the district of Keewatin; and for school lands, &c.

The administration of the outside service offices, as well as of the inside service, represents a very large number of payments, and causes an extensive financial correspondence which is all done by a clerk of this branch having a special knowledge of accounts.

All payments are made through this branch and vouchers of expenditure sent every month to the Audit office, with full statements.

The details of expenditure appear every year in the Auditor General's report.

Revenue.

Revenue from all sources received at head office is deposited to the credit of the Receiver General, weekly statements being sent to the Finance department and monthly statements to the Auditor General, so that all particulars are fully given with respect to every item of revenue.

Eight statements hereto attached, marked A, B, C, D, E, F, G and H show the revenue under general headings during the calendar year ended on the 31st of December, 1896, as follow:—

"A," the revenue received from the several agencies of the outside service, and at headquarters in Ottawa, on account of Dominion lands to be: cash, \$181,758.12; warrants and scrip, \$52,506.23; total, \$234,264.35.

"B," the revenue from Ordnance lands, month by month, a total in cash of \$11,302.31.

"C," the revenue from school lands from each of the school districts in Manitoba, and the North-west Territories, amounting to \$53,890.65.

"D," the revenue from registration fees from each of the registration districts in the North-west Territories, amounting to \$9,606.46.

"E," the revenue from fines and forfeitures in the North-west Territories, amounting to \$1,021.87.

"F," the receipts on account of casual revenue, amounting to \$4,230.77.

"G," seed grain and relief mortgage repayments amounting to \$7,766.01.

"H," the revenue received on account of Dominion lands during the year in question. This is shown month by month under each sub-head. The total amount received is, in cash, \$181,758.12; and in warrants and scrip \$52,506.23; total, \$234,264.35.

Eight statements also hereto attached, marked A1, B1, C1, D1, E1, F1, G1 and H1, show the revenue under general headings during the calendar year ended on the 31st of December, 1895.

"A1," shows the revenue received from the several agencies of the outside service, and at headquarters in Ottawa on account of Dominion lands to be cash, \$167,885.34; warrants and scrip, \$42,192.82; total, \$210,078.16.

"B1," shows the revenue from Ordnance lands, month by month, a total in cash of \$19,127.32.

"C1," shows the revenue from school lands from each of the school districts in Manitoba and the North-west Territories, amounting to \$44,552.24.

"D1," shows the revenue from registration fees from each of the registration districts in the North-west Territories, amounting to \$10,729.48.

"E1," shows the revenue from fines and forfeitures in the North-west Territories, amounting to \$842.50.

"F1," shows the receipts on account of casual revenue, amounting to \$891.12.

"G1," shows seed grain and relief mortgage repayments amounting to \$5,284.43.

"H1," shows the revenue received on account of Dominion lands during the 12 months in question; it is shown month by month under each sub-head. The total amount received is, in cash, \$167,885.34; and in warrants and scrip \$42,192.82; total, \$210,078.16.

Respectfully submitted,

J. A. PINARD, *Accountant*.

Department of the Interior.

A.—STATEMENT of Receipts on account of Dominion Lands for calendar year 1896.

	Cash.	Scrip and Warrants.	Total.
	\$ cts.	\$ cts.	\$ cts.
Dominion Lands Agencies—			
Battleford	190 00		190 00
Beaver Lake	26 00		26 00
Calgary	3,332 99	15,617 70	19,950 69
Coteau	933 51	160 00	1,093 51
Edmonton	2,646 64	1,004 44	3,651 08
Kamloops	18,618 55		18,618 55
Lethbridge	4,816 34	8,502 49	13,318 83
Little Saskatchewan	2,839 70	479 99	3,319 69
Lake Dauphin	4,756 32	400 00	5,156 32
New Westminster	3,986 75	760 00	4,746 75
Prince Albert	1,031 58	551 92	1,583 50
Qu'Appelle	5,613 53	1,586 66	7,200 19
Red Deer	1,319 40	480 00	1,799 40
Souris	9,951 45	4,360 17	14,311 62
Swift Current	223 00		223 00
Touchwood	767 87	581 01	1,348 88
Wetaskiwin	920 85	800 00	1,720 85
Winnipeg	10,815 21	11,182 65	21,997 86
Crown Timber Agencies—			
Winnipeg	35,981 09		35,981 09
New Westminster	18,793 96		18,793 96
Prince Albert	7,639 89		7,639 89
Calgary	3,751 40		3,751 40
Edmonton	3,178 28		3,178 28
Rocky Mountains Park of Canada.			
Grazing lands	2,315 85		2,315 85
Hay permits	5,298 14	5,039 20	10,337 34
Mining fees	4,814 54		4,814 54
Coal lands	1,439 00		1,439 00
Stone quarries	34 00		34 00
Irrigation revenue	26 25		26 25
Map sales	41 00		41 00
Survey fees	570 91		570 91
Hudson Bay Co.	9,523 71		9,523 71
Surveyors' examination fees	7,047 24		7,047 24
Fees re applications for patents, &c.	70 00		70 00
Settlers' deposits	4,785 50		4,785 50
Suspense account	58 07		58 07
Foreshore fees	3,478 00		3,478 00
Refunds of overpayments	100 00		100 00
Rentals	19 60		19 60
	2 00		2 00
	181,758 12	52,506 23	234,264 35

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

B.—STATEMENT of Receipts on account of Ordnance Lands for the calendar year 1896.

Month.	Amount.	Total.
1896.	\$ cts.	\$ cts.
January	3,101 55	
February	542 63	
March	1,015 08	
April	1,883 00	
May	452 81	
June	649 07	
July	412 15	
August	513 23	
September	351 35	
October	2,019 82	
November	221 73	
December	139 89	
		11,302 31

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

C.—STATEMENT of Receipts on account of School Lands for the calendar year, 1896.

School District.	Amount.	Total.
	\$ cts.	\$ cts.
Manitoba	53,056 51	
Assiniboia	269 90	
Alberta	502 39	
Saskatchewan	61 85	
		53,890 65

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

Department of the Interior.

D.—STATEMENT of Fees received from Registrars in the North-west Territories for the calendar year 1896.

Registration Districts.	Amount.	Total.
	\$ cts.	\$ cts.
Assiniboia	4,437 03	
North Alberta	2,322 54	
South Alberta	2,045 67	
East Saskatchewan	753 30	
West Saskatchewan	47 92	
		9,606 46

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

E.—STATEMENT of Receipts on account of Fines and Forfeitures in the North-west Territories for the calendar year 1896.

Date.	Through whom paid.	Amount.	Total.
		\$ cts.	\$ cts.
Jan. 6....	His Honour the Lieut.-Governor of the North-west Territories...	80 50	
Mch. 3....	do do do	32 00	
April 20....	do do do	51 00	
June 15....	do do do	48 50	
July 17....	do do do	137 00	
Aug. 31....	do do do	454 20	
Nov. 2....	do do do	218 67	
			1,021 87

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, January 28th, 1897.

F.—STATEMENT of Casual Revenue for calendar year 1896.

Name.	Particulars.	Amount.
		\$ cts.
P. M. Barker.	Refund of overpayment, Aug. 6, 1894.	7 50
C. E. Phipps.	Refund, account postage stamps.	10 00
Queen's Printer.	Sale of transit, tripod, &c.	83 00
North American Transporta- tion and Trading Co.	Liquor license, 1896, Yukon District.	250 00
Alaska Commercial Co.	Permit dues on liquors, Yukon District.	1,261 50
Dom. Land Com'r.	Sale of buggy (purchased for G. H. Campbell).	10 00
Dom. Land Com'r.	Proceeds of sale of seed grain, 1896.	481 21
Dom. Land Com'r.	Proceeds of sale of seed grain, 1896.	2 60
Dom. Land Com'r.	Proceeds of sale of scrap iron.	1 50
G. A. Stewart.	Proceeds of sale of lumber.	2 30
Dom. L'ds Agt., Touchwood.	Refund, account advances to Sheho Lake settlers.	18 69
Otto J. Klotz.	Refund, balance account travelling expenses.	17 15
A. J. Brabazon.	Refund, account survey of 1896.	261 56
A. J. Brabazon.	Refund, balance account survey of 1896.	23 50
J. Johnston.	Refund, account travelling expenses.	278 59
W. F. King.	Refund, balance account travelling expenses.	292 28
G. A. Stewart.	Proceeds of sale of brick and lime.	7 72
Dom. Land Com'r.	Refund of freight charges, account seed grain, 1896.	79 20
Otto J. Klotz.	Refund, balance account survey of 1896.	12 36
O. Foursin.	Refund of immigration commission on one settler.	8 00
Dom. Land Com'r.	Refund, proceeds of sale of seed grain, 1896.	1,019 11
Dom. Land Com'r.	Refund of freight charges, C.P.R. account seed grain, 1896.	98 00
J. Johnston.	Refund, medical examination fee.	5 00
		4,230 77
Dom. Land Com'r.	Repayments, account relief mortgages of 1876.	393 68
Dom. Land Com'r.	Repayments, account seed grain advances of 1894.	1,846 46
Dom. Land Com'r.	Repayments, account seed grain advances of 1896.	501 13

The last three items appear on Statement of Repayments of seed grain advances.

J. A. PINARD,

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,

Accountant.

OTTAWA, 28th January, 1897.

G.—STATEMENT showing Seed Grain and Relief Mortgage Repayments for the calendar year 1896.

Relief Mortgages, 1876.	Seed Grain Advances, 1886-7-88.	Seed Grain Advances, 1890.	Seed Grain Advances, 1894.	Seed Grain Advances, 1895.	Seed Grain Advances, 1896.	Total.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	cts.	\$ cts.
393 68	690 70	630 89	1,846 46	3,653 15	501 13	7,766 01

J. A. PINARD,

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,

Accountant.

OTTAWA, January 28th, 1897.

Department of the Interior.

A¹.—STATEMENT of Receipts on account of Dominion Lands for calendar year 1895.

	Cash.	Scrip and Warrants.	Total.
	\$ cts.	\$ cts.	\$ cts.
Dominion Lands Agencies—			
Battleford	171 15		171 15
Beaver Lake	590 00		590 00
Calgary	2,824 39	3,440 17	6,264 56
Coteau	1,230 47	480 00	1,710 47
Edmonton	2,588 31	5,752 45	8,340 76
Kamloops	9,750 65		9,750 65
Lethbridge	4,817 36	5,549 65	10,367 01
Little Saskatchewan	4,017 69	1,392 44	5,410 13
Lake Dauphin	3,567 96		3,567 96
New Westminster	6,909 54	2,465 21	9,374 75
Prince Albert	1,434 67	1,256 37	2,691 04
Qu'Appelle	6,440 08	983 15	7,423 23
Red Deer	2,903 87	500 00	3,403 87
Souris	5,418 21	3,772 57	9,190 78
Swift Current	160 00		160 00
Touchwood	1,612 93	1,060 00	2,672 93
Wetaskiwin	3,571 22	1,843 62	5,414 84
Winnipeg	8,383 57	8,232 49	16,616 06
Crown Timber Agencies—			
Winnipeg	31,393 84		31,393 84
New Westminster	24,757 38		24,757 38
Prince Albert	5,073 94		5,073 94
Calgary	7,010 38		7,010 38
Edmonton	3,383 16		3,383 16
Rocky Mountains Park of Canada	2,422 65		2,422 65
Grazing lands	5,954 98	5,464 70	11,423 68
Hay permits	5,679 50		5,679 50
Mining fees	127 00		127 00
Coal lands	83 00		83 00
Stone quarries	5 17		5 17
Map sales, office fees, &c	546 64		546 64
Survey fees	5,878 28		5,878 28
Hudson Bay Co	4,446 53		4,446 53
Surveyors' examination fees	20 00		20 00
Fees re applications for patents, &c	4,262 00		4,262 00
Settlers' deposits	89 82		89 82
Suspense account	281 90		281 90
Foreshore fees	39 00		39 00
Refunds of overpayments	13 10		13 10
Refunds of scrip taken	10 00		10 00
Rentals	11 00		11 00
	167,885 34	42,192 82	210,078 16

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

B¹.—STATEMENT of Receipts on account of Ordnance Lands for the calendar year 1895.

Month.	Amount.	Total.
1895.	\$ cts.	\$ cts.
January	681 10	
February	2,564 02	
March	659 91	
April	2,727 46	
May	526 94	
June	1,755 50	
July	1,355 84	
August	1,386 67	
September	4,084 07	
October	2,781 47	
November	285 18	
December	319 16	
		19,127 32

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

C¹.—STATEMENT of Receipts on account of School Lands for the calendar year 1895.

School District.	Amount.	Total.
	\$ cts.	\$ cts.
Manitoba	43,267 99	
Assiniboia	658 57	
Alberta	556 13	
Saskatchewan	69 55	
		44,552 24

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

Department of the Interior.

D¹.—STATEMENT of Fees received from Registrars in the North-west Territories for the calendar year 1895.

Registration Districts.	Amount.	Total.
	\$ cts.	\$ cts.
Assiniboia	4,747 14	
North Alberta	2,487 30	
South Alberta	2,587 21	
East Saskatchewan	809 32	
West Saskatchewan	98 51	
		10,729 48

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, January 28th, 1897.

E¹.—STATEMENT of Receipts on Account of Fines and Forfeitures in the North-west Territories for the calendar year 1895.

Date.	Through whom paid.	Amount.	Total.
		\$ cts.	\$ cts.
1895.			
Feb. 4	His Honour the Lieut.-Governor of the North-west Territories	261 50	
April 2	do do do	73 50	
do 9	do do do	145 50	
May 7	do do do	72 00	
Aug. 12	do do do	123 50	
Nov. 4	do do do	124 50	
Dec. 2	do do do	42 00	
			842 50

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, January 28th, 1897.

F¹—STATEMENT of Casual Revenue for calendar year 1895.

Name.	Particulars.	Amount.
		\$ cts.
W. H. Stevenson	Account purchase, old land office, Regina	64 80
A. C. Talbot	Sale of tent, \$4; canoe, \$11	15 00
Alaska Commercial Co.	Liquor license, 1895, Yukon Dist	250 00
North American Transportation and Trading Co.	do do	250 00
"Gazette" Publishing Co.	Refund of immigration check 5,128 of July 7, 1893	15 00
W. F. King	Sale of boat, &c.	123 75
Dom. Lands Com'r.	Sale of Insp. Cox's horse	20 55
Lieut.-Governor, N. W. T.	Overpayment to Regina Electric Light Co.	18 00
Ottawa "Citizen"	do account Semi-weekly for 1894-95	12 00
R. A. Ruttan	Refund balance account removal expenses	118 98
E. J. Wood.	Refund of amount paid for one rug	3 04
		891 12
Dom. Lands Com'r	Repayments, account Seed Grain advances, 1894	1,401 02
Dom. Lands Com'r	do do Relief Mortgages of 1876	1,300 48

The two last items appear on statement of repayments of Seed Grain Advances.

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

G¹—STATEMENT showing Seed Grain and Relief Mortgage payments for the calendar year 1895.

Relief Mortgages, 1876.	Seed Grain Advances, 1886-87-88.	Seed Grain Advances, 1890.	Seed Grain Advances, 1894.	Seed Grain Advances, 1895.	Total.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1,300 48	583 52	447 54	1,401 02	1,551 87	5,284 43

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

Department of the Interior.

H-1. STATEMENT of Receipts on account of Dominion Lands for the calendar year 1895.

MONTH.	Homestead Fees.		Inspection Fees.		Improvements.		(General Sales of Lands.		Timber Dues.		Rents from Grazing Lands.		Hay Permits, Mining Fees and Coal Lands.		Fees re applications for Patents, &c.		Surveyors' Examination Fees.		Rocky Mountains Park of Canada.		Map Sales, Office Fees, &c.		Survey Fees.		Miscellaneous.		TOTAL.		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	
1895.																													
January	1,424 00		200 00		153 50		4,006 71		7,727 60		123 48		99 30		460 00		90 92		32 00		1 00		14,374 67		32 00		1 00		14,374 67
February	1,262 00		130 00		455 00		3,085 30		4,575 87		100 62		24 45		230 00		120 43		149 13		10 00		10,209 32		37 52		10 00		10,209 32
March	1,970 00		160 00		289 00		2,400 90		3,703 93		731 97		36 50		205 00		1 00		46 80		24 52		9,569 64		46 80		24 52		9,569 64
April	2,998 00		180 00		467 00		4,464 42		3,757 46		108 42		430 55		210 00		13 75		30 55		4,527 71		29 62		17,217 38		33 00		17,217 38
May	3,152 00		120 00		293 25		2,762 58		7,592 05		116 46		724 15		332 00		33 00		85 70		16 10		57 25		15,284 54		32 00		15,284 54
June	3,711 00		140 00		194 50		2,518 95		10,692 69		254 79		1,487 75		350 00		371 15		111 40		32 00		104 00		19,968 23		2,055 21		19,968 23
July	2,236 00		120 00		178 25		2,845 98		8,249 25		433 92		1,667 87		375 00		712 27		4 75		2,055 21		10 00		13,818 50		175 61		13,818 50
August	1,638 00		190 00		296 50		3,697 61		3,111 24		246 66		791 43		400 00		290 05		80 46		175 61		10 00		10,828 51		31 88		10,828 51
September	1,088 00		70 00		160 00		1,270 79		3,426 72		427 81		268 41		300 00		160 43		32 86		81 88		25 00		7,261 40		113 65		7,261 40
October	1,356 00		100 00		302 25		2,612 05		10,046 78		148 45		199 30		405 00		75 75		30 60		113 65		98 43		15,628 26		244 00		15,628 26
November	1,420 00		240 00		94 50		3,476 90		3,805 29		2,357 82		122 07		520 00		244 00		32 66		2,799 65		13 47		15,126 36		391 87		15,126 36
December	1,300 00		140 00		348 89		4,753 42		9,929 75		890 58		102 89		605 00		309 00		43 13		591 87		285 00		19,198 53		10,324 81		19,198 53
	23,645 00		1,790 00		3,232 64		37,325 61		71,618 70		5,958 98		5,894 67		4,392 00		2,422 65		602 09		10,324 81		658 19		167,885 34		42,192 82		167,885 34
Scrip and warrants							36,728 12				5,464 70																		42,192 82
	23,645 00		1,790 00		3,232 64		74,053 73		71,618 70		11,423 68		5,894 67		4,392 00		2,422 65		602 09		10,324 81		658 19		210,078 16				210,078 16

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

H.—STATEMENT of Receipts on Account of Dominion Lands for the calendar year 1896.

Month.	Homestead Fees.		Inspection Fees.		Improvements.		General Sales of Lands.		Timber Dues.		Rents from Grazing Lands.		Hay Permits, Mining Fees and Coal Lands and Stone Quarries.		Fees re applications for Patents, &c.		Surveyors' Examination Fees.		Rocky Mountains Park of Canada.		Map Sales, Office Fees, &c.		Survey Fees.		Miscellaneous.		Total.		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	
1896.																													
January	1,120 00		285 95		6,282 20		7,623 39		513 64		338 40		265 00		247 42		66 75		81 69		82 00								17,026 34
February	1,070 00		321 93		2,869 54		4,282 61		366 18		155 95		425 00		182 50		61 65		64 00										8,929 36
March	1,570 00		295 83		3,866 73		5,734 75		434 67		186 26		563 00		1 75		75 98				22 00								12,940 47
April	1,741 00		137 25		2,916 75		3,427 18		827 37		577 33		430 00		382 25		57 40												10,616 53
May	1,768 00		256 90		8,876 76		4,464 56		118 60		513 45		285 00		61 00		66 65												16,770 92
June	1,881 00		485 50		3,475 25		3,851 90		247 16		950 15		307 50		67 50		58 39		15,251 88										26,964 20
July	1,669 00		263 25		2,298 77		6,942 59		461 41		1,392 55		535 00		298 93		39 61		210 33										14,335 14
August	1,581 00		639 36		3,044 87		3,390 51		166 27		538 30		340 00		425 50		40 24												10,218 05
September	1,320 00		276 15		1,933 05		4,349 71		428 28		166 50		280 00		210 50		41 85		378 05										9,745 69
October	1,440 00		183 75		4,763 56		7,763 56		529 66		1,174 95		535 00		131 50		32 40												20,226 56
November	1,570 01		430 80		4,264 98		8,040 26		245 85		93 15		312 50		344 25		42 65		130 00										15,625 04
December	1,470 00		188 46		3,728 87		10,563 60		969 65		226 80		512 50		52 75		70 79		465 00										18,360 42
1896	18,140 01		3,664 62		48,415 61		69,344 62		5,248 14		6,313 79		4,940 50		2,315 85		644 36		16,570 95										181,758 12
Script and warrants					47,467 03				5,089 20																				52,506 23
1897	18,140 01		3,664 62		95,882 64		69,344 62		10,337 34		6,313 79		4,940 50		2,315 85		644 36		16,570 95										234,264 35

J. A. PINARD,
Accountant.

DEPARTMENT OF THE INTERIOR,
ACCOUNTANT'S BRANCH,
OTTAWA, 28th January, 1897.

Department of the Interior.

No. 6.

DEPARTMENT OF THE INTERIOR,
ORDNANCE AND ADMIRALTY LANDS BRANCH,
OTTAWA, 25th January, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior.

SIR,—I have the honour to submit a report on the transactions of this branch of the department for the fourteen months ending 31st December, 1896, also a statement of receipts for the calendar year 1895, the preparation of which has been considered necessary for the purposes of comparison.

Appended will be found the usual statements.

(A.) Statement of sales made since 1st November, 1895. This includes 11 lots redeemed by Ottawa tenants in accordance with the provisions contained in the leases originally granted by the officers of Her Majesty's Ordnance.

No public sales were held during the year.

(1.) At Burlington beach a small portion (33 x 89 feet) of the canal reserve on the north side of the channel, which had been placed under the control of this department in 1889, was sold for the sum of \$50.

(2.) Part of the Ordnance reserve on St. Joseph's island, known as Military Reserve No. 2, containing $73\frac{1}{2}$ acres, was disposed of to Mr. Owen Rains at 20c. per acre. Mr. Rains had been in occupation of the property as far back as 1854, having taken possession of the land under a location ticket issued by authority of the Crown lands department previous to the survey of the island, and had made improvements which entitled him to special consideration.

(3.) A part of the Ordnance reserve at Three Rivers, which had been transferred to the department of Public Works by Order in Council of the 17th September, 1872, was reconveyed to this department, and a quit claim deed of the portion transferred, also of the beach in front of the same, was granted to the Richelieu and Ontario navigation company for and in consideration of the sum of \$100. The company had been in possession of this property since the year 1866, having purchased at sheriff's sale held on the 27th day of July of that year, and had expended between \$15,000 and \$20,000 in improvements.

(4.) Lot No. 8, on the north side of Rear Street, Ottawa, which had been held under a 21 years lease at an annual rental of \$72, was sold to the lessee, as provided in subsection 3 of section 5 of the Ordnance and Admiralty lands Act, the price paid being \$800.

In addition to the sales above mentioned, letters patent for 31 acres of land surrounding Brock's monument at Queenston Heights were issued 5th May, 1896, to the province of Ontario, to be held in trust for the perpetuation of the monument.

Under the authority of an Order in Council dated 10th April, 1894, a license of occupation for two parcels of land at Queenston, containing together an area of 5.75 acres, was granted to the Commissioners for the Queen Victoria Niagara Falls park, to be used for park purposes, at the nominal rental of \$1 per annum.

The lease issued to the Kingston and Pembroke railway company for a period of 21 years from the 1st April, 1874, renewable, for all that portion of the land, premises and water frontage in the city of Kingston lying north of the Cataragui bridge, conveyed by letters patent from the Crown to the Honourable Board of Ordnance on the 22nd November, 1845, having expired on the 31st of March, 1895, negotiations between the department and the company resulted in the acceptance by the latter of a license of occupation "during pleasure" of the lands formerly leased, and at the same rental as before, namely \$50 per annum.

By Order in Council dated 8th July, 1896, part of the Government reservation at Burlington beach, consisting of 400 feet extending from the southern face of the northern pier of the channel, and 240 feet from the northern face of the southern pier, was retransferred to the control of the department of Public Works, being required in connection with the new bridge recently constructed at that point.

(B). Statement showing the several localities on account of which moneys have been received. Total amount \$11,302.31, from which must be deducted refunds of amounts overpaid by purchasers of former years, amounting to \$306.25, leaving the net receipts at \$10,996.06.

The expenses of the branch for the same time amount to \$618.86.

(C). Statement in detail showing the receipts each month, divided into principal, rent or interest, and fees.

(D). Statement showing the amounts due and remaining unpaid 31st December 1896, arranged according to locality, and classified under separate headings as principal, and rent or interest. Total amount due, \$35,492.71. It is respectfully suggested that more stringent measures should be adopted to secure the collection of at least the rentals due on lands held under lease, and the interest due on instalments of purchase moneys. Notifications made from time to time have failed to produce the desired result; indeed, in many cases these seem to be regarded with the most perfect indifference.

(E). Statement of receipts for the year ended 31st December, 1895, showing the receipts to have been \$19,127.32.

The Order in Council of the 28th December, 1895, authorizing the sale of 18.93 acres of Block A, opposite Sorel, to the South Shore railway company, under the provisions of the railway Act, has not been carried out, owing to the consideration money not having been paid. It is to be presumed that the railway company is still in possession of this property, while no benefit whatever accrues to this department on account of such occupation. A similar state of affairs exists with reference to the lands occupied by the same company in the city of Sorel for station grounds.

The Orders in Council of the 7th December, 1895, and 6th July, 1896, relating to certain Ordnance properties at Sorel and Fort Erie, leased to E. A. D. Morgan, and Messrs. B. & E. Baxter, respectively, remain in abeyance, and the lands continue to be held under lease as before.

The litigation begun in June, 1888, between the Commissioners of the Queen Victoria Niagara Falls park, and the Honourable the Attorney General for the province of Ontario on the one side, and George Henry Howard, and Thomas Swinyard (representing the interests of the Dominion of Canada) on the other, involving the question of title to the chain reserve extending along the Niagara river, has terminated in favour of the contentions of the province of Ontario. As the decision has an important bearing on the business of this branch of the department, a short resumé of the case may not be without interest. On the 22nd July, 1887, this department leased to Messrs. Howard and Swinyard for a term of 20 years from the 9th June, 1887, the slope of the bank of the Niagara river, extending from the dividing line between lots 92 and 93, in the township of Stamford, to a parcel of land previously leased to the town of Niagara Falls for a ferry landing, for the purpose of constructing a carriage road and footpath along the shore of the river, together with the privilege of constructing and operating tramways or elevators for carrying passengers, with the use of sufficient ground on the chain reserve at the top of the bank to work the same. Subsequently the Commissioners for the Queen Victoria Niagara Falls park, in pursuance of the provisions contained in the Acts passed by the legislature of Ontario in that behalf, obtained a grant from the province of all the land included in the lease to Messrs. Howard and Swinyard, together with other lands adjacent to and in the vicinity of the Falls of Niagara, for the purposes of a public park. Soon afterwards an action to determine the ownership of the land in question was entered in the Chancery Division of the High Court of Justice for Ontario. In order to protect its interests, the Dominion Government instructed the defendants' solicitors to proceed in the case as solicitors of the Government also. The trial was heard before the Hon. Mr. Chancellor Boyd, who decided in favour of the contentions of the Ontario Government. The

Department of the Interior.

case being of such importance it was decided to appeal from the decision, with the result that judgment was given a second time in favour of the Commissioners. The judges being unanimous in their opinion, it was deemed inadvisable to carry the case further, and the chain reserve, which had up to this time been dealt with as Ordnance lands and the property of Canada, passed to the control of the province of Ontario. The evidence submitted comprises three large volumes of interesting correspondence and official documents dating from 1787 to 1843.

Of the duties of the office it may be said that the work done compares favourably with that of former years. Upwards of 1,000 notices have been sent to purchasers and tenants in arrear; 440 letters received and filed; 524 written in reply; 22 assignments have been examined and registered; 36 drafts of letters patent and leases have been prepared; 110 warrants issued to pay money into the bank of Montreal at Ottawa; and 600 accounts, representing the interests of as many individuals scattered over Ontario, Quebec, New Brunswick and Nova Scotia, have been carefully kept.

I have the honour to be, sir,

Your obedient servant,

P. G. KEYES.

A.—ORDNANCE LANDS BRANCH.

STATEMENT of Sales made during the fourteen months ended December 31st, 1896.

Locality.	Number of Lots sold or redeemed.	Amount sold for.	Amount received on account.
		\$ cts.	\$ cts.
Burlington Beach.....	1 lot.....	50 00	50 00
Ottawa.....	1 lot sold.....	800 00	800 00
do.....	11 lots redeemed.....	1,689 86	1,689 86
St. Joseph's Island.....	73½ acres.....	14 70	14 70
Three Rivers.....	1 lot (part of Platon).....	100 00	100 00
	Total.....	2,654 56	2,654 56

P. G. KEYES.

DEPARTMENT OF THE INTERIOR,
ORDNANCE AND ADMIRALTY LANDS BRANCH,
OTTAWA, January 25th, 1897.

B.—ORDNANCE LANDS BRANCH.

STATEMENT showing the several localities on account of which moneys have been received during the calendar year ended December 31st, 1896.

Locality.	Amount	Locality.	Amount.
	\$ cts.		\$ cts.
Amherstburg	470 92	Brought forward	7,791 35
Burlington Beach	130 00	Presqu'isle	1 00
Chambly	98 70	Pointe Pelée	400 00
Dalhousie, N.B.	0 63	Quebec	30 00
Elmsley	41 10	Queenston	3 00
Edmundston	76 83	Rondeau	20 00
Fort Erie	21 00	Sorel	66 81
Fort Cumberland	125 00	Sarnia	40 00
Grenville	4 40	St. Joseph's Island	8 45
Grand Falls	19 68	Shelburne, N.S.	31 00
Kingston	821 65	Toronto	2,600 00
Montreal	2,208 42	Three Rivers	100 00
Niagara	253 87	Wolford	138 20
Niagara Falls	1 00	Registration and office fees	72 50
Owen Sound	33 10		
Ottawa	3,483 80	Refunds	11,302 31
Oromocto, N.B.	0 25	Net receipts	306 25
Prescott	1 00		
Carried forward	7,791 35		

P. G. KEYES.

DEPARTMENT OF THE INTERIOR,
ORDNANCE AND ADMIRALTY LANDS BRANCH,
OTTAWA, 25th January, 1897.

Department of the Interior.

C.—ORDNANCE LANDS BRANCH.

STATEMENT of Receipts on account of Ordnance and Admiralty Lands for the calendar year ended December 31st, 1896.

Date.	Fees.	Rent or Interest.	Principal.	Total.
1896.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January.....	10 00	212 30	2,879 25	3,101 55
February.....	12 00	90 63	440 00	542 63
March.....	2 00	658 08	355 00	1,015 08
April.....	4 00	1,742 53	136 47	1,883 00
May.....	4 00	230 23	218 58	452 81
June.....	6 00	183 07	460 00	649 07
July.....	14 00	298 15	100 00	412 15
August.....	4 00	359 23	150 00	513 23
September.....	4 50	346 85	.....	351 35
October.....	2 00	1,807 82	210 00	2,019 82
November.....	6 00	215 73	.....	221 73
December.....	4 00	115 58	20 31	139 89
	72 50	6,260 21	4,969 61	11,302 31
Less refunds.....				306 25
Net receipts.....				10,996 06

P. G. KEYES.

DEPARTMENT OF THE INTERIOR,
ORDNANCE AND ADMIRALTY LANDS BRANCH,
OTTAWA, 25th January, 1897.

D.—ORDNANCE LANDS BRANCH.

STATEMENT showing the Amounts due and remaining unpaid 31st December, 1896, on Account of Rent and instalments of Purchase Money and Interest.

Locality.	Rent or Interest due and unpaid 31st Dec., 1896.	Amount of Instalments due and unpaid 31st Dec., 1896.	Total due.
	\$ cts.	\$ cts.	\$ cts.
Amherstburg.....	2 00		2 00
Beaver Harbour, N. B.....	0 25		0 25
Chambly.....	769 04	1,160 43	1,929 47
Crosby, South.....	2 01	11 20	13 21
Elmsley.....	9 20		9 20
Edmunston.....	57 48	303 44	360 92
Fort Erie.....	196 00		196 00
Fort Cumberland, N. B.....	183 00		183 00
Grenville.....	2 00		2 00
Grand Falls.....	511 67	741 35	1,253 02
Kingston.....	120 42	1,460 96	1,581 38
Longueuil.....	750 00		750 00
Montreal.....	30 69	113 63	144 32
Marlborough.....	40 00		40 00
Niagara.....	161 00		161 00
Nepean.....	113 36		113 36
Owen Sound.....	3 90		3 90
Ottawa.....	6,021 02	392 00	6,413 02
Oxford.....	0 60		0 60
Pomroy Bridge, N.B.....	3 75		3 75
Pittsburg.....	1 08	6 00	7 08
Quebec.....	16,498 04	3,304 00	19,802 04
Rond Eau.....	20 00		20 00
Sorel.....	666 24		666 24
Shelburne.....	40 00		40 00
St. Croix.....	3 36		3 36
Toronto.....	390 16	1,056 00	1,446 16
Vespra.....	78 63	250 00	328 63
Wolford.....	18 80		18 80
	26,693 70	8,799 01	35,492 71

P. G. KEYES.

DEPARTMENT OF THE INTERIOR,
ORDNANCE AND ADMIRALTY LANDS BRANCH,
OTTAWA, 25th January, 1897.

Department of the Interior.

E—ORDNANCE LANDS BRANCH.

STATEMENT of Receipts on account of Ordnance and Admiralty Lands for the Calendar
Year ending 31st December, 1895.

Date.	Fees.	Rent or Interest.	Principal.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January.....	24 00	267 10	390 00	681 10
February.....		1,231 52	1,080 00	2,311 52
March.....		270 41	389 50	659 91
April.....	24 00	2,220 21	483 25	2,727 46
May.....		254 03	272 91	526 94
June.....	15 00	717 17	1,023 33	1,755 50
July.....	2 00	1,019 89	196 00	1,217 89
August.....	16 00	432 20	938 47	1,386 67
September.....	4 00	2,420 07	1,660 00	4,084 07
October.....	6 00	2,385 28	780 64	3,171 92
November.....		136 86	148 32	285 18
December.....		193 50	125 66	319 16
	91 00	11,548 24	7,488 08	19,127 32

P. G. KEYES.

DEPARTMENT OF THE INTERIOR,
ORDNANCE AND ADMIRALTY LANDS BRANCH,
OTTAWA, 25th January, 1897.

APPENDIX A.

ABSTRACT of Letters Patent covering Dominion Lands situate in Manitoba, the North-west Territories and British Columbia, issued from the Department of the Interior during the calendar years 1895 and 1896.

Number.	Nature of Grant.	1895.		1896.	
		Number of Patents.	Number of Acres.	Number of Patents.	Number of Acres.
1	Homesteads	1,239	195,520	1,663	273,447
2	Sales	108	14,094	158	27,804
3	British Columbia homesteads.....	61	9,478	40	6,827
4	do sales.....	20	2,447	23	2,515
5	Canadian Pacific Railway nominees.....	147	30,794	179	34,341
6	do grants.....	15	3,266	131	66,719
7	do road bed and Station grounds.....	90	4,872	24	331
8	Half-breed allotments	6	1,440	5	1,146
9	North-west Half-breed grants.....	20	4,195	6	1,631
10	Manitoba Act grants.....	5	759	2	222
11	Special grants.....	38	2,451	48	4,363
12	Commutation grants.....	5	363	2	52
13	Manitoba North-western Railway.....	229	50,450	193	51,801
14	Manitoba South-western Colonization Railway..	14	1,569	67	7,046
15	Hudson's Bay Company.....	12	17,500	3	7,232
16	Qu'Appelle, Long Lake and Saskatchewan Railway and Steamboat Company.....	1	5		
17	Military homesteads.....	12	3,733	21	6,683
18	School lands sales.....	35	2,421	66	9,682
19	Parish sales.....	13	1,132	9	496
20	Coal land sales.....	2	303	3	183
21	Mining sales.....	3	111		
22	Forest tree culture.....	2	320		
23	Leases.....	6	794		
24	Foreshore rights.....	6		7	
25	Assignments of mortgage.....	2		1	
26	Alberta Railway and Coal Company.....			8	28,980
27	Water lot grants.....				
28	Calgary and Edmonton Railway Company.....	3	640	4	960
29	Shuswap and Okanagan Railway.....	5			
30	Mineral Rights.....	19	307	2	
	Total.....	2,118	348,964	2,665	531,861

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

Department of the Interior.

APPENDIX B.

STATEMENT of entries affecting Dominion Lands which were made at head office during the calendar years 1895 and 1896.

1895.

Special Grants.		Hudson's Bay Co.		Canadian Pacific R'y Co.		Man. & N. W. R'y. Co.		Man. S.W. Col. R'y Co.		Qu'Appelle L.L.&S.R & S. Co.		Cal. & Ed. R'y Co.		Railway Right of Way.		Total.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
59	11,545	11	149,419	206	37,741	161	50,374	42	2,425	1	5	3	640	99	7,618	682	259,767

1896.

Special Grants.		Hudson's Bay Co.		Canadian Pacific R'y Co.		Man. & N. W. R'y. Co.		Man. S.W. Col. R'y Co.		Qu'Appelle L.L.&S.R & S. Co.		Cal. & Ed. R'y Co.		Railway Right of Way.		Total.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
56	4,508	7	38,914	315	79,978	165	73,780	32	6,110	.....	.....	4	960	26	281	605	204,531

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

APPENDIX C.

COMPARATIVE STATEMENT of Homestead entries and Sales which have been made at the several Agencies of the Department during the twelve months ending 31st December, 1895, and the 31st December, 1896, respectively.

	Twelve months ending 31st December, 1895.		Twelve months ending 31st December, 1896.	
	Number of Entries.	Acres.	Number of Entries.	Acres.
Homesteads	2,394	383,040	1,857	297,120
Sales		32,485		33,374

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

APPENDIX D.

STATEMENT showing the number of Deeds of Transfer recorded at Head Office during the years 1895 and 1896.

Calendar Year 1895.		Calendar Year 1896.	
Number of Deeds registered.	Fees.	Number of Deeds registered.	Fees.
	\$ cts.		\$ cts.
142	282 00	136	266 00

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

APPENDIX E.

STATEMENT showing the number of acres of swamp lands in Manitoba passed by Order in Council to the Province of Manitoba up to the 1st January, 1897.

	Acres.
By Order in Council of 21st April, 1884.	104,740
do 16th April, 1888.	52,600
do 7th June, 1888.	60,335
do 25th August, 1891.	105,635
do 7th December, 1891.	36,479
do 22nd April 1893.	69,680
do 21st October, 1893.	13,040
do 4th October, 1895.	50,602
do 31st October, 1896.	53,520
do 31st October, 1896.	6,960
do 10th November, 1896.	137,016
do 1st December, 1896.	117,250
Total.	807,857

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

Department of the Interior.

APPENDIX F.

STATEMENT showing the number of patents forwarded to the several Registrars of the Land Registration Districts of the North-west Territories, and the number of notifications mailed to patentees during the calendar year, 1896.

Registration Districts.	Number of Patents sent Registrars.	Number of Notifications mailed to Patentees
Assiniboia.....	585	607
East Saskatchewan.....	75	75
West do.....	13	13
North Alberta.....	378	384
South do.....	148	156
Total.....	1,199	1,235

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

APPENDIX G.

STATEMENT showing the number of cancellations effected during the calendar year 1896, showing also the year in which the entries were made.

Year.	Homesteads.	Pre-emp- tions.	Pre-emp- tion Sales.	Time Sales.	Sales.
1873.....	1				
1877.....		1			
1878.....	1	1			
1879.....	7	3		1	
1880.....	3			51	
1881.....		9		3	
1882.....	9	39			
1883.....	23	37		3	
1884.....	9	23	12		
1885.....	8	19	4	1	
1886.....	16	14	2	1	
1887.....	6	13	9	1	
1888.....	23	19	14	2	
1889.....	101	77	1	3	
1890.....	56		4	1	1
1891.....	87		2	5	1
1892.....	154		4	4	
1893.....	179		1	1	
1894.....	227				
1895.....	210		3	2	
1896.....	45			1	
	1,165	255	56	80	2

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

APPENDIX H.

STATEMENT showing the number of cancellations of entries effected during the calendar year 1895, showing also the year in which the entries were made

Year.	Homesteads.	Pre-emp- tions.	Pre-emp- tion Sales.	Time Sales.	Sales.
1874.....	1	2			
1875.....	2	1			
1877.....	2	4			
1878.....	1	1			
1879.....	1	2		7	
1880.....	1	5		28	
1881.....	2	6		1	
1882.....	10	43			
1883.....	8	50		1	
1884.....	11	35	4	1	
1885.....	11	12	3		
1886.....	18	19	1	2	
1887.....	18	14	1		
1888.....	37	24	7		
1889.....	82	82	4		
1890.....	56		3	4	
1891.....	112		4	5	
1892.....	256		1	3	
1895.....	320		2		1
1894.....	329			1	
1895.....	91				
	1,368	300	30	53	1

WM. M. GOODEVE,
Chief Clerk, Land Patents Branch.

DEPARTMENT OF THE INTERIOR,
LAND PATENTS BRANCH,
OTTAWA, 10th February, 1897.

Department of the Interior.

PART II

DOMINION LANDS SURVEYS

Department of the Interior.

SURVEYS.

DEPARTMENT OF THE INTERIOR,
TOPOGRAPHICAL SURVEYS BRANCH, OTTAWA, 11th February, 1897

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the following report on the operations of the Topographical Surveys branch during the year 1896. Except in and near the Rocky mountains where the smoke from forest fires proved very troublesome, the progress has generally been satisfactory.

The surveys may be divided into three classes : township, boundary and irrigation surveys. Township surveys will first be described.

MANITOBA.

The surveys in the province of Manitoba where confined to the Lake Dauphin district, two parties being employed under Messrs. P. R. A. Belanger and E. W. Hubbell, respectively.

Mr. Belanger ran some outlines, renewed old corner marks and extended the subdivisions of former years. A number of half-breeds from Ste. Anne, who had recently located with their families in township 23, range 14, were glad to have their lands surveyed. Another settlement has existed for some time on the Mossy river : here are Mr. Paul Wood's salt works, the buildings being on section 21, township 31, range 18, and the wells on section 16. The settlement is on sections 3 and 10. In township 32, range 19 are four settlers, one of whom has been there twelve years. The last station of the Lake Manitoba railway and canal company's line, built last fall, is within half a mile of the north-west corner of township 27, range 19.

Mr. E. W. Hubbell subdivided two townships and renewed the corner marks in some of the old surveys. The unusual depth of water in the marshes proved very troublesome and obliged him to postpone some of his surveys until the ground was frozen.

NORTH-WEST TERRITORIES.

Mr. Thomas Fawcett was in charge of the surveys in the Prince Albert district. He subdivided five townships, surveyed several outlines and renewed some of the old surveys. In parts of the new townships are found combined good land, pure water and clumps of large spruce : it is gratifying to learn that such fine locations are still to be had in close proximity to Prince Albert. Fires were frequent during the summer and destroyed a quantity of timber and hay. The crops in the district were considered a good average. A dairy established about five miles from Prince Albert is said to have made a shipment of butter to England, which yielded 17 cents to the owners after paying all expenses. This was very encouraging and may be expected to develop the industry.

The surveys in the Edmonton district were in charge of Mr. J. E. Woods. He surveyed parts of five townships, the Victoria and Lobstick settlements on the Saskatchewan river, and located the trail from Beaver creek to Victoria, this last survey being made at the request of the North-west Government. He also renewed and completed old surveys at various places. The Victoria and Lobstick settlements had been occupied for years, and considerable improvements had been made in the shape of buildings, fencing, etc. The settlers do a little farming, but live principally by hunting, fishing and washing gold on the gravel bars of the river.

Four townships having been set apart for the half-breed colony near Saddle lake, Mr. T. W. Chalmers was instructed to subdivide the land. At the request of the board of management of the colony, it was laid out into lots of eighty acres.

In Southern Alberta, Mr. F. W. Wilkins was in charge of the surveys. His work consisted of the subdivision of parts of several townships, traverses of Willow and Beaver creeks and the north branch of Sheep creek, also the survey of township outlines. Mr. Wilkins reports the best feeding ground in Alberta to be just north of the Sweet Grass hills and south of the Milk river: it is interesting to note that a few years ago this country was known as "The bad lands" and was supposed to be a bare and arid desert. The principal industry of Southern Alberta is stock raising upon which Mr. Wilkins gives valuable information.

BRITISH COLUMBIA.

As in former years the surveys in the Railway belt in British Columbia were in charge of Mr. John Vicars. The work consists in subdividing a few sections here and there, to meet the demands of the settlers: much time is thus lost in travelling from one end of the belt to the other. The surveys are moreover extremely complicated by the existence of provincial "Pre-emptions" or "Crown Grants" the validity of which is sometimes doubtful. The surveyor does not know whether he has to deal with Dominion or Provincial lands. It is to be hoped that these difficulties will soon be adjusted: until they are, the progress of the surveys can never be satisfactory. Mr. Vicars reports that public attention is now absorbed by mines, claims being recorded in all parts of the belt.

In addition to the above, a number of minor surveys requiring only a few days were made at various places by local surveyors.

BOUNDARY SURVEYS.

Investigations had to be made at several places to elucidate questions relating to the international boundaries of Canada.

A request was received from the department of Marine and Fisheries to mark the boundary on a chart of lake Erie. The Commissioners appointed under Article VI of the Treaty of Ghent describe it as a line running "southerly and westerly along the middle of lake Erie in a direction to enter the passage immediately south of Middle island." On investigation it was found that no accurate survey had been made of the greater part of the Canadian shore of the lake, so that a proper definition of the middle line was impossible. In order to supply this deficiency, Mr. Otto J. Klotz, assisted by Mr. J. L. Cote, was instructed to make an accurate traverse of the shore. The work was checked by a traverse of the roads next the shore, with which the first traverse was connected at frequent intervals. After the completion of the survey, Mr. King and Mr. Klotz determined the longitude of Port Stanley by a telegraphic exchange of time signals between Port Stanley and Ottawa.

The boundary between lake Superior and lake of the Woods follows the water communications and portages between the two lakes. Doubts having been expressed about the true location of this line, Mr. A. J. Brabazon was directed to make an examination of this part of the boundary and to ascertain whether the maps are sufficient to identify the boundary at every place. This examination was completed early last summer.

In British Columbia a difficulty was discovered on the boundary east of Osoyoys and was brought to the attention of the Hon. G. B. Martin, Commissioner of Lands and Works, by the Surveyor-General of British Columbia. It appears that two lines are cut on the ground, one on which the monuments are standing and another one upon which they have been pulled down. It was deemed advisable to investigate the matter and for this purpose a survey party was organized. It was in charge of Mr. J. J. McArthur, assisted by Mr. A. St. Cyr. Advantage was taken of their presence on the spot to

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make a topographical survey connecting the Dominion lands system of the railway belt with the boundary. The operations were unfortunately much delayed by smoke, and the results are not as complete as was expected.

YUKON DISTRICT.

Mr. Wm. Ogilvie, who left for the Yukon district in the spring of 1895, has not yet returned. He has been engaged in making all surveys required in the district, such as mining locations, claims, town sites, etc. He has also run a line across the Yukon river and Forty Mile creek in longitude 141° west of Greenwich: this line indicates the approximate position of the international boundary and the limit of Canadian jurisdiction until the boundary is finally located. The information given by Mr. Ogilvie on the resources of the country shows that it is very rich in minerals, and that a great development may be expected as soon as the means of communication with the outside world are improved. He was instructed last summer to return to Ottawa, but the letter reached him too late for doing so.

IRRIGATION SURVEYS.

The irrigation surveys were under the direction of Mr. J. S. Dennis, Chief Inspector of Surveys, assisted by Messrs. A. O. Wheeler, A. C. Talbot and James Gibbons.

Mr. Gibbons' work was in the Medicine Hat, Maple Creek and Swift Current districts. Commencing at Maple Creek, he carried lines of levels along township outlines, some of which crossed at different altitudes the streams flowing north from the Cypress hills. In this way some idea was obtained of the general slope of the country and of the possible diversions for irrigation. Special attention was paid to reservoir sites, one of which, comprising Elk Water lake, deserves special mention.

An investigation was made of the south-eastern slope of the Cypress hills with a view to the diversion into Swift Current creek of the water now running to waste into the White Mud river. The scheme was found practicable and, if carried into execution, will greatly assist in the development of the country along the Canadian Pacific railway.

A diversion of the South Saskatchewan river to the Regina and Moose Jaw plains, where water is so scarce, would change the aspect of the country. Mr. Gibbons made a special examination of the project but unfortunately found that its realization was not possible.

Mr. A. C. Talbot was employed in the western portion of Alberta. After running lines of levels along township lines, he located a canal for diverting into the Rosebud river the waters of the Red Deer river. The scheme was found feasible, the only engineering difficulty being a flume 1,275 feet long and 73 feet high across the valley of the Little Red Deer river. He also located secondary canals for distributing the waters of the Bow river canal located in 1895. Gauging streams and placing gauge rods completed his work for the season.

Mr. A. O. Wheeler continued the main and secondary triangulation of the Foot hills between Sheep creek and the Bow river and made a topographical survey of the country. His operations were seriously delayed by the smoke from the forest fires in the Selkirks and on the western slope of the Rocky mountains. The eastern slope being the source of the water supply of the Territories, a perfect knowledge of the configuration of the ground and of the forest distribution is of the utmost importance.

OFFICE WORK.

The correspondence consisted of :—

Letters received	1,500
Letters sent	1,771

The accounts examined and payments made were :—

Accounts examined and passed	272
Amount of accounts	\$92,166 51
Cheques forwarded	812

The following is a synopsis of the work of the draughting office :—

Plans and field notes of subdivisions examined	72
Plans and field notes of corrections and miscellaneous surveys examined	129
Township plans completed for printing	109
Declarations of settlers received	39
Progress sketches received	78
Proofs examined	144
Miscellaneous plans, tracings, &c., made	279

The following sectional maps have been issued :—

Sounding Creek,	Rush Lake,
Rainy Hills,	Touchwood Hills,
Pincher Creek,	Saskatoon,
Porcupine Hills,	Willow Bunch,
Red Deer Forks,	Fort Alexander,
Swift Current,	Emerson,
The Elbow,	Medicine Hat.

A schedule of surveys completed was prepared for notification to the Hudson's Bay company, and also a statement of one-twentieth the cost of surveys.

The list of "Sumas Dyking Lands" was completed for the Order in Council which was passed 21st October, transferring these lands to British Columbia.

The registrars in the North Alberta, South Alberta and West Saskatchewan districts have been furnished with diagrams of sections showing the location of surveyed trails.

Diagrams of the limits of the railway belt were made for the registrars in British Columbia.

A considerable number of returns of right of way surveys for irrigation ditches in Southern Alberta have been received and examined.

Mr. T. A. Pope has been employed under the direction of the New Westminster agent in copying at the Lands and Works department, Victoria, the records relating to lands within the railway belt alienated by the province prior to the transfer of the belt to the Dominion. One hundred and thirty files of papers were received; their examination and classification involved considerable work.

Mr. Macdonald, who was employed as clerk in Mr. Dennis's office at Calgary, died in September last; he was replaced by Mr. S. C. Wilson. In January, owing to pressure of work, it was found necessary to give additional assistance to Mr. Dennis, and Mr. R. W. McIntyre was appointed.

The photographers of this branch had to do the work of the Alaska Boundary commission, and of the Geological Survey department; the negatives and prints made are enumerated hereunder :

Geological Survey Department.

Wet plates	22
Dry plates developed	206
Bromides	76
Albumen prints	464
Transparencies	24

Department of the Interior.

Alaska Boundary Commission.

Wet plates.....	45
Bromides.....	79
Silver prints.....	5,400

Topographical Surveys Branch.

Wet plates.....	68
Bromides.....	258
Dry plates developed.....	246
Tansparencies.....	51
Silver prints.....	262

A schedule of the work of the lithographic office is appended: it shows 20,716 copies printed from 236 originals.

BOARD OF EXAMINERS.

The regular meetings of the Board of Examiners for Dominion land surveyors were held as usual in February and August.

At the former meeting Mr. T. H. Wiggins, Ontario land surveyor, of Brockville, Ontario, passed examination for Dominion land surveyor.

At the latter meeting Mr. R. W. Cantley, of Vancouver, British Columbia, passed the same examination on papers written at a special examination held in June before one of the members of the board.

The correspondence of the board amounted to:—

Letters received.....	53
Letters sent.....	54

APPENDICES.

The following documents are appended:—

- Schedule of Dominion land surveyors employed :
- Schedule of work executed by the Lithographic Office.
- Report of the Chief Inspector of Surveys.
- Reports of the surveyors employed.
- Examination papers of the Board of Examiners for Dominion land surveyors.

I have the honour to be, sir,

Your obedient servant,

E. DEVILLE,
Surveyor General

SCHEDULE of Dominion Land Surveyors employed and work done by them during the season of 1896.

Surveyor.	Address.	Description of work.
Belanger, P. R. A.	Ottawa, Ont.	Subdivision of township 23, range 14, townships 29 and 31, range 18, townships 27, 28, 31 and 32, range 19; re-survey of townships 25 and 26, range 18, and of east outlines of townships 27 and 28, range 20 and township 29, range 21; renewal of survey marks and re-establishment of north outline of township 22, range 14; survey of east outlines of township 30, ranges 19 and 21, and north outline of township 30, range 19, all west of principal meridian.
Brabazon, A. J.	Ottawa, Ont.	Examination of international boundary from Lake Superior to Lake of the Woods.
Chalmers, T. W.	Edmonton, Alta.	Subdivision of townships 57 and 58, ranges 9 and 10; correction of surveys east boundaries section 36, township 58, ranges 10 and 11, and east boundaries, section 1, township 59, ranges 10 and 11, and survey of east outline of township 59, range 9, and east and north outlines of township 60, range 9, all west of the 4th meridian.
Doupe, J. L.	Winnipeg, Man.	Traverse of the Souris River in section 31, township 3, range 26, west of principal meridian.
Dennis, J. S.	Calgary, Alta.	Canadian irrigation surveys, division A, and chief inspector of surveys.
Fawcett, Thos.	Ottawa, Ont.	Subdivision of township 44, range 15, townships 43 and 44, range 16, and township 42, ranges 25 and 26; re-survey of south outline of township 42, range 26, the east outline of township 42, range 27, all west of 2nd meridian, and the re-survey of the outlines and subdivision of township 36, range 5, west of 3rd meridian, also the survey of the north outlines of township 40, ranges 16 and 17, and east outlines of townships 41 and 42, ranges 16 and 17, west of 2nd meridian.
Hubbell, E. W.	Ottawa, Ont.	Subdivision of townships 19 and 20, range 18; correction of surveys of north and south outlines and of east half of township 14, range 16; the re-survey of the outlines and of subdivision of township 18, range 12, and re-survey of east outline of township 19, range 19; the survey of the north, south and east outlines of township 19, range 18, and the east outline of township 20, range 18, all west of principal meridian.
Jephson, R. J.	Calgary, Alta.	Survey of additional lots in the town of Golden.
Klotz, O. J.	Ottawa, Ont.	Survey of north shore of Lake Erie and longitude determinations.
McArthur, J. J.	Ottawa, Ont.	Topographical survey from Canadian Pacific Railway to 49th parallel of latitude in British Columbia.
Ogilvie, Wm.	Ottawa, Ont.	Subdivision of the town site of Cudahy; survey of part of the 141st meridian and of certain mining locations, all in the Yukon district.
Ross, J. E.	New Westminster, B.C.	Traverse of the north shore of Nicomen Slough in sections 33, 34 and 35, township 20, east of coast meridian.
Saint Cyr, A.	Ottawa, Ont.	Topographical survey from Canadian Pacific Railway to 49th parallel of latitude, British Columbia.
Thompson, W. T.	Qu'Appelle, Assa.	Correction of survey of east boundaries, sections 1 and 12, township 27, range 6, west of 2nd meridian.
Vicars, John.	Kamloops, B.C.	Partial subdivision of township 21, range 13, township 18, range 17, township 19, ranges 18 and 19, township 3, ranges 29 and 30, all west of 6th meridian.
Woods, J. E.	Ottawa, Ont.	Subdivision of township 58, ranges 17 and 18, and township 52, range 22, west of 4th meridian, and of townships 53, ranges 3 and 4, west of 5th meridian; correction of survey in township 43, range 25; renewal and re-establishment of corners in township 52, range 23, west of 4th meridian, and of east outline of township 53, range 4, west of 5th meridian, and re-survey of part of township 53, range 26, west of 4th meridian, and subdivision of Victoria and Lobstick settlements; also survey of that portion of the Victoria trail between Beaver Creek and Victoria.

Department of the Interior.

SCHEDULE of Dominion Land Surveyors employed and work done by them during the season of 1896—*Concluded*.

Surveyor.	Address.	Description of work.
Wilkins, F. W.	Ottawa, Ont	Subdivision of township 6, range 26, part of township 1, range 28, townships 8, 9, 10, 11 and 13, range 29, and township 10, range 30, west of 4th meridian, and townships 12 and 14, range 1, west of 5th meridian; traverse of Willow Creek in township 9, ranges 25 and 26, township 13, range 28, and of Oxley Creek in township 14, ranges 28 and 29, and traverse of north branch of Sheep Creek in township 21, range 2, west of 5th meridian, and survey of east outlines of townships 1, 2, 3 and 4, ranges 10, 11, 12 and 13, west of 4th meridian.
Wheeler, A. O.	Ottawa, Ont.	Division B, Canadian irrigation, survey and photo-topographical survey.

SCHEDULE showing work executed by the Lithographic Office, from Nov. 1, 1895, to Oct. 31, 1896.

Months.	Maps.		Townships.		Circulars.		Forms.	
	No. of Maps.	No. of Copies.	No. of Townships.	No. of Copies.	No. of Circulars.	No. of Copies.	No. of Forms.	No. of Copies.
1895.								
November	11	774	7	372			1	204
December	10	814	11	587			4	1,090
1896.								
January	5	187	11	583			13	318
February	13	881	5	265			1	150
March	7	682	7	371	1	200	3	240
April	7	94	9	477	1	500	2	525
May	10	361	8	424			2	550
June	8	225	11	583				
July	6	140	6	318			2	50
August	11	475	6	318			2	1,500
September	5	220	11	583			1	3,000
October	4	181	8	424			6	2,050
Total	97	5,034	100	5,305	2	700	37	9,677

RECAPITULATION.

Number of maps	97	Number of copies	5,034
do townships	100	do do	5,305
do circulars	2	do do	700
do forms	37	do do	9,677
Total	236	Total	20,716

No. 2.

REPORT OF P. R. A. BELANGER, D.L.S.

SURVEYS IN LAKE DAUPHIN DISTRICT.

OTTAWA, 29th January, 1897.

E. DEVILLE, Esq.,
 Surveyor General,
 Ottawa, Ont.

Sir,—I have the honour to submit the following report on the surveys performed by me during the past season in the Dauphin district.

In accordance with your instructions dated the 7th May last, I left home on the 9th of the same month for the field of operations (via Strathclair) stopping on the way at Winnipeg for eighteen hours to hire men and buy supplies, and reaching Strathclair on the 12th.

Here I waited four days for the arrival of my supplies, and during that time I kept my men busied in repairing the transport outfit I had left the year before in care of Mr. William Spurway of this place. In connection with this outfit, I regret to say the horse Mr. Spurway reported to you as having been stolen from his premises in March last could not be recovered. Mr. Spurway had a warrant issued against the suspected party, but it appears that no further action was taken by the authorities in the matter.

On the 18th I left Strathclair for Dauphin, which place I reached on the 26th, after a very hard journey over a very wet and muddy road, travelling at a rate of about nine miles a day, and having sometimes to haul the wagon and carts across creeks and muskegs. On several occasions I had to repair the corduroy over muskegs, or build bridges over creeks which, in ordinary seasons, could be stepped over.

From the 27th May to the 3rd July I was occupied in the re-marking of section corners in townships 25 and 26, range 18. This work involved the re-opening of nearly all the lines in these townships, and involved just as much labour as a new survey, but did not give me the same satisfaction because, in several cases, I had to perpetuate errors which, though not very large, could have been avoided on a new survey; but as these townships were thickly settled, I considered it better not to make any change when the old corner could be found, in order to avoid disturbance with the settlers. Some corners were also re-established where the original ones could not be found, but, on the other hand, I regret to say that the eastern rows of sections of both townships were mostly left in the old state on account of the high water in Dauphin lake, which had flooded the sections and kept them under water for part of the summer.

Having completed all the work which could possibly be done in the above mentioned townships, I proceeded to township 23, range 14, to perform the survey of such good land as I left unsurveyed last year.

That part, comprising the south half of the township, is mostly a burnt country overgrown with scrub, with a good soil very suitable for farming purposes.

When I reached here I found that some half-breeds with their families had recently arrived from Ste. Anne, and, by prolonging the lines I ran in 1895 in this township, they located themselves on even numbered sections and had taken possession of sections 2, 4 and 10. These sections have but little timber on them, having recently been burnt over, and have excellent soil, and are in close proximity to a stream of good water which enters the township on section 3 and runs in a northwesterly direction across sections 10 and 9.

In connection with this survey I must say that I had to re-survey the whole of the south boundary of the township, and re-establish half of the corners which were

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entirely lost. As to the line itself, it had never been run before ; the posts had been offsetted from the south side of the correction line and could only be found by means of measurements, and by digging in the ground for the sharpened end of the post which was the only part left to witness the corner.

I re-marked the corners according to the manual of survey.

I did the same work, also, for the south side of the correction line which I found entirely obliterated. I re-opened this line and re-marked or re-established the corners according to circumstances, with the exception of the north-east corner of township 22, which I could not re-establish owing to the want of special instructions.

On the 21st July, having finished my sub-division survey and renewal of corners in range 14, I proceeded to range 19, viâ Dauphin, to subdivide townships 27 and 28.

Here I was occupied for the remainder of this month and up to the 21st September.

Before commencing the subdivision of these townships I re-surveyed their west boundaries which I knew as being in error both in azimuth and chainage.

Having also found the north boundary of township 28 erroneous, I made corrections in the measurement by distributing the error equally on the first five sections leaving section 36 as it was, as no correction could be made, its north-west corner having already been re-marked by me in 1895, for the purpose of carrying the subdivision across township 29.

As to the azimuth of the line no correction could be made, and all the new corners were placed on the old line as re-opened from one section corner to the other.

The general aspect of the country in township 27 is that of a burnt country with scattering dry and green poplar thickly overgrown with scrub, especially on the east half. A great percentage of the west half of the township is low marshy land, better adapted for stock raising than for farming purposes ; but on the east half, with very little exception, the land is good for general farming purposes, and is rated first class.

Two small streams of good water run easterly across the north half of the township, but these creeks carry water only in wet seasons or early in the spring ; however, on both of them are found deep holes or beaver dams where water can be usually obtained all the year round.

The last station on the Lake Manitoba railway and canal Co., line built last fall, lying within half a mile west of the north-west corner of this township, will afford great convenience to settlers intending to take land here.

The same remarks apply to township 28, as to the advantage offered by the proximity of the railway, and as to the aspect of the country and quality of soil over the west half of the township, but the east half is mostly heavily timbered.

The soil is of the best quality and well adapted for all purposes.

Four small streams run easterly across the township and empty into Dauphin lake ; one of them called "Mink river," the largest of the four, is, however, for the four western miles, nothing more than a small creek varying from 8 to 25 links wide, by one to two feet deep. This same stream in range 21 may be considered a river, but before running out of that range it divides into two branches, and is lost in a large spruce or willow swamp which extends across ranges 20 and 19, and is drained in range 19 by two streams, one emptying into Fishing river, and the other, the larger, running into Dauphin lake ; the latter stream in sections 26 and 36 averages 25 links wide by one foot deep.

The trail from Mossy river to Dauphin crosses on sections 32, 31 and 30, and follows at a short distance to the west along the east boundary of range 20, entering range 19 again and crossing sections 30, 19, 20, 17 and 8 of township 27.

My next work consisted in the running of the necessary outlines to establish the 9th base line for the purpose of subdividing the townships adjoining lake Winnipegosis. According to instructions I ran the east boundary of range 21 across townships 29 and 30, but finding that the country was becoming very swampy, and seeing no prospect for improvement to the north, I discontinued the survey of this line and ran the east boundary of range 20 for the purpose of establishing the 9th base as before mentioned, and in order to save time and expense by running only those lines which were required for immediate subdivision.

The east boundary of township 29, range 21, having already been described by the surveyor who surveyed it first, I need not add anything to his description ; but I must say that I re-surveyed it according to instructions I received in 1894 and 1895, authorizing me to make the proper corrections on all meridian outlines projected from the 8th base, which I had reported as erroneous in azimuth and chainage. As to the east boundary of township 30, range 21, it runs through low marshy land alternating with small gravelly ridges or elevations generally timbered with dry poplar or spruce, and running northerly nearly parallel to Mossy river, and so preventing the proper draining of this country towards its natural slope.

The north channel of Fork river is crossed near the centre of section 1, where it measures 30 links wide by one foot deep, from this point turns to the north for half a mile, after which it turns easterly. This river divides somewhere in the west half of township 29, range 21 ; part of it forming the north channel inclines towards township 30, and the other part runs easterly through a large spruce swamp branching into many small streams to meet again at a few yards east of the east boundary of section 36 of township 29, range 21, where they form the "South Channel" which is a larger stream than the north channel.

These channels meet somewhere in the northern part of the east half of township 29, range 20. The country along the east boundary of townships 30, 31, 32, range 20, may be described as follows, viz. :—In township 30 the line runs through a poplar bush interspersed with spruce and tamarack and alternating with *brulé*s thickly overgrown with high scrub.

Large swamps are crossed on sections 1 and 12 ; another large swamp or muskeg varying from 20 to 40 chains in width lies along the whole length of the township at a distance of about 30 chains east of this line.

The soil has been rated 2nd and 3rd class, and to judge by what I saw travelling across this township I would say that it was unfit for settlement in range 20.

In township 31, for the south half of section 1, the line runs over an open muskeg which extends south south-east and north north-west ; after which it crosses a small ridge diagonally and enters a large spruce and tamarack swamp which, though wet on section 1, is dry to the north where the fire has killed all the timber.

A large muskeg measuring about 60 chains wide is also crossed diagonally on section 36. This muskeg appears to be the same one crossed on section 1, which extends northerly at a short distance west of the meridian.

The remainder of this outline runs over a low country covered with small dry spruce and tamarack intermixed with willow scrub and heavy windfalls, and intercepted occasionally by small ridges covered with green spruce and poplar of medium size. The soil is poor, sandy and stony, and to judge by this line the township on the west side would also be unfit for settlement.

Over township 32 the line runs all along through a low country covered with small dry spruce and tamarack intermixed with heavy windfalls, and broken by numerous large muskegs intercepted by small ridges.

Small groves of poplar and spruce good for building purposes are seen in the north half of section 12 and south half of section 13. The soil is rated 3rd and 4th class and is certainly unfit for anything in the immediate vicinity of this line.

From the north-east corner of township 32 I ran the 9th base line across range 19 as far as lake Winnipegosis, which I intersected at the north-east corner of section 33, after which I subdivided in township 32 all the land desirable for settlement.

This comprises the fifteen sections that are left between the lake and the two rows of sections adjoining the west boundary, these latter rows being considered mostly unfit for settlement.

The land surveyed in this township is generally fair and offers some advantage for mixed farming, but is better adapted for ranching on account of the great quantity of hay which grows in the neighbourhood of the lake.

Several salt lagoons and springs of very strong brine are found at a short distance from the lake. One of these springs, which I consider the most important, lies on the

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north-west quarter of section 4, at about 50 yards east of the west boundary of that section.

Four squatters were found in this township; one of them, a Mr. Geekie, had been there for twelve years, and speaks well of the country, notwithstanding all the hardship he had to endure from the want of roads &c.

In township 31 range 19, I subdivided only the east half, which I considered desirable for settlement. As to the west half, part of it, the western row of sections, is unfit for settlement, and the remainder is heavily timbered and somewhat stony.

The soil in the east half is in general nearly the same as described in township 32, and is considered very good for mixed farming, more especially in the north-east quarter where lake Winnipegosis encroaches on section 36, and affords a good supply of hay and water.

Two small creeks run across sections 23, 24, 25, 26, 27, 34 and 35, and empty into the lake in section 36.

A large hay marsh and muskeg occupies the greater part of sections 1, 12, 13 and 14.

This marsh, which extends over 6 miles southerly, furnishes large quantities of hay for the settlement at Mossy river.

After the completion of the survey of township 31, range 19, I next subdivided the fractional township 31, range 18, and located the "Mossy river" settlement which occupies sections 3 and 10.

Lake Winnipegosis occupies over one third of this township—the north-east portion. It also encroaches on section 31 on the west side of Red-deer point, a peninsula which projects from sections 31, 32 and 33, and extends northerly for 24 miles.

A small lake with salt water, about one mile and a quarter in length, occupies part of sections 4, 5, 8 and 9.

The remainder of this township may be described as a low marshy country, with scrubby ridges or elevations running nearly parallel to the lake in alternation with the marshes.

The soil is good on the hills, and is placed in class No. 2.

This township is better adapted for stock raising; however, mixed farming can also be carried on with advantage in the immediate vicinity of lake Winnipegosis as well as along Mossy river where the land is a little higher.

Mossy river enters the township on section 3 and empties into lake Winnipegosis on section 10. This stream varies in width from $2\frac{1}{2}$ to 4 chains, and is from 4 to 10 feet deep.

On sections 16 and 21 are found Mr. Paul Wood's salt works, the workshops being located on section 21 and the salt wells and private buildings on section 16.

On the west half of section 3 and on section 10 are found thirteen squatters, who, with the exception of two, are all half-breeds, and make their living by a little gardening, hunting and fishing, and by raising a few head of stock. Some of them were talking of removing further into the interior of the townships to take homesteads.

Mr. Gunne, the land agent of Dauphin, having applied for the survey of the western row of sections in township 29, range 18, as being urgently required, I made that survey, leaving only the east boundary of section 6 unsurveyed owing to the want of authentication for making the correction required on the base line before closing that meridian.

The land on these sections is of the very best quality, and though heavily timbered will be taken up at once on account of the great advantage offered by the richness of the soil and proximity to the Mossy river which runs along and across their west boundaries.

In order to obtain a better knowledge of the country in township 29, range 19, I ran its north boundary, and found it as follows:—On section 31 the line runs partly over an open muskeg, about 20 chains wide, which extends north for $2\frac{1}{2}$ miles and south for about 7 miles, and partly across a tamarack and spruce swamp, which is separated from the muskeg by a small gravelly ridge. On sections 32 and 33, and part of 34, a dry poplar bush, occasionally interspersed with willow swamp, is met with. The remainder of section 34 and the west half of section 35 are covered with willow scrub, while the east half of 35 and nearly all of 36 are occupied by a large muskeg and hay

marsh, which extends north and south for many miles. The soil, where dry, is generally good, but it is stony on the tops of hills.

On the 10th December, having finished the subdivision most urgently required for the present in that district, I went back to township 32, range 19, to make the traverse of lake Winnipegosis across that township, which work had been postponed till the ice would form on the lake.

I spent two days at that work, after which I disposed of my camp equipage and made arrangements with Mr. Wm. Geekie, of lake Winnipegosis, for wintering my horses and transport outfit, and hired him to take my party down to Dauphin, where I boarded the train for home.

The weather during the season was unusually unfavourable. The rain fall was certainly the heaviest I have witnessed in Manitoba for many years, and through it I experienced a great deal of delay and much annoyance, as very often we had to work in the rain and were kept constantly soaked by the dripping foliage.

The level of water in the Dauphin lake and lake Winnipegosis was 4 feet higher than it has been for many years, and caused the flooding of the low land in the vicinity of Dauphin lake, and obliged several farmers to abandon their homesteads, which were under water and seemed as though there was no chance of their ever getting dry again. In one case a farmer was forced to move away because the floor of his house was covered by at least one foot of water, and the fields he had cropped the year before were entirely submerged.

Owing to the flood and the very wet spring, a great percentage of the land prepared for grain could not be seeded.

The construction of a railway from Gladstone, a station on the Manitoba and North-western railway, during last season has proved a great blessing to the Dauphin district, and has given a great impetus to agricultural industry by affording the farmers a ready market for their surplus products in grain and beef.

Another calling which will benefit by the railway is the fishing industry, which is being carried on during this winter on a large scale at lake Winnipegosis.

It has also caused an influx of new settlers who have taken land in the vicinity of the railway, and have even invaded the northern part of the district as far as lake Winnipegosis.

Three of these settlers, who are Icelandic agents, having not found enough good land to establish a colony of their own people in this district, came over to my camp to get some information about the land in the valley of the Swan river, and as I could not give them any definite information they made up their minds to hire a guide, and started for that country with the intention of forming a colony there should they find the land suitable for that purpose.

I have often heard people speak very highly of the Swan river valley between Swan lake and the second meridian; I have even heard that some farmers had already settled there, and by what I could gather from different sources, as well as by the geological reports on that country, the land, I should judge, would be most desirable for farming purposes, and should be surveyed as soon as practicable in order to encourage the settlement of that district.

I have the honour to be, sir,

Your obedient servant,

P. R. A. BELANGER, D.L.S.

Department of the Interior.

No. 3.

REPORT OF ERNEST W. HUBBELL, D.L.S.

SURVEYS IN MANITOBA.

OTTAWA, 22nd December, 1896.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report of my field operations during the past season.

As pre-arranged by you, my base of operations was transferred from the Edmonton district to Manitoba: accordingly, on the first of May I telegraphed Mr. F. Gibson, my assistant at Edmonton, to bring in the survey outfit from winter quarters, and accompany same by train to Moosomin; this he did, reaching there on the 11th of May. I left Ottawa on the 9th of May, arriving at Moosomin on the 13th, having stayed over one day in Winnipeg in order to organize my party and procure necessary supplies and iron bars. Remaining one day at Moosomin to complete final arrangements, I left the following day, May 14th, with my outfit en route for Minnedosa, arriving there Tuesday evening the 19th.

I left for Neepawa on the morning of the 21st, having spent one day in loading supplies which had been previously shipped by rail from Winnipeg. To describe the condition of the roads is beyond my power. The wagons loaded with about 1,200 lbs. each sank to the axles in mud, the horses to their middle; it was load and unload in mud from 7 a.m. to 7 p.m., at the same time waging an incessant war against myriads of mosquitoes. Six miles a day, with six horses attached to each wagon, was about the limit of travel; however, on the 22nd of May I arrived at township 14, range 16, west of the principal meridian, and the following day commenced the re-survey of this township. I had completed about 60 miles of subdivision when I received word from you June the 4th to stop re-survey of township, which I did. This township is nearly all under cultivation, with fine substantial buildings and wire fencing; judging by appearances the settlers are in a prosperous condition. From here I proceeded to township 18, range 12, to renew the corners as instructed. The trails were in a worse condition than before, the whole country being inundated; for miles we travelled through water above the horses' knees, and the soft sticky mud, adhering thickly to the wheels, made travelling anything but pleasant.

Owing to the illness of one of my horses I was compelled to hire an extra team for a few days to assist in transport, otherwise it would have taken a considerable time longer to have reached our destination; in fact, it would have been almost impossible with the horses belonging to the outfit. Whole farms were covered with water, and many settlers were compelled to live in the top stories, and on the roofs of their houses. As may be imagined it was almost impossible in many cases to find a dry spot upon which to pitch camp, indeed on several occasions we had to sleep in the wagons.

Of course this constant heavy strain combined with the wet pasturage told on my horses, in my opinion ultimately causing the death of two.

On June 13th I arrived at township 18, range 12, and the following day commenced the survey. About two thirds of the original survey marks of this township had disappeared; and the old lines were completely covered with a dense growth of poplar, hazel scrub and underbrush, making them, if anything, more difficult to clear out than they were in the original survey. This township being covered with heavy timber, principally poplar and spruce, with numerous muskegs intervening, prevented our moving camp as

often as desirable, and necessitated unusually long walks to and from work. The greater part of the township being under water, as a consequence, we were saturated from the time of leaving camp until our return, which resulted in acute rheumatism for many of us.

The soil throughout is a good black loam and clay subsoil, with the exception of a gravel ridge which lies nearly north and south, near the western boundary,

“Big-grass river,” a nice stream, usually about 3 or 4 feet deep, and 75 links broad, runs in an easterly direction across this township. The southern portion of the township is fairly well settled. Whilst at work here we had almost continuous rain, which prevented rapid work. At that time it was utterly impracticable to renew the corners in township 19, ranges 12 and 13, owing to the quantity of water, and I therefore deemed it advisable to subdivide townships 19 and 20, range 18, in the Riding mountains, which were included in my allotment of work. After a tedious trip I arrived at Minnedosa, July 13th, procured fresh supplies and additional iron bars, and got to township 19, range 18, on the 16th of July. The survey marks being obliterated (with one or two exceptions) on the south boundary, my first work was to re-open this line and re-establish lost corners. I next proceeded to run the eastern boundaries of townships 19 and 20, range 18, and the north boundary of township 19, range 18. These lines were through dense spruce, jack pine, poplar and dead timber, varying in size from 8 to 30 inches in diameter.

On the 7th of August I commenced the subdivision of township 19, range 18.

This township with the exception of a small opening in sections 3 and 11 is densely covered with spruce, poplar, jack pine and dead timber, and very hilly.

The greater part of the large timber had been cut; a good deal, however, yet remains that is fit for manufacturing purposes, but I do not think in sufficient quantities to warrant the reservation of lands for timber. The “Whirlpool river” running through the eastern part of this township affords an excellent supply of fresh water, and it is well stocked with jackfish and suckers. A great quantity of dead jackpine and spruce, which is exceedingly hard to chop (turning the edge of an axe in a short time), prolonged the survey considerably; with six experienced axemen all that could be accomplished in a day's hard work was a mile or a little over. The thick branches of jackpine and spruce extending to the ground and reaching far from the trees necessitated additional chopping, thus making the survey lines unusually wide. Several lakes required traversing, but these were not done until late in November, as they were surrounded by muskegs and impossible of approach until frozen over. A portion of Clear lake occupies the north-west corner of the township; it is well stocked with pike and whitefish. After the completion of this township I began the survey of township 20, range 18, which is densely covered with spruce and poplar, varying in size from 10 to 30 inches in diameter. A fair quantity of this timber being suitable for lumber and other manufacturing purposes, it might be desirable to retain certain sections for timber berths, more especially those on the north and west of the townships.

Owing to the numerous and immense muskegs in the south-east of the township, it could only be surveyed to advantage after they were frozen. This vicinity is wonderfully stocked with moose, elk, and smaller deer, and as the game laws in Manitoba prohibit the shooting of deer until 1900, a large increase to their number may be reasonably expected. Feathered game was scarce throughout the season.

On the 15th November, owing to the unusual depth of snow for this season of the year, two feet on the level, and the extremely cold weather, 30° to 48° below zero, I concluded to discontinue field operation for the season. I therefore dismissed some of my party, and after finishing the traverse of several lakes, which, as before mentioned, could only be done when they were frozen over, and which kept us employed until the 25th of November, I stored my survey outfit and horses with one of the settlers in township 19, range 18, it being impossible to move my wagons nearer Minnedosa. On the 27th November I hired a couple of sleighs, and in the midst of a howling blizzard travelled to Minnedosa, 35 miles. On the 30th I paid off the remainder of my party and left for Winnipeg the same day. Rain and floods from the day we commenced work until the day we finished made the past season the most unsatisfactory and disagreeable that I have experienced in the west. Snow fell on the 15th of October, and

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remained on the ground, winter commencing about the 1st of November. During this month the cold was intense, the thermometer on the 26th reading as low as 48° below zero ; on this day we were traversing Octopus lake, and I had the misfortune to break through the ice whilst carrying my instrument. Owing to the early and unusually heavy fall of snow, I was compelled to purchase hay and oats in larger quantities than is usual at this season of the year. In conclusion, I again record my appreciation of the efficient manner in which my assistant, Mr. F. R. Gibson, performed the duties assigned him. During the past season (including traverse lines) I completed about 300 miles of work. Taking into consideration the fact that nearly all my work was through heavy dense timber, and greatly retarded by rain and water, it will be seen that we did not lose much time.

I have the honour to be, sir,

Your obedient servant,

E. W. HUBBELL, *D.L.S.*

No. 4.

REPORT OF T. FAWCETT, D.T.S.

SURVEYS IN THE SASKATCHEWAN DISTRICT.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of my operations during the past season in connection with surveys in the Saskatchewan district.

In carrying out my instructions dated the 7th day of May, I left Ottawa two days later for Prince Albert; a couple of days were spent at Winnipeg purchasing supplies and camp equipage and attending to shipping.

Prince Albert was reached early on Sunday morning the 17th of May, and the day following I was met by Mr. Robert Craig who had been appointed assistant, also by members of my parties in former years who were on hand anxious to secure appointments on the work, and the men who had given entire satisfaction in former years were taken in preference to strangers as long as there were vacancies to be filled.

In the evening my outfit and some of the horses were brought in by Mr. Tennant, of Caxby, who had charge of them during the past two years, and as usual the horses were in splendid condition. On Tuesday the 19th the morning was spent in repairing wagons and replacing portions of harness which through wear and tear had become unfit for use. In the afternoon I started the party by trail for Saskatoon, where I had been directed to make a survey of township 36, range 5, west of the 3rd meridian, the original survey having been cancelled by order in council under power given by sub-section 2, section 129 of the Dominion lands Act. Gross inaccuracies had been reported by settlers and others who requested that a correction survey be made.

I followed by train to Saskatoon on Thursday morning the 21st of May, and my party arrived the same evening, two teams with outfit from Prince Albert and one team from Yorkton, brought by Duncan and John McNicol, who were two of the most useful men in my party. On the 22nd of May, after handling axes, grinding spades and making other preparations, I began work by retracing the north outline of the township, repairing pits and replacing posts, substituting iron posts for the wooden ones found on the ground. On the outlines all the original corners were found and re-marked and nearly all the original corners were re-established in the interior of the township. The ten chain error reported by the persons who applied for a correction survey, and the corners affected by it, were corrected: sections 5, 6, 7, 8, 17 and 18 were affected by the correction.

The quarter section post on the north boundary of section 20 was found 13·37 chains too far west, and this also was corrected. The post marking the east boundaries of sections 20, 29 and 32, were found more than 50 links out of position, but were not corrected because of the proximity of the town plot, the survey of which was based on the original survey, and to have changed these posts would have caused trouble in some quarters.

The soil in this portion of the country is a sandy loam rather too light to be durable, but will produce good crops in seasons when the rain fall is plentiful.

The inhabitants do not attempt to raise much grain as they find stock-raising and dairying more profitable. Saskatoon is the distributing point for mail and supplies to Battleford and surrounding country. The majority of the people who own farms in the township reside in the village and some of their farms are quite a distance away from the place of residence.

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There is a dairy which has been in operation two seasons and is doing a good business, at least I was informed by the person in charge that he was well satisfied with the result of the factory so far.

The township is entirely devoid of timber with the exception of a few patches growing on the bank of the Saskatchewan, and the people have to haul the principal part of their fuel from a place fifteen or twenty miles up the Saskatchewan called the Moose Woods. Work was completed in this township on the 4th day of June and a start made for the locality where my next work was projected, viz. : township 42, range 26, west of the 2nd meridian, which place was reached on Saturday the 6th June. The order of proceeding was to make a re-survey of the south and west boundaries, then to run the north boundary and finally proceed with the subdivision : this work was finished on the 29th day of June. This township has been described in former reports as in every respect suitable for settlement. It is watered by Wakaw lake near its north boundary and ponds of fresh water near the south-east and south-west corners. There are also several ponds of alkaline water. Stadia measurements were made in traversing Wakaw lake, the banks being generally timbered without any margin between the woods and water. This effected a considerable saving in time. A settler who last winter occupied section 29 left in the spring and sold out his improvements to a person who resides at Batoche. I was informed that the family was frightened by an Indian who ordered them to leave that part of the country as he considered he possessed proprietary rights. The same Indian was arrested last summer and convicted of trying to drive out a settler who had located in township 42, range 24, and sentenced to three months imprisonment. The confinement will probably teach him a salutary lesson.

Township 42, range 25, west of second meridian, was next subdivided, and in soil and other properties was very similar to the township above described, except that the surface was somewhat more hilly, and stony ridges more numerous than in the other. Wakaw lake cuts off a small corner of the township in section 31. There is a large lake intersected by the south boundary, but the water is alkaline and not suitable for domestic purposes. Good water was seen issuing from a spring in a ravine crossed by the line on the east side of the lake. Fresh water was also found in a ravine in section 16, where a little work in excavating or constructing a dam would insure a plentiful supply all the year around. Several families of half-breeds from Batoche were camped in these townships during the time of the survey digging "senega," or snake root, in which there has been a large traffic during the past summer. Owing to the supply being greater than usual, prices paid this summer were lower than in former years, but as soon as the supply fell off in the fall prices increased, and those who had a good stock on hand derived a large profit from this investment. Some of the herbalists gathered a plant which they thought to be ginseng (*Arabia quinquefolia*) a plant which is much in demand among the Chinese because of supposed medicinal properties which it possesses. Samples of the North-west plant were sent to China for valuation, but did not fill the bill in a commercial sense, and some of the merchants who had risked a little of their money in it were out of pocket. The North-west plant appears to have been the dwarf of ginseng (*Arabia tripolia*), a plant in appearance very like the true ginseng, growing in a single stem eight or ten inches high, bearing at the top three long petioled leaves, each of which has three or five divisions. The leaves of the tree ginseng have five divisions invariably.

On the 10th of July the work in the neighbourhood of the Birch hills was completed, and, that projected for the remainder of the season being located east of Melfort, I started for that locality. When in the neighbourhood of Kinistino I had an investigation made into a complaint by Mr. Samuel Ellis in relation to the position of a lake shown on the map of township 45, range 22, west of the second meridian, in sections 24 and 25, which Mr. Ellis affirmed was in error, and that he (Mr. Ellis) was injuriously affected by the error. The investigation showed that the lake complained of had no existence in fact, but was one of the "had beens." It should be removed from the map and the areas supposed to be affected by this lake entered in full.

On the 15th of July I reached township 44, range 16, west of the second meridian, and began work by extending the twelfth base eastward across the range, then ran the east out line and afterwards the subdivision. During the spring months we had rather

more wet weather than usual, but the wettest part of the summer was from the middle of July to the end of September. During that time scarcely a day passed without a shower of rain and generally several showers, keeping the brush and grass wet all day. There were also several days of continuous rain. In such seasons the mosquitoes are unusually troublesome, and the past season in that respect was no exception to the rule. On cloudy days and in the mornings and evenings they would make life a burden to both man and beast. This township had been overrun by fire about two years previous to the survey, and this summer the ground was literally covered with strawberries, and the wheels of our vehicles when travelling were painted red with them. All kinds of fruit were plentiful and the summer being cool and wet during the latter part of the berrying season prolonged the duration of it. The soil of this township may be described as a sandy loam usually underlaid with clay.

There are several stony ridges consisting of boulders imbedded in drift clay.

Nearly every section contains more or less wood suitable for fuel, and at several points in muskegs and sometimes on dry ground there is excellent spruce for building purposes. There is just about enough timber in the township to satisfy the requirements of settlements. A branch of Leather river enters the township in section 4 and leaves it in section 34. This is a small stream of splendid water which flows all the year round.

There are some other smaller streams, branches of this, also ponds, all of which contain fresh water. It is refreshing to find a part of the country so well supplied with water entirely free from alkaline matter. Hay land is generously distributed over the township, and all the elements necessary to make a successful settlement are present and awaiting the immigrant.

The surface is undulating and the high ground covered with berry bushes or other scrub in places fire killed.

The survey of township 43, range 17, west of the 2nd meridian, began on the 12th of August and was finished (with the exception of the south boundary) on the second day of September. At the south-west corner are several sections of timber and brulé, and at the north-east corner there is considerable timber with underbrush. There are several muskegs containing spruce of large size and good quality, also some good poplar timber. About one-third of the entire area is covered with timber, the remainder being rolling prairie. A belt of sandy land about two miles in width crosses the township east and west nearly coincident with the centres. The soil north and south of this belt is a sandy loam, generally underlaid with clay.

The westerly branch of Leather river flows northerly through the township entering in section 2, and leaving in section 33. There are also several lakes all containing good water. Mr. J. C. Campbell has a stock ranch in this township, and has constructed valuable buildings on section 21. He cuts his hay mostly in sections 30 and 31, where there is a large meadow. During the summer he did not occupy his ranch, but resided at Fletts springs, where he has a farm and keeps a small general store. His men returned later in the season to make preparation for winter occupancy. There is a considerable area of hay land along Leather river, but the ground would need some cleaning up before the hay could be cut to advantage.

Township 44, range 15, west of the 2nd meridian, was reached on the 3rd of September, and the survey completed on the 7th of October. The westerly half of the township is mostly brulé, more or less open, while the remainder is wooded—the greater portion with green timber. Parts of sections 25, 26, 35 and 36 are included in a spruce swamp containing good timber, some of the trees attaining a diameter of 30 inches and retaining their thickness, with but a slight diminution, from 50 to 60 feet from the ground. The poplar, too, in places is very tall and straight. A fine stream averaging in width 10 feet and 2 feet in depth, with a brisk current, enters the township in section 25, and winds to and fro across the line on the east and north boundaries of section 36. The stream is called by the Indians "Doghide river." The water is clear, sweet and faultless in every respect. The banks of the stream in September were covered with black currant bushes loaded with fruit, also wild hops with large well developed fruit. The east branch of Leather river flows north through the township, entering in section

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1 and leaving in section 31. These two streams, besides several lakes of good water, make a fine supply in all parts of the township. With the exception of a few sections near the north-west corner, this township can scarcely be recommended as suitable for settlement in its present condition, there being too much timber. The soil is good enough, being a dark loam usually with clayey subsoil. Another fire in a dry time (which will be sure to run over it sooner or later) will clear up a large portion of the surface. The townships which lie immediately to the north and south of this contain more open land than this. That to the south was included in my instructions for subdivision this year, but owing to there being so much timber in those subdivided the survey had to be deferred until some future time.

My subdivision surveys being completed, on the 8th of October I started for the eleventh base.

No connection having been made between the eleventh and twelfth bases east of range 24, in order to complete my survey of township 43, range 16, in accordance with the manual of surveys of Dominion lands, the eleventh base had to be extended eastward across ranges 17 and 16 and connecting meridians run north to the correction line. That part of the country lying between the correction line and eleventh base being thickly timbered and broken by many unknown muskegs and lakes, I concluded that time would be saved by following the trail to Melfort and thence *via* new trail to Gordon and Ironsides' ranch which is situated in range 20 and crossed by the eleventh base line. My starting point, *viz.*: the north-east corner of township 40, range 18, west of the second meridian was reached, and work begun on the 12th October. For a mile and a half eastward the country is quite open, being prairie and scrub; then for a mile and a half dense brush and fallen timber broken by a couple of meadows.

The remaining two miles to the township corner is through dense poplar woods, some of the trees attaining a diameter of 20 inches, very tall and free from branches for 20 to 40 feet from the ground. The woods in this part seem to have escaped the fire for a great many years as there are old trees standing and fallen among the green timber, and logs embedded in the ground in places two or three deep.

In sections 35 and 36 two lakes are crossed, the one 20 chains and the other a mile in width where crossed by the line.

From the north-east corner of township 40, range 17, I ran the meridian north twelve miles to the correction line. For nine miles the line runs through timber similar in dimensions and quality to that described above. Lakes are crossed in sections 12, 13 and 25, and other lakes are seen from the line.

On the east boundary of section 13, township 42, at 61 chains, the line intersects Kuratapioo or "Upsetting lake" which is formed by an enlargement of Barrier river. It extends a mile and a half east of the line and probably two miles west. The banks of the lake are about 100 feet high and are generally very stony, being formed largely of masses of boulders and other drift material.

North of the lake the fires have destroyed nearly all the timber, and nearly one half the surface is burnt bare and clean.

The fire seems to have been through there two years ago, and nearly all vegetable life was destroyed. A small lake is crossed on the east boundary of section 24, and Nikik lake is crossed just before the correction line is reached. The corresponding corner on the north side of the correction line to the west lies in the lake. Clumps of spruce timber were seen from the line at points both east and west, the trees being large in size and good.

Transport was aided considerably by the frost which had so improved the muskegs that the horses and wagons would travel on the surface where it would be impossible without the frost. We were thus enabled to follow the marshy margins of lakes and save time which would otherwise have been spent in making roads. In running the north boundary of township 40, range 15, I found green timber consisting of the original forest the entire distance, except where broken by lakes in sections 33 and 34, and marsh meadows in sections 32 and 36. For a wooded country this part contains some fine meadow land. The grass is mostly blue joint. The lake crossed in section 34 extends about two miles north of the base, and a stream

about 10 feet wide flows out of the lake, northerly, towards Barrier river. There is an excellent meadow along the west margin of the lake, varying from a few chains to nearly half a mile in width, and about four miles long. In running north on the east boundary of township 41, range 16, at 53 chains, we reach a branch of Mijashk lake (Hay lake), which here is a little more than three quarters of a mile wide, and appears to be of a considerable depth. On the east boundary of section 12, at 29 chains, we reach the other branch of the same lake, the two parts being connected by a narrow channel about half a mile east of the line. This branch where crossed is 30 chains wide.

The lake empties northerly by means of a small stream which crosses the meridian from east to west in section 24. North of the creek the country up to 30 chains on the east boundary of section 25 is *brulé*, and from there we pass through heavy timber to the margin of a beautiful lake about five miles in length, very deep, and of an average width of 30 chains. The banks rise upwards of 100 feet on both sides. The lake is said to teem with fish, principally pike and doré. The local name for the lake is *Ke-pab-is-kow*, and has been rendered "Barrier" in English, and this name has been given to the river (of which the lake is but an extension) for a number of years. North of the lake on the east boundary of section 36 the timber is smaller, the poplar being on an average 6 inches in diameter. From 48 to 62 chains a lake is crossed, and, north of the lake, *brulé* and windfall. Continuing north on the east boundary of section 1, township 42, range 16, at 5 chains, we cross the trail which runs from Melfort to Nut lake, and thence to Yorkton. The residents in the vicinity of Melfort are travelling that road now in preference to the other trail, which passes through the hills *via* lake Lenore. The *brulé* continues until Spruce lake is reached at 70 chains on the east boundary of section 12. This lake is about a mile wide and between two and three miles long.

West of the lake and extending south-west is a belt of spruce, the best timber I have seen in that part of the country, covering in area nearly half of sections 1, 12 and 13. Some spruce in this belt attains a diameter of 3 feet and is in every respect good timber. North of Spruce lake is *brulé* to section 25, and then prairie to within a short distance of the correction line, where a muskeg containing dry spruce is crossed. Having completed this portion of my work on the 6th November, I proceeded with the survey of the south boundary of township 43, range 16, which was completed, and lakes traversed in sections 3, 4, 5 and 6 by the 12th November. At that date the frost had penetrated to a depth of 15 inches in the open prairie and meadow land. It began to snow on the 6th of November and kept adding a little every day, until at the time I left Prince Albert, on the 19th November, it was about 12 inches deep. The thermometer was then between 30° and 40° below zero; the night of the 12th November was the first date on which the mercury fell below zero. The Saskatchewan district suffered in many localities through fires. The wetness of the summer only increased the danger by adding fuel to the flames in the form of increased vegetation. The losses were more in produce and buildings and destruction of timber than in injury to the soil as is the case in dry seasons.

A great quantity of hay was destroyed in the vicinity of Carrot river and of Melfort. There was also a great fire which started in the direction of Humboldt, travelled north-east and divided at lake Lenore, running north into the woods and south-east over a great tract of country towards Yorkton. When this fire was in progress I was afraid it might come upon us when in a jungle when it would be difficult to save our outfit; the air was dense with smoke, while burnt leaves, straws and ashes were falling to the ground like a shower after being carried over thirty miles. Fortunately we did not suffer any further inconvenience except that which was caused by the dense smoke.

Crops in the Saskatchewan district would be considered a good average. The yield of wheat per acre in several localities where I made inquiry was about 20 bushels, and oats a very good crop. In spots, especially on sandy land, the hot winds in July did considerable damage. No large area, however, suffered in this way. All root crops were enormous. A dairy established about five miles from Prince Albert last summer made a shipment of butter to England, which after paying all expenses netted the

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owners some 17 cents per lb. This was very encouraging, and, as a result, considerably more attention will be given to dairying in the future than it has received in the past.

There is little immigration to the district at present, but the country and town of Prince Albert are making substantial progress. In the town brick houses are rapidly replacing those of frame and there is a general feeling of hope and courage throughout the district.

I have the honour to be, sir,

Your obedient servant,

THOS. FAWCETT, D.T.S.

No. 5.

REPORT OF J. E. WOODS, D.L.S.

SURVEYS IN EDMONTON DISTRICT.

OTTAWA, 1st December, 1896.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,— I have the honour to submit the following report on my operations during the past season, performed under your instructions of the 6th May, 1896.

The work consisted of: reposting, correction, trail, settlement and subdivision surveys in the Edmonton district.

I left Ottawa on the 11th May, and reached Calgary on the 17th, having stopped over at Winnipeg to order supplies.

On the 18th I sent two men to take my outfit from Tindastall to Red Deer where I met them with my party on the 21st.

As a part of my supplies were delayed, I was unable to leave Red Deer before the 26th.

At Ponoka I made a correction survey of the south boundary of township 43, range 25, west of 4th meridian, as well as of the meridians closing on this line. I also connected my survey with the traverse of the Battle river and with the traverse of the Edmonton trail.

On section 2 there is a large outcrop of limestone; it lies in horizontal beds and consists of a mass of shells. A few yards have been quarried, but none of it has been burnt for lime; should this stone make good lime the quarry would be valuable as all the lime used in this district is imported from Kananaskis.

From Ponoka I drove on with my outfit to Beaverhills creek, a distance of about 120 miles, taking six days of actual travelling. The weather was very bad and the roads in such a condition that the horses and carts were frequently mired, with the unavoidable consequences of breakage and delay.

I found the old trail from Beaverhills creek to Victoria very crooked and in places located over bad ground; it generally followed the edges of marshes and low land to avoid bush and willows, and the crossings of the sloughs and muskegs were not of the best. In making the survey of this trail I therefore adopted the following system: I first made with the compass a preliminary survey of the old trail, noting the topography of the country, the most advantageous crossings of streams and sloughs, the easiest hills to ascend and the position of high land. Having plotted these notes I projected on the plan the courses which would pass over the ground best adapted to the construction and maintenance of a highway, and ran out these courses on the ground with the transit and marked them according to instructions.

In wet weather the trail on section 1, township 57, range 17 is so bad that freighters always take the trail by Whitford lake, although five miles longer and far from good. However, when this part of the trail is cut out on the surveyed line, very little work will be necessary to make it a good road in all seasons. There is a large traffic on this trail, as that from Fort Saskatchewan to Victoria, on the north side of the river, is very hilly, sandy, and somewhat longer. A great deal of work has been done in making a new grade down the valley of the Saskatchewan to the ferry landing opposite Victoria.

When going over this trail in the month of October, I noticed that many iron posts placed close to the old trail had been removed, probably by travellers who found

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them useful either in repairing a broken wagon, or in making a tripod from which they hung their kettle over the fire.

On the 3rd of July I began the subdivision of township 58, range 17 west of the 4th meridian, by first surveying the part south of the river. When my survey reached the north side it was greatly objected to by the settlers who had taken up their claims many years ago with the expectation of having them surveyed into river lots. I had only made a few miles of subdivision in the settlement when I received your instructions to discontinue this work.

From Victoria I went to township 52, range 22 west of 4th meridian, and subdivided the two western tiers of sections, where I found nine settlers; many had gone to the trouble of running lines and taking measurements, so as to locate on the proper sections. The surface is hilly and broken and mostly covered with burnt poplar and willows with patches of open. There are several lakes surrounded by large hay meadows which afford a plentiful supply of hay to settlers of the adjoining townships to the west. The soil is mostly a clay loam, in a few places it is light and the subsoil is stony. All the surveyed land in this township will soon be taken up, as it is only 15 miles from Edmonton which is reached by good trails, one on the north side, the other on the south side of the township. The eastern part seemed to be heavily timbered with poplar and spruce with a great deal of windfall. I have been informed that since I was there extensive fires have run over this part of the country and cleared a large strip of land.

I completed the renewal of corners in township 52, range 23, west of the fourth meridian; this work was much needed, as many posts were burned off, and in some cases the lines had not been completed, causing great annoyance to a number of settlers. Afterwards I proceeded to township 53, range 3, west of fifth meridian, with the object of locating the settlers along the Sturgeon river. I first ran the east boundary of the township and afterwards surveyed the western tier of sections. The country is high and hilly, covered with patches of scrub; there is also some small spruce on the low land between the hills. There was only one settler here, but I met a few persons who were looking for land along the outline where there are a few good hay meadows. I also laid out a few sections in township 53, range 4, along the north shore of Wabamun lake. Four half-breeds have taken up claims here and will probably be soon joined by others, as whitefish and pike abound in the lake, and there is plenty of hay along the shore and good pasture a couple of miles to the north. Extensive bush fires raged in this district and greatly delayed the work. All the land I subdivided around Wabamun lake was burnt over while I was making the survey; the fire became so serious that I had to burn fire guards around my camping ground and keep my horses picketed on the edge of the lake. At that time I received your instructions to make the settlement survey at Victoria. I therefore abandoned the work here and set out for that place. On my way I stopped at St. Albert settlement and made a survey of Atim creek in township 53, range 26, and of the necessary lines to connect the survey; I also traversed that part of the shore of Big lake which seemed to have changed its position since the original survey was made.

I found the settlement to be surveyed at Victoria divided into two parts; the first, which I began to survey on the 19th October, comprises eleven lots, extending westward along the north side of the Saskatchewan river from the Hudson Bay Company's reserve to within 63 chains of the east boundary of township 58, range 18.

Considerable improvements have been made here in the way of buildings and fencing, but not much cultivation has been done. The settlers live by fishing, hunting, and washing gold on the gravel bars of the river. The country is open for about half a mile back from the river and rises rapidly; further on it consists of ridges and hollows; the ridges are prairie and hollows are hay land bordered with poplar and willows. On lot 10 there is a good building used for a church and school house.

About one and a half miles west of the Victoria settlement begins the Lobstick settlement in township 58, range 18; it extends to within three quarters of a mile of the western boundary of the township and comprises 18 lots averaging about 22 chains in width by 70 chains in depth.

This settlement lies along a large flat on the north side of the Saskatchewan river. With the exception of some bush along the north boundary of the settlement, it is all open country with a few patches of scrub. The settlers have all good buildings and considerable fencing, keep a few cattle and horses and do some farming. Gold washing is also quite a source of revenue for them.

I completed the survey of this settlement on the 7th of November and left for home on the 9th. There was a foot of snow on the ground, and the weather very cold. I reached my winter quarters near Edmonton on the 13th, and put up my horses for the winter and stored my outfit.

I intended to traverse, on the ice, the lakes in township 52, range 22, which are only a few miles from where I left my outfit, but I found that, notwithstanding the severe weather we had, the ice was covered with slush and would not carry a man, the snow having fallen while it was very thin. The snow was over two feet deep, and in many places it was difficult to determine the shore line.

I therefore decided to leave the scaling for another season and left for Ottawa on the 19th November and reported at the office on the 1st December.

I have the honour to be, sir,

Your obedient servant,

J. C. WOODS, D.L.S.

Department of the Interior.

No. 6.

REPORT OF F. W. WILKINS, D.T.S.

SURVEYS IN SOUTHERN ALBERTA.

OTTAWA, 26th January, 1897.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I have the honour to report as follows on my field work of the past season.

In accordance with instructions received from you, and dated 7th May, 1896, I proceeded to Calgary, Alberta, at which place I made up my party, and got my outfit put in order for the summer's work. On the 28th of May I set out from Calgary by the Macleod trail, going south, to reach township 14, range 28, west of the 4th meridian, in which township my season's work was to commence, by making a traverse of a small stream in the same, for the purpose of obtaining the areas of a number of quarter sections broken by the stream, and which the Oxley ranch company desired to purchase. I reached this township on the 2nd of June, from which place, after completing the above traverse, I moved on the 6th to the next township to the south, where another traverse along Willow creek was to be made; also for the purpose of obtaining the areas of broken sections sold to the Oxley ranch company.

Whilst engaged on the above work I was seized with an illness which so prostrated me that it was only with the greatest difficulty that I was enabled to get anything done at all. For upwards of a week my pulse stood at over 100 to the minute and I was so weak that I could stand on my feet for only a minute or so at a time.

Finally, however, I got this job completed by sheer force of will; but the work was slow, and took far too much time to do. At one time I thought that I should be obliged to return to Calgary or go to Macleod for medical attendance, but, beginning to feel somewhat better, stayed in the field and gradually recovered. Here I should like respectfully to draw your attention to a matter which has been more or less of a grievance to surveyors employed by the government for some years past, I mean the matter of surveyors' assistants. The young man who was appointed my assistant last spring, and who was with me of course during the above illness, had no knowledge whatever of surveying, so that as an "assistant surveyor" he was of no use to me in the world. Had I been less determined than I was, or had I become so ill that it would have been a physical impossibility for me to go out at all, then my party would have had to be entirely idle, and no work could have been accomplished during the continuance of this condition.

Now if the assistant appointed was really an assistant surveyor very little hindrance to the work would ensue from the illness of the surveyor in charge; and it would not be at all necessary that a man should suffer fearful pangs and misery while endeavouring to carry out his instructions. With all due deference I would suggest that this matter of "a-sistants" be remedied by requiring all applicants for the position of "assistant" on Dominion lands survey parties to furnish a certificate from a professional man (a surveyor) that the said applicant is qualified to take up, should occasion demand it, some of the easier parts of surveying, and thus keep things going in the event of a complete knock-out of the surveyor in charge.

My next work was a traverse of this same Willow creek in township 9, ranges 25 and 26, to determine broken areas, as before, of land sold to different parties, it being the policy of the department to make streams in this ranching country boundaries of the lands patented to different individuals.

This work also took a considerable length of time to carry out. I was still very weak, from the sickness mentioned, and easily fatigued. Also this stream is here tortuously crooked and this alone would make the work slow.

After completing the above traverse I went to township 6, range 26, west of 4th meridian for the purpose of subdividing the same, but after working in this township for a short time found that I could not complete the survey of it just at this time as I was unable to cross the Waterton river by reason of unusually high water in the same at this early time in the summer. This river rises in the Rocky mountains at or about the boundary line (U.S.), no great distance from the above township, and there having been a continued spell of very hot weather just before I got there, an exceedingly high stage of water was the result.

I now concluded that it would be best to take up some other work and come back later on to complete this township, when I could ford the river. Acting on this decision I then went south easterly to the Milk river country, where I had been instructed to run the meridian exteriors between the ranges 9 to 13 inclusive in townships 1 to 4. This work took me a considerable time to accomplish, and was a slower job than I had anticipated.

On account of the extreme heat and dryness of the season up to this time, all the ponds and small streams were entirely dried up, so that I was obliged to camp all the time on Milk river itself, and this necessitated almost continuous long drives from camp to reach the work. I did endeavour to mitigate this condition of things by camping at Kipps coulée, in which there was water, and which was comparatively near to some of the work, but was put to ignominious flight on attempting it. The water in this coulée on trial proved to be a solution of unmitigated virulence and a most excellent thing to keep away from. This part of the Milk river country is bare prairie of a generally rolling character, with some hilly areas, and as you approach the Milk river itself in places cut up considerably by deep coulées and ravines. This description applies to the north side of the river. To the south of the river to the boundary line (a general distance of about eight miles) the country is dreadfully cut up by ravines deep and rough, leading from the south in a northerly direction to the river.

The "Three buttes" or "Sweet Grass hills" lie immediately to the south in the United States and the drainage from these high hills (mountains, properly speaking) is the cause of the rough surface found to the south of the river here. This roughness is no detriment for all that, but rather the reverse. Almost the whole surface may be called "Hogs-backs" from the side of which the slight snow fall of this locality is quickly wafted away by the wind in the winter time leaving the grass bare, and thus furnishing a large area of winter range for stock. I believe that this locality is the best winter range in Alberta, and that is saying not a little; and as the kinds of grass found hereabout are of the most nutritious varieties and locally known as the best kind of "beef grass", it is also one of the best summer ranges as well. As a matter of fact cattle keep "beef-fat" the year round on this part of the Milk river. Large herds are found here at all times of the year (all beef cattle no breeding cattle) but are almost entirely American cattle; I mean by this that they are owned in the United States and are, with very few exceptions, trespassers, and designedly so.

The American owners of these cattle drive them from their ranges, mostly from a good way to the south, to the boundary line, and when once there the cattle do not then require any further driving. The nearest water is to the north in the Milk river in Canada and the grass is good. These cattlemen, with but one exception, do not rent or own one acre of grazing land to the north of the boundary line; and as the ranges in the state of Montana adjoining are about eaten out, and are difficult to acquire, there is one very evident reason for the presence of American cattle—grass and tax free.

In the state of Montana, I am informed, a poll tax is imposed on all cattle, and as cattle on the Canadian side of the boundary line could hardly be counted as being in the above state, these cattlemen not only contrive to feed their cattle on their neighbours' grass but rob their own government by keeping the said cattle in their neighbours' paddock,—a beautiful system.

Probably 50,000 of these cattle are feeding in Canada in this locality; and by inquiry I learn that this has been about the number for the last six years that have

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been constantly on Canadian soil. Lean cattle are being constantly driven up, and fat ones are being as constantly taken away. As the average time is about four years from the time a calf is dropped until it becomes a "beef" at the average selling value on the ground of \$40, it will be easy to see the result. As to the exception mentioned about these cattle, that are not American, they are owned by three settlers who are located on the Milk river in Canada, who own perhaps 300 head between them.

These men had learned of the excellent feeding ground in this locality and came here two years ago, but they will have to leave, as, on account of the immense numbers of American cattle constantly about, they are obliged to herd their cattle night and day, or they would become so inextricably mixed up with these large bands that it would be more than they would be worth to cut them out. Thus it will be seen that Canada is robbed not only of grass, but practically of the land on which it grows, and the locality made untenable to her own people.

This part of the country is in my opinion not a good one for agriculture, though the soil is quite good enough everywhere. I am quite satisfied that the rainfall is too light, but along the river bottom, which is quite extensive along the Milk river, irrigation can be easily resorted to, and the result would be, I am confident, a complete success. Wood for any purpose is scarce in Canada in this part, there being but a very limited amount in some small clumps along the river.

After finishing this work in the Milk river country, which I did early in August, I next returned to township 6, range 26, which I had left in June on account of high water, and completed my work in this township.

This township is mostly of a rolling character with some hilly land at the north, is entirely in prairie country with a very strong clay loam soil (almost clay in fact) of most excellent quality without doubt, having a very fair growth of grass on it everywhere. This locality is also very dry, and, with the possible exceptions of some bottom lands along the Waterton river which as before mentioned runs through the township, which may be irrigated, it is not fitted for agriculture. Within about four miles of the river it is good grazing land, however, and this township is in general far more valuable as a range for cattle than for any other purpose. Two or three settlers are already in the township located along the river, some of whom are doing a very reprehensible thing in erecting long stretches of wire fence from cliff to cliff along the banks of the river, and thus compelling cattle to travel long distances along the same before they can get down to the water.

While in this township I received additional instructions to run out a portion of township 1, range 28, west 4th meridian, for which an application had been sent in by some settlers.

On going to this township I found but a very small portion of any use for agriculture, as it is largely on the sides of the mountains and to a great extent timbered. I ran out a small portion of the township into sections. To the east of this and reaching past the village of Mountain View and over to the Mormon town of Cardston, is a very good agricultural country, well settled and presenting a very prosperous appearance. Despite the very dry season grain looked well and root crops were good. I saw splendid looking winter wheat and, from conversation with settlers whom I fell in with, I am confident that this crop can be successfully cultivated right along.

From this I now went to the Porcupine hills to subdivide township 9, range 29, west of the 4th meridian, in which several settlers had already located themselves. This township is largely composed of very high hills and ridges with here and there outcroppings of soft sandstone rock. Beaver creek and a tributary, Fivemile creek, flow through the township.

There are small streams of excellent spring water, which abound with trout. Many splendid springs are found throughout the township, bursting from the hill side. The soil is invariably good, and the settlers here, who are of course in the creek valleys, speak highly of its capabilities. Some very fine fir timber exists in this township, and timber for all purposes is abundant and quite easily obtainable.

I also run out, at this time, a portion of township 8, in this same range. With the exception that this township is not so hilly as the last one, it is otherwise

very similar in its general characteristics. From this time on to the end of the season my work consisted in the location of settlers in townships 10, 11 and 13, in range 29, west of the 4th, and in townships 12 and 14, range 1, west of the 5th meridian, all in the Porcupine hills, and also subdivision work in township 17, range 4, and in township 18, range 3, and a small traverse in township 21, range 2, all west of the 5th meridian. In all of the above localities very little attempt at agriculture has been made, the people being almost entirely interested in stock raising. That these people are doing well at this business is abundantly evidenced by the appearance of their places.

A good many of these settlers had very good gardens, in which most excellent vegetables were grown, and in a few places small areas of oats had been grown and cut green for feed for stock.

From what I saw I am convinced that where land is available in these hills, and water can be had for irrigation, good returns await the husbandman; wood and building timber are also easily procurable in this hilly country.

Many desirable locations for settlers are to be found all over these hills, and everywhere it is a most excellent cattle country.

The value of this hilly section of country as a cattle raising district is well understood, and between the two classes of the occupants of the same, the "rancher" and the "small man," a strong feeling of antipathy exists. The rancher wishes to have the whole country open so that his cattle may range at will everywhere, and objects to the presence of the small man with perhaps a couple of hundred head, several of whom usually locate near one another in some valley. These erect buildings and fence off pieces of country for winter pasture, and thus offer considerable obstruction to the free passage of the "range cattle" along such occupied valley. The difference between the methods used in cattle raising by these two classes of cattle men is very marked, and both in the matter of humanity and of utility is in my opinion largely in favour of the small man. The rancher trusts largely to providence to preserve his cattle alive through winter storms, cuts a little hay sometimes and argues that the cost of putting up hay is as great as the loss he is likely to suffer by his cattle dying during the winter. Not a thought of humanity stirs his soul, although he quite well knows that every winter large numbers of magnificent cattle slowly starve to death. The settler or small man on the other hand cuts or provides plenty of hay for every hoof he has, and as a consequence never loses any cattle by bad weather, and off the same amount of territory produces more than twice as many cattle for the market each year—thus making a much better showing than his more pretentious neighbour.

Of the meteorological conditions prevailing in this part of the North-west during the past season it may be said that they were in general very unfavourable all round, the early part of the season backward and very dry, and then later on, when haying time came, for a long time much too wet.

The crops in general were not good, and in some instances grain was so short in the straw that it could not be cut at all.

I have the honour to be, sir,

Your obedient servant,

F. W. WILKINS, *D.T.S.*

Department of the Interior.

No. 7.

REPORT OF J. VICARS, D.L.S.

SURVEYS IN THE RAILWAY BELT, BRITISH COLUMBIA.

KAMLOOPS, B. C., 4th January, 1897.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of surveying operations performed by me during the past season in the Kamloops and New Westminster districts.

Acting under your instructions I proceeded to Shuswap station on the 27th of February, where, with the help of my assistant and a couple of temporarily engaged men, I made a survey of part of township 21, range 13, west 6th meridian. This work consisted principally in retracing provincial lot lines, in order to complete surveys which had already been made, and, while the actual work was easy, I was considerably delayed by several of the lot posts being lost, and it was difficult to re-locate the original corners.

In fact one line, an Indian reserve boundary, had to be left till I obtained the original notes. The land here surveyed was principally open range suitable only for pasture, with a few narrow gores of arable land adjoining the provincial lots. Application was in to purchase the most of the land surveyed here.

From Shuswap station I returned to Kamloops, and, after organizing a party, moved out some twelve miles south-west of Kamloops, where I subdivided part of township 18, ranges 18 and 19, west of 6th meridian. The day we moved out here the weather, which had formerly been fine and spring like, suddenly changed, and for several days a small blizzard was experienced, rendering work on the open range impracticable. Fortunately it was of short duration, and in a few days spring opened in earnest. Most of the land surveyed here was open range and suitable only for pasture.

With the exception of a Mr. Newberry, on lot 418, which lot is cancelled I believe, there was only one settler located on this land, and he had only done a few improvements in the shape of fencing.

On the 16th of March I moved back to Kamloops, and that night took the train for New Westminster district, where I was engaged till the 11th of May subdividing part of township 3, ranges 29 and 30, west of 6th meridian. All of this land surveyed consisted of islands in the Fraser river, or lands adjacent to the river, and principally lying to the south of it.

Practically it may be said, from the number of large sloughs here which all have ingress and egress into and from the Fraser, that the whole consisted of islands.

On the larger higher islands the soil is a rich sandy loam, but on the lower and smaller ones it is very light, and on those which are very low it is almost pure sand, fit only at present for pasture. Most of the land here, with the exception of the smaller islands, is settled on and large improvements have been made, but over all of the settlers the "bête noire" hangs. At any time during the early summer freshets they are liable to be flooded out.

Many preventives of this have been suggested, amongst others dyking or dredging of the Fraser. As for dredging I do not consider it feasible, but it might be possible to construct a dyke to keep the water out, though, from the sandy nature of the soil, I doubt it, owing to the enormous soakage that would take place and again it is a question, even if a serviceable dyke were constructed, if the increased improvement to the land would repay the large expenditure which would necessarily be incurred in constructing it.

On the completion of this work I moved back to Kamloops, and from there to the north shore of Shuswap lake, where it was reported there was a large quantity of arable land, principally lying at the mouths of Adams river and Scotch and Ross creeks, and which the Dominion lands agent at Kamloops urged me strongly to survey, in order that he might have available land to which he could direct intending settlers.

The land at the mouths of Adams river and Scotch creek, consisting of part of township 22, ranges 11 and 12 west 6th meridian, I surveyed, but I found that from the nature of the country between Scotch and Ross creeks which was very mountainous, it would be too costly to take a connecting survey during the summer months as far as Ross creek. What should be done is to take a survey line up the lake in the winter time on the ice, running section lines as far as the shore, where temporary posts could be planted, and from these the survey of what land might be desired could be taken up during the summer months. At the same time a traverse of the lake might be carried on. I had intended doing this on a small scale last winter, but owing to the mildness of the winter the ice never became strong enough to carry.

Most of the land at the mouth of Adams river and Scotch creek is fairly good, being a light sandy loam and not heavily timbered. The great trouble is that the greater portion of the best of it is taken up by Indian reserve, and here, as in a great many other places, the Indians have made no use of it. Even the timber on it they will not cut, but instead cut the timber on the adjacent Crown lands. Two settlers were in residence on the land surveyed and had made small improvements.

From Shuswap lake I returned as far as Shuswap station, where I spent a couple of days retracing the north boundary of Naskainlith Indian reserve, which I had to leave incomplete in the spring.

From here I returned to Kamloops, and from there moved to Shumway lake, which I traversed, and subdivided part of township 18, range 17, west of the 6th meridian. All of this land was open range and only suitable for pasture. There was an application in to purchase part of it.

From here I moved back to New Westminster district, where I re-surveyed part of the towns of Lytton and Yale, and subdivided part of township 15, range 27, township 5, ranges 26 and 27, and townships 6 and 7, range 26, all west of the 6th meridian. The part of township 15, range 27 surveyed, is open range and only fit for pasture, though should the town of Lytton ever grow—a possibility, not a probability—part of it might be utilized as town property.

The part surveyed of townships 6 and 7, range 26, is mostly rough hilly country and heavily timbered.

The part surveyed of township 5, ranges 26 and 27, may practically all be said to be first class land, and was by far the best I have surveyed this season in the New Westminster district. It is heavily timbered with fir, cedar, maple and alder. Four settlers were located here, all of whom had large improvements made and were in a prosperous condition. Up to the 19th of October, the date of the completion of this work, we had had little rain, but as the rainy season was at hand I considered it would not be advisable to undertake any other surveys in the New Westminster district, and so returned to Kamloops, and from there moved into the Salmon river valley, where I subdivided part of township 18, range 10, west of the 6th meridian. I completed this on the 4th of December and returned next day to Kamloops, where I laid off my party and suspended operations for the season.

Most of the land surveyed here was first class and well adapted for agricultural purposes. It is all heavily timbered, as is all the land along the Salmon river, with fir, cedar, bull pine and cottonwood.

I found only two settlers in actual residence, but many others had improvements made, though of these a few may have abandoned their claims. The work here was seriously retarded by the fact that we had to cut some eight miles of a sled road for the transportation of our camp and provisions, and by winter setting in early and being unusually severe. To make matters worse, on the 14th of November we had a heavy rain and hail storm, which left the hills and mountains one sheet of ice, and from that out, whenever we struck a hill, footholds had to be first cut in the crust before we

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could either ascend or descend it. Even with this it was an hourly occurrence to see one of the party making a hurried though not graceful descent of from twenty to several hundred feet. Fortunately we all escaped without broken bones, but I broke one of my instruments, although I had taken the precaution to box it before moving it.

As I mentioned in one of my former reports I do not consider British Columbia a farming country in the same sense as we would consider Manitoba or one of the lower provinces. Minerals, timber and fish are her natural resources, and, if signs do not fail, we are in for a mining boom in the near future such as the province has never seen, even in the palmiest of the old Cariboo days. Nothing is talked of but mines and mining, and discoveries are being made and claims staked out, not in one locality alone, but all over the country. As an example I may mention that on the 29th of July last the Python claim was discovered near Kamloops and recorded, since when two hundred and one claims have been recorded within a radius of ten miles of Kamloops, and they are still coming in at the rate of from two to three per day. It goes without saying that many of the claims will most likely prove worthless, still when samples assayed give an average of \$5 in gold and from 5 to 30 per cent in copper, it will be seen that the prospects are good for many of them.

As in years past my work this year has been of a very scattered nature, entailing great loss of time and heavy travelling expenses, though I cannot see how this can be avoided. The available land fit for settlement is becoming more scattered and harder of access from year to year, and it is certain that more lost time and greater expenses in travelling will be entailed in the future than in the past.

I have the honour to be, sir,

Your obedient servant,

JOHN VICARS, D.L.S.

REPORT OF OTTO J. KLOTZ, D.T.S.

SURVEY OF NORTH SHORE OF LAKE ERIE.

OTTAWA, 8th February, 1897.

E. DEVILLE, Esq.,
Surveyor General.

SIR,—I have the honour to make the following preliminary report on my survey of the greater part of the north shore of lake Erie in compliance with instructions dated May 11th, 1896.

I left Ottawa for the field on the 20th of May. The outfitting was done in Ottawa, Toronto and Dunnville. My party consisted of ten men besides myself, and for transport I had a team, horse and buckboard. For inshore hydrography a boat was used.

The survey was divided into three parts:—The survey of the shore line; the survey along the road nearest the lake with connections with the lake survey every few miles; and the determination of the fathom line in the lake.

For both the lake and road surveys 6-inch D.L. transits graduated to $^{\circ}004$ were used. The linear measurements were made with 100 foot Chesterman's steel tapes, whose lengths were determined by means of the comparison or standard tape tested and issued under statutory authority. It is scarcely necessary to state that these tapes have the zero marks on the tape and not at the end of the handles as obtained with the old form of chain. For establishing the fathom line a light trussed sounding rod about thirteen feet in length was used; on one end the six feet were marked by a transverse painted line, the other end carried, six feet apart, two lines, and these latter were used for micrometer readings thereon, for the determination of the distance from a shore survey station to the point on the fathom line where the boatman held the rod vertically. The micrometer used was of the Lugeol type with divided objective. The value of division on the micrometer was determined at the beginning of the survey, during the survey, and at the end thereof, for the fixed lengths between the discs on the sounding rod at distances from 200 to 3,000 ft. at a hundred feet intervals. The angular measures were controlled by azimuth observations on Polaris daily, or as often as the weather permitted. The observations were always made by daylight and generally shortly before sunset. As the azimuth observations were dependent on the exact hour angle of Polaris, observations for time were always made at the same time. My assistant and I each carried a sidereal pocket chronometer.

The angles on the shore and road surveys were read in both positions of the instrument—circle right and circle left—and the three verniers were read each time. This gave two independent determinations of the angle between back sight and fore sight. Every day, circumstances permitting, the road survey was brought down to the lake and there made a common station with the shore survey and thereby obtained a check on the latter. This check was in the first place in azimuth by account, and in the second place in latitude and departure; theoretically the quantities spoken of should be identical for the two surveys. There was seldom any marked disparity between the two azimuths, but the linear measures on the lake require at times remeasurement to ensure greater accuracy. From the physical character of the lake shore and adjoining precipitous banks and ravines the difficulty of carrying on linear measure becomes apparent. The location of the position of the sounding rod when held on the fathom line was determined by an azimuth shot from one of the shore stations and by micrometer readings—forward and reversed motion of micrometer head.

The preceding is a succinct account of the methods of survey.

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The survey was begun at the United States lake survey geodetic station "Grand River"

Latitude 42°50'49" .96

Longitude 79°37'23" .82

and ended at a similar station, "Kingsville"

Latitude 42°01'36" .1

Longitude 82°44'21" .4

passing around Point Pelée, the most southerly point on continental Canada.

A few words about these United States geodetic survey stations may be appropriate. They are part of the trigonometrical survey of the great lakes executed by the government of the United States during the period 1841-1882, and at an expenditure of over three million dollars. High class work is expensive in the first instance, but cheap in the end, for it requires to be done but once. This survey was begun at Duluth, the westernmost point of lake Superior, and a chain of triangles was carried thence along lakes Superior, Michigan, Erie, Ontario and the river St. Lawrence to near the international boundary of the 45th parallel of latitude, where the north or Canadian shore of the lakes was visible from United States geodetic stations; similar stations were erected, occupied and established thereon in exact geographic position, and of these latter are the stations "Grand River" and "Kingsville" which are so useful for co-ordinating in geographical position our survey of lake Erie. Without such points geodetically or astronomically determined, a survey of the lake Erie shore, however accurate, could not be fixed in proper position upon the earth's surface; in short, such points are the basis for all surveys of extent. All civilized countries save Canada have a system of triangulation to which other surveys, topographic, hydrographic and municipal are referred and connected.

These United States geodetic stations are marked on the ground by a stone monument placed beneath the surface, for greater security from disturbance, and by three stone reference posts placed at some convenient distance and favourable spot. Both "Grand River" and "Kingsville" were readily found by me by means of their reference posts, which are still in position after 20 years. About 10 miles west of Long Point there was another geodetic station "Houghton," but being, or having been, on the large drifting sand hills no monument could be found. From the nature of the hill and the sand it would appear that the hill travels.

The greater part of the lake front surveyed is bordered by high precipitous cut banks attaining their maximum height, about 120 feet, in the vicinity of Port Stanley. The cut banks often descend directly into the water, *i.e.*, there is no beach whatever. This necessitated taking the survey to the top of the banks, there often meeting woods and many deep ravines filled with brush, much retarding the progress and increasing the difficulty of attaining accuracy of the work. The extensive marshes of Turkey Point and Long Point gave an opportunity for testing the imperviousness of the epidermis. To one accustomed to the wilds of the North-west and British Columbia the mosquitoes of lake Erie were a pleasure. In the county of Haldimand on the lake shore we find rock (highly fossiliferous limestone) exposure, showing beautiful parallel glacial groovings. By means of a prismatic compass I determined the direction of the groovings and found it to be N. 40° 30' E. on lot No. 12 in the township of Rainham, and on lot No. 1, nearly five miles west, N. 48° 30' E. magnetic. Beyond, no rock exposure was encountered and boulders were scarce until we reached the western end of the survey. The most of the so called ports along the north shore of lake Erie are but a memory of the past. A few piles of a former wharf speak of shipping of by gone days. Deforestation and the advent of railways are the principal causes of this change.

The history of Talbot road, now one of the best roads in Canada, has an interest from the physiographic reasons. Originally it was a colonization road reserved along the strip five rods wide in front of the lake. As the prevailing winds on the lake are south-westerly the north shore is especially subject to erosion, and the banks have in consequence been slowly and continuously receding, necessitating from time to time the shifting of fences to make room for the lake road, besides the renewal of bridges near the lake over creeks and ravines. When the trouble arising therefrom became so acute

the various township councils concluded to shift the Talbot road to a safe distance from the lake, and we have the present in many respects model road. Much information of the wasting away of the banks was gathered from old farmers who have spent their lives on farms abutting the lake. The evidence was of course always of a circumstantial kind, but none the less conclusive. An illustration will perhaps illustrate the point. In the Crown patents one finds: "Reserving Talbot road and one chain in front thereof." This was along the lake front. A farmer would say to me when interrogated about the former and present positions of the bank: "Do you see that hickory tree out there on the edge of the bank? Well, when I was a boy, the Talbot road used to run on the south side of that tree." Now this is pretty good evidence that about eight rods of land have disappeared into the lake. It may be stated that this erosion has not increased the beach whatsoever, but undoubtedly tends to shoal the lake in general, but especially along the shore so that where formerly small craft could land it is now inaccessible. Erosion along the north shore has been general and, westward of Port Stanley, has averaged within the past fifty years from four to eight rods. There has been some accretion on the west side of Point Pelée. This is explained by its position in the lake and the prevailing winds. Being situated near the western end of the lake the westerly winds lower the water at that end so that while accretions take place on the westerly side of the Point decretion obtains on the opposite or easterly side. This effect is well illustrated too at Port Stanley through the artificial obstruction—the pier. To the west of the pier several hundred feet of beach have been added and materially help to make Port Stanley a favourite summer resort. Along the eastern part of the lake where we have rock exposure underlying the alluvium there has been less wasting away of the banks.

The low stage of the water for some years has exposed the rim of the bottom to the action of the wind, and in consequence where the banks are low, as they are a little west of Morpeth, sand hills have grown and partially buried trees standing near the lake shore.

That lake Erie is very shallow is well known, and an ocean liner would, if sunk almost anywhere in the lake, show its masts above water, but what calls one's attention to the fact very forcibly are the pound-net fishing arrangements. For the row of tamarack piles which extend into the lake for about a mile are only about 40 feet long, of which five feet are in ground and seven feet above water. These piles are removed every fall to prevent damage from ice and also to prevent fouling of the fishing ground by debris gathering around the poles.

The two deep bays shown on the township plans of Romney as "the Two Rivers" are now but a memory, for one walks dry shod over their former mouth. A number of the streams discharging into the lake do so by filtration.

At several points east of Point Pelée coarse gold has been found on the beach.

In the townships of Romney, East Tilbury and Raleigh we have the peculiarity of the land immediately adjoining the lake having its natural drainage northward into the Thames basin, so that the artificial drainage of the long narrow farms which is made into lake Erie becomes rather expensive on account of the depth to which the drains must be carried. By erosion one of these drains was found to be a narrow V-shaped channel over fifty feet in depth, threatening calamity to the buildings near by.

A few miles east of Wheatley in the county of Kent some engineers' stakes were encountered, having been placed in connection with a proposed canal across the peninsula from lake St. Clair into lake Erie for shortening the distance.

In view of the possible future triangulation of the country north of the lake it may be mentioned that on the ridge in the township of Orford a suitable primary station might be found. From the level character of the country in the extreme western part of Ontario, suitable ground for such stations is difficult to find. Another one that came under my notice is a little west of Woodstock, which, with one near Port Stanley and the Houghton sand hill would form nearly an equilateral triangle of about 35 miles to a side.

The reduction of the work of the survey will take considerable time. There are altogether 1,466 stations, 580 on the road and 886 on the shore, the latter covering over

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211 miles and the former somewhat more. The shore survey will be adjusted so as to conform with the road survey. In the latter the chaining is in the first instance assumed as absolute. The error azimuth of the road survey between any two observation stations, after correcting each course for convergence of meridians, will be equally distributed between the angles. When this method has been carried through from "Grand River" to "Kingsville" and the dependent latitudes and departures computed, a systematic correction will be applied in order to connect the geographic positions of "Grand River" and "Kingsville" already geodetically known.

I have the honour to be, sir,

Your obedient servant,

OTTO J. KLOTZ, D.T.S.

No. 8.

REPORT OF J. J. McARTHUR, D.L.S.

TOPOGRAPHICAL SURVEY ALONG THE COLUMBIA RIVER.

OTTAWA, 2nd February, 1897.

E. DEVILLE, Esq.,
Surveyor General, Ottawa.

SIR,—I beg leave to submit to you my report on the topographical survey along the Columbia river carried on by me during the past season, under instructions from you dated June 17th, 1896.

I reached Revelstoke on July 2nd, having been detained a few days by "washouts" on the railway. On the 3rd, accompanied by Mr. Saint Cyr, I travelled down the Arrowhead branch of the C. P. Railway to select a site for a base line. About two miles from Revelstoke we came to a tangent, parallel to the river, which extended for five miles, offered fine conditions for measurements, and from which we could expand direct to the mountain summits. At this time the Columbia river was very high, and the river flats were inundated, the railway for long stretches was under water and the bridges over the tributaries and channels were impassable. It was some weeks before traffic was resumed.

We selected a point for the north end of the base, and began clearing towards the mountain summits on which we intended placing our signals. In some cases long avenues had to be cut on account of the size and height of the trees, which ranged from 3 to 7 feet in diameter, and our progress was naturally slow. At Revelstoke we established a station named "Gold Hill" a few hundred feet above the railway track and a short distance from the astronomical station of 1886, and connected it with the astronomical traverse of the railway also of 1886.

Up to July 11th the weather was clear, but from that time until August 15th the smoke was very dense, the mountains for many days at a time being altogether obscured.

On the 17th we began measuring a section (10,000 feet) of the base from the north end. The smoke was very dense about this time, the sun being frequently invisible at mid-day.

On July 23rd Mr. Saint Cyr and I went down by steamer to Arrowhead, our object being to select the mountains along the valley which were most suitable for triangulation points, but the summits were invisible.

On August 11th we moved our camp to Montana slough near the middle of our base.

We completed the measurements on August 14. The mean length is 26,143.569 feet. The two measurements differed by $\frac{1.5}{100}$ of a foot. On August 15th accompanied by Mr. Saint Cyr I made another trip to Arrowhead by steamer; the weather was fine and we were able to decide on the position for our signals. On the 16th assistants Rielly and Canavan made the ascent of Mt. McKenzie and erected a signal and established a camera station. On the 18th I completed the parties, and crossed the river to make the ascent of Mt. Begbie, while Mr. Saint Cyr remained to complete his observations on the base. On August 21st I erected a signal on a spur of Mt. Begbie. We attempted the peak itself, but, after two narrow escapes on the glacier, I gave it up. The smoke was too thick for the taking of views, although we were able to get the necessary readings. We had no clear weather until September 12th, when I moved down to Green Slide at the base of Mt. Cartier, leaving assistants Rielly and Canavan to make the ascent of a mountain to the north-west and complete the camera work on Mt. Begbie. I reached the summit of Mt. Cartier on the 14th, the snow was about six inches deep and a regular gale blowing. On the 16th our next signal was set on a mountain on the west side of

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the valley, some miles south from Mt. Begbie. My assistants joined me at Green Slide on the 19th and Mr. Saint Cyr on the 21st. On the 23rd I moved down stream; we left an assistant and two men to make the ascent of Mt. Sproat while I moved down to the lake and around to the mouth of Cranberry creek, up which we went to the base of Bald Mt., our next station. We reached the summit on the 25th; on the same day the signal was erected on Mt. Sproat.

On the 27th with my full party I moved down the lake about twelve miles. On both sides the mountains were on fire, and we had to remain idle for some days. The effect of the wide-spread destruction of the forests on the mountain sides along the Columbia and its tributaries is being felt more and more every year in the devastating floods which sweep over the arable flats in the valley. Many ranchers have been compelled to quit their holdings altogether.

On the 3rd and 4th of October it rained heavily, after which we had a few clear days, during which we placed a signal on mount Odin, and occupied several secondary and camera stations. The snow line was within 2,000 feet of the lake level, and climbing through the wet underbrush was very disagreeable. I concluded that this was as far as the observing party would get this season, and returned to Arrowhead, my intention being to move up stream, occupying camera stations along the way, as far as Montana slough, and then re-measure the base and complete other observations.

At Arrowhead I received your letter referring to the extension of the work further south. Mr. Saint Cyr had been successful in occupying Cartier, Sproat and Bald stations. On the 17th of October I started once more down the lake. I sent my assistants to set a signal on the mountain south of the St. Leon springs, while I made the ascent of a mountain east of the Halcyon springs. About this time banks of fog lay low in the valleys, and it was a pleasant surprise, after climbing about 2,500 feet through thick mist, to suddenly break through into clear sunshine. All below was a rolling mass of white, and the scene was strangely beautiful. On the 23rd I went down to the foot of the lake and returned on the 25th. I despatched an assistant to place a signal on the highest point of the triple peaked mountain across the lake from Nakusp, while I moved back up the lake, occupying camera stations by the way. On the 27th I met Mr. Saint Cyr, who had just returned from Halcyon mount, and was preparing to ascend to the signal on mount Odin. We reached Arrowhead on the 29th, and for some days the weather was damp and the snow line came down to the valley. We measured a base and started a triangulation along the shores of the Lardean arm towards Thompson's landing, but rainy weather interrupted us.

On 4th November we moved up stream to Wigiwan, where we remained several days and succeeded in putting in two camera stations. We moved to Green Slide on the 9th November, when a heavy storm set in. Snow fell to a depth of 8 inches.

On the 11th I started south to hunt up the observing party. I met them at Halcyon springs. The weather had not allowed Mr. Saint Cyr to occupy mount Odin station, although he camped for some days at timber line in the deep snow. He reached Arrowhead on the 15th, but the river was full of running ice, and he had to lay up his boats there and come to Revelstoke by rail. My party had reached Montana slough on the 13th. It was impossible to take our boats further, and we laid them up on a point out of reach of high water.

On the 16th November Mr. Saint Cyr occupied Gold Hill station. I hoped that we would have some fine weather, but it turned very cold and stormy. I discharged all the labourers but one. The weather continued very bad and the snow became very deep. We succeeded in putting in a few camera stations in the neighbourhood of Revelstoke. I left for home on the 10th December and reached Ottawa on the 15th. We set 12 signals and occupied 27 camera and secondary triangulation stations. Nine principal stations were occupied by the observing party. Our topographical survey covers 600 square miles.

I have the honour to be, sir,

Your obedient servant,

J. J. McARTHUR, D.L.S.

No. 9.

EXTRACTS FROM REPORTS OF WM. OGILVIE, D.L.S.

BOUNDARY AND OTHER SURVEYS IN THE YUKON DISTRICT.

FORT CUDAHY, YUKON RIVER, N.W.T., 4th September, 1895.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I arrived here the evening of the 30th ultimo after a tedious journey through much bad weather which delayed me fully 10 days. I leave for the boundary in a day and will commence marking it at once. With reference to the applications for land at Selkirk I may say I have not seen the applicants as yet, as they are away. It appears to me, however, from what I have learned, that the best policy is to sell the applicants the land they ask for. They have all occupied and cultivated part of it for several years, raising in their gardens such roots and vegetables as the climate will permit, on which I will report more fully later on. There is no great prospect of any town of importance ever being either at Cudahy or Forty Mile. There are many mining camps now in the country and, besides, the miners find it pays well to what they call "drift" that is quarry out the frozen gravel during the winter, pile it up, and wash it during the spring and summer. This keeps scores of them on their claims all winter, so that there is not that demand for town residences during the winter that existed formerly, and consequently town lots are somewhat at a discount. Coarse gold and excellent prospects have been found on the Hootaliqua (Teslin) and there will likely be a rush there next spring. I will report more fully on that in future.

I propose if I can close my operations here early enough next season to make a survey and examination of the Hootalinqua rivers and basins on my way out to Juneau. I think this is desirable in view of the prospects of that region.

FORT CUDAHY, N.W.T., 8th January, 1896.

I have the honour to transmit the following interim report of my operations since I came into this territory :—

I have already sent out a short report from this place being fortunate enough to catch the boat here when I came down. In that report I made some remarks on the townsites in our territories; since then I have learned nothing of importance in that connection, the most noteworthy fact being that gold bearing quartz has been found in Cone hill which stands midway in the valley of the Forty Mile river, a couple of miles above the junction with the Yukon. The quantity in sight rivals that of the Treadwell mine on the coast, and the quality is better, so much so that it is thought it will pay well to work it even under the conditions existing here. Application has been made to purchase it, and an expert is now engaged in putting in a tunnel to test the extent. Indications in sight point to the conclusion that the whole hill is composed of this metalliferous rock. If the tests corroborate this, a stamp mill will be erected next season, which will have an important bearing on the future of this country. If this venture succeeds, (as it doubtless will, for it is in the hands of parties who are able to push it) it will give permanent employment to a good many men, who with their families will form quite a community.

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Apart from this I cannot see very much of a chance for speculation in buying or selling town sites; and my opinion is confirmed by the present condition of Forty Mile, which now contains very few people, the great majority of the miners remaining on their claims all winter, coming in only once or twice for supplies. Even in the case of the mine at Cone hill being worked, only a village would be formed around it.

Outside of all such considerations, the present applicants for "Forty Mile" and "Cudahy" town sites have either directly or indirectly occupied the present sites for years and spent thousands of dollars improving and building on them. One house erected in Forty Mile last summer is said to have cost \$10,000.00. It would cost between two and three thousand in Ottawa. Those improvements cover so much ground that even if it were decided to lay out the town site and convey it in lots the applicants would have a claim to most of the ground they ask for.

* * * * *

A couple of coal claims have been staked and applied for, which I will survey in the spring, and at the same time make an examination of the coal area where they are. I may anticipate this to a certain extent by saying that, a few days after I reported to you last fall, I went up Coal creek to search for this coal, to which I referred in my report of 1887 and 1888. I found it about 7 miles up the creek overlying a coarse sandstone and under drift clay and gravel.

The seam is 12 feet 6 inches thick. It seems to me to be a good quality of lignite. I have packed 30 or 40 pounds of the best specimens I found a few feet in, and will send them out to you in the spring, that a test may be made. That exposure has now been staked and applied for to the agent here. I judge from the position of these coal claims that we have quite an area of coal here. Both exposures furnished, as far as external features show, the same character of coal, and are about the same level, so that it is fair to assume they are in the same seam. I will make a search in the intervening distance to determine this when I make a survey of the claims. Coal is reported in the drift on Chandindah, about 30 miles up the river from here, which would go to show that there is another area or a continuation of this one there.

On my way down the river I saw the copper bearing vein near Ton-dac creek above Fort Reliance. It does not appear to be extensive, but there are several small veins in the vicinity, and it may be that a commercially valuable deposit may be found; about 25 miles further down I found a small vein which indicates that this copper deposit is extensive.

I found a small seam of rather poor asbestos a short distance from Fort Cudahy, and as there is quite an extensive area of serpentine around here, asbestos may yet be found of commercial value.

Very rich placer diggings are now being worked on the creeks flowing into Sixty Mile, part of which are supposed to be in Canada. I shall be able to say definitely when I produce the line that far where they are and how much we have of them.

Except in the vicinity of Forty Mile there appears to be nothing doing in the way of quartz prospecting.

Last season good placer mines were found on the Hootalinqua—Teslin of Dawson—with coarse gold in them, and there will probably be a lot of claims worked there next season. Several miners were wintering there to commence operations early in the spring. A great deal of improvement has been introduced in the working of placer diggings, which has much increased the output. The miner instead of putting in the winter months in the towns and saloons remains on his claim all winter, cutting wood in the earlier months, with which he builds fires and thaws the frozen gravel, piling it up to be washed as soon as the flow of water in the spring will permit. In this way the work is more than doubled, but as the supply of wood is very limited except on the main river this cannot always be done.

TIMBER.

The timber fit for buildings and lumber is fast disappearing along the river, and in a few years there will be none left near here. There is a portable saw-mill at Fort

Ogilvie—100 miles above this—and one here, which yearly cut a good deal of lumber. Were all this utilized in Canada nothing might be said of it, but some of it goes down the river into American territory, in addition to which a good deal of wood and logs are cut on our side and floated into Alaska where it is sold. Some men make a business of this, and on this at least the department might collect dues. There is very little good timber on the American side of the line, hence the demand for our timber.

* * * * *
 The police have so far made a very favourable impression, and the general policy of the Government in connection with this district is admired.

The merchants are well satisfied with the establishment of a court of justice, and look for the early addition of some sort of a court of record where transfers and claims can be recorded, so that the collection of debts can be undertaken with some degree of certainty. As it is now, A transfers to B, who keeps the record as long as it pays him to do so, but if he is dishonest and A is absent or dishonest too, he may destroy it, and repudiate payment of his debts. This has occurred already, and as a good deal of transferring and counter transferring is indulged in, it may occur more frequently in the future unless some court of record is created.

It is probable the boundaries of the police jurisdiction may have to be extended in the near future, for a good deal of trading is done on the head waters of the river by parties who cross the summit of the coast passes with goods from Juneau. Also the miners on the head waters and on the Hootalinqua bring in their supplies from Juneau. Now one of the traders here—Harper—has a small steambot named the "Beaver" which he got in last season for the express purpose of reaching the upper parts of the river and its affluents with supplies, and, having paid duty on all his foreign goods, expects to be protected against smuggled goods. Should the Hootalinqua turn out as expected and promised, a police force will be required there. Harper will try hard to get up with supplies to it and Teslin lake. I fancy he can lay down most things there as cheaply as they can be brought over the pass. It costs \$14 to \$15—sometimes more—per 100 lbs. to transport from Taiya to the lakes, which makes flour cost \$16 to \$17, per hundred at the lake, while it costs or is sold here for \$8. Things here are sold so low now that were I ever coming in from the Pacific again I would bring nothing in quantity but bacon, on which I might save a dollar or two a hundred it being sold here for \$30 to \$35 per hundred. * * * * *

I have produced the boundary line about five miles north of where it crosses the Yukon river, which is as far as I thought needful at present. I have also produced it about 7 miles south, and about the end of February will resume work and run it as far as Sixty Mile creek. In connection with this I have occupied six photograph stations and developed all the plates exposed which have turned out satisfactorily. I have made a cross section measurement of the Yukon river where the boundary crosses it.

In order to determine the exact position of the boundary as referred to the longitude of my observatory of 1887-88, I made a careful triangulation and traverse survey from the observatory westward, which located it 109 feet west of the spot I marked in 1888 as the boundary, this being established by micrometer measurements—the distance is 3 miles. In the vicinity of the river I have opened out a wide line in the woods which will remain visible for several years, but I erected nothing permanent on it. In the valley of the river the distances are chained; elsewhere they are deduced from micrometer measurements.

During the November-December lunation I got seven lunar culminations, of which I have only had time to completely reduce one, and the result differs from the mean of my 1887-88 determinations by only 0.13 seconds. I hope to get some more in the January-February lunation.

On the way in the system of 13 wires in the transit got so damp that they bent into a useless mass of lines, some in, some out of focus: of course I did not open the box until I arrived at my winter quarters. I repeatedly dried them, thinking I might make them serve, but after a few hours in the cool damp atmosphere, they were as bad as ever. Finally one of them became detached at one end, fell across the others, and rendered them completely useless, there being a lump of glue attached to the loose end.

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A diligent search for several days discovered no spider lines that could be used to replace them, and I was hopeless of doing anything with the transit this winter until one day I discovered that a solution of India-rubber I had mixed with careful manipulation furnish what I wanted. I tried it, and after several attempts succeeded in getting five fair threads on in the place of the original five, ten seconds apart. These wires possess the virtue of always being taut by reason of the elasticity of the rubber, so temperature does not affect their positions, but they stick together like gum if they touch, so that I could not use a micrometer wire, and consequently cannot get latitudes with the zenith telescope bubble.

Up to date our lowest temperature has been 63° below zero. The winter has been unusually windy. Coming up here we had to face a strong wind when 52° below zero, and frozen faces and noses were the rule of the day.

No mail from outside since September.

FORT CUDAHY, N.W.T., 10th June, 1896.

I submit the following interim report of my operations in the Yukon district up to date.

After sending my last report I left Cudahy on the 12th January, reaching the boundary on the 13th, when I immediately set to work reducing the observations I had taken of lunar culminations up to that date, six in number, on one of which both limbs of the moon were observed, making seven determinations of the longitude.

After my return there was some fine clear weather in January, but it was exceedingly cold, more than 60° below zero, one night $68^{\circ}5$; and as I had both my ears pretty badly frozen and could not go out in such cold without having them covered, so that I could not hear the chronometer beat, I could not observe until the end of the month when we had two fine nights—29th and 30th—mild enough for me to work. On the 29th I again observed both limbs, the moon on both these occasions being suitably full at transit here. This makes in all ten different determinations of the longitude to be summed with my work of 1887-88, and as most of my observations then were on the first limb, and most of these on the second, the total result is better balanced.

Having reduced all my observations, and the days having attained a reasonable length, I went into camp on the line on the 20th February, resuming work on the 22nd. But as the hill tops are all bare and from two to three thousand feet above the river we lost many days through the fierce winds.

Our progress was necessarily slow for this reason and also from the fact that I photographed from several stations, which took some time. As there were no important creeks between the Yukon and Forty Mile rivers I did not cut the line out continuously, but left it so that any one wishing to can place himself on or very near to the line. The distance from the Yukon to Forty Mile river is a little over twenty-five miles. In the valleys along the line the timber was thick, with much underbrush, but very little of it is of much value. Curiously enough the line kept generally in the valleys or on the sides of them and very little of it was in the open. Going from point to point we had to follow as much as possible the hill tops and ridges. I reached Forty Mile river with this survey on the 13th March. From this point southwards there are many streams cut by the line, all of which are more or less gold-bearing and all have been more or less prospected. This necessitated my cutting the line out continuously from Forty Mile river onwards, which increased our work very much. The valleys traversed are generally upwards of 1,000 feet deep and often very steep, so that the work was exceedingly laborious.

Transporting our outfit from camp to camp was often a very hard task as the hills were so steep every thing had to be packed up them, which in the deep soft snow was anything but easy. I reached a point within two miles of Sixty Mile river on the 14th April, and as I had passed all the creeks of any note, and many of them were already running water and our way lay down them, I thought it well to quit work on the line and return to Forty Mile and Cudahy, and attend to the local surveys there. The weather was fine and warm and so much water ran in the creeks by which we had to

return that we could only travel a few hours in the early morning and forenoon. Had the season been more favourable I would have visited Glacier and Miller creeks which were generally supposed to be in Alaska but are found to run in Canada for some distance. They are the two richest creeks yet found on the Yukon and are both tributaries of Sixty Mile river. Both creeks are fully located and worked, each claim being 500 feet along the creek and the width of the valley or creek bed. There are nearly 100 claims, all of which pay well. One on Miller creek I understand will yield 75 to 80 thousand dollars this season, and the owner will net, it is said, between 40 and 50 thousand dollars. He took out, it is reported, nearly half that sum last year off the same claim, and expects to do equally well next year. This is much the richest claim yet found, but all on those creeks do well. There are many other creeks in this vicinity yet to be prospected and some will, I have no doubt, pay well. Gold is found all along the valley of Sixty Mile river and under more favourable conditions, both mercantile and climatic, it would yield good results to large enterprises. The mercantile conditions will improve; the climate is a serious difficulty but will be surmounted in time I believe. Along the last 10 or 12 miles of the line I ran, the mountains consist principally of quartz and schists, which no doubt originally held the gold found in the valleys and doubtless hold some yet. Several men have taken to quartz prospecting, and from indications which I will dwell on later I believe we are on the eve of some magnificent discoveries.

The miners on all the creeks referred to have quietly accepted my line as the boundary *pro tem*, and as far as I can learn at present the general feeling is satisfaction that one can now know where he is. Even if the line is not final, no one doubts its being very near the final position. The line as far as run is marked by cairns of stones wherever it was possible to procure them with reasonable time and labour, and is cut through the woods and blazed so that no one who wants to find it can mistake it. Another source of satisfaction to all is that they now know distances and directions. Many miners remark to me "we now know how we are going, we can see where south is." In this high latitude in the summer months it is impossible to tell when the sun is near the meridian because its change in altitude is so little for 8 or 9 hours, consequently any point between east and west was called somewhere near south. This helps to explain much of the variance in the direction of points as given by miners and others who have no compass or are unacquainted with the use of one and the application of the declination.

On my arrival at Fort Cudahy I rented two cabins from the N. A. T. & T. Co., to house my men and self as I would be around here probably until I started up the river. I did this because there are no convenient camping places in the vicinity, and in the spring all the flats are like lakes along the river until well into the month of June.

After a couple of days rest for the party, who had worked very hard, and after I had developed all my photographs, I began to attend to the local surveys, first surveying the coal claims on Coal creek and making a chain traverse survey of the creek from the claims down to the Yukon. I mail you a plot of this and the claim on a scale of 40 chains to the inch. I also mail you a sketch map of my survey of the boundary line on a scale of 20 miles to the foot, and have pencilled in an idea of the topography; it is made on the best paper I could get here as I brought none with me. I next made a survey of the Cone hill quartz mining claim and a chain traverse survey of Forty Mile river from the claim down to the Yukon. I then went to work on the Forty Mile town site and Cudahy town site. The last I was asked to block out, which I have done. The manager, Mr. C. H. Hamilton, objected to streets 66 feet wide on such a small plot of ground (there is only about 50 acres). I read him my instructions and wrote him an official letter on the subject, but he insisted on streets only 50 feet wide and assumed all responsibility, so I did as he desired. I made him a plot of the work done on the ground, and he understands that he will have to pay the department for the service rendered in blocking as well as the original survey, and wishes a plan of it which of course can only be prepared when I go out.

I made a complete survey of Forty Mile, locating and taking the dimensions of every house in it, and it is the worst jumble I ever saw. I had to do this though it

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entailed a great deal of work, for there were so many claim holders, and there appeared to be a general distrust in the vicinity ; every man wants himself on record in evidence as to his claim. I have taken some, but I have several days work yet. I made a survey of the island for the Anglican mission, and of another island for a man named Gibson. This is in the delta of Forty Mile creek and he intends to make a market garden for the growth of such vegetables as the country will produce. In my final report I will deal as fully as my experience here will permit on that phase of the country's character. Many here have small gardens and are fairly successful with ordinary vegetables. I have advised many to correspond with the experimental farm at Ottawa, with a view to learning the best sort of vegetables for growth in this climate. There is an application in, and the purchase money and cost of survey paid, for 80 acres just west of Cudahy town site, which I will survey in a few days. There is also an application in for 40 acres containing a hay swamp on the east side of the river, about 2 miles below here, which I will survey before starting out. There are many other applications in, but I shall not have time to attend to them, nor have the parties asked for a survey. I think these applications are simply intended to hold the ground until the future of this region is forecasted ; it certainly looks promising now. I would respectfully call the attention of the department to the fact that the services of a surveyor are urgently needed in here and will be for some years to come, and I would suggest that one be appointed to look after and take charge of all the land interests in the district. He will find plenty to do, and any work outside of departmental which he might be asked to do (and there is much of it, and will be more, in the way of engineering) would help materially to pay his salary which would of course in here have to be liberal.

I have had several applications for engineering surveys, and I have told the parties I can only make these as an officer of the department, with whom they will have to settle on the basis of the time it took and the cost per day of the party and myself, should I undertake any of it, which is more than doubtful. Any surveyor so appointed will require experience in the taking of evidence and will need to be patient and attentive, for it is extremely difficult to make some of the people here understand what they want to know.

Some sort of registration office is now and will be still more needed in the country.

Another inconvenience is the want of a trade medium : there is very little coin, nearly all business being transacted in gold dust, which passes current at \$17 per ounce troy, but as most of it will not assay that, there is some hardship to those taking it out, though there may be no actual loss. If enough money were sent in to pay the North-west mounted police for some time it would help for a period at least, and would emphasize the existence of Canada. What coin and bills are here are largely American.

Another important question is the treatment of the liquor business which cannot be ignored much longer ; there are several saloons in Forty Mile and one in Cudahy, yet there is no law recognizing them nor regulating them in any way. It would be almost impossible and very unpopular were any attempt made to close them. Liquor could not be kept out of the country if the whole North-west mounted police were scattered around the river.

Another subject which I have mentioned before is that of the timber. Large quantities of timber are being and have been cut in our territory and floated down the river to American territory where it is used, and Canada derives no benefit. Were it used to develop our country it would matter less, in fact I would encourage such use, but to see the best of our timber taken out without any sort of benefit to the country is I think worthy of some sort of attention. There is very little useful timber in the country, and much of what does exist is cut into fuel, while more of it goes beyond the boundary. In the near future we shall feel the want of it. I have spoken to the agent about it but he has no authority to act, and, if he had, is disinclined to run up and down the river looking after it unless he has a steamer.

A word or two on the steamer question. He labours under the delusion that a small steam launch is all he requires. Now the best of them can only make 5 to 7 miles per hour in dead water, and here we have a river with a current of 6 to 8 miles per hour the greater part of the summer ; even in low water it is 5 to 6 generally. To get

up at all his launch would have to keep inshore, and even then she would not make more miles per day than the same number of men would with a good canoe or boat tracking or poling, with the advantage to the canoe or boat of not having to stop for fuel. The only boat suitable for this river is a stern wheeler, and one of suitable size for police purposes would cost ten to twenty thousand dollars and require experienced men to run her.

Some sort of court for the collection of debts is required here now, and whether or not the agent could act in that capacity is a question to be decided.

The merchants here who pay duty are naturally dissatisfied at the smuggling done on the upper river and ask for some sort of protection. It might be advisable to have a squad of police and an officer somewhere on the lake to look after that. I am thoroughly convinced that a road from the coast to some point on the head waters of the river, preferably by the Taku if at all practicable, would convert all our part of the river into a hive of industry. It may be said there is no competition, and any way in the present conditions of trade things cannot be sold very much cheaper at a fair profit. Once let a railroad get from some point on the coast to some point on the river so that we can have quick, cheap, and certain entrance and exit, and the whole Yukon basin will be worked. At present the long haul makes the expense of mining machinery practically prohibitive, for the cost of transport is often more than the first cost of the machine.

Assays of the Cone hill quartz are very satisfactory, and the quantity good for generations of work; were it on the coast the Treadwell mine would be diminutive beside it. Five tons of rock from it are being sent out for a mill test, and should they prove as satisfactory as the test of a ton sent out last year, I understand the parties owning it will proceed to develop it. If it starts and proves reasonably successful there are scores of other places in the country that may yield as well. An expert here who prospects for the N. A. T. and T. Co., found a ledge last spring on the Chandendu river of Schwatka (known as Twelve Mile creek here) and located two full claims on it. He told me the assay he made of many specimens of it was much more satisfactory than that of Cone hill, and this ledge, he claims, is where a commencement should be made in quartz milling in this country and there would be no fear of the result. He appears to be pretty well versed in mining lore, is a practical assayer—that is his profession—and he says he never saw or read of anything like it for extent in the world. He informed me there were extensive deposits of coal about 20 miles up the creek, and this ledge was about 4 miles up. He has no doubt but that the copper around Fort Reliance will, with better facilities, yet be a valuable feature of the country. He showed me a lump of native copper some Indians said they found on the head of White river but could not or would not specify where. Speaking of White river reminds me that it and Sixty Mile are very close together in the vicinity of the boundary. I was told it was only a short walk from the creeks of one to the creeks of the other, but how far from stream to stream is uncertain.

This expert is an American who has spent many years of his life in the best mining districts in the United States, and he assures me this country promises better than any he ever saw before, and as an evidence of his satisfaction with it he is going to spend the rest of his life here.

Great anxiety is felt here about a mail route and regular mail. Last winter 3 mails left the coast, one by the Taku route, one by the White pass, and one via Taiya; the first two got here in good time, the last (ours by the way) did not, nor is it likely to arrive for some time—may be never. The man in charge was badly frozen on the summit and had to turn back leaving the mail behind him and it is now probably buried in fathoms of snow. An Indian brought the mail in by the Taku and took the Slocoh branch of it to Atlin lake. From what I learned of this route while up there it may be found to afford an easier way than by Teslin lake but it has the disadvantage of landing on the head of the Lewis instead of the Hootalinqua or Teslin and so takes in the cañon and White Horse rapids.

Last winter many of the residents and miners here talked to me about the mails and what the Government intended in that direction; of course I could tell them nothing,

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but suggested that they make their views known by getting up a petition to the Minister of the Interior which I understand they did.

The Alaska Commercial Company are putting a new and powerful steamer on the river, which will make four, the "Arctic," "Alice" and "Emma," large, and the "Bedon" small. There is some talk of the N. A. T. & T. Co. putting on a sister boat to the "Portus B. Weare." All are stern wheel boats.

From my camera stations on the boundary I saw many high mountains, some of them not less than 8,000 feet and some I believe 10,000. Some of the prominent ones I have named after the pioneers of the country, notably one mount Campbell after the late Mr. Robert Campbell of the H. B. Co., who established Fort Selkirk. It is about 60 miles due east of here and is a noteworthy peak in that it stands on top of an extensive well defined range, rising like a lofty pillar about 1,000 feet above the ridge. It is, as far as seen, the most remarkable peak in the country. I have not made any computations yet but I do not think its summit is much if any less than 10,000 feet above the sea. No one noticed it before for the reason that it is only about 600 feet wide, is always black, and very distant from points where it can be seen around here.

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FORT CUDAHY, N. W. T.,
June 25th, 1896.

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Producing the line.

My experience last winter was that with a party of say 8 men, 3 on the line continuously and 4 forwarding continuously, and 1 cook, the line could be advanced at the rate of 25 miles per month with no great difficulty during February, March, April and May and part of October, November and part of December.

Good strong toboggans and good strong large snow shoes are all that are required. During June, July, August and September the same party with say 5 pack horses, 3 at camp and 2 forwarding from depot of supplies, could proceed at an equal if not faster rate. There would be about 2 or 2½ months too dark to profitably work on the line. This would I think be more satisfactory than putting in a few isolated points here and there, certainly it would give us a continuous boundary and a more extended geographical knowledge of the country as well as botanical and geological information of importance. Horses could be laid down here for, I would say, about \$250 per head and the same animals ought to last the whole survey. Horses that have been in use here, packing to the mines in the summer and hauling wood in the winter for several years, are still serviceable, notwithstanding that they live only on the coarse grasses of the country. They pack 200 lbs. apiece from Forty Mile river at the mouth of Moore creek to the mines on Miller creek (about 17½ or 18 miles) and climb some very steep long hills on the way, taking 2 days with loads and one day without: all they get to eat is what they find.

As a gauge of what can be done I refer you to what I did last winter. In less than 2 months, February 22 to April 13, I produced the line nearly 50 miles cutting every bit of bush on 25 miles of it and partly cutting the rest, besides spending several days on my photograph stations; and I had only 6 men. I am confident that a joint party consisting of say 12 altogether could produce this line at the rate of 300 miles per year, marking it properly and permanently, and enabling a fair map of the country on both sides to be made. The cost of this you can easily estimate and add say 25 per cent for the establishment of provision depots, and incidentals.

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My last report told you of the agent here going to Miller and Glacier creeks and collecting fees and making entries: as he did not go west of those creeks no complications will arise for as you will see by my sketch map they are within Canada. I may say here that one claim on Miller creek has turned out about \$70,000 last winter, and several others have done very well too: so far nearly all the miners have passed here,

going to Circle City (about 200 miles down) and I have no doubt many of them will keep on going.

About 100 miners are reported on the Hootalinqua this summer. We shall probably soon have to extend law and order there.

Many here make gardens, using any seed they can get, and some are going to try grasses for fodder. I would suggest the director of the central experimental farm be asked to send in seeds of the kinds of ordinary vegetables and grasses best suited to such a climate as this to be distributed by the agent here to those who will make a proper use of them, or for sale at cost. I am quite sure it would be of much service, and if some hints on the proper care of plants were sent in it would be more so, as most of the people in here know practically nothing of gardening or farming. Besides, it would improve the feeling among the people here towards our country and institutions and would cost the country practically nothing.

FORT CUDAHY, August 18th, 1896.

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It is now certain that coal extends along the valley of the Yukon from Coal creek for 10 or 12 miles down, and from Coal creek up to Twelve Mile creek which flows into the Yukon about 30 miles above here. The latter stretch is cut off from the river by several miles of hills as it is about 6 miles direct from the river at Coal creek and about 18 on Twelve Mile creek. This is the stream named Chandindu by Schwatha. There is a seam on it about 6 feet thick, as reported by an expert who went in search of it. I found drift coal on the south branch of Coal creek.

On the Cornell claim on Cliff creek the seam is 5 feet 4 inches thick. I have sent specimens of it out. I found it necessary to refer to the different creeks so had to name them "Shell creek," because I found a stone with a shell impression at its mouth, "Cliff creek," because it enters the river at the foot of a high cliff, and "Flat creek," because it enters the river in a large flat.

Glacier creek is turning out very well, and several good creeks have been discovered up Forty Mile in Alaska.

FORT CUDAHY, 6th September, 1896.

I have been in hourly expectation of the Canadian mail for some days now, but it has not arrived yet. The A. C. Co.'s Steamer "Alice" came up on the 4th instant, but brought no news for me, so that I am completely in the dark as to my movements yet, and if I am to go out it is time I was on the way. I do not wish to remain here another winter unless it is absolutely necessary; more especially with my party and all its expenses. In case I go out, I will try to accompany Mr. J. Dalton over his trail from the head of Chilcat Inlet to Selkirk on the Yukon. He has made several entries over that route with horses and packs and speaks very highly of it. I will make a rough survey of it and take some photographs along the route.

I have taken copious notes of it from him, but would like to see it for myself.

I am very much pleased to be able to inform you that a most important discovery of gold has been made on creek called Bonanza creek, an affluent of the river known here as the Klondike. It is marked on the maps extant as Deer river and joins the Yukon a few miles above the site of Fort Reliance.

The discovery was made by G. W. Cormack, who worked with me in 1887 on the coast range. The indications are that it is very rich, indeed the richest yet found, and as far as work has been carried on it realizes expectations. It is only two weeks since it was known, and already about 200 claims have been staked on it and the creek is not yet exhausted: it and its branches are considered good for 300 or 400 claims. Besides there are two other creeks above it which it is confidently expected will yield good pay, and if they do so we have from 800 to 1,000 claims on this river which will require

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over 2,000 men for their proper working. Between Deer river (or Klondike) and Stewart river a large creek called Indian creek flows into the Yukon and rich prospects have been found on it, and no doubt it is in the gold-bearing country between Klondike and Stewart rivers, which is considered by all the old miners the best and most extensive gold country yet found. Scores of them would prospect it but for the fact that they cannot get provisions up there and it is too far to boat them up from here in small boats.

This new find will necessitate an upward step on the Yukon, and help the Stewart river region.

News has just arrived from Bonanza creek that 3 men worked out \$75 in four hours the other day, and a \$12.00 nugget has been found, which assures the character of the ground, namely, coarse gold and plenty of it, as three times this can be done with sluice boxes. You can fancy the excitement here. It is claimed that from \$100 to \$500 per day can be made off the ground that has been prospected so far. As we have about 100 claims on Glacier and Miller, with three or four hundred in this vicinity, next year it is imperative that a man be sent in here to look after these claims and all land matters, and it is almost imperative that the agent be a surveyor. Already on Bonanza creek they are disputing about the size of claims.

I would have gone up and laid out the claims properly, but it would take me ten or twelve days to do so, and meantime my presence might be more urgently required elsewhere.

Another important matter is the appointment of some sort of legal machinery here. Before the police came miners' meetings administered justice, collected debts, etc., etc.; now the magistrates here are expected to do all that, and when it is found they do not it causes much dissatisfaction, and there are several cases of real hardship where parties will not pay their just debts though able to do so. If a miners' meeting were held and judgment given against the delinquent it would do no good for he would and does resist payment, and were force resorted to he would appeal to the police for protection. A continuation of this state of affairs is most undesirable in the interests of our country, for we have a reputation as a justice-administering, law-abiding people to maintain, and I would urgently press this matter on the authorities.

From the indications I have mentioned it will be seen that this corner of the North-west is not going to be the least important part of it, more especially when we consider the fact that gold-bearing quartz has been found in it at numerous places and much will no doubt be worked. It is apparent that the revenue and business of the country will more than offset the expense of administration.

I cannot here enter into the reasons for it, but I unhesitatingly make the assertion that this corner of our territory from the coast strip down and from the 141st meridian eastward will be found to be a fairly rich and very extensive mining region.

As I have already pretty fully reported on coal, I will only add that it is reported in abundance only 8 miles up the Chandinaler river, where a seam over 6 feet thick has been found of the same quality as that already described.

FORT CUDAHY, November 6th, 1896.

Your official letter informing me that negotiations for a joint survey of the 141st meridian had so far failed, and that I had better return to Ottawa for the winter, reached me here on the 11th September. As the Alaska Commercial Company's steamer "Arctic" was then hourly expected up the river on her way to Selkirk, I thought it best to wait and go up on her to that point. Day after day passed without any sign of her; wearied of waiting, and hopeless of her arrival at all this year, I determined to start out on the 27th September, a late date but with fair conditions feasible. On the 25th a tremendous storm of snow set in which so chilled the river that in a few days after it was choked with ice which precluded all idea of getting up the river, and it was equally hopeless down the river.

Three parties have announced their intention of starting for the outside world about the 1st prox., and I write this contemplating its transmission by one or other of

these parties. For myself to think of going out in the winter is I think unwise for the following reasons. Dogs, the only means of transport, are scarce and dear, ranging from 30 or 40 dollars to 125 dollars apiece. Dog food, like all other food, is scarce by reason of the poor salmon run in the river last season; practically none were caught near here, and the result is the dog owners here have to use bacon for food which at 25 to 40 cts. per lb. is expensive.

I would require a team of 8 dogs to take my outfit and my man Fawcett with our provisions and the dogs' food as far as Taiya. There the dogs would have to be abandoned or killed as they are worthless on the coast, except to parties coming in here early in the season. Starting from here say December 1st it would be February before I reached Ottawa, and during 35 or 40 days of this time we would be exposed to much cold and hardship, and some hazard from storms.

The journey has been made and I would not hesitate to undertake it were things more reasonable here and dog food plentiful, but it would take at least \$1,000 to equip us with transport and outfit, which sum I think I can expend more in the interests of the country by remaining here and making a survey of the Klondak of the miners—a mispronunciation of the Indian word or words "Thron-dak" or "duick," which means plenty of fish, from the fact that it is a famous salmon stream. It is marked Tondak on our maps. It joins the Yukon from the east—a few miles above the site of Fort Reliance—about 50 miles above here. As I have already intimated rich placer mines of gold were discovered on the branches of this stream. The discovery I believe was due to the reports of Indians. A white man named J. W. Carmach who worked with me in 1887 was the first to take advantage of the rumours and locate a claim on the first branch which was named by the miners Bonanza creek. Carmach located late in August, but had to cut some logs for the mill here to get a few pounds of provisions to enable him to begin work on his claim. The fishing at Klondak having totally failed him, he returned with a few weeks provisions for himself, his wife and brother in law (Indians) and another Indian in the last days of August and immediately set about working his claim. As he was very short of appliances he could only put together a rather defective apparatus to wash the gravel with. The gravel itself he had to carry in a box on his back from 30 to 100 feet; notwithstanding this the 3 men working very irregularly washed out \$1,200 in 8 days, and Carmach asserts with reason that had he had proper facilities it could have been done in 2 days, besides having several hundred dollars more gold which was lost in the tailings through defective apparatus.

On the same creek two men rocked out \$75 in about four hours, and it is asserted that two men in the same creek took out \$4,008 in two days with only two lengths of sluice boxes. This last is doubted, but Mr. Leduc assures me he weighed that much gold for them, but is not positive where they got it. They were new comers and had not done much in the country, so the probabilities are they got it on Bonanza creek. A branch of Bonanza named Eldorado has prospected magnificently, and another branch named Tilly creek has prospected well; in all there are some four or five branches to Bonanza which have given good prospects. There are about 170 claims staked on the main creek and the branches are good for about as many more, aggregating say 350 claims which will require over 1,000 men to work properly,

A few miles farther up Bear creek enters Klondak and it has been prospected and located on. Compared with Bonanza it is small and will not afford more than 20 or 30 claims it is said. About 12 miles above the mouth "Gold Bottom creek" joins Klondak, and on it and a branch named Hunker creek after the discoverer, very rich ground has been found. One man showed me \$22.75 he took out in a few hours on Hunker creek with a gold pan, prospecting his claim on the surface, taking a handful here and there as fancy suggested. On "Gold bottom" creek and branches there will probably be two or three hundred claims. The Indians have reported another creek much farther up, which they call "Too much gold creek," on which the gold is so plentiful that, as the miners say in joke, "you have to mix gravel with it to sluice it." Up to date nothing definite has been heard from this creek.

From all this we may, I think, infer that we have here a district which will give 1,000 claims of 500 feet in length each. Now 1,000 such claims will require at least

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3,000 men to work them properly, and as wages for working in the mines are from 8 to 10 dollars per day without board, we have every reason to assume that this part of our territory will in a year or two contain 10,000 souls at least. For the news has gone out to the coast and an unprecedented influx is expected next spring. And this is not all, for a large creek called Indian creek joins the Yukon about midway between Klondak and Stewart rivers, and all along this creek good pay has been found. All that has stood in the way of working it heretofore has been the scarcity of provisions and the difficulty of getting them up there even when here. Indian creek is quite a large stream and it is probable it will yield five or six hundred claims. Farther south yet lies the head of several branches of Stewart river on which some prospecting has been done this summer and good indications found, but the want of provisions prevented development. Now gold has been found in several of the streams joining Pelly river, and also all along the Hootalinqua. In the line of these finds farther south is the Casair gold field in British Columbia; so the presumption is that we have in our territory along the easterly water-shed of the Yukon a gold bearing belt of indefinite width, and upwards of 300 miles long, exclusive of the British Columbia part of it. On the westerly side of the Yukon prospecting has been done on a creek a short distance above Selkirk with a fair amount of success, and on a large creek some 30 or 40 miles below Selkirk fair prospects have been found, but, as before remarked, the difficulty of getting supplies here prevents any extensive or extended prospecting.

Dalton informed me he had found good prospects on a small creek nearly midway between the coast range and Selkirk in his route. His man showed me some coarse gold, about a dollar's worth, he found on the head of a branch of the Altsek river near the head of Chilcat inlet, which is inside the summit of the coast range and of course in our territory. From this you will gather that we have a very large area all more or less gold bearing and which will all yet be worked.

Good quartz has been found in places just across the line on Davis creek (see my map of the 141st sent you) but of what extent is unknown as it is in the bed of the creek and covered with gravel. Good quartz is also reported on the hills around Bonanza creek, but of this I will be able to speak more fully after my proposed survey. It is pretty certain from information I have got from prospectors that all or nearly all of the northerly branch of White river is on our side of the line, and copper is found on it, but more abundantly on the southerly branch of which a great portion is in our territory also, so it is probable we have that metal too. I have seen here several lumps of native copper brought by the natives from "White river", but just from what part is uncertain. I have also seen a specimen of silver ore said to have been picked up in a creek flowing into Bennet lake, about 14 miles down it, on the east side.

I think this is enough to show that we may look forward with confidence to a fairly bright future for this part of our territory.

When it was fairly established that Bonanza creek was rich in gold, which took a few days, for Klondak had been prospected several times with no encouraging result, there was a great rush from all over the country adjacent to Forty Mile. The town was almost deserted; men who had been in a chronic state of drunkenness for weeks were pitched into boats as ballast and taken up to stake themselves a claim, and claims were staked by men for their friends who were not in the country at the time. All this gave rise to such conflict and confusion, there being no one present to take charge of matters, the agent being unable to go up and attend to the thing, and myself not yet knowing what to do, that the miners held a meeting, and appointed one of themselves to measure off and stake the claims, and record the owners' names in connection therewith, for which he got a fee of \$2.00, it being of course understood that each claim holder would have to record his claim with the Dominion agent and pay his fee of \$15.00.

At the same meeting they discussed our law on mining, and discovered, as they thought, that it was very defective. They appointed a committee to wait on the agent and ask him to ratify their course in appointing the surveyor and recorder to act *pro tem* on the creek and to forward their views on the law to the department at Ottawa. Now, it appears to me that a good deal of fault of the law as they found it lay in the

fact that they did not read it all in its proper connection ; and because the printed law did not start out from a given point and detail consecutively just what was to be done under every possible contingency that might arise under that reading they thought it defective. I believe this to be the case because I have never had any difficulty in explaining any case that has been submitted to me for an opinion, and there have been a good many.

The miners as rule are dissatisfied with the claims laid out for them by their own surveyor appointed as I have already intimated, and many of them are claiming for a remeasurement now that they know that I am going to make a survey of the creeks. In fact many of them thought that a survey of the creeks necessarily meant a survey and adjustment of the claims, and it took me some time to correct that impression. I made them understand that as the claims had been laid out by their own act and had been approved of by the agent I could not interfere without the consent and approval of all the original parties to the act, and they would have to meet and discuss the question and determine whether they would have them adjusted or not. If they decide to have it done I made them understand they would have to assist me at work as I passed along. If they do not require it I will take the necessary steps to enable me to plot very closely where every claim is. I may make a good deal of the survey by photography as I have about 10 doz. good plates yet. In any case I will occupy several photo stations to enable me to give some idea of the mountain ranges around—if any—and supplement my views from the boundary last winter. As soon as this work is done all my men will take their discharge, Adam Fawcett going into the service of the Alaska Commercial Company, and all the rest mining.

If you want any further surveys made in here men will have to be sent in to do it, for men cannot be had here for less than from \$5.00 to \$10.00 per day. Any man sent in for survey purposes will require to bring a good canoe with him, say 19 feet long and 44 inches wide and 18 to 20 deep. Such a canoe will bring in 5 or 6 men and their stock of provisions for the trip. By the time they would arrive here provisions will be plentiful, for the boats will then be up from Circle City where two of them are probably wintering. A party crossing the summit early in June would just about find the lakes open for the run down. You might warn any such party that they had better run no risk at the Cañon, White Horse and Five Fingers. The Cañon is not dangerous, but there is a good portage past it. The rapids between it and the White Horse are rough in high water but with care are safe. A great many large boats run the White Horse but most of them take more or less water ; many fill altogether and the owners are often drowned ; in any case they lose all their effects if they do escape. A careful estimate of those drowned in 1895 places the number at 13, a large percentage I think of those who tried it. The Five Fingers are at certain stages of the water uncertain. Last time I came down I found it very nice on the left side—no danger at all, while boats passing the right side took in water. In every case the party in charge will do well to carefully examine beforehand all the points named. Should you deem it advisable for myself to return early in the summer I will have to make my way around by the mouth as I will have no men to help me up stream and no one will be ascending the river until near September, and indeed very few do at all now. Any party coming in would reasonably be expected in before I started down, and I could confer with them on the work to be done should you deem it advisable to do so.

In the course of a year I believe coal will supersede wood for fuel, which will relieve the demand as far as the towns and villages are concerned ; but mining interests will require a lot of fuel where coal cannot be taken.

The traffic in liquor will have to be taken hold of and regulated at once : it is here now and cannot be kept out by any reasonably practical means. The majority—the great majority of miners—will have it, and all the more will their predilection be if it is attempted to stop the entry of it.

In my opinion it is imperative that this business be brought under control at once, or it may develop phases that will be at least annoying in the near future.

I have in previous reports intimated that some sort of legal machinery is now absolutely necessary for the trial of cases of contract, collection of debts and generally the

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judicial interests of the country. There are several cases of hardship now for the want of a proper court.

If some sort of court to satisfy the necessities of the people in business here is not at once established serious inconvenience will result. The officer appointed will require to be a hale vigorous person, for it is probable he will have to make journeys of considerable length across unoccupied country, in the discharge of his duty.

There have been several applications for land in the vicinity of the mouth of the Klondak, and Inspector Constantine has selected a reserve for government purposes at the confluence of that stream with the Yukon 40 acres in extent.

A court or office of record in real estate transactions will require to be opened here at once. A recorder was appointed in Forty Mile and a plot made in 1894. In anticipation of my going out this fall I got a meeting held of the property owners and had them hand the records over to me for the information of the department. They are in my possession yet, and I will take them out with me when I go. They are rather crude in form and require an initiate to understand them. I act as recorder *pro tem*.

* * * * *

Before closing I may say that every report that comes in from Bonanza creek is more encouraging than the last. Prospecting has only begun, and up to date of mailing, November 22nd, very rich prospects have been found on the few claims prospected on: from one dollar to the the pan of dirt up to twelve dollars are reported and no bed rock found yet. This means from \$1,000 to \$12,000 per day per man sluicing.

The excitement is intense but at this season of the year it is naturally very local.

I expect a mail will be starting from here in January and I will try and send out a short report by it embracing events up to date.

FORT CUDAHY, 9th December, 1896.

A mail left here for the outside on the 27th ultimo by which I sent you an interim report, which will probably reach you in January. From it you will learn how I came to be caught in the country and why I have not attempted to get out in winter. As you are as likely to get that report as you are this one, I refrain from repeating more here than to say that should it be necessary for me to go out before summer I will try and get out by dog team, starting in the last days of February or early in March when the days are long and the weather mild, getting out say early in May.

Since my last the prospects on Bonanza creek and tributaries are increasing in richness and extent until now it is certain that millions will be taken out of the district in the next few years.

On some of the claims prospected the pay dirt is of great extent and very rich. One man told me yesterday that he washed out a single pan of dirt on one of the claims on Bonanza and found \$14.25 in it. Of course that may be an exceptionally rich pan, but \$5 to \$7 per pan is the average on that claim it is reported, with 5 feet of pay dirt and the width yet undetermined, but it is known to be 30 feet even at that; figure the result at 9 to 10 pans to the cubic foot, and 500 feet long: nearly \$4,000,000 at \$5 per pan—one fourth of this would be enormous.

Another claim has been prospected to such an extent that it is known there is about 5 feet pay dirt averaging \$2 per pan and width not less than 30 feet. Enough prospecting has been done to show that there are at least 15 miles of this extraordinary richness, and the indications are that we will have 3 or 4 times that extent, if not all equal to the above at least very rich.

It appears a great deal of staking for absentees has been done, some of whom have turned up and some have not. This has caused confusion and leads to a good deal of what might be called fraud, for it is easy for a few in the inner circle to know what claims have been recorded in accordance with the law, and what have not. They can then for themselves directly or through the intervention of a friend have the latter jumped for their whole or partial interest. It appears this has been done in several instances.

I think the department should get large posters printed on which shall be shown the sections of the law governing the location and recording of quartz and placer mines,

the extent of each, the duties of miners in both cases, and the rulings of the department on the questions I have submitted, with the penalties attached to offences against the law. Some of these should be printed on stout paper or parchment capable of standing exposure to the weather, and posted at every important point in the country so that there may be no excuse hereafter for ignorance.

A large number of copies of the mining Act, land Act, and timber and hay lands Regulations should also be sent in.

As to the extent of mining districts they should I think be made large, and section 21 amended to enable a man who has located a claim which does not pay a reasonable return on outlay the first season after his claim has been prospected, to make a second location in the same locality or district provided he can find one in it. The agent would have to determine whether or not he had expended the proper amount of labour on his claim to get reasonable returns; this I know opens the door for a lot of trouble and may be fraud, but on the other hand a great many worthy men suffer from the want of some such regulation, and as very few would be in a position to take advantage of such a provision until after their second season, there would hardly be anything left for them to take. Enterprising industrious men who would work almost continuously might get some benefit—probably would—but no others, so such a regulation could not do very much harm and might help some deserving people. As it is now men stake claims on nearly every new find, some having several claims in the Klondak locality. They know I believe that they will not be able to hold them, but as the localities are not yet clearly defined they can hold on to them for a while and finally by collusion with others acquire an interest in them.

The miners here are I understand getting up a petition to the Minister asking for aid in opening a way from the south and building along it shelter for winter travellers with suitable supplies scattered along.

As it is now a winter trip out from here is on account of the long haul and want of shelter tedious and hazardous, and their representations are worthy of consideration.

FORT CUDAHY, 11th January, 1897.

The reports from the Klondak region are still very encouraging: so much so that all the other creeks around are practically abandoned, especially those on the head of Forty Mile in American territory, and nearly one hundred men have made their way up from Circle City many of them hauling their sleds themselves. Those who cannot get claims are buying in on those already located. Men cannot be got to work for love or money, and development is consequently slow; one and a half dollars per hour is the wages paid the few men who have to work for hire, and work as many hours as they like. Some of the claims are so rich that every night a few pans of dirt suffices to pay the hired help when there is any: as high as \$204.00 has been reported to a single pan, but this is not generally credited. Claim owners are now very reticent about what they get, so you can hardly credit anything you hear; but one thing is certain we have one of the richest mining areas ever found, with a fair prospect that we have not yet discovered its limits.

Miller and Glacier creeks on the head of Sixty Mile river, which my survey of the 141st meridian determined to be in Canada, were thought to be very rich, but they are poor both in quality and quantity compared with Klondak.

Chicken creek on the head of Forty Mile, in Alaska, discovered a year ago and rated very high, is to-day practically abandoned.

* * * * *

Some quartz prospecting has been done in Klondak region, and it is probable that some good veins will be found there. Coal is found on the upper part of Klondak; so that the facilities for working it if found are good and convenient.

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FORT CUDAHY, 22nd January, 1897.

A quartz lode showing free gold in paying quantities has been located on one of the creeks, but I cannot yet send particulars. I am confident from the nature of the gold found in the creeks that many more of them—and rich too—will be found.

* * * * *

FORT CUDAHY, 23rd January, 1897.

I have just heard from a reliable source that the quartz mentioned above is rich, as tested, over one hundred dollars to the ton. The lode appears to run from 3 to 8 feet in thickness and is about 19 miles from the Yukon river. I will likely be called on to survey it, and will be able to report fully.

Placer prospects continue more and more encouraging and extraordinary. It is beyond doubt that 3 pans on different claims on Eldorado turned out \$204.00, \$212.00, and \$216.00, but it must be borne in mind that there were only three such pans, though there are many running from \$10.00 to \$50.00.

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No. 10.

REPORT OF J. S. DENNIS, D. T. S.

CHIEF INSPECTOR OF SURVEYS.

CALGARY, 31st December, 1896.

E. DEVILLE, Esq.,
 Surveyor General,
 Ottawa, Ont.

SIR,—I have the honour to submit herewith my report for the past year.

The report for 1895 having been closed on 31st October of that year, this report covers the remaining months of 1895 as well as the current year.

The field operations of divisions A and B of the irrigation surveys were closed at about the date of the 1895 report, the remaining months of that year, as well as the early months of the present year, being employed in the preparation of the plans, profiles, discharge sheets, details of structures, and other information resulting from the season's field work, and this information was finally assembled in the form of a general report on irrigation and irrigation surveys for the year 1895, which was printed and has lately been issued.

The preparation of the report in question kept me and the staff under my instructions engaged until the 11th of May, on which date your instructions for the season's field work were issued.

The work of the irrigation surveys during the past season was divided, as has been done during the two preceding years, into two divisions, division A which worked under my immediate supervision, being again divided into two sub-parties under the charge of Messrs. James Gibbons and A. C. Talbot, Dominion lands surveyors, respectively.

Messrs. Gibbons and Talbot reported here for duty early in May, and, after a few days spent in making preparations for the season's work, departed for their respective scenes of operations. Sub-party No. 1, under Mr. Gibbons' charge, was instructed to operate in the central portion of the Territories, in the vicinity of Medicine Hat, Maple Creek, and Swift Current. These portions of the arid region had not been previously reached by our irrigation surveys, and the rapid increase in the number of irrigation ditches, particularly in the vicinity of Maple Creek, rendered it necessary to take some immediate steps to obtain a knowledge of the general topography and water supply of the district, so that the provisions of the irrigation Act regarding the distribution of this water supply might be intelligently administered.

Mr. Gibbons commenced his work at Maple Creek, the initial elevation for his line levels being taken from sub-grade of the Canadian Pacific Railway at that point, as shown by the profile of the line. This elevation will probably differ slightly from that which will ultimately be determined by the extension to the east of our elevations from primary bench mark of the irrigation surveys, but the difference can be provided for when the connection is made.

From Maple Creek the levels were carried west along the railway track to its intersection with the outline between ranges 26 and 27 west of the 3rd meridian, and from thence to the north along this line to the north-east corner of township 11.

From this initial point line levels were run along the following township outlines:—

North boundary, township 11 in ranges 27, 28, 29, 30, west 3rd meridian.

North boundary, township 11 in ranges 1, 2, 3, 4 and 5 west 4th meridian.

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East boundary, townships 9, 10 and 11 in range 3, west 4th meridian.

East boundary, townships 10 and 11 in range 1, west 4th meridian.

East boundary, townships 10 and 11 in range 28, west 3rd meridian.

East boundary, townships 10 and 11 in range 27, west 3rd meridian.

North boundary, township 9 in ranges 1 and 2, west 4th meridian.

North boundary, township 9 in ranges 25, 26, 27, 28, 29 and 30, west 3rd meridian.

East boundary, township 12 in range 29, west of the 3rd meridian.

These line levels together with the levels run from Maple Creek to the west along the railway track comprise a total length of some 159 miles.

The usual permanent bench marks were placed at township corners in connection with the line levels, and topographical sketches were made of the country lying adjacent thereto, covering in all some 316 square miles.

The east and west lines along which levels were run had been so located as to intersect the streams heading in the Cypress hills and running to the north in the lower or plain portion of their length, and again on the north slope of the hills, so that some idea might be had of the general slope or fall of these streams, and of the possibility of diverting them for irrigation purposes.

The available water supply of the district was estimated by the usual measurement of cross-section and determination of low, high water and flood discharge of the streams, and by measurement of discharge of springs and volume of lakes.

The possibility of conserving the available water supply by the construction of reservoirs was made an important part of the season's work, all sites in the vicinity of the lines run which were likely to afford suitable facilities for the storage of water being carefully examined and surveyed. Several favourable reservoir sites were found, the one on township 8, range 3, west 4th meridian, comprising the basin containing Elkwater lake being deserving of special mention, as it affords an opportunity to store, at a very trifling cost, a very large volume of water which now runs to waste during the spring freshets, and also for the easy diversion of this water to areas that promise the best results from irrigation.

After completing the work outlined above, Mr. Gibbons proceeded to the south-eastern slope of the Cypress hills for the purpose of examining the feasibility of diverting water from the Whitemud river, which forms the main drainage channel for the run-off from a large portion of the hills, into the head of Swift Current creek, the object being to obtain the large volume of water which now finds its way to the south through a country not well suited for irrigation development, for the reclamation of desirable areas in the immediate vicinity of the Canadian Pacific Railway line. This object is to be attained by increasing, if possible, the present flow of Swift Current creek by diversion of the water as above mentioned, and as the scheme is one that will materially affect the future development of the district in question, I am pleased to be able to report that the exploration and preliminary levels completed by Mr. Gibbons prove the feasibility of the scheme within reasonable limits of financial cost, the diverting ditch being of reasonable length, and presenting no serious engineering difficulties in its construction.

After finishing the Whitemud river exploration Mr. Gibbons returned to Maple Creek and under special instructions proceeded east from there for the purpose of running levels necessary to determine the feasibility of diverting water from the South Saskatchewan river to the Regina and Moose Jaw plains. The work in connection with this scheme was commenced at Rush lake station on the Canadian Pacific Railway line, and in travelling from Maple Creek to that point Mr. Gibbons determined the cross sections and measured the discharge of the different streams which head in the Cypress hills and flow to the north between these points.

At Rush lake station the elevation of sub-grade of the railway line was taken as an initial elevation for the work on hand, and from thence a line of levels was run to the north, along the township outline between ranges 10 and 11 west 3rd meridian, as far as the South Saskatchewan river. Returning south to the intersection of the outline above mentioned with the trail from Swift Current to the Elbow, levels were run to the north-east along this trail to the Elbow, a distance of some fifty miles. From

the Elbow, levels were then run to the south-east through the valley of Aiktow creek, a distance of thirteen miles to the height of land between this creek and Qu'Appelle river, and from thence down the valley of the Qu'Appelle for a distance of some nine miles, cross sections of the valley being made at the height of land, and also at the most south-easterly point reached.

Returning to the Elbow, the suitability of the south bank of the river for canal construction was examined for a distance of some thirty miles to the south-west.

This completed the examination necessary to determine the possibility of diverting water to the plains region south-east of the Elbow, and I regret to say that the results of the work prove the scheme impracticable. This result is especially to be regretted in view of the fact that the region in question is very badly in need of water supply for both domestic and stock watering purposes, and it was hoped that this want might be supplied from the large volume running to waste in the south branch of the Saskatchewan river, even if nothing in the way of irrigation was undertaken.

After completing this work Mr. Gibbons returned to Maple Creek, where the party was disbanded, and then came to Calgary where he remained until the early part of the present month completing the indexing and assembling of the notes of his season's field work.

Sub-party No. 2 of division A, under Mr. A. C. Talbot, commenced their season's operations at bench mark No. 62, at the north-east corner of township 28, range 4, west of the 5th meridian, and from thence carried the usual line levels to the north, east and west, along the following township outlines :

East boundary of townships 29, 30, 31 and 32, range 4, west 5th meridian.

North boundary of townships 29, 30, 31 and 32, range 3, west 5th meridian.

North boundary of township 32, ranges 4 and 5, west 5th meridian.

North boundary of townships 31 and 32, range 2, west 5th meridian, comprising some 69 miles of levels.

The usual bench marks were placed at township corners on lines run, and the streams intersected were gauged in usual manner to determine their low, high water and flood discharges. The general topography of the country adjacent to the lines run was sketched in usual manner, one hundred and twenty-three square miles being covered by sketches of this character.

After completing this work Mr. Talbot undertook the survey and location of the proposed canal to divert water from the Red Deer river into the head of the Rosebud river. The preliminary exploration for this canal had been made by division A of the survey in 1894, and the elevations determined by barometer at that time having been checked by the line level run by Mr. Talbot as above mentioned, and a general examination of the proposed route having been first made, the work of location was commenced at the east or lower end of the proposed canal, in section 10, township 33, range 3, west 5th meridian. From that point the canal was located south and west, in the immediate vicinity of the projected location shown on the sketch map issued with the general irrigation report for 1894, for a distance of some forty-seven miles to the proposed point of intake at the Red Deer river in township 33, range 5, west 5th meridian.

The location adopted for this canal presents no serious engineering difficulties except at the point of crossing of the valley of the Little Red Deer river, where a flume of about 1,275 feet in length will have to be carried on a trestle 73 feet in height for the purpose of bringing the water from the north to the south side of the valley. However, the construction of the canal will play such an important part in the development of the large areas of good land in the Rosebud river district that this flume will not prove a serious obstacle in its construction.

After completing the location of the canal, Mr. Talbot returned to the point of commencement and from there made a detailed survey to the south-east of the country in the immediate vicinity of the head of the valley of the Rosebud river, to determine the suitability of this valley to carry the water diverted from the Red Deer river, and also to determine the advantages offered by numerous lakes and basins in that vicinity for the storage of water.

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Having finished this work Mr. Talbot extended the line levels and topographical work to the south and east through the Rosebud river district, following the under-mentioned township outlines.

North boundary of townships 31, 29, 28 and 25 in ranges 26, 27, 28 and 29, west 4th, and range 1 west 5th meridians.

East boundary of townships 26, 27 and 28, range 27, west 4th meridian.

East boundary of township 29, range 28, west 4th meridian.

East boundary of townships 30 and 31, range 1, west 5th meridian.

This work involved some 69 miles of line levels and 122 square miles of topographical investigations.

Upon completion of the last mentioned work Mr. Talbot was instructed to proceed with the location of the secondary canals to distribute the water from the main branch of the Bow river irrigation canal located during the season of 1895. In accordance with these instructions two secondary canals were located heading in the main canal in section 11, township 23, range 29, and section 3, township 24, range 28, both west of the 4th meridian, respectively, these canals being carried to the south and east through the district which is to be irrigated from this system, for a joint distance of some fifty miles.

Having completed this canal work Mr. Talbot returned to Calgary and reduced the strength of his party to three men, with whom he made a rapid trip through the southern part of the district for the purpose of gauging certain small streams from which the water was wanted for irrigation purposes, and to place gauge rods at numerous points where they were needed for administrative purposes. This work was finished early in November and after few days spent in the office here Mr. Talbot returned to Ottawa.

Division B of the irrigation surveys was during the past season, as it had been during the two previous seasons, in charge of Mr. A. O. Wheeler, D.L.S. The work outlined for the division included the completion of main and secondary triangulations in the foothill country and on the eastern slope of the Rocky mountains in the district covered by the topographical explorations of the previous year comprised between the Bow and Sheep rivers, and the extension of photographic surveys over the area covered by the triangulations. Mr. Wheeler was detained in Ottawa until June finishing up some work in connection with the operations of his division in 1895, and was not able to commence this season's field work until the beginning of July.

Unfortunately the season proved a very unfavourable one for the character of work which Mr. Wheeler had in hand, the whole country being covered for weeks at a time with dense smoke from the forest fires which raged during the greater portion of the summer on the western slope of the Rocky mountains and in the Selkirk range.

However, by availing himself of every hour of clear weather, and by working late in the fall after the snow and low temperature made field work very unpleasant, he succeeded in completing the main triangulation, a portion of the secondary triangulation, and also considerable photographic work. The work upon which Mr. Wheeler is engaged has a most important bearing upon the future of irrigation development in the arid portion of the territories, correct knowledge of the topographical conditions and forest distribution in the foothill country, and on the eastern slope of the mountains, which form the main water shed of the portion of the territories in question, being indispensable in attacking the many complex questions connected with the water supply available for irrigation. During the season I issued necessary instructions to Messrs. J. E. Woods and F. W. Wilkins, D.L.S., relative to the surveys upon which they were engaged, and in June I made a trip to Edmonton to meet and confer with the member of the legislature for Victoria district regarding the location of the trail from Beaver-hills creek to Victoria, which Mr. Woods was instructed to survey.

In August I made a trip to the Jackfish lake district, near Battleford, for the purpose of examining some questions regarding water rights in that vicinity. My duties in this office connected with the administration of the provisions of the irrigation Act and the numerous inspection trips connected therewith prevented my devoting as much time as I would have liked to the actual supervision in the field of the operations of our irri-

gation surveys, but I was able by frequent visits to keep in touch with the gentlemen having the work in charge. The large amount of work accomplished was largely owing to the cheerful and earnest manner in which all instructions were carried out by those in charge of the different parties. The season's operations are now being assembled in the shape of plans, profiles, discharge sheets, and sketches, and will be issued in the shape of a general detailed report so soon as this information is completed and in shape for general reference. The administrative work of this office being carried on through the timber and mines branch of the department is being made the subject of a separate report.

I have the honour to be, sir,

Your obedient servant,

J. S. DENNIS, D.T.S.,

Chief Inspector of Surveys.

Department of the Interior.

No. 11.

REPORT OF ARTHUR O. WHEELER, D.L.S.

FOR SEASON OF 1895.

DEPARTMENT OF THE INTERIOR, TOPOGRAPHICAL SURVEYS BRANCH.

OTTAWA, 8th December, 1895.

E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of the operations of division B of the Canadian irrigation surveys during the season of 1895.

In accordance with your letter of instructions, dated 8th May, I reported to the chief inspector of surveys, Mr. J. S. Dennis, at Calgary, and received from him the following instructions to govern the operations of my division.

CALGARY, ALTA., 22nd May, 1895.

SIR,—I have the honour to give you the following instructions for your guidance in carrying on the work of division B of the irrigation surveys during the present season's field operations.

It is desired to obtain, by a rapid reconnaissance survey, some idea of the topography of the foothill district in southern Alberta lying to the west of the surveys so far completed under the Dominion lands system and to the east of the immediate slope of the Rocky mountains, and of the location and discharge of the streams heading in these foothills. It is proposed to conduct this survey in the following manner:—

Commencing at the point where the valleys of the undermentioned streams are intersected by the most westerly lines run and marked under the land survey system, topographical traverses are to be carried up the valleys of the streams until the immediate slope of the mountains is reached.

These traverses are to be effected by starting from some known corner of the land survey system and reading all angles between stations with the transit and measuring distances with a micrometer. The azimuth of the line of origin for the traverse should be determined by astronomical observation and the azimuth by account checked during progress of the work. When it is possible to do so, readings between traverse stations on opposite sides of the valley should be taken in such a way as to make traverse points stations in a chain of triangles, so as to afford a check on the micrometer measurements of distances between stations.

By keeping the stations of the traverse on the high and open sides of the valleys, it is expected that the work can be carried on with a very small amount of line cutting; should the sides and bottoms of the valleys become too heavily timbered to permit of the work being proceeded with without opening lines through the brush or timber, operations will be stopped at the point where such obstruction is encountered.

The topography of the immediate valley through or along which the traverse is being carried will be shown by sketch notes on cross section sheets, these notes being based on traverse lines run, and it is desirable that the information regarding the valley and the course of the stream flowing therein should be made as full as possible. The elevation along the traverse for use in determining the fall of the stream, and differences of elevation of topographical features, are to be determined from barometer readings.

When the conditions permit of such being done the main topographical features of the country adjoining the valleys on either sides should be located and the contours

sketched in; but it is not intended that the main operations should be seriously delayed to accomplish the latter work.

At suitable points along the traverse the method of photographic surveying is to be resorted to for the purpose of procuring data from which to map the topography of the adjacent district; and it is desired that work of this nature should be effected at all points where the valleys afford sites suitable for the construction of reservoirs for storage of the water flowing therein.

The streams up which traverse lines are being carried are to be gauged at the highest point reached, the actual discharge at the date of measurement, and the elevation of the high water and flood water stages of the stream above the water level, as shown by existing marks, being noted.

When suitable sites are found, trigonometrical stations should be erected for use next year in the system of triangulation which it is intended to extend over the foot hill country as a basis for a photographic survey of the district. These stations should be made of a permanent and prominent character and their location, which should be tied into the traverse lines, should, as far as possible, be made dependent upon the suitability of the site as a station in a well proportioned scheme of primary triangulation. It is expected that in addition to the particular topographical and hydrographical information provided by the above described survey, you will keep notes of such fact regarding the general character of the streams, valleys and adjacent country, and of the distribution of the timber, as may be of value in discussing the probable location of catchment areas in the district, and the run off therefrom. The strength of the party which you will employ on the above work will be as follows:—1 assistant, 1 picketman, 1 teamster, 1 cook.

The transport will consist of:—3 carts, 1 buckboard, 7 horses.

Work will be commenced on the Jumpingpound creek and will then be conducted in the valleys of the following streams in the order given:—Elbow river, Fish creek (N. and S. forks), Sheep river (N. and S. forks), Highwood river (N. and S. forks), Willow creek, Oldman river (N.S. and Middle forks), Pincer creek, Drywood fork, Waterton river.

In connection with your other operations on Jumpingpound creek you will make such investigations as may be necessary at the head waters of the stream to enable you to report upon the possibility of diverting the water, which is reported to flow to the west into the Kananaskis river from the muskeg in which the Jumpingpound heads, into the latter stream.

You will report the progress of your operations from time to time, and keep me informed of your movements and the probable location of your camp.

I am, sir,

Your obedient servant,

J. S. DENNIS,

Chief Inspector of Surveys.

A. O. WHEELER, Esq., D.L.S.,
In charge, Division B,
Irrigation Survey,
Calgary, Alta.

Acting upon the above instructions a party was formed at Calgary, micrometer tables established, and on May 30th a move made westerly for the valley of Jumpingpound creek.

JUMPINGPOUND CREEK.

The traverse of this stream was commenced June 4th at a point where it is intersected by the meridian outline between ranges 5 and 6, in township 24, west of 5th meridian. The correct azimuth of the initial course of the traverse was duly ascertained by

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astronomical observation and the subsequent courses projected from side to side of the valley of the stream, the angles being carefully read by transit and the distances measured by micrometer.

The transit and topographical sketch work, at this stage of the survey, were in my own charge, while the micrometer readings and calculation of resultant distances were attended to by my assistant, Mr. C. S. W. Barwell, D. L. S., under my personal supervision.

The traverse was carried south-westerly up the main stream, in the manner indicated in the instructions above quoted, to the height of land between it and the Kananaskis river, at a point where a number of small water courses, draining from a bare rocky range between the two, join together to form the main stream. A creek joining the main stream in section 13, township 24, range 7, was next traversed westerly to the summit between it and the Kananaskis river.

Two reservoir locations were surveyed, one at the junction of the main stream and the branch creek referred to, the site consisting of an expansion of the valley, locally known as "the Jumpingpound park"; the other close to the head of the branch creek joining the main stream in the park.

For the main stream the length of traverse was 21.53 miles, for the branch creek 5.27 miles, and for the two reservoir sites 5.17 miles; making a total of 31.97 miles for this system.

Two cross-sections were made at different points on the main stream and measurements taken with a current meter to ascertain the discharge. Three other cross-sections and measurements for discharge were taken of tributary streams. Two signals were erected on the north side and two on the south side of the valley of the Jumpingpound creek, on the highest suitable prominent points, to be subsequently used in the extension of a primary triangulation over the foothill region. The positions and elevations of these points were approximately ascertained by taking horizontal and vertical transit readings from two or more points in the traverse, thus supplying data for the formulation of a well conditioned scheme of triangulation.

The elevations of all traverse points and principal topographical features were ascertained by an aneroid barometer and were based upon accurate elevations obtained by spirit levelling during the previous season.

Corrections for atmospheric change were applied to the travelling barometer by means of data obtained from a stationary barometer read half hourly.

Topographical sketches of the surrounding country were made at the several trigonometrical signal stations and the direction of the signals from one another approximately established by magnetic bearings.

ELBOW RIVER.

Work was commenced July 1st at the north-east corner of section 33, township 23, range 4, west of 5th meridian, and a traverse carried south-westerly up the stream, past the junction of the Cañon and Fisher branches (so called upon Dr. G. M. Dawson's reconnaissance map of the Rocky mountains, dated 1886) to a point where two branches emerging from the narrow valleys bounding Tombstone mountain and mountain Rae join together and flow north-westerly between the outlying peaks of the Fisher range and Misty range of the Rocky mountains.

In so far as the object of the irrigation survey was concerned nothing was to be gained by carrying the traverse beyond this point.

The river here assumes the character of a swift mountain stream fed during the spring and early summer by torrents rushing down steep gorges from the melting snow of the lake and ragged mountains hemming in the valley. The valley is thickly timbered and traverse work would have been very difficult and slow, entailing much cutting. Moreover, but little was to be hoped for in the matter of facilities for water storage. Work was next commenced at the confluence of the main stream and Fisher branch, and the compass traverse carried up the latter to ascertain if it would present facilities for water storage.

For a similar reason a compass traverse was carried up the Cañon branch.

In the survey of the Elbow river the methods adopted were the same as those employed upon the survey of the Jumpingpound creek.

On the main stream one reservoir site was surveyed and two smaller storage basins located. On the Fisher branch a point was also found where a dam of large proportions could be erected, and on the Cañon branch two good locations for building dams and storing water.

The traverse carried up the river proper was 32.59 miles in length, up the Fisher branch 6.09 miles, up the Cañon branch 3.77 miles, and for reservoir sites 3.55 miles; in all a total of 46 miles.

Three cross-sections were taken of the main stream, one of the Fisher branch, one of the Cañon branch, and six of tributary streams joining the main river at different points. Current meter measurements were made at all cross-sections to supply data for ascertaining discharge.

Eight trigonometrical stations were selected in connection with this water system and signals erected for use in the projection of a primary triangulation. Three were on the north side of the river, three on the south, one to north of the Fisher branch, and one to north of the Cañon branch. The position and elevation of these points were defined, as on the Jumpingpound creek, by horizontal and vertical transit readings, the elevations being checked by aneroid barometer readings carried up and down from established elevations on the traverse, and the relative positions of the trigonometrical stations to one another by magnetic bearings at each signal.

Topographical sketches of the surrounding country were made at the several triangulation stations.

Throughout the survey barometer readings were taken for elevation of traverse points and topographical features in the same manner as on the survey of the Jumpingpound creek.

NORTH BRANCH OF FISH CREEK.

Your letter of 12th July having reached me while engaged upon the survey of the Elbow river, I immediately upon its completion went into Calgary to get the camera, mountain transit, and other apparatus necessary to a photographic survey, referred to in your letter.

During my absence Mr. Barwell was instructed to connect the traverse of the Elbow river with the head waters of the north branch of Fish creek. This he did by projecting traverse lines easterly through the low valley in the south-east portion of township 23, range 5, west of 5th meridian, to an intersection with the above mentioned stream.

In doing this work he located definitely the course to be followed in a diversion of water from the Elbow river to the north branch of Fish creek. This proposed diversion is shown approximately upon sheet 1 of the irrigation map of 1894, having been laid down thereon from surveys made by division A of the irrigation survey during that season.

The introduction of the camera and accompanying surveying outfit necessitated somewhat of a change in the order of work.

Photographic views were substituted for the topographical sketches previously made at trigonometrical signal stations. The mountain transit, used to obtain the azimuth and altitude of points in the photographic views, also enabled the relative positions of the signals to one another to be ascertained much more accurately than by the former method of magnetic bearings. The photographic work, however, rendered necessary the occupation of a large number of supplementary stations (styled camera stations), and filled all my time, compelling me to place Mr. Barwell in charge of the transit as well as the micrometer in the conduct of the regular traverse work. Mr. C. H. Watson, of division A, had been transferred to my division as topographer, and with his assistance Mr. Barwell was enabled to keep the traverse party going as usual.

Signals were usually erected by the traverse party, this duty alternating with their regular work.

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On my return from Calgary, 4th August, the traverse was continued easterly down the north branch of Fish creek and "tied in" to bench mark No. 18, at the north-east corner of section 24, township 22, range 4, west of 5th meridian, planted the previous season by division A.

Two cross sections were made of this branch and current meter measurements taken for discharge.

Three trigonometrical stations were established and signals erected, two on the north and one on the south side of the valley.

Seven camera stations were occupied and twenty views of surrounding country obtained, together with data necessary to enable the topography shown by these views to be utilized in the construction of a map. The traverse of the north branch of Fish creek, including the tie line from Elbow river traverse, was 13.59 miles in length.

SOUTH BRANCH OF FISH CREEK.

Work on this branch was commenced at the north-east corner of section 12, township 22, range 4, west of 5th meridian, and a traverse carried up the creek a distance of 11.68 miles to a point where the stream is little better than a small rivulet winding through a muskeg valley.

One good reservoir site was surveyed at the initial point of commencing work and a second located some nine miles further up the stream. Photographic views of suitable points to build dams in connection with these two sites were also obtained. Between the two basins mentioned two other points were found, where, if required, dams might be built to hold back a considerable quantity of water.

Two cross-sections were made of the stream and the necessary meter measurements taken for discharge.

Three trigonometrical signal stations were established, and their position located by the usual methods, from the traverse proper. Two were on the north side and one on the south side of the valley of the creek.

Thirteen camera stations were occupied and thirty two views obtained for use in map construction.

In all about fifteen miles of traverse were run to define the stream and dependent facilities for water storage.

NORTH BRANCH OF SHEEP RIVER.

In township 20, range 4, west of the 5th meridian, two streams join together to form the north branch of Sheep river. The one to the north discharges the larger quantity of water.

Commencing at the north-east corner of section 28, in the same township, a traverse was first carried up the north branch to a point, about 12 miles distant, where two streams of nearly equal magnitude meet in a deep narrow cañon. Here the northerly stream was again selected and the traverse continued to a third junction of two streams of almost equal proportions. Still keeping the northerly course, the traverse was conducted past the spring origin of this branch to the height of land between the most northerly valley of the Sheep river system and the Elbow river valley. A connection was here made, by triangulation, with the Elbow river traverse, a complete circuit of micrometer readings being thus obtained, based upon accurately established points in the land surveys. This enabled a fair estimate of the micrometer error to be arrived at.

The traverse was next carried from the initial point up the southerly stream of the two joining in township 20, a distance of 11.78 miles, to a point not far from the mountains, where several small streams, emerging from thickly timbered valleys, contribute to form the main flow. The facilities for storing the water of this system are few. Two small basins of questionable utility were located on the upper waters of the northerly stream, otherwise nothing suitable was found.

Two cross-sections were made of the northerly fork and one of each of the forks meeting in the deep cañon referred to, one of the southerly fork, and one of a branch stream joining it about $3\frac{1}{2}$ miles from the junction of the forks in township 20. The customary current-meter measurements for discharge were taken.

Four trigonometrical stations and signals were temporarily fixed, two on the north side of the northerly fork, one between the two forks traversed, and one on the south side of the southerly fork not far from the point of commencement.

While engaged upon this work 21 camera stations were occupied and 62 photographic views obtained.

The total amount of traverse was 30.46 miles.

SOUTH BRANCH OF SHEEP RIVER.

Through the foothill region the south branch of Sheep river flows north-easterly in a deep and narrow trough, affording practically no facilities for water storage. It is joined on either side by a number of streams of considerably less magnitude.

Traverse work was commenced 25th September where the meridian outline between ranges 3 and 4, west of 5th meridian, intersects the river, and carried up the main stream to within a short distance of its exit from the mountains. At the point where the traverse was stopped the valley is thickly timbered and the stream flows in a very narrow bed between precipitous banks. The work of continuing the traverse would have been very laborious and slow to so small a party. I had received instructions from the chief inspector of surveys to close the field work of my division by the 15th October, and as that date was close at hand the work was discontinued.

It is quite possible that water storage facilities can be found further in the mountains along the valley of this stream or of some of its tributaries, for, where the investigation ceased the flow was still of considerable volume, and, although its immediate bed is deep and narrow, the valley of the river is of large extent. One small storage basin was surveyed and photographed at a point known locally as "the Forks." It is, however, the only one and is of questionable practicability.

Three cross-sections were made of the main stream and six of tributary streams together with the corresponding meter measurements for discharge.

Six trigonometrical stations for use in a primary triangulation were selected, signals erected and their approximate positions ascertained by the usual methods. Two were on the north side and four on the south side of the stream, between it and the north branch of Highwood river.

In the vicinity of the south branch of Sheep river 26 camera stations were occupied and 71 views obtained for use in map construction.

Aneroid barometer elevations were obtained and connected during this portion of the work, as also throughout the entire survey, in the manner previously set forth.

The traverse work done, in connection with this system, extended over 19.30 miles of line.

The season's work may be summarized as follows :—

Number of miles of traverse	156
Number of reservoir sites surveyed	5
Number of storage basins located	11
Number of cross-sections and measurements for discharge	39
Number of trigonometrical stations established and signals erected	29
Number of camera stations occupied	67
Number of photographic views taken for map construction	185
Number of square miles surveyed topographically that can be mapped	750

The foregoing is a mere outline of the season's work. To properly embody the investigations carried on and the large amount of information obtained it will be neces-

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sary to prepare a special report with the results of the measurements for discharge of streams, meter-rating and other information, concisely set forth in schedule form, to be illustrated by the following maps :—

A general topographical map showing the geographical position and relative elevation of the different features.

A skeleton map showing the respective catchment and timbered areas of the several streams as far as comprehended by the extent of the survey.

A plan showing the approximate position of the trigonometrical stations established, to enable a well conditioned scheme of primary triangulation to be projected for the foothill region.

Sketches on a larger scale showing the reservoir sites, storage basins and other water storage facilities on the several streams.

I have the honour to be, sir,

Your obedient servant,

ARTHUR O. WHEELER, D.L.S.,

In charge, Division B, Canadian Irrigation Surveys.

No. 12.

REPORT OF ARTHUR O. WHEELER, D.L.S.

FOR SEASON OF 1896.

CANADIAN IRRIGATION SURVEYS.

DEPARTMENT OF THE INTERIOR, TOPOGRAPHICAL SURVEYS BRANCH,
OTTAWA, 30th January, 1897.E. DEVILLE, Esq.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the operations of division B of the Canadian irrigation surveys during the season of 1896.

In May, 1895, a topographic and photographic survey was commenced by the said division, having in view the following three principal objects :—

1. To ascertain what storage facilities in the foothill region could be counted upon to augment the natural water supply available for irrigation purposes from the eastern watershed of the Rocky mountains, and at the same time to increase the existing knowledge of the extent of this supply by further measurements of the discharge of the several streams draining the watershed to the east.
2. To obtain sufficient topographical information to provide a fairly approximate map representation of the district covered by the survey, and thereby some idea of the drainage basins of the several principal streams, the location of such reservoir sites and storage basins as might be found, the definition of the principal summits and heights of land between the different water systems, and the distribution of the timbered areas.
3. The placing of signals at convenient points to be used as stations in the extension of the general trigonometrical survey of the mountain and foothill region and the approximate location of the signals so placed ; also to obtain such other information as pertains to the construction of a reconnaissance map for the purpose of projecting a well conditioned scheme of primary and secondary triangulation, upon which to base a comprehensive photographic survey, having in view the production of a complete topographical map on a scale of $\frac{1}{250,000}$, with a contour equidistance of 100 feet.

During the winter of 1895-96 a scheme of primary and secondary triangulation was projected from the information obtained in the field the preceding summer.

The work now reported upon embraces the occupation of the stations selected and observing of the angles of the primary and secondary triangulation mapped out, the accurate location of the camera stations of the previous year, and the obtaining of such further photographic views as were required to supplement those already in hand. It may be summarized as follows :—

On the 29th May I received your official notification that Mr. C. S. W. Barwell, D.L.S., had been appointed as my assistant.

Owing to press of office work I found that I should be unable to take the field before the middle of June. Considering that, in the meantime, Mr. Barwell's services might be utilized to advantage, I dispatched him on the 1st June to inspect the signals placed the previous season and erect a better class for the primary triangulation, signals more likely to be visible at long distances. I hoped thereby to obviate all delay in commencing observation work upon my arrival. Mr. Barwell carried with him written instructions, which were duly endorsed "approved" by Mr. J. S. Dennis, chief inspector of surveys and irrigation.

By an official letter, dated 15th June, I was instructed to place myself under the direction of Mr. J. S. Dennis and receive all instructions from him. The next day I left

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Ottawa for Calgary, arriving on the 20th; from that date until the end of the month I was fully occupied in organizing a party and completing my report of the previous season's operations for the general report on irrigation.

On the 29th June I received Mr. Dennis' instructions, in accordance with which I moved my camp westerly to the Jumpingpound creek on the 1st day of July, and began the occupation of Mr. D. L. S. Drewry's stations. Unfortunately the work was barely commenced when it was stopped by smoke from local and other bush fires, chiefly located in British Columbia. Observation work was prevented from this cause until the 7th of August.

In the meantime micrometer traverses were carried up the Elbow river and south branch of Sheep river to their heads from the point where similar traverses had been discontinued the previous season.

One good reservoir site was located on the upper waters of Elbow river and a cross-section for discharge of the stream made to obtain some idea of the flow available to fill it.

The Elbow heads in a small lake about 40 acres in extent. The main supply is derived from mountain snows.

The south branch of Sheep river heads in Mt. Rae. It is separated from the Elbow river by a height of land about two miles wide. No facilities for storage were met on the upper waters of the stream.

While at the traverse work a portion of the party were employed selecting and erecting signals at prominent points to be used as secondary triangulation and camera stations.

Four primary stations and a number of secondary were occupied between the 7th and 15th August, when cloudy weather interfered.

Having been informed some time previously that my camera and photographic outfit had arrived from Ottawa, I now took advantage of the opportunity to run into Calgary and get it. During my absence Mr. Barwell continued the secondary triangulation work. Adjustments to camera, testing speed of plates and other details, detained me there until the 21st.

In the meantime the smoke had rolled up again thicker than ever, shifting back and forth with every change of the wind. It now seemed more than likely that this state of things would continue until the September snow storm arrived, and that it would be advantageous to give up the angle reading for the time being. I forthwith despatched a messenger to Calgary to obtain instructions, and, while awaiting his return, made a camera survey of reservoir site K on the south branch of Sheep river. In this work the distances required being short the accuracy of the result was not affected by the smoky atmosphere.

My messenger on returning brought me instructions to "stay with the observing." Accordingly, with Mr. Barwell, I established temporary camps as near as possible to the summits of Hoffmann and junction signal stations and remained until the 4th of September, on which date the reading of angles at these points was completed.

Work now progressed favourably until the evening of the 10th, when the September snow storm arrived and lasted continuously until the 16th. In the portion of the hill country in which I was located at the time snow fell to a depth of three feet on the level.

From the 16th of September until the 19th October observation and camera work was carried on almost uninterruptedly, a few delays occurring from passing bodies of smoke and broken weather.

On the last mentioned date word was received from the chief inspector of surveys and irrigation that the share of the appropriation allotted to division B was almost expended, and instructing me to bring in and pay off my party immediately. In obedience thereto I started for Calgary the next day and paid off all hands except the assistant on the 22nd October.

Owing to the lateness of starting the field work, the unfortunate atmospheric conditions throughout the season, and the early closing, there still remained a considerable amount of work to be done before the data in hand could be used for the construction of

accurate maps. Four primary stations were yet to be occupied to connect the main triangulation with that of W. S. Drewry, also a number of secondary points for the purpose of locating camera stations of the present and preceding years ; moreover no photographic views had so far been obtained on the Elbow river and Jumpingpound creek.

Upon my earnest representation that the foregoing requirements were absolutely necessary to enable the season's work to be utilized, Mr. Dennis permitted my return to the field with my assistant and one other man for the purpose of closing up the triangulation and gathering such other information as could be obtained within three weeks.

During this period the weather was exceptionally fine for the time of year and a large amount of good and rapid work was done.

On the evening of the 11th November the party returned to Calgary and were paid off within the next two days, the horses and outfit having been stored with Mr. Ralph Bell of that town.

The following is a synopsis of the season's work :—

No. of stations occupied for primary angles	13
“ “ “ secondary “	36
“ camera stations occupied	39
“ photographic views taken	162
“ miles of micrometer traverse	28
“ measurements for discharge of streams	2

Full details of the scheme of primary and secondary triangulation, the methods employed on the survey and the results obtained, will be given in the issue of the general report of irrigation and irrigation surveys for 1896. At the present time this information has not been gathered in a sufficiently comprehensive form to be placed before you.

I have the honour to be, sir,

Your obedient servant,

ARTHUR O. WHEELER, *D.L.S.*,
Member American Society of Irrigation Engineers.
 In charge, Division B,
 Canadian Irrigation Surveys 1896.

Department of the Interior.

No. 13.

REPORT OF T. W. CHALMERS, D.L.S. SUBDIVISION SURVEYS OF HALF-BREED COLONY.

EDMONTON, 6th February, 1897.

E. DEVILLE, Esq.,
Surveyor General, Ottawa.

SIR,—I have the honour to submit the following general report of my field operations during the last season.

In compliance with your instructions dated at Ottawa the 4th of May and received on the 12th, I began preparations for the subdivision of townships 57 and 58, ranges 9 and 10 west of the 4th meridian, which had been set apart for a half-breed colony.

I visited the Rev. F. A. Lacombe, as directed, and arranged with him to meet the Rev. Father Morin on the ground on the 28th.

I had my outfit ready on Monday the 18th, but a report having come in that the heavy rains of the preceding week had made the roads impassable for loaded teams, I decided to send my supplies and the men not required to drive the carts down the river on a raft which was being constructed to be run to Battleford.

I made the necessary arrangements, and the raft being completed on the 20th I got my men and supplies on board ready to start, at daybreak the following morning.

Having seen the raft off, I started with the remainder of my outfit by trail.

The roads being very heavy, progress was slow, although I was travelling as light as possible—almost too light, as my supplies on Saturday night were so low that I was obliged to travel on Sunday.

I reached St. Paul's that evening and met there the balance of my party who had arrived by raft the previous evening with the supplies in good order.

On the morning of the 25th I made a raft and took my outfit across the river, hired a team to take the supplies that could not be taken on the carts, and pulled out for the head of Manawan lake, which was reached on the evening of the 26th.

The two days previous to the arrival of the Rev. Father Morin on the 28th were occupied in retracing parts of the north boundary of township 57 and the east boundary of township 58, range 10, and in having the chainmen chain there for practice; the corners met with were also renewed.

On the morning of the 29th I went over some of the ground with Father Morin, and ascertained what part of the reserve he desired I should lay out first.

Having stored everything not absolutely required, and taking three weeks provisions, I pulled out in the afternoon for the north-east corner of township 60, range 10, to run the north boundary (16th base line) of township 60, range 9.

I found the country very rough and was obliged to wind about a great deal, only arriving at my starting point on the evening of Monday, June the 1st.

On the 2nd I started to run the north boundary of township 60 by deflecting from the base line. After running across this township I turned south, laying off the proper angle from the base line, and checking by an observation. I then ran south to the south-east corner of township 59, range 9, ran in the jog, measured the quarter section adjoining the correction line and placed the corner marks in their proper positions. This part of the work was completed on 15th June.

I found an iron post instead of an iron bar at the north-east corner of township 60, range 10, and, being on the base line, I thought it best to replace it with an iron bar which necessitated putting in an iron post at the south-east corner of township 59, range 9.

The west side of township 60, range 9 is rough and broken, but the north and east sides are nearly flat and full of muskegs and swamps. There are some good bluffs of tamarack and spruce through it. With the exception of two ravines the line along the east of township 59 runs through rolling ground.

The north-east corner of township 58, range 9, now being fixed, I began the subdivision work. I started the north boundary of township 58, range 9, from the north-east corner and found the first two miles very fair running, but the rest of the line was as rough as it could well be. On arriving at the north-west corner I measured the quarter sections adjoining the correction line, re-ran the jog, and corrected the corners.

On the 20th I moved south to the north end of Manawan lake (north) and ran the north boundary of township 57, range 9, on the 22nd.

As the northern and southern portions of the reserve are rough and were likely to cause errors in chainage, I determined to run all the meridians north and south from the boundary line between townships 57 and 58 in order that the cross roads in this portion of the reserve, which is most suitable for settlement, might be as straight as possible.

On the 26th June I received your telegram directing me to continue operations.

I completed the subdivision of township 59, range 9 on the 25th of July and moved into township 58, range 10.

Except for about two miles along the south of this township it is very rough and broken. The timber is mostly poplar and not of much value except for fuel. There is an abundance of hay all through this township and several lakes large enough to be traversed.

I began the survey of township 58, range 10, on the 27th of July, and completed it on the 24th of August, and on the same day made out my progress sketches and report and forwarded them to you.

This township except in the north-east and north-west corners is fairly open and good for farming. There is no timber of any importance in it. There are two lakes large enough to traverse, one of them—(Owlseye)—in the north east corner, being a particularly fine one, deep, with sand and gravel bottom, and having fish in it. It is about a mile and a half long by one mile in breadth.

The Saddle lake Indian reserve cuts out from the south-west corner a strip $3\frac{1}{2}$ miles long by $1\frac{1}{2}$ in breadth.

I began the subdivision of township 57, range 10 on the 25th of August and completed it on the 12th of September, with the exception of the most easterly meridian, which I could only run south as far as the edge of Manawan lake (south) as a wooded island prevented me from seeing the opposite shore. I left it to run, if possible, across the ice. Manawan lake (south) cuts out a large portion of the east centre of this township. There are also several good sized lakes which are all alkaline.

These are the only alkali lakes in the whole reservation. There is some timber along the base line at the south and along the edge of Manawan lake, but none of any importance.

The Saddle lake Indian reserve cuts off from the north-west corner a strip one mile long by one and a half wide. The Methodist mission also owns the east half of section 32.

I traversed one lake on the west side of this township with a small party while the rest of my men were completing the marking of corners.

I began the subdivision of township 57, range 9, on the 15th September, and finished running the lines on the 28th of October.

The most southerly four miles of this township is solid timber, mostly poplar, a good part of it being large enough to be converted into lumber. There is also the best birch I have seen in the country, a considerable quantity of large spruce and some tamarack.

On the 29th I went to Saddle lake to meet the Hudson's Bay officers to arrange business connected with supplies, returning the next day, leaving my men in the meantime to finish some mounding.

Department of the Interior.

As the ice was not yet strong enough to work on I spent the next three days in laying out 80 acre lots in accordance with your telegram of the 21st June.

The ice was by this time strong enough on the smaller lakes to work on and I traversed one of them on the 6th and another on the 7th.

The mail came in on the 8th, bringing instructions from you to close operations for the season.

Thinking that if you knew I had completed the work, with the exception of the traverse, which could be best done in winter, on the ice, I dispatched a man to Saddle lake with a telegram to you to that effect, and with instructions to wait for a reply.

In the meantime I wished to complete the meridian of township 57, range 10, and as the large lake was not yet frozen over I deflected the north boundary of section 12, township 57, range 10, from the north boundary of section 7, township 57, range 9, run it the breadth I knew it should be, then ran south to the base line, but could not find the post.

As I had not time to re-establish this corner, I put in temporary posts on the line but did not mound them. The base line had been run in winter and I found it necessary to re-establish a great number of the corners.

This work took two days, the time I expected my messenger to be away.

While waiting for his return I traversed two more lakes.

All week the weather had been disagreeable and about fourteen inches of snow had fallen, and towards the end the cold became intense.

My messenger returned on Saturday evening without a reply to my telegram and I immediately determined to break up camp and come in.

The snow was too deep to move on wheels, and, as there was only one sleigh to be procured in the settlement, I was obliged to make two jumpers. These were made on the 16th, and I started on the morning of the 17th for Edmonton, arriving at Saddle lake agency at midnight.

Not having been able to procure sufficient transport I was obliged to leave my tents, stoves and everything I could get on without at the settlement, and, as the thermometer ranged between 20° and 40° below zero, had to make stopping houses at night.

As the jumpers were very heavy I left them at Saddle lake and hired bob-sleighs and drove my cart horses in a team in them. I also hired a team and sleigh to replace the one hired at Manawan lake, as the team was played out and unable to go farther.

After an extremely cold and tedious journey we arrived in Edmonton on the 23rd November and I paid off my party the same day.

I consider the country laid out for this colony could not have been better chosen for its purpose. Out of the whole grant I should judge about one fourth is water in lakes and sloughs. The larger lakes abound with fish, and wild fowl are plentiful.

There are good hunting grounds for large game and fur bearing animals within easy distance.

There is sufficient farming land for a large colony with plenty of hay and grazing land. There is an abundance of wood for fuel and sufficient timber to furnish lumber for a number of years if fire is not allowed to get into it.

Although the colony was only started this summer there are in the neighbourhood of twenty families in it now. There is a large mission building to be used as a residence for the officials, church and school. Considerable breaking has been done and there are a number of comfortable log houses and stables built by the settlers.

I have been so often questioned since my return as to the chances of success of the colony that I feel constrained to state that, keeping in view the object of the colony, which is, as I understand, to furnish a home for destitute half-breeds or for those who may become so owing to inability to cope with the advance of civilization, to teach them agriculture and to educate their offspring, I see no reason why it should not be a success.

Should a grist-mill be built, as I believe is the intention next spring, it will stimulate the settlers to engage in the production of bread stuffs.

With a saw-mill attached, which would cost very little more, the same engines being used for both, they could make their houses more like homes. With the establish-

ment of a good school ; and, last but not least, the presence of a manager who rules with a firm though gentle hand, I prophesy success for the colony.

One of these requirements is already fulfilled in the appointment of the Rev. Father Therien as manager, and I take this opportunity of thanking that gentleman for his kindness and assistance to me during the past summer.

I have the honour to be, sir,

Your obedient servant,

T. W. CHALMERS, *D.L.S.*

Department of the Interior.

No. 14.

Examination papers of the Board of Examiners for Dominion Land Surveyors.

PLANE GEOMETRY.

TIME, 3 HOURS.

	No. of Marks.
1. Draw a right line parallel to the base of any triangle so that the sum of the sides cut off between the parallel line and extremities of the base shall be equal to the parallel line.	12
2. If one of the diagonals of a parallelogram is equal to one of the sides, the other diagonal will be greater than any side of the figure.	12
3. Bisect a quadrilateral by a straight line drawn from a point in one of its sides.	16
4. Show why a circle cannot be described about a parallelogram which is not rectangular.	14
5. The line drawn from the angle of an equilateral triangle, inscribed in a circle, to any point in the circumference on the arc opposite, is equal to the sum of the lines drawn from the other two angles to the same point.	15
6. If two triangles have their sides proportional, they shall be equiangular, and the equal angles are subtended by homologous sides.	15
7. Take any point within an equilateral triangle and let fall perpendiculars on the three sides ; their sum is equal to a perpendicular from one of the angles on the opposite side.	16

SOLID GEOMETRY.

TIME, 3 HOURS.

	No. of Marks.
1. Straight lines cut by parallel planes are divided proportionally.	20
2. In any pyramid a section parallel to the base is similar to the base, and the section and base are to each other as the squares of their distances from the vertex.	20
3. Every solid angle is contained by plane angles, which are together less than four right angles.	20
4. Give formulæ for surface and volume of sphere, pyramid, right cone, cylinder, and regular polyhedron.	20
5. A sphere of metal weighing 20 lbs., specific gravity 12.5, is put into a cylindrical vessel 6 inches in diameter, and containing water to the depth of 5 inches. How much will the water rise by putting in the sphere?	20

6. A scow is made of 2-inch plank, specific gravity .60, with vertical sides, flat bottom, equally sloping ends, and 10'×16' top measure, 10'×12' bottom and 2½' deep. How many pounds can it carry in water? 30
7. The contents of a cask containing 62 gallons are to be put into a rectangular tank whose sides are in the ratio of 1, 2 and 3. What are the dimensions of the tank? 20

SPHERICAL TRIGONOMETRY

TIME, 3 HOURS.

- | | |
|--|------------------|
| | No. of
Marks. |
| 1. Prove that $\cos a = \cos b \cos c + \sin b \sin c \cos A$. | 25 |
| 2. Give values of $\cos \frac{1}{2} A$ $\sin \frac{1}{2} A$ and $\tan \frac{1}{2} A$ in terms of a, b and c , and prove one of the values given. | 25 |
| 3. In the right-angled triangle ABC where $AB = h$, the hypotenuse, $AC = b$, the base, and $CB = p$, the perpendicular, prove $\tan A = \frac{\tan p}{\sin b}$. | 25 |
| 4. $\cos b = \cos a \cos c + \sin a \sin c \cos B$.
What is the corresponding equation for polar triangle? | 20 |
| 5. Given in an oblique angled spherical triangle, the side a equal to $63^\circ 50'$, the side b equal to $80^\circ 19'$, and the angle A equal to $51^\circ 30'$; find angle C and side c . Is this an ambiguous case? Give reasons. | 30 |
| 6. In a right-angled triangle ABC are given the two angles, A equal to $44^\circ 50'$ and B equal to $65^\circ 49' 53''$; to solve the triangle. | 25 |

DIVIDING AND LAYING OFF OF LAND

TIME, 3 HOURS.

- | | |
|--|------------------|
| | No. of
Marks. |
| 1. The sides of a triangular field are 15, 20 and 26 respectively; required to divide the field into two equal parts by the shortest possible line.

Give the length of the line of division and its position. | 25 |
| 2. Give the following field notes of the survey of an inclosure; required to divide it into two parts by a north and south line. The western part must contain 20 acres. | 50 |

Station.	Bearing.	Distance. Chs.
1	N. $40^\circ 21'$ E.	15.00
2	N. $84^\circ 21'$ E.	38.00
3	N. $35^\circ 24'$ W.	25.00
4	S. $79^\circ 02'$ W.	19.00
5	N. $58^\circ 29'$ W.	16.88

3. How to divide a triangular field ABC into two equal parts by a line running in a given direction. 25

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MEASUREMENT OF AREAS.

TIME, 3 HOURS.

No. of
Marks.

1. Given the following field notes of the survey of an inclosure ; required its area in acres and hundredths :

50

Station.	Bearing.	Distance Chs.
1	N. 40° 21' E.	15·00
2	N. 84° 21' E.	38·00
3	S. 35° 24' W.	25·00
4	S. 79° 02' W.	19·00
5	N. 58° 29' W.	16·88

2. In a close survey of a rectinileal figure we have the equations

$$l \sin A + l' \sin A' + l'' \sin A'' + \dots = 0$$

$$l \cos A + l' \cos A' + l'' \cos A'' + \dots = 0$$

Show what missing parts, bearings and distances can be computed and how ; and also how ambiguity may arise through missing parts.

25

3. A rectangular field, 40 chains long, is divided by a brook. From the side of the field at every five chains offsets were taken in the brook as follows : 20 lks., 2 chs., 45 lks., 60 lks., 22 lks., 74 lks., 32 lks., 5 lks. and 23 lks. Required the area cut off by the brook.

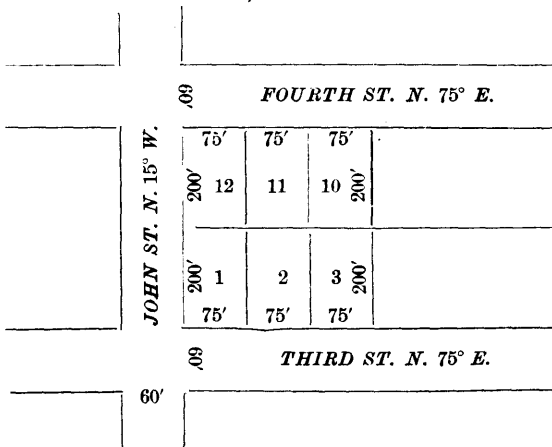
25

DESCRIPTIONS.

TIME, 3 HOURS.

No. of
Marks.

1.



The above is part of the registered plan of the town of Holly in the county of Tweed and province of Alberta. *A* sells to *B* a part of lot No. 1, and adjoining John and Third Streets. The part sold is to have a frontage of forty feet on Third Street to extend to the rear of the lot and the dividing line to be parallel to John Street. Make a description for a deed.

25

2. Using the plan of question 1. Supposing *A* to own lots Nos. 1 and 2, he sells lot No. 2 to *B*, and gives the right of ingress and egress to *B* by a lane 16 feet wide running along the whole of the rear limit of lot No. 1. Make the necessary description for the conveyance.

25

- | | |
|--|----|
| 3. Moose Creek flows across the N. E. $\frac{1}{4}$ S. 12, T. 13, R. 15 W. in an easterly direction. B desires to buy the northerly part of the quarter section lying north of the creek, together with the creek. From measurement the southerly bank of the creek intersects the eastern and western quarter section lines respectively at 22 ^{ch.} 12 and 20 ^{ch.} 18 from the northern quarter section line. The whole area to be conveyed is supposed to contain 85 acres. Make a description for a deed. | 25 |
| 4. Make a description for the remaining part of the quarter section given in question 3. | 25 |

ASTRONOMY (1st PAPER).

TIME, 3 HOURS.

- | | No. of
Marks. |
|---|------------------|
| 1. Define apparent, mean, and sidereal time ; also right ascension, declination and parallax. | 13 |
| 2. Explain the cause of the variation in the equation of time. A graphical solution may be given of the variation. | 13 |
| 3. Explain fully why Polaris is better adapted for the determination of azimuth than the sun. What are the most favourable times for observations of the sun for azimuth and time ? | 14 |
| 4. At what time—local mean time—was <i>a</i> Lyræ (<i>Vega</i>) on the prime vertical on June 16th, 1882, at the intersection of the Fourth Base Line and Third Meridian ? | 20 |
| 5. What was the local mean time of western elongation of Polaris at the place and time given in the preceding question ? | 20 |
| 6. At mean noon on March 15th, 1882, a sidereal chronometer is slow 2h. 15m. 17s. on local sidereal time, and has a daily losing rate of 2s. When will the chronometer show the correct local mean time ? | 20 |

ASTRONOMY (2ND PAPER).

TIME, 3 HOURS.

- | | No. of
Marks. |
|---|------------------|
| 7. On July 5th, 1882, at the intersection of the Sixth Base Line and Fourth meridian the observed altitude of the lower limb of the sun was 35° 16' in the forenoon.
What was the local time of observation and azimuth of the sun ? | 40 |
| 8. Explain the modus operandi of simple interpolation by second differences. | 20 |
| 9. At the same place and date as in question 7, what was the zenith distance of <i>a</i> Bootis (<i>Arcturus</i>) when on the prime vertical ? | 20 |
| 10. At the same place and date as in question 7, the hour angle of a star when on the prime vertical was three hours ; what was its observed altitude ? | 20 |

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PART III

IRRIGATION

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Map of a portion of Southern Alberta (sheets Nos. 1 and 2) showing the*Canadian Irrigation Surveys.

Sketch showing proposed location of the Saskatchewan Irrigation Canal.

Plan showing location of the St. Mary Irrigation Canal and the lands irrigable therefrom.

Plan of structures for the St. Mary Irrigation Canal (sheets Nos. 1 and 2.)

Plan showing preliminary location of the Bow River Irrigation Canal and the lands irrigable therefrom.

Plan of proposed structures for the Bow River Irrigation Canal (sheets Nos. 1 and 2.)

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Sketch showing the proposed method of diverting water from the Elbow River into the North Branch of Fish Creek.

Sketch of reservoir site "G" on the South Branch of Fish Creek.

Sketch of reservoir site "H" on the South Branch of Fish Creek.

Sketch of reservoir site "K" on the South Branch of Sheep River.

The maps and sketches referred to above will be found in the paper Pocket accompanying this report.

Department of the Interior.

SURVEYS AND IRRIGATION,
CALGARY, 2nd July, 1896.

E. DEVILLE, Esq.,
Surveyor-General, Department of the Interior.
Ottawa.

SIR,—I have the honour to transmit herewith the general report on irrigation and Canadian irrigation surveys for the year 1895.

Following the system adopted in the issue of the report for 1894, and to permit of convenience of reference, the present report has been divided into two parts.

Part I. contains some general remarks regarding the progress made during the past year in irrigation development, the administration through this office of the provisions of the North-west Irrigation Act, the meteorological conditions and water supply in the arid region, and the colonization of our arid lands. In the preparation of the portion of the report regarding the last-mentioned subject, I have had the benefit of the views of Mr. William Pearce, superintendent of mines, who has devoted considerable time and thought to the subject of the colonization of arid lands.

Part II. is devoted to a detailed account of the results of our irrigation surveys during the past season, and is necessarily of a somewhat technical character.

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

J. S. DENNIS,
Chief Inspector of Surveys.

Department of the Interior.

PART I.

GENERAL REPORT.

Before discussing the progress which has been made in irrigation development since the publication of the last general report on the subject, or the other questions treated of in this section of the present report, it is necessary that some remarks should be offered to correct a very erroneous opinion which prevails regarding the application of the term "arid" as applied to that portion of the North-west Territories within which irrigation is necessary.

In describing the boundaries, area and general characteristics of this region in previous reports, it has been clearly set forth that the portion of the Territories in question is only arid in the sense that there is insufficient rainfall during the majority of seasons to mature crops, and the fact therein stated that the soil of this region is good, and that none of it is arid in the sense of being barren wastes, but that the whole region produces a good crop of grass every year, cannot be too strongly emphasized in repeating that statement here. Probably the best means of dissipating the erroneous impression referred to, is to state that the so-called aridity constitutes one of the strongest features in the present value of the region, and renders it, even in its present condition and without irrigation, an exceedingly valuable portion of the public domain. This assertion will be better understood by reference to the marked success which has resulted from the stock industry in the arid portion of the Territories, and from the statement that this success is distinctly traceable to the fact of the small rainfall during certain portions of the year. The area in question produces every year a good crop of grass, the moisture from the melting snows and spring rains being sufficient to advance this growth to a healthy condition before the hot and dry summer months. The effect of the lack of rainfall during these months, which has led to the application of the term arid, is to rapidly cure the grass grown in the earlier part of the year in such a manner that its nutritive qualities are retained, and as a consequence, stock will thrive on this sun dried grass, which to the observer looks hard and useless, in such a marked manner that beef fit for market purposes is provided during the late fall and winter months direct from the range. Were the moisture sufficient to keep the grass green and growing until late in the season, the effect, which has been experienced during some seasons, would be that instead of being cured and rendered fit for good winter feed, it is largely killed by the early fall frosts, and cattle fed thereon become poor and weak. It will, therefore, be realized that while certain portions of the arid region will, with the aid of irrigation, produce bountiful crops of all kinds of cereals, the total water supply available for reclamation of areas by irrigation, as is more fully explained further on, will only suffice to irrigate a small portion of the region, and that the value of the remaining portion for grazing purposes is mainly due to the aridity which renders irrigation necessary, and further, that one of the greatest benefits to be looked for from irrigation is the reclamation of districts well suited in all other particulars for grazing purposes, by providing the water necessary for stock watering purposes.

IRRIGATION DEVELOPMENT.

During the past year, irrigation, both in the construction of reclamation works and in the interest in the subject manifested by those resident in the arid portion of the Territories and those connected with the advancement of the settlement of lands therein, has made rapid strides, and the subject has now passed beyond the stage when the value of water applied through irrigation and the possible results therefrom were looked upon with much doubt and suspicion.

At the close of the year 1894, there were 70 ditches constructed and in operation in Southern Alberta and Western Assiniboia. On the 31st December of the past year, this number had increased to 112, and the acreage under constructed ditches susceptible of irrigation therefrom to the surprising figure of 79,271 acres.

In addition to the canals and ditches which have been constructed, 42 ditches and canals have been surveyed, and the necessary applications for licenses therefor filed under the provisions of the North-west Irrigation Act. These works are calculated to supply water to about 62,753 acres, and as the construction thereof has, under the provisions of the law, to be commenced by the 1st May next, it is evident that this year will see a further satisfactory development in the reclamation of areas at present unproductive.

The following schedule will serve to show the extent and location of ditches and canals constructed and in operation at this date, together with those that have been authorized to be constructed during the present year.

Department of the Interior.

SCHEDULE of Canals and Ditches constructed and in operation in Southern Alberta and Assiniboia, together with those which have been authorized to be constructed during 1896.

Name.	Address.	Source of Supply.	LOCATION OF INTAKE.				Length of Ditch in Miles.	Acreage to be Irrigated.	Remarks.	
			Part.	Section.	Township.	Range.				Meridian.
Aird, James	Millarville	N. Fork of Sheep River	N. E.	23	20	4	5	2 00	105	Application made.
Aird, Peter	do	do	N. E.	4	21	3	5	0 75	110	do
Allen, Peter	Mountain View	Belly River	N. E.	35	2	28	4	1 00	100	do
Anderson, G., jun.	Millarville	N. Fork of Sheep River	S. E.	8	21	3	5	0 50	80	do
Anderson, G., sen.	do	do	N. E.	4	21	3	5	0 50	20	do
Austin & Mathewson	Dawdney	Sheep River	N. W.	25	20	2	5	1 50	70	do
Banister, A. F.	Davisburg	Bow River	N. W.	7	22	28	4	3 00	160	do
Bebo, Nelson	Calgary	Spring adjoining Fish Creek	N. E.	5	23	1	5	0 50	100	do
Behan, Thomas	do	Elbow River	N. E.	5	24	2	5	0 50	100	do
Bell, George	Millarville	N. Fork of Sheep River	N. E.	31	20	3	5	1 50	100	do
Bell, Irving & Kerfoot	Cochrane	Coal Creek	S. W.	31	27	5	5	4 50	580	do
Blake, F. S.	Livingstone	Tributary Oldman River	S. E.	21	28	4	5	1 00	80	do
Botterell, A. F.	Montreal	Dogpound Creek	N. W.	33	25	4	5	2 00	240	do
Bow River Horse Ranch Co.	Cochrane	Jumpingpound Creek	N. E.	30	11	23	3	1 50	200	do
Bramiff, Daniel	Maple Creek	Bear Creek	N. E.	10	26	4	5	1 50	68	do
Brettington, J. H. G.	do	Whitemud River	S. E.	20	18	28	4	1 00	158	do
British American Ranch Co.	Cochrane	Bighill Creek	N. W.	24	9	26	3	0 50	30	do
Broderick, Jamie	High River	Little Bow River	N. W.	24	9	26	3	0 50	30	do
Brown, William	Maple Creek	Maple Creek	N. W.	24	9	26	3	0 50	30	do
Burn, H. St. G.	Pincher Creek	Creek in Tp. 7, R. 2, W. of 5th M.	S. W.	34	7	2	5	0 50	60	Application made.
Burn, R. H.	do	do	S. W.	34	7	2	5	0 60	50	do
Calgary Hydraulic Co.	Calgary	Bow River	S. W.	4	25	4	5	6 00	2500	do
Calgary Irrigation Co.	do	Elbow River	S. E.	4	24	4	5	61 00	45400	do
Canadian Land and Ranch Co.	Crane Lake	Skull Creek	N. W.	7	12	22	3	7 00	930	do
do	do	Bridge Creek	N. W.	24	13	19	3	1 50	120	do
Card, C. O., and others	Cardston	Lee Creek	S. E.	5	3	25	4	6 00	1002	do
Claustre, Jean	Maple Creek	Pianot Creek	S. W.	19	10	24	3	1 00	300	do
Cochrane Ranch Co.	Macleod	Belly River	N. E.	8	2	27	4	2 00	200	do
Cox, D. H.	Mahmeed	Mahnee Creek	N. E.	31	10	27	4	1 00	80	do
Daly, James	Macleod	Daly Creek	N. E.	30	16	19	4	0 25	20	do
Davis, J. R.	Lethbridge	Etzi-kom Coulee	N. E.	31	6	27	4	1 00	100	do
Davis, R. A.	Livingstone	Creek in Tp. 7, R. 2, W. of 5th M.	N. W.	34	7	2	5	0 75	100	do

SCHEDULE of Canals and Ditches constructed and in operation in Southern Alberta and Assinboia, &c.—Continued.

Name.	Address.	Source of Supply.	LOCATION OF INTAKE.				Length of Ditch in Miles.	Acreage to be Irri-gated.	Remarks.
			Part.	Section.	Township.	Range.				Meridian.
Durban, W.	Springbank	Creek in Tp. 24, R. 3, W. of 5th M.	N. W.	18	24	3	5	100	Application made.
Edgar, William.	Priddis.	Fish Creek.	N. W.	26	22	3	5	82	do
Ellis, J. H.	Calgary	Elbow River.	N. W.	14	24	4	5	110	do
Elton, C. W. S.	Livingstone.	Todd Creek.	E. E.	19	8	1	5	80	do
Elton, E. A.	do	do	E. E.	36	8	2	5	80	do
Faucher, H. H.	Maple Creek.	Hay Creek.	N. W.	29	10	25	3	150	do
Flint, Charles.	Priddis.	Fish Creek.	N. E.	21	22	3	5	120	do
Fearon & Moore.	Maple Creek.	Piapot Creek.	N. W.	19	10	24	3	300	Surveyed and application about to be made.
Fisher, Joseph.	Millarville.	North Fork of Sheep River.	N. W.	1	21	3	5	375	Application made.
Findlay, R., and others.	High River.	Highwood River.	N. W.	30	18	29	4	5400	do
Fraser & McKinnon.	Millarville.	North Fork of Sheep River.	N. W.	7	21	2	5	315	do
Furman, John.	Cardston	Lake in Tp. 1, R. 26, W. of 4th M.	S. S.	28	1	26	4	100	do
Gardner, M.	Springbank	Tributary of Elbow River.	N. E.	12	24	4	5	360	do
Genge, Colin.	Macleod	Willow Creek.	N. W.	24	9	26	4	175	do
Glen Estate.	Calgary	Fish Creek.	N. E.	4	23	1	5	130	do
Glengary Ranch Co.	New Oxley	Troul Creek.	N. W.	26	12	29	4	473	do
Gunn, W. M.	Livingstone.	Todd Creek.	S. W.	12	9	2	5	70	do
Hackney, D. G.	Priddis	Creek in Tp. 21, R. 3, W. of 5th M.	N. E.	24	21	3	5	119	do
Hamilton, R.	Dewdney.	Sheep River.	N. E.	24	20	29	4	125	do
Heron, John.	Pincher Creek.	Pincher Creek.	N. E.	22	6	30	4	1000	do
Hooper, R. E. C.	Calgary	Elbow River.	N. E.	9	24	3	5	170	do
Howe, Samuel.	Dewdney.	Macabee Creek.	N. E.	31	19	3	5	100	do
Hull, W. R.	Calgary	Bow River.	N. E.	12	23	1	5	800	do
Hull, W. R.	do	Fish Creek.	N. E.	35	22	1	5	130	do
Indian Department.	Gleichen.	Bow River.	S. E.	17	28	3	5	1200	do
Inglis, R. C.	Calgary	Beaverdam Creek.	S. E.	17	28	3	5	105	do
Jackson, F. A.	Millarville.	Creek in Tp. 21, R. 3, W. of 5th M.	N. E.	26	21	3	5	75	do
Johnston, J. Lee.	Calgary	Rosebud River.	N. W.	14	24	4	4	215	do
Jones, W. J.	Maple Creek.	Hay Creek.	N. E.	20	10	25	3	25	do
Jones & Smart.	Saskatchewan Landing.	S. Saskatchewan River.	N. E.	20	10	25	3	25	do
Kennnis, John.	Livingstone	Todd Creek.	S. E.	26	8	2	5	70	do

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Lott, H. S.	Calgary	Ellbow River	N. W.	6	24	2	5	1-25	380	do
Lachance, P., and others	Macleod	Belly River	N. E.	14	8	25	4	3-50	1940	do
Lane, George, & Co.	High River	Kuntz Creek	N. W.	11	30	30	4	3-00	850	do
Leeds, Elliott & Co.	New Oxley	Willow Creek	N. W.	1	13	28	4	3-00	240	do
Lees, W. H.	Pincher Creek	Mill Creek	N. E.	34	7	2	5	0-50	50	do
Lineham, John	Dewdney	Creek in Tp. 20, R. 2, W. of 5th M.			20	2	5	0-30	100	do
Lloyd, Alfred	Maple Creek	Piapot Creek	S. W.	20	10	23	3	1-00	30	do
Lucas, Alex.	Calgary	Elbow River	N. E.	5	24	2	5	1-70	100	do
Maloney, Wm	do	Bow River	E. 3	26	23	1	5	2-00	300	do
Maunsell Bros	Macleod	Oldman River	N. E.	35	8	27	4	2-00	300	do
May, Ernest G	Calgary	Elbow River	S. W.	8	24	2	5	0-70	103	do
Moseley, W. R.	Priddis	Fish Creek	N. W.	21	22	3	5	1-00	130	do
Moseley, C.	Maple Creek	Bear Creek	S. E.	18	20	23	3	0-25	15	do
McLaughlin, J. W.	High River	Highwood River	S. E.	33	18	29	4	3-50	680	do
Newbolt, R. N.	Calgary	Bow River	N. W.	34	21	28	4	1-50	128	do
Newson, A. C	Priddis	Creek in Tp. 21, R. 3, W. of 5th M.	S. W.	35	21	3	5	0-75	240	do
Nelson, John	Livingstone	Oldman River	S. W.	27	8	1	5	1-50	80	do
Nelson, J. A.	Cardston	Lee Creek	S. W.	36	2	26	4	1-00	40	do
North-west Mounted Police	Colles	Spring in Tp. 2, R. 24, W. of 4th M.	S. W.	20	2	24	4	0-50	25	do
do	do	Waterton River	N. W.	28	6	25	4	1-75	160	do
Oxarart, M.	Stand Off	Creek emptying into Davis Lake						0-50	40	do
Ockley, J. W.	Priddis	Fish Creek	N. E.	10	22	3	5	0-75	110	do
Payne, W.	Mountain View	Mahmee Creek	N. W.	12	2	28	4	0-50	35	do
Pecock, F. W.	Maple Creek	Hay Creek	E. 1	9	11	25	3	1-00	255	do
Pecock & Sheldon	do	do	S. W.	4	11	25	3	0-50	125	do
Priddis, Charles	Priddis	Fish Creek	N. E.	21	22	3	5	2-00	130	do
Quail, W. H.	Lyndon	S. Fork of Trout Creek	N. E.	25	12	30	4	1-00	30	do
Quirk, John	Millarville	N. Fork of Sheep River	S. W.	5	21	4	5	2-50	350	do
do	do	do	S. E.	33	20	4	5	1-00	134	do
Quorn, Ranch Receivers	Dewdney	Sheep River	S. W.	22	20	2	5	4-00	1505	do
Ricardo & Bevan	Calgary	Bow River	N. W.	17	22	29	4	3-00	250	do
Russell, Geo. F.	Lethbridge	Pothole Creek	N. E.	17	7	21	4	1-00	80	do
Sheep Creek Irrigation Co.	Dewdney	Sheep River	E. 3	25	20	2	5	6-00	1206	do
Short, C. C.	High River	Highwood River	S. W.	34	18	29	4	1-00	120	do
Sibbald, J.	Jumping Pound	Jumpingpound Creek	N. W.	12	24	7	5	0-50	100	do
Skrine, W.	High River	Mosquito Creek	S. W.	8	16	1	5	0-25	60	do
Spalding, C.	do	Highwood River	N. W.	29	18	29	4	1-50	130	do
Stuart, W. W.	Jumping Pound	Jumpingpound Creek	N. W.	19	24	4	5	1-00	60	do
Turner, Robt.	Millarville	N. Fork of Sheep River	N. W.	3	21	3	5	1-50	145	do
Vaudin, E. H. O.	Calgary	Elbow River	S. W.	3	24	4	5	1-25	200	do
Waite, Joseph	Millarville	N. Fork of Sheep River	N. E.	23	20	4	5	1-50	120	do
Walker, B. G.	Calgary	Elbow River	N. W.	6	24	2	5	1-00	175	do
Wallace, A. T.	Maple Creek	Piapot Creek	N. E.	7	10	24	3	0-50	40	do
Wallace, R. A.	High River	Highwood River	W. 3	1	19	29	4	5-00	1985	do
Ware, John	Millarville	N. Fork of Sheep River	S. E.	27	20	4	5	1-70	100	do

SCHEDULE of Canals and Ditches constructed and in operation in Southern Alberta and Assiniboia, &c. — *Continued.*

Name.	Address.	Source of Supply.	LOCATION OF INTAKE.				Length of Ditch in Miles.	Acreage to be irrigated.	Remarks.	
			Part.	Section.	Township.	Range.				Meridian.
Warren, J. C.	Millarville.	Creek in Tp. 21, R. 3, W. of 5th M.	N.	E.	26	21	3	5	80	Application made.
Wells, W. C.	Palliser, B. C.	Creek in Tp. 27, R. 6, W. of 5th M.	S.	E.	2	27	6	5	300	do
Whitten, N.	Maple Creek	Hay Creek.	S.	E.	16	10	25	3	25	do
Young, George T.	Priddis.	Fish Creek.	N.	W.	3	22	3	5	310	do

APPLICATIONS MADE AND CONSTRUCTION AUTHORIZED.

Blunt, C. D. McK	High River	Highwood River	W.	S.	23	18	1	5	5.00	960
Card, C. O. and others	Cardston.	Lee Creek	N.	W.	9	3	25	4	1.00	295
Cochrane, T. B. H	Mitford	Biglinn Creek	N.	W.	11	26	4	5	3.00	586
Cook, Hy. F.	Cardston	Boundary Creek	S.	W.	26	1	26	4	1.50	148
Cumberland, A.	Maple Creek	Piapot Creek	S.	W.	17	11	24	3	0.25	50
Dixon & Stuart.	do	Maple Creek	S.	E.	28	10	26	3	4.50	915
Dowling, Annie	Priddis	Fish Creek	N.	E.	4	22	3	5	1.00	110
George Bros	Macleod	Beaver Creek	S.	W.	20	9	29	4	3.00	400
Glennie, A., and others.	Maple Creek	Bear Creek	S.	E.	30	11	23	3	2.00	220
Glennie, W., and others.	do	do	S.	E.	22	11	23	3	1.50	250
Graves, H. D.	Calgary	Dogpound Creek	S.	E.	30	30	3	5	1.50	95
Hamilton, J. & S.	do	Springs in Tp. 22, R. 2, W. of 5th M.	N.	W.	9	22	2	5	1.00	60
Head, J. J.	Cardston.	Lee Creek	S.	E.	13	2	27	4	1.50	71
Hone, Addison	Priddis	Fish Creek	N.	W.	21	22	3	5	0.50	40
Houk, George.	Lethbridge.	St. Mary River	S.	W.	25	7	22	4	0.50	50
Hull, W. R.	Calgary	Mosquito Creek	S.	E.	25	15	29	4	1.00	105
Hunter Bros. & Edgar.	Priddis.	Fish Creek	N.	W.	26	22	3	5	2.00	347
Kearl, James.	Cardston.	St. Mary River	S.	E.	9	1	25	4	1.50	148
Livingstone, S. H.	Calgary	Elbow River	S.	E.	3	20	2	5	4.00	486
Macmillan, J. A.	do	Sheep River	W.	E.	3	23	2	5	2.00	799
Marsh, D. W.	do	Maple Creek	S.	E.	28	10	26	3	1.50	110
Marsh & Dixon	Maple Creek	Belanger Creek	S.	E.	28	10	26	3	4.50	915
Millar, M. T.	Millarville.	N. Fork of Sheep River	N.	W.	2	21	3	5	0.75	165

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Morgan, William	Counties	Halfbreed Creek	31	2	9	4	1.00	200
McDonough, James	High River	Highwood River	S. W.	18	1	5	2.00	263
McHugh, T. P.	Gleichen	Spring in Tp. 19, R. 22, W. of 4th M.	S. W.	25				
Paterson, J. D.	Priddis	Fish Creek	S. E.	33	19	4	0.50	100
Pilling, R., senr.	Cardston	St. Mary River	N. W.	23	3	5	1.00	116
Reid, E. O. & G. A.	Cochrane	Dogpound Creek	N. E.	19	2	4	0.50	67
Rodgers, James	Dewdney	Creek in Tp. 20, R. 1, W. of 5th M.	N. W.	20	28	5	1.00	114
Shea & Madden	Cochrane	Beaverdam Creek	W.	32	20	5	0.50	32
Shead, Arthur	Macleod	Oldman River	E.	21	28	3	2.25	249
Short, J. W.	High River	Highwood River	W.	14	9	4	1.00	160
Sinnot, Hy	Millarville	Ware Creek	N. E.	30	18	4	3.00	305
Smith, Jesse P.	Lethbridge	St. Mary River	W.	21	20	4	0.75	32
Springbank Irrigation District	Springbank	Elbow River	W.	25	7	4	1.00	87
do	do	Jumpingpound Creek	E.	4	24	4	36.00	21200
Walsh, R., senr. and junr.	Cochrane	Beaverdam Creek	S.	13	24	5	42.00	30776
Waters, William	Counties	Milk River	S. W.	36	28	5	2.00	258
Pilling, Richard, senr.	Cardston	Snake Creek	N. W.	31	2	5	3.00	320
Lindquist, A. A.	do	Boundary Creek	E.	22	2	4	2.00	191
Furnman, John	do	Tributary of Boundary Creek	S. E.	19	1	4	1.00	109
Herron, John, and others	Pincher Creek	Pincher Creek	N. E.	28	1	4	1.00	24
			S.	22	6	4	3.00	975

In considering the foregoing schedule, it is worthy of note that the large and healthy growth of irrigation development as evidenced therein, is largely the outcome of personal efforts of the resident population in their endeavour to improve existing conditions, and is not in the remotest sense attributable to any attempt to "boom" irrigation or the construction of irrigation works. It may be safely said that in very few of the new and undeveloped portions of Western America, have the settlers evinced a greater readiness to help themselves by striving to overcome nature's shortcomings in the way of insufficient moisture than has been shown by our population in the arid portion of the Territories during the past two years. That this fact is sure to aid in the rapid growth of the irrigation principle, and result in the early construction of the larger works requiring combined effort and capital, will be realized by those who have experienced the many difficulties to be overcome in interesting capital in any undertaking which is in an experimental stage, or from which the results are uncertain.

It is somewhat difficult, with the data available, to estimate with any close degree of accuracy the cost of works which have been constructed by the owners thereof without the employment of outside labour, but by making a fair allowance at current wages for the work performed by the settlers themselves, it may be assumed that the amount expended to date on existing irrigation works is not less than one hundred and ten thousand dollars.

CALGARY IRRIGATION COMPANY.

This company made an important addition to their works during the past year, having completed the construction of an additional twenty miles of canal in their main system, and also having constructed a second small ditch, about one and a half miles in length, heading in the Elbow River in the immediate vicinity of Calgary, and calculated to serve some seven hundred acres of land lying east of the Elbow River and south of the Bow River.

The works of this company now completed, are capable of serving water to about five thousand acres irrigable therefrom, and as the portion of this area susceptible of irrigation from the small ditch is situated within easy reach of this city, the results from the application of water should prove a useful object lesson to those unacquainted with the principle of irrigation.

The accompanying illustration, Plate I., shows the manner in which the water for the small ditch above mentioned is carried over the Elbow River from the west to the east side.

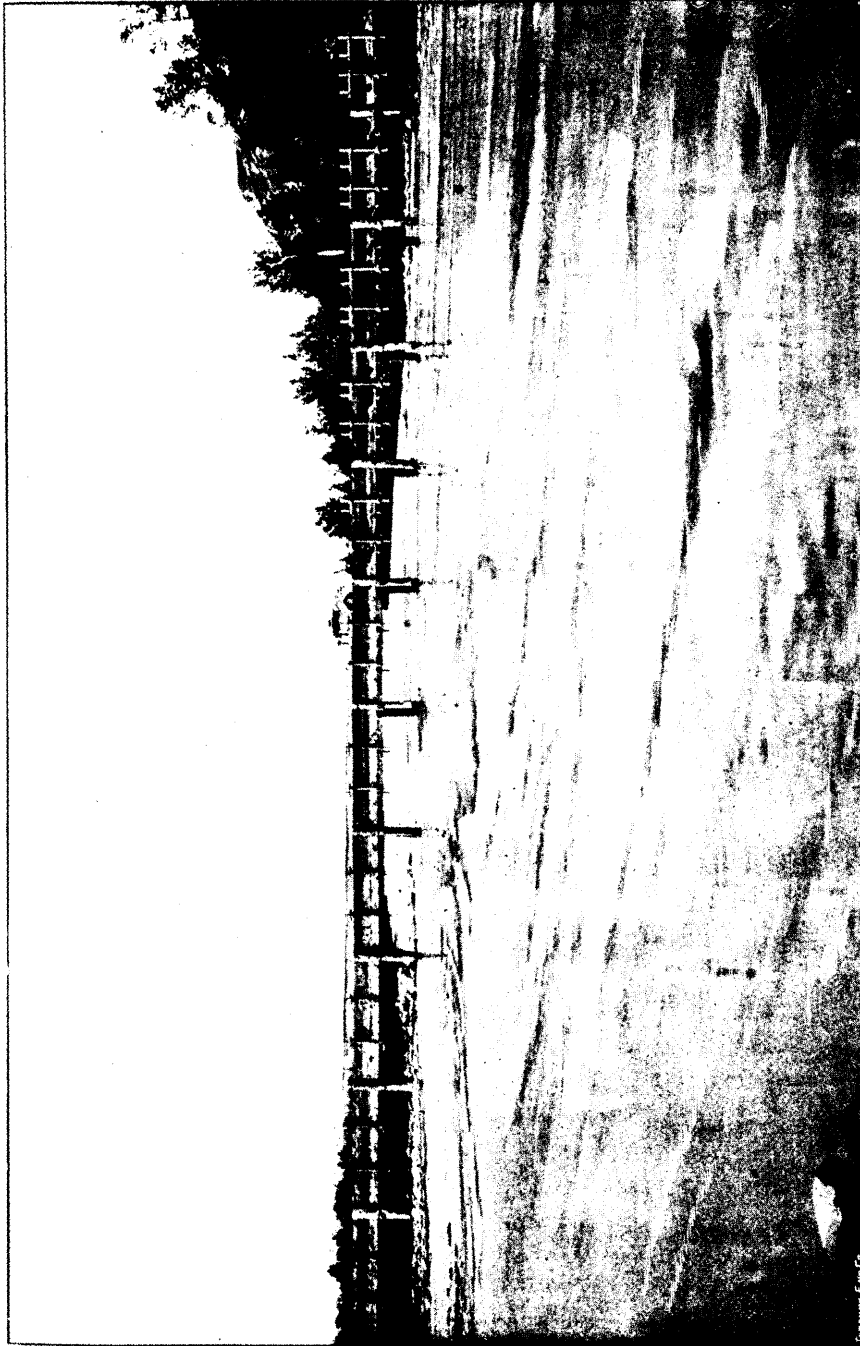
CALGARY HYDRAULIC COMPANY.

During the past year, the Calgary Hydraulic Company completed some necessary additions to the portion of their main canal described in the report for 1894, and also constructed a main lateral across Sections 19, 20 and 21, in Township 24, Range 1, W. of 5th Meridian. The works of this company are now capable of supplying water to some 1900 acres, and as the larger part of this area is good soil, the results should be of a satisfactory character.

Many extensions and enlargements have been made during the past year in the private ditches, among the most important of which may be mentioned the extension of the system constructed by Mr. W. R. Hull on his large farm at the mouth of Fish Creek, so as to bring an additional area of 800 acres under water. The extent of the work undertaken, and the faith of the owner in irrigation, is graphically shown by the accompanying illustration, Plate II., showing the deep cut through a gravel bank at the intake of his Bow River ditch, and the results of the application of water to a portion of the area are quite as forcibly shown by the view, Plate III., of his automatic raker and stacker at work gathering the season's yield of 900 tons of crop from land which yielded nothing before irrigation.

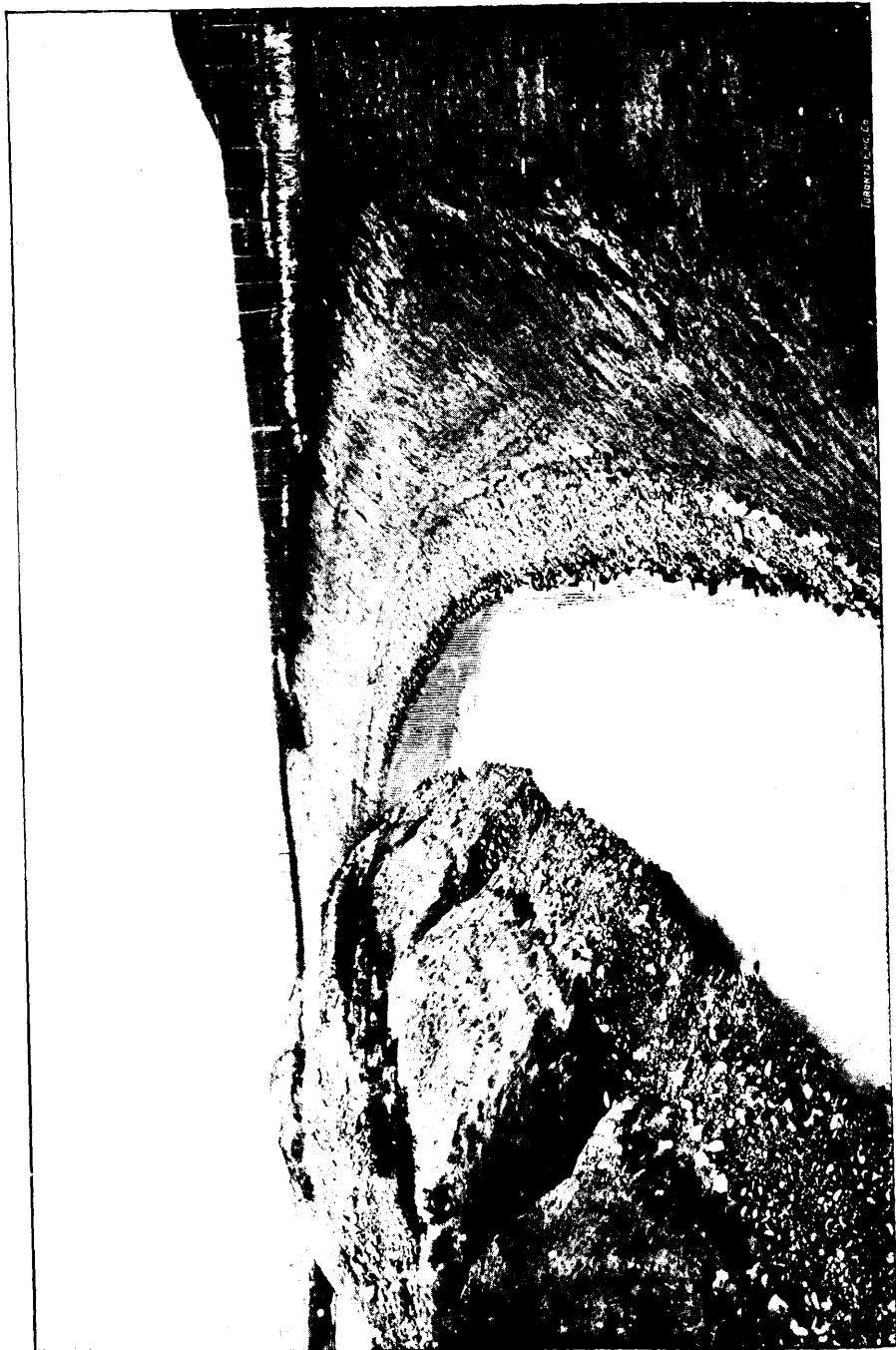
Messrs. Findlay, McDougall and Riley, who, jointly with the High River Horse Ranch Company are building the ditch heading in Highwood River mentioned in last

PLATE No. I.



CALGARY IRRIGATION COMPANY'S FLUME ACROSS THE ELBOW RIVER.

CHRYSE E. W. CO.



DEEP CUT AT INTAKE OF MR. W. R. HULL'S BOW RIVER DITCH.

LIBRARY OF THE U.S. GEOLOGICAL SURVEY

PLATE No. III.



AUTOMATIC RAKE AND STACKER AT WORK ON "MR. W. R. HELL'S IRRIGATED FARM."

Department of the Interior.

year's report, finished a considerable portion of their main ditch during the past season, and with the completion of the work to be undertaken as soon as the weather permits this spring, will be in a position to supply water to a large portion of the 5,400 acres to be supplied from the completed system.

Mr. R. A. Wallace, of High River, who now owns the ditch originally constructed by Mr. Isaac Potter, has completed enlargements and extensions of the system so as to bring an additional 1,000 acres under irrigation.

The ditch heading in Lee Creek upon which construction was commenced by Mr. C. O. Card and others of the Mormon colony at Cardston, in September, 1894, was nearly completed last season, and it is expected that water can be supplied from this ditch during the present year to serve 1,000 acres.

Many of the smaller private ditches constructed and in operation during the previous year, have been enlarged, and more permanent structures erected, and the majority of them are in good shape to begin the supply of water so soon as the irrigable season opens.

The extension of irrigation to portions of the arid region where particular attention had not heretofore been given to the subject, is indicated by the construction and operation of the 14 ditches in the Maple Creek district, and those being operated by the Canadian Land and Ranch Company, at Crane Lake and Gull Lake, together with the ditch constructed by Messrs. Jones and Smart, at Saskatchewan Landing, north of Swiftcurrent. All these ditches are in Assiniboia, in the central portion of the arid region, and owing to the favourable conditions as to temperature existing there, as indicated in the meteorological tables published in the last general report, the results from the application of water through irrigation are sure to be more satisfactory.

Mention should also be made of the interest aroused in the subject of irrigation at points outside the arid region proper, where dry seasons are occasionally experienced, as evidenced from informal applications received from residents of the Battleford district and from Southern Manitoba, for permission to use water for irrigation purposes, and by inquiries from the Annapolis Valley, in Nova Scotia, regarding the methods to be pursued in applying water artificially to aid in the production of fruit crops.

Among the ditches which have been authorized, and upon which construction will be commenced this spring, two or three are deserving of special mention as an evidence of the faith of the present population of the district in the artificial application of water to aid in producing crops. The largest of these ditches is that to be constructed by the Okotoks Irrigation Company, which heads in Sheep River, near the village of Dewdney, and runs from there in an easterly and southerly direction for about 15 miles. This ditch is designed to water 5,000 acres, and as the soil of a larger portion of the area is of a very fertile character, the results should be satisfactory. The authorization for this ditch was originally applied for jointly by those owning the lands to be irrigated therefrom, and their subsequent incorporation by letters patent as a joint stock company was obtained for the convenience of administration and allotment of rights, and not in any sense as a commercial undertaking. It is understood that the company purpose constructing their ditch mainly with the labour of different land owners who have become members of the company, and who will obtain their stock therein in payment for actual work done; by carrying out this arrangement, it will only be necessary to raise the comparatively small amount of money needed for the purchase of supplies and materials, and there is no doubt that the results from canals constructed by mutual effort of this kind, provided the labour is done under intelligent direction and supervision, must be of the most satisfactory character, for those who are to receive water from the ditch will be the owners thereof, and have an opportunity of acquiring their interest by work in the construction, instead of having to pay therefor in actual cash expenditure, and as there is a considerable portion of each season during which a farmer can devote his own labour, and the use of his teams to outside work, without in any way interfering with the farm work, the time expended on canal construction during this period is really of little cost to him.

Mr. C. D. Blunt has been authorized to construct a ditch heading in Highwood River, a short distance above the village of High River, designed to serve some 960 acres in that

vicinity. The area to be covered by this ditch is good soil, and judging from the crops raised on other irrigated farms in the vicinity, the results from this undertaking should be of a satisfactory character.

Of the smaller undertakings authorized, mention should be made of the ditch to be constructed by Mr. J. W. Short, heading in Highwood River, and calculated to reclaim about 350 acres; that to be built by Mr. J. A. Macmillan, heading in the South Fork of Sheep River, designed to water about 800 acres; and the scheme undertaken by Messrs. George Bros., having in view the diversion of sufficient water from Beaver Creek on the south slope of the Porcupine Hills to irrigate some 400 acres.

SPRINGBANK IRRIGATION CANALS.

These canals, heading in the Elbow River and Jumpingpound Creek respectively, are calculated to reclaim some thirty to forty thousand acres in the district lying between the Bow and Elbow Rivers and the Jumpingpound Creek, and are being undertaken as a municipal work by the residents of the district under the provisions of the North-west Irrigation District Ordinance. Authority has been issued for the construction of the canal heading in the Elbow River, but owing to protests received from some of the residents in the district who do not want to go in for irrigation on this basis, the Jumpingpound scheme has not yet been authorized, and at present there seems to be considerable doubt regarding the commencement of construction on the Elbow River canal this season. The delay in getting water for irrigation in this district is to be regretted, as the efforts of the farmers during late years to raise crops under natural conditions have been very unsatisfactory, and with irrigation, the prospects, particularly from a dairy farming standpoint, would be very encouraging. However, it is a matter of considerable doubt in the minds of many, whether irrigation works constructed as a municipal undertaking under the present provisions of the above mentioned ordinance are calculated to be successful, this opinion being based upon reasons referred to at some length further on in these pages.

ST. MARY AND BOW RIVER CANALS.

Two important records have been made during the past year against the available water supply for irrigation in Southern Alberta, to provide for the St. Mary and Bow River canals heading in the streams of those names, which were surveyed during the past year by Division A of the Irrigation Surveys. These canals are designed to reclaim between two and three hundred thousand acres of land at present unavailable for successful agriculture, and their construction will have a most important bearing upon the future development of the western portion of the arid region. The location and survey of these canals were undertaken with the object of demonstrating, in connection with our general survey operations, where the available water supply for large known areas of good soil could be obtained, but it is hoped that the favourable conditions for the easy diversion and delivery of the water discovered by our surveys may expedite the actual construction of the canals by private enterprise. The dimensions and locations of the canals and the areas to be served thereby, are fully described in Part II. of this report.

WATER RIGHTS GRANTED, OTHER THAN THOSE FOR IRRIGATION PURPOSES.

The North-west Irrigation Act recognizes the beneficial use of water under three heads, viz., domestic, irrigation and other purposes, and applications for water under these heads take precedence in the order given. To enable us to properly administer the available water supply, in manner more fully described below, we have endeavoured to get all the rights existing before the passage of the Act under the first and last above mentioned heads recorded during the past year. The following schedule will show the applications so far recorded for domestic and other purposes:—

Department of the Interior.

SCHEDULE of Water Rights granted for Domestic and Other Purposes.

Name.	Source of Supply.	Water granted for.	LOCATION OF INTAKE.				Quantity of Water.	Remarks.	
			Part.	Section.	Township.	Range.			Meridian.
Alberta Railway and Coal Co.	Belly River	Domestic.	S. W.	1	9	22	4	Second feet.	
do	Milk River	do	S. W.	2	16	4	4	.154	
Calgary Gas and Water Works Co	Bow River	Other purposes.	S. W.	22	24	1	5	.030	
Calgary Water Power Co.	do	Domestic.	S. W.	22	24	1	5	20 000	
Canadian Pacific Railway Co.	Moosejaw Creek	do	S. W.	33	16	26	2	.154	
do	Swiftcurrent Creek	do	S. W.	25	16	12	3	.038	
do	do	do	N. W.	19	13	13	3	.116	
do	Piapot Creek.	do	N. W.	8	12	23	3	.045	
do	Ross Creek.	do	N. W.	31	11	2	4	.030	
do	South Saskatchewan River	do	N. E.	31	12	5	4	.154	
do	Bow River.	do	S.	Blackfoot Reserve.				do	.092
do	Elbow River.	do	S. W.	14	24	1	5	.090	
do	Bow River.	do	S. W.	18	26	4	5	.045	
do	do	do	S. W.	30	24	8	5	.045	
do	do	do	S. E.	2	26	12	5	.030	
do	Fortymile Creek.	do	N. E.	28	28	16	5	.045	
do	Bow River.	do	N. W.	33	2	30	1	.030	
do	North Antler Creek.	do	S. W.	33	3	2	2	.030	
do	Moose-mountain Creek.	do	S. W.	30	1	6	2	.045	
do	Souris River.	do	N. E.	20	8	14	2	.030	
do	do	do	S. E.	20	8	14	2	.015	
do	Boggy Creek.	do	N. W.	26	19	21	2	.015	
do	South Saskatchewan River	do	N. W.	28	36	5	3	.007	
do	McFarlane Creek.	do	N. E.	13	46	1	3	.007	
do	Sevenpersons Coulee.	do	S. E.	4	11	7	4	.015	
do	Belly River	do	N. W.	7	10	16	4	.030	
do	Battle River	do	S. W.	4	43	25	4	.015	
do	Bow River.	do	S. W.	22	24	1	5	1 000	
Eau Claire and B.R. Lumber Co.	Lee Creek.	do	S. W.	9	3	25	4	do	
Card, C. O., and others.	Elbow River.	do	S. W.	14	24	1	4	25 000	
Hull, W. R.	Sheep River.	do	S. W.	14	24	1	4	do	
Lineham, John	Mill Creek.	do	S. E.	29	20	29	4	do	
McLaren, Peter	Fish Creek.	do	S. E.	18	6	1	5	do	
Shaw, Kinnaird & Co	Springs.	do	N. E.	4	23	1	5	do	
Gardiner, C. W. E.	do	do	N. E.	16	9	28	4	.008	
								.750	

RESULTS FROM IRRIGATION DURING 1895.

The past year was not a favourable one for irrigation. The season, as compared with the average conditions existing during previous years, being unusually wet and cold, and though the growth was in most cases satisfactory, there was an almost entire absence of ripening or good harvest weather.

Even with these unfavourable climatic conditions, the results obtained by those engaged in irrigation during the past season were not unsatisfactory, as will be noted from the following statement compiled from returns received from the majority of irrigators at the close of the season, which was issued early in the year in the form of a bulletin as given hereunder :—

DEPARTMENT OF THE INTERIOR.

(Surveys and Irrigation.)

BULLETIN No. 1.

CALGARY, 19th March, 1896.

During the past winter an effort has been made to obtain, in a concise and condensed form, the experience of those who have been farming by the aid of irrigation during the year 1895, with some idea of the results which had followed the application of water in this way. The experiences and results have been condensed in the accompanying statement, and are issued with the hope that an interchange of ideas among those engaged in irrigation, to the majority of whom the principle is new, may result in mutual benefit.

In considering the results accomplished, as indicated by the statement, it is necessary that the somewhat unusual climatic conditions which prevailed in Southern Alberta and Western Assiniboia during the summer months of the past year should first receive brief attention. In the early spring months of the year the weather was rather colder than usual and the rainfall below the average, as a consequence vegetation was slow and backward. Beginning with June, a marked change in the weather occurred, and during this and the following summer months the average temperature was low and the rainfall above the average. These conditions resulted in a very rank growth of all crops which did not, in the majority of cases, reach maturity owing to the absence of dry, warm, ripening weather, and it may therefore be assumed that the results obtained are not a fair indication of what may be looked for during the majority of seasons. The exceptional character of the season will be more readily understood from the following information, compiled from the records of the different meteorological stations throughout the district :—

STATEMENT of Temperature and Rainfall at certain points in Southern Alberta and Western Assiniboia during the months June to September, in the year 1895, as compared with the five preceding years.

Place.	Average temperature, June to September, 1895.	Average same period, five preceding years.	Rainfall June to September, 1895.	Rainfall same period, five preceding years.
Calgary	56·0	56·1	8·16	6·61
Gleichen	58·3	58·5	5·13	5·07
Medicine Hat.....	62·7	62·8	6·90	6·71
Swiftcurrent.....	61·1	60·4	7·62	8·40

Department of the Interior.

Bearing in mind the conditions which existed, we may proceed to give the results obtained, accompanied by the remarks of those who have replied to the request for information, but attention may be directed to the fact that many of those having irrigation ditches have not furnished the information asked for, and the statement is not, therefore, as complete as it would have been had complete details been available. It is to be regretted that all irrigators have not seen fit to reply to the invitation of the Department to fill in the forms sent them, because it is largely by an interchange of ideas and a careful assembling of facts regarding crops, number of irrigations and results, that we may hope to be able to compile some reliable data regarding these questions for the guidance of those who look to this means of making farming or ranching profitable, but who are ignorant of the best methods to follow in accomplishing this desired end.

A careful examination of the facts contained in the statement leads to the conclusion that those engaged in irrigation are unanimous in the opinion that irrigation produces an assured and abundant crop of hay where none was harvested under ordinary circumstances, while others speak of their crop being doubled and, in some cases, trebled by the application of water in this way.

In the production of vegetables, the weight of evidence seems to prove that, even in an unfavourable season such as the last was, the results of applying water through irrigation are most satisfactory, and it may now be accepted as a fact, proved by the experience of the past unfavourable season, that the owner of an irrigated farm is certain of a good crop of fodder and vegetables every year.

In the growth of grain the experience of the past year was very unsatisfactory, this result being largely due to the cold wet season and early frosts as above described. It may, however, be reasonably expected that during the average season good results will be obtained at least in the production of oats, barley and rye, as the favourable ripening weather which is usually experienced in August should mature the crops which have been provided with sufficient moisture through irrigation to ensure a luxuriant growth during the preceding months.

From the general remarks of those who have furnished information and from personal experience of the subject, it may be accepted as a rule that the most satisfactory results from irrigation in the growth of hay and grain crops are to be looked for from areas which have been irrigated in the fall, so that water need not be again applied in the spring until the growth is well started and vigorous, and it is also quite evident that the too frequent and abundant application of water is a mistake which will retard instead of advancing the growth.

NOTE.—During the present year it is hoped that irrigators will keep such notes regarding the dates and quantities of water applied, acreage under crop and results therefrom, as will enable a complete bulletin to be issued in the fall.

INFORMATION from Irrigators.

Number.	Name.	LOCATION OF LANDS.			ACREAGE UNDER CROP.										Number of Irrigations.	DATE OF IRRIGATION.		DATE OF HARVEST.		
		Township.	Range.	Meridian.	Wheat.	Barley.	Oats.	Rye.	Timothy.	Alfalfa.	Bromus.	Native Grasses.	Vegetables.	Total.		First.	Last.	Hay.	Grain.	Vegetables.
1	Ricardo & Bevan	22	4	4	20	10										2	May 13, July	July to Sept.	No details.	
2	A. E. Banister	22	28	4													All summer.	June 5, Aug. 15.	No details.	
3	Jos. Fisher	21	3	5													As required.	April 10, July 20.	do	
4	H. S. Lott	24	2	5		18		2½									Constantly.	do 15, do 15.	Aug. 31.	do
5	J. Furman	1	26	4				15										do 12, June 15.	July 15.	Oct. 1.
6	M. Gardner	24	4	5				No details.										do 15.	No details.	
7	R. A. Wallace	19	28	4	20												1	May 15.	do	
8	W. R. Hull	22	1	5	25	25	80	50									2	June 5, July 20.	Aug. 31.	Cut green.
9	W. G. Glennie	10	24	3	6		6		140								Hay all fall.	May 1.	do 10, Sept. 21.	Sept. 27.
10	John Quirk	21	4	5				8									Continual.	May 1, July 30.	do 15, Aug. 1.	Aug. 28.
11	Cochrane Ranch and N. W. M. Police	6	25	4			335											do 23, Aug. 20.	do 17, Cut green.	Sept. 29.
12	G. Anderson	21	3	5														do 15, July 25.	do 1.	
13	G. Anderson, jr.	21	3	5		2												do 15, Aug. 15.	do 15, Cut green.	Oct. 1-24
14	F. A. Jackson	21	3	5														June	Sept. 21.	
15	Alex. Aird	20	4	5		2		3										May 1, do 31.	Aug. 15.	Cut green.
16	Wm. Edgar	22	3	5	8				1									June	do 31.	No details.
17	W. B. Elliott	26	4	5	1½	3	22	5										May 27, June 24.	Sept. 15.	Cut green.
18	Wm. Pearce	24	1	5	6½	4½	13	2	1	6								June 4, June 28	Aug. 31.	Cut green.
19	C. Flint	22	3	5	4	5												July 1, Aug. 1.	do	
20	R. E. Hooper	24	3	5		3												June	No details.	
21	Jas. Aird	21	3	5		7	4		1									Aug. 1, July 1.	Aug. 23.	
22	W. R. Moseley	22	2	5	2½		3½											June 1, July 1.	do 1, Aug. 23.	
23	A. C. Newson	21	3	5														No record kept.	do	
24	C. C. Short	18	29	4	8													Nov., '94	May, '95	Sept.
25	W. C. Wells	26	6	5	40	30												July 20.	do	Cut green.
26	Calgary Irrigation Co.	24	3	5	140													June 1, do 1.	Aug. 15.	

INFORMATION from Irrigators—Continued.

Number.	RESULTS.			Soil.	General Remarks.
	Hay.	Grain.	Vegetables.		
1	Tons. 75	Bush.	Bush.	Sandy loam	Crops in too late. Ditches not in order and considerable hay not cut owing to weather, hence poor results.
2	200	Abundance	Abundance	Black loam	Hay not cut, abundance of green grain. Grass left to seed ground.
3	149	10 tons	10 tons	Loam, gravel sub soil	50 acres not cut. Crops more than doubled by irrigation.
4	30	Very good	Very good	Black loam	Hay cut on land that yielded none before irrigation.
5	No details	No details	No details	do	Land irrigated produced double the quantity of hay from land not irrigated.
6	No details	No details	No details	Sandy loam.	Believe irrigation will keep off frost. Land should be watered late in fall.
7	60	None.	Fair.	do	and grain not before blue tint is on, or it will weaken.
8	985	Cut green.	400 potatoes, Other in proportion.	Sandy and black loam.	Except on grass, plenty of natural moisture for good growth since 24th May. Would recommend that bromus be grown separately, not mixed with other grasses.
9	12	300	200	Black loam	Little irrigation needed owing to wet season. Potatoes below average.
10	240	Cut green	Good	Light, gravelly	I believe in irrigating in fall, as land is moist as soon as frost leaves in spring.
11	2 tons per acre.	do	do	Light sandy loam.	
12	60	3½ tons, green.	do	do	Cold weather and frost retarded growth.
13	30	do	do	do	Potatoes did not do well. Hay, fair. Frost retarded growth.
14	1½ tons per acre.	40 tons, green.	do	Clay loam	Water not distributed to best advantage. Creek often runs dry.
15	102	Average 2 tons per acre.	do	Black and sandy loam.	Irrigation makes a considerable improvement after first year.
16	10	300	300	Deep loam.	Fall irrigation a benefit. Spring freshets are good owing to manure from side hills.
17	50	Not computed	Not computed	Black and light loam.	Cut very little hay, season has been too cold.
18	6	22 loads	22 loads	Light loam	Extreme frost in May greatly injured barley and oats. Alfalfa and timothy seeded this year, no crop. Vegetables, fair. Garden vegetables, excellent. Grain was too small when irrigated, and cold water checked growth. Had water been available at time of seeding, results would have been better. Ditch and works not completed till May.
19	120	650	160 tons, green.	Sandy loam.	No crop but hay in 10 years.
20	128	400	400	Light	Green grain averaged 3 to 4 tons per acre. Vegetables frozen.
21				Sandy loam.	Timothy and green oats excellent. First year of irrigation.
22				Black loam.	Too much rain spoiled grass.
23				Very light	No other details or remarks.
24				Black loam.	Irrigation gave 20 bush, more grain per acre.
25				do	System completed too late for good results.
26				do	Land unfenced, crop small owing to cattle feeding.

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27	40				do	No remarks.
28	50 tons				Sandy loam.	Season too wet. Land not irrigated had as good crops.
29	Cut green.				do	Grain promised well but did not mature owing to weather.
30	400		50		do	Water not on soon enough to start grain. Weather delayed ripening.
31	None cut.		Excellent.		do	Irrigated grass to renew that eaten down.
32	Satisfactory		Good		do	Bad year for irrigation. Too cold in spring to put water on. Cannot grow crops to ripen, but irrigation is what is required for green feed.
33	175				Sandy	No remarks.
34	35				do	Only cut small quantity. Most of grass left for winter feed.
35	15				Black loam.	Slough grass grew very well but upland grass only slightly better. First year of irrigation.
36	150				do	About 200 acres very light on account of being first season of irrigation.
37	No details		No details			Irrigated land confined at present to swamp, which gives good results with water all summer.
38	70				Gravelly	No remarks.
39	73		160		Sandy loam.	Water continuously on timothy. Grain by seepage from hay meadow. Oats 43 lbs. per bushel. Wheat cut green.
40	25				Gravelly	Part of acreage only partly irrigated. Good results where properly irrigated.
41	40				Sandy loam.	Only 40 acres cut. Results fairly good considering quality of soil.
42	60		300		Clay loam	Vegetables of all kinds in abundance. Alkali bothers grain after hot dry weather.
43	2 to 3 tons		Good		do	Crops are doubled when irrigated. Expect to have 1000 to 2000 acres in 1896.
44	45 loads				Sandy loam.	Have no doubt could ripen grain two years out of three. As fodder is of more value, ripening is immaterial.
45	175				do	Season very unfavourable on account of cold. Irrigation of great advantage.
46	1 to 1½ tons per acre.				Black loam.	Care must be taken not to over irrigate this kind of soil.

This statement, although it only contains information regarding part of the crops raised by irrigation, shows the value of these crops during the past year to be a satisfactory return upon the sum invested in the irrigation works mentioned, without making any allowance for the indirect increase in values attributable to irrigation development.

The information regarding the results obtained, condensed in the above bulletin, was issued with the object of providing for an interchange of ideas among the different ditch owners as to kind of crops, number of irrigations and results therefrom, so that each may benefit to some extent from the experience of the others. The bulletin has been favourably commented upon by many of those to whom it was sent, and it is hoped that in the future the returns from irrigators will be prompt and complete, so that an annual bulletin of this kind may be issued containing a complete synopsis of the results of the previous season's operations.

ADMINISTRATION OF WATER RIGHTS.

In the last general report on irrigation, some space was devoted to a discussion of the general principles of our Irrigation Act; it will, therefore, now be of interest to state at some length the steps which have been taken to provide for a careful administration of the provisions of the Act, together with some comment on the title to water obtained thereunder.

The experience gained in administering the Act during the season of 1894 had led to the conclusion that some slight amendments were needed to simplify the procedure to be followed in recording and obtaining a license for the small ditches of individual owners, and also to correct certain ambiguities in the wording of one or two clauses relating to the general question of water rights. These necessary amendments were passed at the session of Parliament of 1895, and the experience gained in administering the law in its application to the large number of ditches constructed or projected during the past year enables us now to speak with some certainty regarding the suitability of the Act to existing conditions.

In the spring of last year the work of the irrigation office here was undertaken in connection with the general supervision of the irrigation surveys, such office having become necessary by the amendment to the Act providing that all memorials and plans submitted in connection with applications for water rights should be first approved by an official of the Department here, before being filed at Ottawa or with the agent. Immediately on arrival in Calgary, the office was opened, and arrangements made to deal with all applications promptly and without delay, and it is proposed to speak of the administration of the Act as evidenced from the working of the office since it was opened.

It will probably conduce to a proper understanding of the remarks which follow, to first notice the procedure adopted in dealing with applications as received.

An applicant for a water right and the authority to construct the necessary ditch or other works for the utilization of such water, is required by the Act to submit, in duplicate, a memorial containing certain information regarding the location and extent of the proposed works and lands to be irrigated, together with maps and plans illustrating the memorial, these returns being of a simpler nature for small ditches designed to carry less than ten cubic feet of water per second than are required in cases where the works are of a more important character. When completed, the memorials and plans are sent to this office, where they are carefully examined to see that they contain the information and are prepared in accordance with the provisions of the law, and they are then endorsed with a certificate of examination and approval, and duly registered in a manner explained further on; one copy is then forwarded to the Department for record, the other being returned to the applicant to be by him filed in the office of the agent of Dominion lands for the district within which the lands affected are situated.

So soon as the memorial and plans filed with any application have been approved and recorded in the Department and with the agent, the applicant is required to publish a notice of his application, giving full information as to the location and extent of the proposed works and the lands to be irrigated, in a local paper, the notice being inserted

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for five weekly issues in the case of ditches carrying less than ten cubic feet of water per second, and for a longer period, up to three months as directed by the minister, supplemented by a like notice in the "Canada Gazette" for ditches or canals of a larger capacity.

These notices are published with the object of giving interested parties an opportunity of protesting against the granting of the rights applied for, and to permit of necessary inspections in connection with such protests.

At the expiration of the publication of these notices, if there have been no protests filed, or after inspection and report upon any protests and ruling thereon by the minister, the applications are granted or refused as the case may be; if granted, the construction of the works is authorized, a fixed period for the completion thereof being stated.

The issue of this authorization is of course dependent upon the recommendation which was issued from this office in the first instance when the memorial and plans were recorded, and, as this recommendation is entirely dependent upon the fact of whether there is water unappropriated and available in the stream in which the proposed ditch or canal heads, it may be well to outline the steps taken to determine the available water supply from each stream or other source, so as to prevent the overtaxing of this supply by the authorization of works for which there is not water available.

Immediately after this office was established, steps were taken to determine as far as possible the available water supply from all sources for irrigation purposes, and the results were made available for use in authorizing diversion of these waters by preparing a statement for each stream of the kind hereunder.

Statement of licenses granted for water from

Bow River.

Gaugings of stream.

Discharge at low water	2784·00	cubic feet per second.
do high water	12540·00	do
do flood level	22630·00	do

Name of Grantee.	Quantity of water in S.F.	Purposes for which water is used.	Number of License.	Period of Flow.
Canadian Pacific Railway Company	0·092	Domestic	1	Low water.
do do	0·045	do	2	do
do do	0·045	do	3	do
do do	0·045	do	4	do
Eau Claire Lumber Company	1·000	do	5	do
Calgary Water Power Company	3·000	Special	6	do
Calgary Hydraulic Company	19·000	Irrigation	7	do
W. Maloney	3·000	do	8	do
Indian Department	12·000	do	9	do
A. E. Banister	1·600	do	10	do
W. R. Newbolt	0·830	do	11	do
Ricardo & Bevan	2·500	do	12	do
Calgary Water Works Company	20·000	Other purposes	13	do
W. R. Hull	8·000	Irrigation	14	do

In the heading for this schedule, as will be seen, we give the measurements to date of the available water supply, and then begin issuing rights against this supply in the order received. Before granting any rights, however, we have endeavoured to determine by sworn evidence the rights held for domestic, irrigation or other purposes before the passage of the Act, and which, under the provisions of the Act are given a first right provided they are recorded before a certain date. These rights we set out in a priorities schedule for each stream, in the form given herewith, with an abstract of the evidence, and after this schedule has been approved and confirmed by the minister, we

transfer them to the above schedule in their proper order, and are then ready to go on issuing licenses for new undertakings, provided there is water supply available.

(Form.)

Schedule showing priorities of right, and order in which final licenses should be numbered when issued to those persons using water from..... before the passage of the North-west Irrigation Act.

Name of Owner.	Portion of stream from which water is diverted.	Purposes for which water is used.	Location of Intake.					Date of commencing construction.	Date water first used.	Date of Survey.	Evidence filed in support of claim.	Order of Priority and Number of License.
			Pt.	Sec.	Tp.	R.	M.					

It will be noticed from the statement of the available water supply given, that we divide the flow of all streams into low water, high water and flood discharge; this is done with the object of utilizing, as far as possible, the total flow of the streams; we are endeavouring to accomplish this end by issuing licenses for the diversion of water during high water stages after the available low water supply has been exhausted by ditches in operation, or during flood stage when the total high water flow has been granted. These different stages of water in the stream are marked by a gauge rod or rods, placed at convenient points for reference, and an inspection of these rods at once shows a license holder whether the stream is at that stage during which his license authorizes him to divert water, and disputes between license holders at different stages are easily settled by reference to the gauge rods as a basis of right. The licenses issued clearly set forth the stage of water at which the holder is entitled to divert water, and while, of course, the holder of a low water license has the right to take his share at any stage of the water, the holder of a high water right can only take water during high water and flood stages, and the holder of a flood water right during that stage only. It must be understood that license holders have priority as between each other in the order of the number and date of their licenses, so that disputes regarding the apportionment of the water at any particular stage can only result from a question as to how much water a license holder is taking, and as our regulations provide that every ditch or canal must have a rating flume near the point of intake, and these flumes are rated and marked for different volumes of flow by a government official, it is thought that opportunities for dispute between those entitled to water from any source have been reduced to a minimum.

The principle of marking the stages of flow in the streams by means of the gauge rods above referred to, is a new departure in the administration of water rights on this continent, and should be followed by satisfactory results, as it minimizes the opportunity for dispute between license holders by fixing defined marks in each stream at which certain license holders can only take water. The ordinary system is to issue rights against a stream or allow appropriations to be registered against the available supply, and then leave it to the courts to decide in cases of dispute as between holders of these rights. Under our system, the rights of each licensee are clearly set forth in the license which he holds, and any disputes are referred to and settled by a government

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official who has authority to enforce a proper diversion of the water by closing and locking the headgates of any ditch taking water to which it is not entitled.

The description of, and manner of placing and renewing gauge rods in streams will be found fully treated of in the next section of this report.

During the time of publication by the applicant for water right of the notices above referred to, an abstract in the following form is made to show the position of the title to lands affected by the application, the lands being entered upon the abstract from the memorial and plans filed with the application, and the facts regarding ownership from information received from the Patents Branch of the Department, the different railway and land companies owning land in the district, and finally, from the registry office for the district in which the lands are situated.

(Form).

Memorandum of information regarding the ownership of lands affected by the application of..... for a water right under the North-west Irrigation Act.

LANDS AFFECTED.					How affected.	Owner.	Information as to title.
Pt.	Sec.	Tp.	R.	M.			

With the above information, we are able to make a complete abstract showing the title to lands affected, and if this abstract discloses the fact that any of the lands to be irrigated, or for which right of way is to be taken for the proposed works, do not belong to the applicant, we notify him of the fact, and do not issue the certificate for the license, described further on, until the necessary title has been acquired ; by this means we prevent the possibility of a right being granted to irrigate lands which are not the property of or controlled by the applicant, and also ensure the acquirement of the necessary right of way for the proposed ditch and other works. The steps to be taken in acquiring the right of way are referred to at some length later on.

The necessity for this somewhat close scrutiny of the title to lands affected by applications for water rights will at once become apparent when it is remembered that licenses are granted for a certain quantity of water to irrigate a defined area as shown by the plans filed with the application, and the water right granted cannot be disassociated from the land for which it is granted, or, to be more explicit, the portion of each quarter section shown upon the plans filed with the application to be irrigable therefrom, is entitled for all time to its share of the water granted, and it would therefore be manifestly wrong to grant an applicant water to irrigate land which he did not own, or regarding which he had no agreement with the owner to supply water for irrigation.

The foregoing remarks apply, of course, only to private individuals. In the cases of companies incorporated by special acts or by letters patent, and who have defined rights under their charters, water is granted for the area shown to be susceptible of irrigation from their proposed works by the plans filed, irrespective of whether they own these lands or not, but the protection of the public in cases of this kind lies in the fact that these companies, in common with individual applicants, are granted a specified time within which to complete their undertakings, and must, under the provisions of the law, do a certain amount of work each year, otherwise their rights lapse. There is also the further protection that failure to use the water granted is equivalent to abandonment of their right, and as the government have the power to fix the prices to be charged by companies for water, it will be seen that ample precaution has been taken to prevent any particular district being locked up for speculative purposes, or water obtained for the same purposes.

Incorporated companies have to go through the same procedure as private individuals to obtain title to the right of way for their works, and for the purposes of reference, some brief remarks regarding this procedure may be of interest. The Irrigation Act provides that the right of way may be taken across any lands for irrigation purposes, but also provides efficient machinery to prevent any injustice being done to the owners of the lands taken. When an irrigation ditch or reservoir is projected and application for a water right therefor made in manner above described, the applicant has to employ a duly authorized Dominion land surveyor to make a careful survey of the right of way required for the ditch, reservoir or other works, and after the returns, in the shape of plans and books of reference, have been prepared in accordance with defined regulations laid down by Order in Council, and have been examined and approved by the Surveyor General and duly recorded in the Department of the Interior and the Registry Office for the district within which the lands are situated, the applicant is in a position to go on and acquire title to the lands shown as being necessary for right of way purposes from the different owners by amicable arrangement as to price therefor, or by arbitration proceedings as provided by the Act, if the parties interested cannot agree as to the compensation to be paid. These right of way plans also serve the further purpose that they are for all time a legal record of the exact position or location of any works, and future disputes as to this somewhat important point are not possible.

Free right of way is granted for irrigation works across lands belonging to the Crown, and the different railway and land companies also offer very reasonable terms for acquirement of areas taken from land belonging to them; it, therefore, only remains for the applicant to acquire the right from private owners, and as the larger number of them are mutually interested in irrigation development, the prices so far charged for lands taken have been merely nominal.

The certificates issued as above mentioned, upon which the final licenses are based, are prepared in the following form:—

(Form).

Department of the Interior.

CERTIFICATE issued in accordance with the provisions of section 3 of the regulations regarding the measurement and use of water, the disposal of reservoir sites and right of way for irrigation works, the establishment of gauge rods and rating flumes for irrigation ditches and canals, and the licenses and certificates to be issued, approved by His Excellency the Governor in Council on the 29th April, 1895.

I,, Chief Inspector, do hereby certify that I have inspected the and the structures connected therewith, constructed by, and using water from, on the $\frac{1}{4}$ of section, Township, Range, W. of the Meridian, as shown by the memorial filed in the Department of the Interior by the said, on the day of, 189.., and that I find the said and the works connected therewith to have been completed and constructed in accordance with the memorial above mentioned.

I further certify that the..... in question is capable of utilizing the water applied for, and is therefore entitled to a license for the under-mentioned quantity of water from..... for..... purposes, and in accordance with the provisions of sections 7 and 8 of the North-west Irrigation Act.

At flood level	Cubic feet per second.
At high water	do
At low water	do

.....,
Chief Inspector.

CALGARY, Alta.,, 189..

Department of the Interior.

This certificate is issued after the applicant has completed construction of the works authorized, and acquired the necessary right of way, and after an inspection has been made to prove the works to have been properly constructed, and that the lands shown by the plans filed to be irrigable therefrom can be properly served.

The form of license issued is as follows :—

(Form).

Department of the Interior.

....., License No.
 Source of supply
 First issued

KNOW ALL MEN BY THESE PRESENTS, that by virtue of the authority vested in me by the North-west Irrigation Act, I,, Minister of the Interior of Canada, do hereby grant unto, hereinafter called the licensee,, executors and administrators, full right, power and license, subject to the conditions and restrictions contained in the North-west Irrigation Act, to divert from the, the following quantity of water for use in the systems constructed by, and as shown by the application of the licensee and by the plans of the same, dated the, and filed in the Department of the Interior, and in the office of the agent of Dominion lands at, and authorized by Order in Council, dated, 189.., that is to say :

At flood level Cubic feet per second.
 At high water do
 At low water do

And to take and keep possession of the said quantity of water for and during the period during which this license may be in force under the provisions of the North-west Irrigation Act.

But this license shall be subject to the following conditions, viz. :—

1. That the license shall only come into force and effect after it has been registered by the licensee in the Registry Office in and for the
2. That the period of flood discharge, high water and low water in the said shall be fixed and determined by the marking of the gauge rod placed in the said stream by the Department of the Interior.
3. That this license shall be subject to forfeiture, as provided by the North-west Irrigation Act.
4. That this license can only be assigned or transferred by approval of the Minister of the Interior and by using the form printed on the back thereof, and that such transfer must be recorded in the Department of the Interior and in the Registry Office in and for before a new license will be issued in the name of transferee.

Dated at Ottawa this day of, one thousand eight hundred and ninety

.....,
Deputy Minister of the Interior.

.....,
Witness.

TITLE TO WATER.

The title to water for any of the purposes authorized by the Irrigation Act acquired by compliance with the provisions of the Act, is worthy of some mention, as it differs very materially from that acquired in most other countries where water is diverted from its natural channel for special purposes.

The marked point of difference between the title acquired under our Act, and under the laws affecting the subject in other countries, is that we grant a license or water patent for a specific amount of water from a certain source for certain purposes, and when this water is used for irrigation, the lands upon which it is to be used are definitely fixed by the plans filed with the application, so that disputes as to the quantity of water granted, or the purpose to which it is to be applied, cannot arise. In most other countries, particularly the United States, the title to water is entirely dependent upon the validity of the record against the stream, and no definite license is granted for a fixed quantity of water, so that the owner is entirely dependent upon his ability to prove the legality of his record and the quantity of water to which he is entitled should any disputes regarding these points arise, and as a natural consequence, undesirable, and in many cases ruinous litigation arises, and money which should be spent in developing water rights is wasted in law suits.

Under our Act the holder of a license has his title direct from the Crown, and has something to show if disputes arise as to the measure of the rights held. Doubtless cases will arise where it will be claimed that the holders of licenses are taking more water than they are entitled to, but these cases can be settled without any reference to the courts, as the rights held are clearly defined, and the means of checking the exercise of these rights are very full and exact, as has been above described.

The provisions made by our law and regulations regarding the connection between the water granted for irrigation purposes and the land to be irrigated, create a bond between the land and water which has been advocated by many of those connected with irrigation enterprise and development on this continent, and should obviate to a great extent the unfortunate conditions existing in other countries where, in many instances, water is looked upon as a merchantable commodity to be disposed of wherever the owner can obtain the highest price.

The experience of the past year confirms the opinion expressed in the report of 1894, that the Irrigation Act as it now stands is well suited to the establishment, under its provisions, of the principle of irrigation on a sound and permanent basis, and the experience of the administration of this law through this office on the system above described, certainly justifies the statement that with care and intelligence the subject of the granting of water rights should be followed by the same general satisfaction that has characterized the granting of other crown properties in this portion of the Dominion.

THE NORTH-WEST IRRIGATION DISTRICT ORDINANCE.

The provisions of this law, under which it is expected that irrigation works can be carried on by districts as municipal undertakings, were fully discussed in the last general report on irrigation, but as the certainty regarding the constitutionality of this law therein referred to, has since been settled by the legislation passed at the last session of Parliament, and to make clear in these pages the reference to its provisions in speaking of the works being undertaken by the Springbank Irrigation District, it is desirable that attention should be directed to some needed amendments in the ordinance to make it more acceptable to those desirous of availing themselves of the powers therein contained, and to meet certain unforeseen circumstances which have arisen in applying it to the district above mentioned.

The principle enacted by this law that the majority of residents in a district may secure the creation of a district within which irrigation works may be constructed as a municipal undertaking, the lands of the minority, as well as those of the majority being pledged as security for the debentures sold to construct these works, and all the lands susceptible of irrigation therefrom being taxed to meet the necessary expenditure for construction and maintenance of these works, renders it possible that land owners who do not favour irrigation may be forced to pay taxes for what they do not want, and makes them parties to a scheme which they have opposed with their votes and influence. This principle may, however, be supported on the ground that any undertaking which has in view the public good must prevail as against individual interests, that being the foundation which underlies all municipal legislation, but in its present shape, the ordin-

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ance authorizes the inclusion of lands within the boundaries of the district which cannot be served with water from the proposed works, and receive no benefit therefrom except that which may accrue from the general improvement in values resulting from development of the irrigable portion, and in addition to the lands so included being subject to taxation for the construction or maintenance of the works, they, in common with the lands actually irrigated, are pledged as security for the debentures sold.

This provision has caused, and doubtless will continue to cause much friction in the administration of the ordinance, and there is little doubt that the law would be a much more popular enactment, and better calculated to meet existing conditions were its provisions amended to provide that only lands, a portion of which can actually be irrigated from proposed works should be included in the district. In this connection, it may be pointed out that the "Wright Act" of California, upon which the ordinance has been largely based, makes definite provision for the exclusion of lands from proposed irrigation districts "which cannot be benefited by irrigation from the proposed system," and it is certain that the amendment of the ordinance by the enactment of a like principle would tend to improve its public utility.

In administering the ordinance, a further difficulty has arisen owing to the exercise of the privilege granted by our general irrigation law for the filing of protests with the minister against the granting of water rights applied for by an irrigation district under the provisions of the ordinance. The provision of the general law permits the minority in a district to call for relief from the Dominion Government from the enforcement of the provisions of a territorial law, and leads to a very undesirable clash between the two authorities dealing with the question at issue, and this condition is emphasized by the fact that the minister has no authority to extend the bounds of a district so as to leave out those who protest against the inclusion of their lands therein, the only course open to him, should he deem the petitioners deserving of relief, is to refuse altogether the application for a water right filed by the district, and thus deprive those who want irrigation of the opportunity to obtain it. It is, therefore, advisable that the ordinance should be amended to provide that the claims of those who petition against inclusion in the district should receive consideration before the proclamation creating the district is issued by the Lieutenant-Governor, and that he should have power to alter the boundaries to leave out the lands of those who have petitioned and are considered entitled to this consideration.

The ordinance now permits the district to bond the lands which can be irrigated from the proposed works up to \$6 per acre, and authorizes the taxing of these lands up to \$1 per acre per annum for maintenance, management and sinking fund. The experience now available regarding the crops which can be raised by irrigation in the larger portion of our arid region, leads to the conclusion that the bonded debt authorized is too high, and that the ordinance should be amended so as to limit the amount to \$4.50 per acre; although it is possible that districts might not spend more than the latter amount in construction, and under existing circumstances certainly should not do so, the history of municipal undertakings on this continent leads to the conclusion that municipalities always spend all that the law allows them to borrow, and there is little doubt that the debentures of irrigation districts will command a much better price if the law under which they are sold limits the expenditure to an amount which experience has proved to be a safe first charge against the land which the expenditure will benefit.

If amended on the lines above indicated, the ordinance will be found a much more workable law, and better calculated to advance successful irrigation development.

METEOROLOGICAL CONDITIONS IN THE ARID REGION.

In the report for 1894, considerable space was devoted to discussion of the climatic conditions existing in the arid region, and attention was directed to the necessity for increased information under this head to aid in an intelligent understanding of the many problems to be considered in attacking the question of the reclamation of large areas within our arid regions. The tables published in the report referred to have been of great assistance in enabling those interested in irrigation to understand the question

of temperature and precipitation which so materially affect their operations, and have convinced those who were previously somewhat sceptical as to the necessity for irrigation, that only by this means can agriculture be successful during the great majority of seasons.

In considering the information given by these tables it is at once apparent that the large area over which the few meteorological stations are scattered, and the total absence of any observations regarding the important question of evaporation, renders the data available very incomplete for use in discussing the conditions to be met in projecting large reclamation undertakings.

The important bearing which the question of reliable data regarding evaporation has upon irrigation development, will be realized from the following extracts from the comprehensive report on irrigation and water storage in the arid regions, presented to the U. S. Secretary of War, by General A. W. Greeley, Chief Signal Officer in 1891.

"Evaporation is a very important element in connection with irrigation. High temperatures and strong winds favour evaporation greatly, since at high temperatures not only will the air contain more aqueous vapour, but the water passes more quickly into the gaseous state, and the greater the quantity of air, whether 'wet,' 'dry' or 'very dry,' which passes over the water surface, so much the greater the quantity of water lost by evaporation. If only 20 or 30 inches of water were lost annually, evaporation would be a factor of minor importance, but over the arid region the water which would be evaporated if freely exposed, would attain a depth ranging from 5 to 9, and possibly in some cases, 15 feet annually. Under these circumstances, it is essential to consider these phenomena. * * * Fortunately, investigations of this subject have been made by Prof. Thomas Russell, of the Signal Service, in which the final values, though obtained by somewhat empirical methods, are dependent in part upon careful observations of evaporimeters made by skilled observers of the Signal Corps, and partly dependent by theoretical connection upon Signal Service observations of wind, temperature and dew point for preceding years.

"The figures obtained and the curves drawn by Professor Russell show the amount of possible evaporation from free water surfaces under favourable conditions, and it is believed that they can be depended upon as fair approximation to the existing physical conditions. In any event, these are the only data extant which can be applied to the extensive region under discussion, and so must be taken for what they are worth.

"It is deemed proper to again state that these figures and curves do not represent the actual evaporation over the whole surface of the State, but only the possibilities of evaporation. It should be further understood that the actual amount of water taken up by the atmosphere depends upon the opportunity of evaporation, which in turn depends upon the relative amount of water surface, the wetness or dryness of the soil and its constituents, and upon the amount and character of vegetation covering the region under consideration.

"It may be questioned by those who have not considered the subject in view of the observed facts, that these possible evaporations are far in excess of the actual amounts which could be absorbed from a water area say, 100 square miles, but such would be an erroneous supposition as indicated by facts observed on an enormous scale. The most convincing and striking case is that of the Caspian Sea, with an area of about 180,000 square miles. As this is a closed sea of a very large area, it is in fact the greatest evaporimeter of the world, where the silent but powerful operation of nature's forces in this direction are susceptible of direct observation and measurement. It appears from Woeikof, (*Climates of the Earth*, p. 226) that the actual annual evaporation from the Caspian Sea is equal to 1.09 metres, or 43 inches of water. These figures have been determined from observed heights of the water surface of the Caspian Sea in connection with the measured inflow of the Volga and other contributing rivers.

"The great contrast between evaporation over extended water surfaces within the limits of the United States, is illustrated by Prof. Gilbert in his valuable and exhaustive monograph on Lake Bonneville, which came to hand just as this report was finished. Professor Gilbert gives the amount of evaporation over the surface of Lake Michigan as equal to a layer of water 22 inches deep, this result being derived from the

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report of Mr. D. Farrand Henry on the meteorology of the Laurentian lakes, and the report of the Chief of Engineers for the year 1868, Washington 1869, p. 980. Professor Gilbert estimates that 80 inches of water are yearly removed from the Great Salt Lake, an estimate closely agreeing with the evaporation values determined by Prof. Thomas Russell, Signal Service, for this region, since according to his calculation the evaporation at Salt Lake City, near the south-eastern shore of Great Salt Lake, amounts annually to 74.4 inches in depth.

“Professor Gilbert speaks of this locality as follows:—‘As in other desert regions, precipitation here results only from cyclonic disturbance, either broad or local, is extremely irregular and often violent. Sooner or later the “cloud-burst” visits every tract, and when it comes the local drainage way discharges more water in a few hours than is yielded to it by the ordinary precipitation of many years. The deluge scours out a channel which is far too deep and broad for ordinary needs, and which centuries may not suffice to efface. The abundance of these trenches, in various stages of obliteration, but all manifestly unsuited to the every-day conditions of the country, has naturally led many to believe that an age of excessive rainfall has but just ceased—an opinion not rarely advanced by travellers in other arid regions. So far as may be judged from the size of the channels draining small catchment basins, the rare, brief, paroxysmal precipitation of the desert is at least equal while it lasts to the rainfall of the fertile plain.’

“Experiments in Sydney, New South Wales, under the direction of Mr. H. C. Russell, government astronomer, show that the amount of evaporation from day to day depends very materially upon the conditions of the soil. If it is wet on the surface, evaporation proceeds much faster than over water, but as the ground dries, the earth evaporates less than the water, and, what is a very important matter when considered with reference to the large areas of the arid region of the United States, when the soil becomes dry and is packed hard, surface evaporation substantially ceases, even when the soil is damp enough below to keep vegetation growing.

“These experiments in New South Wales show the very important factor which suitable vegetation will exercise in bringing subsoil water to the surface, and thus increasing evaporation during the dry portions of the year. The results of the experiments show that evaporation from grass soil is more regular than from bare soil, and in the course of the year it lost more than dry earth by 14 per cent, and also evaporated 9 per cent greater than water surfaces.

“Reeves's experiments at the London Water Works show evaporation from grass land to be 12 per cent less than from water. In Sydney, during a year of deficient wind, in 1885, the water evaporated most, but in a wet and windy year the grass evaporated most.

“It must be admitted, however, that careful and extended observations will be necessary before the definite relations of different classes of vegetation to evaporation will have been determined with the accuracy which the importance of this question to the farmer demands.

“In 1888 special observations upon evaporation were made at Lake George, New South Wales—a body of water with about 80 square miles of surface, at an altitude of 2,200 feet and surrounded by high land; the lake itself is shallow, especially at the margin. During 1888 the evaporation amounted to 47.72 inches, which in round numbers was twice the amount of the whole rainfall. In 1889, a valuable set of observations were made by means of a tank at Lake George, while the evaporation of the lake was also determined from day to day. In 1889, the evaporation of the lake was 44.29 inches, which gives an average of 46 inches for the two years.

“Evaporation observations made from a pan in comparison with those from the Piché evaporimeter at Sweetwater Dam, San Diego County, Cal., show that the Piché evaporimeter indicates, if anything, less than the true value of evaporation from free water surfaces. This deficiency amounts to about 8 per cent, the Piché evaporimeter indicating for the 7 months of the year 29.88 inches, and the pan observations 32.33 inches.

"In 1889 observations made from water pans at Albuquerque, New Mexico, under the supervision of the United States Geological Survey, showed evaporations as follows, in inches: June, 9.6; July, 9.6; August, 9.3; September, 7.5; October, 4.1; a total in five months of 40.1 inches, which would probably amount for the whole year to about 80 inches, the evaporation as calculated by Professor Russell.

"The average amount of water which could possibly evaporate yearly expressed as depth of water in inches, and also in cubic miles of water, is as follows:—

States.	Total amount.	Average depth of possible evaporation.
	Cubic miles.	Inches.
California	170.9	67
Utah	90.9	68
Colorado	108.6	69
New Mexico	146.2	78
Arizona	145.9	80
Nevada	145.8	90

In view of the foregoing statements and the facts disclosed by our meteorological records regarding the annual precipitation in the arid region, it is to be hoped that at an early date the present number of meteorological stations will be materially increased, and that observations regarding evaporation will be added to those now taken regarding temperature and precipitation.

Pending the initiation of this work by the Meteorological Department, it is proposed during the coming summer to make some observations at Calgary regarding evaporation from the earth and water surface by means of the common evaporating pan with hook gauge, the proposed methods and appliances being more fully described in Part II. of this report.

As having a direct bearing on the subject of the climatic conditions in the arid region, and more particularly on the subject of evaporation, attention may be directed to the total lack of reliable data upon which to found a theory regarding the "chinook" winds, which play such an important part in tempering the winter months, and in burning up irrigated crops during the summer season. Probably this data can only be obtained by the establishment of meteorological stations at very high altitudes in the mountains to the west of us, but that some more reliable means of foretelling the arrival of these winds and their probable duration, than those now available are needed, will be readily admitted by the stockman who is anxious to know whether his cattle can, during the winter months, get at the hill tops and sides cleared of snow by the warming influence of the wind, and by the farmer who dreads the hot dry wind which saps the vitality of and dries up his crop at the most critical stage of its growth. The subject also is of great interest to the irrigator, for the application of water immediately preceding one of these warm winds is not likely to be followed by the same beneficial results that result from water applied under ordinary circumstances, and as has been stated, in considering the question of evaporation these winds play a most important part.

Although the question of the origin and cause of the chinook winds is somewhat foreign to the subject of irrigation proper, the winds themselves have such a direct bearing upon the existing climatic conditions in the western portion of the arid region and upon the agricultural undertakings therein, that some reference to these points and to the possibility of obtaining information of use in foretelling the arrival of these winds and the period of their duration may be of value.

Many theories regarding the origin and cause of the chinook winds have been advanced, but as they are all based on scattered or partial observations of the effect only, they are at the best but theories. That the winds come from a warmer region and arrive most unexpectedly is realized by all those who have experienced them, but that

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they should leave the Pacific Ocean, as claimed, and traverse some hundreds of miles of snow-capped, and, in the winter, snow-covered mountains, and arrive in the plains region at a temperature which causes snow and ice to rapidly disappear, and even in the summer, dries up everything and feels hot and scorching, seems almost incredible. The most reasonable explanation of this extraordinary climatic phenomenon which has been advanced, is that this hot wind from the Pacific Ocean, like the Trade winds of the Atlantic, blows all the time at a high altitude, and that under certain atmospheric conditions it meets an opposing current coming from the east and is by it deflected downwards until its influence is felt. This explanation certainly seems to be borne out by observations of the conditions which immediately precede a chinook; at that time, the clouds overhanging the mountains invariably become dissipated, and the so-called "chinook arch" forms. This arch is caused by a banking up of the clouds in the east and overhead, leaving a well defined segment of the heavens to the west marked by a blue sky and bright sunlight. This condition is followed by a gradual movement of the arch to the east, and by the arrival of the hot wind simultaneously with or immediately preceding the arrival of the sunlight. During very pronounced chinooks, the mountains become covered with heavy vapoury clouds which cling to the peaks and do not seem to be carried to the east by the prevailing wind, and these clouds have all the appearance of being formed by the contact of the hot wind with the snows of the mountains. That there is a "mighty conflict" at times between this hot wind from the west and the cold winds coming during the winter months from the east across the snow-clad plains, is evidenced by the fact that these contending elements create a bank of fog, so pronounced and sharply defined that occasionally one can pass from the sunlight and warm influence of the chinook into the damp fog and cold east wind as rapidly as one passes from one room to another through a door.

Bearing these facts in mind, it seems more reasonable to suppose that the influence of a hot wind of this kind at points just outside the mountains and at an elevation of many thousands of feet lower than the immediate mountain peaks in the vicinity is the outcome of the deflection of a high current of warm air by an opposing cold current from the east, than that this hot current comes all the way from the west in contact with hundreds of miles of snow-clad mountains without losing its warming influence, and certainly the phenomena which invariably herald a chinook supports the former theory. However, as has already been said, these explanations are but theories at best, and from a scientific or definite standpoint are of no value in attacking the problem of providing data upon which to base an intelligent discussion of the question of how to foretell the coming of these winds or the probable duration of their continuance.

That a forecast of this kind would be of immense value to the stock and farming interests of the district is admitted by all acquainted with the facts, and when we add to this the results which would accrue to general meteorological information from an intelligent examination of this peculiar phenomenon, it may be assumed that the question is one well worthy of the attention of the Meteorological Department.

So much of the future success of irrigation undertakings in the arid region is dependent upon a careful and intelligent investigation into the subject of temperature, precipitation and evaporation, that the necessity for obtaining reliable and regular observations of these conditions cannot be too strongly emphasized. The investigations which we are carrying on regarding the available water supply as more particularly referred to below, are providing information regarding the flow from the different drainage areas through the numerous channels, but unless supplemented by assembled observations as to the precipitation on these drainage areas, and the evaporation and probable run-off therefrom, they are not of the exact nature which should be looked for in facts used as a basis for the expenditure of large sums of money in the construction of large irrigation canals, and in considering the disastrous results which are sure to follow miscalculation regarding the water supply for the irrigation of a given district during periods of extreme drought.

WATER SUPPLY OF THE ARID REGION.

Upon a correct estimate, in the first instance, of the water supply available for irrigation, and the permanency of this supply, will depend much of the success of future

irrigation development in the arid region, and it is therefore desirable that the information with reference to the discharge of streams given herewith, should be supplemented by some remarks regarding the general characteristics of the water supply, the total volume and the probable area which it may be expected to reclaim.

The watershed which supplies the larger number of the streams in the arid region, and which practically furnishes all the supply for irrigation, is largely composed of broken and almost inaccessible mountains, rising many thousand feet above the water line, and this portion of the area will probably remain in its present condition for all time. The remainder of the drainage area comprises the foot-hills and lower slopes of the mountains, and is partly covered by a more or less dense growth of timber and brush.

The drainage channels which carry off the water from this watershed, may be divided into five main groups, viz. : the Red-Deer system, the Bow River system, the Oldman River system, the Belly River system, and the St. Mary River system, all of which finally unite in forming the South Saskatchewan River, which carries the accumulated water from these sources into the streams emptying into the Hudson's Bay. All the systems mentioned, with their large number of tributary channels are comprised within the limits of the western portion of the region, the central and eastern portions being traversed by the resulting channel only, and it would therefore seem that if the run-off from the watershed can be closely approximated and some data regarding the subsequent losses from evaporation and other causes obtained, we should be able to form a fair estimate of what the total volume of water available for irrigation is. Two methods of making this calculation are available, viz. : first, to use the known area of the watershed and the precipitation thereon in estimating the run-off therefrom, and second, to actually measure this run-off by gauging the streams forming the drainage channels.

In considering the first method, we are confronted with the difficulty of the want of sufficient data, both with regard to precipitation or evaporation, to enable any reliable estimate of the run-off to be formed, and we have therefore adopted the second system in endeavouring to obtain the facts wherewith to answer the important question of the volume of the water supply, and the proportion of the arid region which it may be expected to reclaim.

In presenting a statement of our investigations regarding this question, it must of course be understood that the measurements of the streams are not yet sufficiently numerous, nor have they been extended over a long enough period to enable us to speak with anything like certainty as to the annual flow of the streams in question, and the figures given are at best only an approximation based on the data available, and are quoted mainly to correct erroneous existing ideas and utterances on the subject of the water supply, and the percentage of the arid region which may be irrigated therewith.

In estimating the amount of land which can be irrigated from any given source by the construction of ordinary ditches or canals, without storage facilities, the area must of course be made dependent upon the extreme low water flow of the stream, or its flow at the period during which water is needed for irrigation ; we have, therefore, tabulated the measurements of low water flow in the different drainage channels as follows :—

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SCHEDULE showing the low water Gaugings of certain Streams during the Year 1894, by Divisions A and B, Canadian Irrigation Surveys.

Name of Stream.	Point where gauged.	Date.	Measured discharge.	Gauging by	Remarks.
Belly River.....	Section 31, Township 5, Range 25, W. 4th Meridian.....	Aug. 18, '94	399.3	Division B.	Low water.
Bow River.....	do 24, do 25, do 4, W. 5th do	Sept. 27, '94	2784.5	do	do
Dogpound Creek.....	do 33, do 28, do 4, W. 5th do	do 19, '94	2.4	do	Extreme low water.
Elbow River.....	do 34, do 22, do 5, W. 5th do	Oct. 3, '94	210.5	do	do
Fish Creek (N. & S. Forks).....	do do 22, do 3, W. 5th do	July .., '94	6.4	do	Low water.
Highwood River.....	do 32, do 20, do 28, W. 4th do	do 19, '94	667.9	do	Mean flow.
Little Bow River.....	do 1, do 18, do 28, W. 4th do	Aug. 2, '94	3.1	do	Low water.
Little Red-Deer River.....	do 18, do 34, do 2, W. 5th do	Oct. 13, '94	30.1	do	do
Milk River.....	do 1, do 1, do 23, W. 4th do	Sept. 17, '94	16.1	do	do
Oldman River.....	do 20, do 9, do 25, W. 4th do	Aug. 9, '94	539.9	do	Mean flow.
Red-Deer River.....	Near mouth of Raven River.....	Oct. 16, '94	1078.0	do	Low water.
Sheep River.....	Section 24, Township 20, Range 29, W. 4th Meridian.....	July 23, '91	159.1	do	Mean flow.
St. Mary River.....	do 25, do 6, do 25, W. 4th do	Oct. 4, '94	821.3	do	Low water.
Waterton River.....	do 13, do 6, do 26, W. 4th do	Aug. 16, '94	611.9	do	do
Willow Creek.....	do 24, do 9, do 26, W. 4th do	do 10, '94	39.6	do	do
Total low water flow.....	.....	.....	7370.1	.....	.....

The above measurements indicate that at low water stage there is a probable volume of 7370·1 cubic feet of water per second being carried off from the watershed, or a quantity, after deducting 20 per cent to provide for domestic rights, under the duty of water as fixed by the regulations (1 cubic foot to 100 acres), sufficient to irrigate 589,600 acres, equal to about 1·18 per cent of the area of the arid region. To this we must add the probable quantity of water available from these streams during high water and flood stages which will be conserved and made available by the construction of reservoirs for irrigation as needs increase. This estimate being based on the following determinations of the discharge of the streams at these stages.

SCHEDULE showing the measured or calculated High Water or Flood Discharges of certain streams during the year 1894, by Divisions A and B, Canadian Irrigation Surveys.

Name of Stream.	Point of Measurement.	Date.	High Water	Flood	Measured by	Remarks.
			discharge.	discharge.		
		1894.	sec. ft.	sec. ft.		
Belly River.....	Sec. 31, Tp. 5, R. 25, W. 4th M.	Aug. 18	.....	2462 0	Division B	Flood level.
Bow River.....	Sec. 34, Tp. 24, R. 2, W. 5th M.	June 25	.....	22632 0	do A	do
Dogpound Creek.....	Sec. 33, Tp. 28, R. 4, W. 5th M.	Sept. 19	66 0	.....	do A	High water.
Elbow River.....	Sec. 13, Tp. 24, R. 4, W. 5th M.	June 30	.....	7368 0	do A	Flood level.
Fish Creek.....	Sec. 1, Tp. 23, R. 2, W. 5th M.	do 26	.....	1255 0	do B	do
Highwood River.....	Tp. 18, R. 2, W. 5th M.	July 9	.....	23538 0	do B	do
Little Bow River.....	Sec. 31, Tp. 16, R. 26, W. 4th M.	do 28	.....	993 0	do A	High water.
Little Red-Deer River.....	Sec. 18, Tp. 34, R. 2, W. 5th M.	Oct. 13	624 0	.....	do A	do
Milk River.....	Tp. 1, R. 23, W. 4th M.	Sept. 17	.....	389 0	do B	Flood level.
Mosquito Creek.....	Sec. 12, Tp. 16, R. 28, W. 4th M.	July 23	.....	216 0	do B	do
Oldman River.....	Sec. 20, Tp. 9, R. 20, W. 4th M.	Aug. 9	.....	14547 0	do B	do
Red-Deer River.....	Near mouth of Raven River.	Oct. 16	.....	14429 0	do A	do
Rosebud River.....	Sec. 32, Tp. 28, R. 27, W. 4th M.	Sept. 7	.....	29 0	do A	do
Sheep River.....	Sec. 35, Tp. 20, R. 2, W. 5th M.	July 3	.....	12463 0	do B	do
St. Mary River.....	Sec. 34, Tp. 4, R. 24, W. 4th M.	Aug. 23	.....	7770 0	do B	do
Waterton River.....	Sec. 13, Tp. 6, R. 23, W. 4th M.	do 16	.....	7854 0	do B	do
Willow Creek.....	Sec. 24, Tp. 9, R. 26, W. 4th M.	do 10	.....	2504 0	do B	do
			690 0	118449 0		
				690 0		
	Total high water or flood discharge.....			119139 0		

The foregoing determinations show that at times of high water or flood levels in the streams, the run-off from the watershed amounts to 119,139 cubic feet per second; in the absence, however, of data as to the period of this flow, we are unable to estimate accurately the quantity by which the minimum discharges given in the first schedule should be increased to permit a fair estimate of the average discharge being arrived at, but for the purposes of the present discussion, we may safely assume that at certain periods the run-off from the watershed is equal to 126,509·1 cubic feet per second, and that with storage facilities this flow can be utilized for irrigation purposes; we therefore have the total water supply as follows:—

	Cubic feet.
Run-off from the watershed during low water stage in the streams.....	7,370·1
Run-off from watershed during high water and flood stages of streams....	119,139·0
Total available water supply.	126,509·0

Presuming that when circumstances permit the total water supply being rendered available by the storage works required to conserve the high water and flood discharges,

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we may safely assume a mean between the low water and flood run-off as given above for the amount of water available. This would give us a volume equal to 63,254·5 cubic feet per second, which, under the duty of water mentioned, would reclaim by irrigation 6,325,450 acres, or a little over 12½ per cent of the arid area.

To the latter area must be added the area which can be supplied with water from the local watersheds formed by the Cypress Hills and Wood Mountains in the central and eastern portions of the arid region. We have as yet completed no measurements of the discharge of the drainage channels carrying the run-off from the watersheds, and are therefore unable to speak definitely regarding this run-off, but sufficient data is available to enable us to say that the water supply from this source is very limited, and that even with the most careful conservation it cannot be expected to irrigate more than a very small percentage of the lands in these districts. This quantity we estimate at 100,000 acres, which, added to the above-quoted figures, increases the water supply to 64,254·5 cubic feet per second, and the area to be reclaimed thereby to 6,425,450 acres, or nearly 13 per cent of the total area of the arid region.

In connection with the subject of the volume of the water supply of the arid region, attention is drawn to the pressing necessity of inaugurating at once some system of obtaining a complete and continued record of the discharge from the main drainage channels, so as to make our information regarding the available water supply more exact than is possible from the isolated measurements which have been described.

The only method of obtaining a correct estimate of the annual discharge of streams is to establish thoroughly equipped gauging stations on the streams, and to obtain by careful observations at hourly intervals through a series of years the discharge at these stations. To do this would necessitate the expenditure of a considerable sum of money in constructing and equipping these gauging stations with the necessary instruments, and in remunerating the observers who look after the stations and keep the records, and while it is desirable that the work should be undertaken on a proper basis as soon as possible, it is recognized that until the irrigation development becomes more extended and general interest therein aroused, the amount required to equip and maintain these gauging stations will probably not be available. It is therefore desirable that some system should be devised and inaugurated at once, by which partial observations at least can be made of daily discharges on some of the main streams, and to accomplish this end the following system is suggested. That suitable points on the Bow and Elbow rivers near Calgary, on Sheep River near Dewdney, on Highwood River near the village of High River, on Oldman River near Macleod, and on the Belly River near Lethbridge, should be selected for the location of a nilometer, which will record the rise and fall of the stream automatically during a period of seven days, and that these instruments be placed in position at these points and arrangements made with some competent local person to visit the instruments each week and renew the register sheet, replacing it with blank sheet, and winding up the clock mechanism, the sheets removed being sent each week to this office for record. At the points where the instruments are placed, careful cross sections of the stream would be made and the velocity, at different stages, as shown by a suitable gauge rod placed in the stream, determined, and with this information, we would be able to compute some close approximate data of the discharges of the streams at these points.

The stations mentioned could probably be equipped for \$100 each, or a total of \$600 for the six stations, and the necessary attendance at stations could probably be secured for a small sum, say \$1 a visit, or \$52 per annum, making \$312 a year for the six stations, which amount would, however, be reduced by the cost of attendance on the two stations at Calgary, which could be looked after from this office, making the annual charge for the other four \$208, a very small sum when compared with the value of the results obtained.

With reference to the necessary conservation of the flood discharge of the different drainage channels from the main watershed so as to render the total water supply available for irrigation purposes, attention is directed to the necessity of formulating some practical method by which the water so conserved by storage in reservoirs can be carried through ordinary drainage channels to the points where, by being diverted from these

channels into a ditch or ditches, it can be used for irrigation without loss in transit owing to improper diversion by those owning ditches heading in the drainage channel, and having rights only as against the ordinary flow.

The question is one of the difficult problems connected with the utilization to its fullest extent of the water supply in arid regions, and before long, it will have to be faced in our arid district. Its present importance in the United States will be understood from the following remarks on the subject extracted from the report on "The Public Lands and their Water Supply," by Mr. F. H. Newell, of the United States Geological Survey, published last year.

"In the case of public lands, one of the great obstacles to the utilization of storage reservoirs is the lack of safeguards for water rights. For example, if water is saved in a reservoir high among the mountains by one person or company, for the purpose of employing it upon lands 50 miles or more away, it usually happens that this water must be allowed to flow down natural channels, and possibly by the heads of many small ditches having prior rights to the use of the stream. Theoretically, it should be possible to let this pass through the natural channel and recover it below, but in most localities this is practically impossible, owing to the fact that the owners of the various ditches will inevitably capture some of this water during the dry season, or claim it as part of the regular flow of the stream. Unless, therefore, the stored water belongs to the community as a whole, or to ditch owners having priorities to the use of the stream, it appears impracticable to attempt to store water at great distances from the land to be irrigated. This has led to the construction of many low lying reservoirs upon the edges of the valleys or out upon the plains convenient to the land to be irrigated, where they are filled at time of flood or during winter. This method, however, is not economical, as the losses from evaporation are great, and it is often impracticable to fill the reservoirs at proper times."

Although the necessity for the storage of water to meet actual requirements for irrigation purposes has not yet arisen with us, it is desirable in the inception of irrigation undertakings that if possible, precise regulations should be adopted to prevent loss from the causes referred to by Mr. Newell.

These regulations should be so framed as to provide that any individual or company who constructs a reservoir for the storage of water, and subsequently returns this water to any stream for carriage through its channel to a point at which it is to be again diverted for irrigation purposes, shall obtain at the latter point the full quantity of water delivered into the stream from the reservoir less the amount lost by seepage and evaporation during its flow through the channel of the stream. To accomplish this desired end, however, is a matter of great difficulty for while it is a simple matter to determine by the aid of a suitable rating flume at the reservoir the volume of water delivered into the stream, and at the point of diversion by a similar contrivance the water taken therefrom, the loss between these points from seepage and evaporation is dependent upon so many local and as yet poorly understood conditions, that any proper estimate of this quantity is almost impossible to arrive at. There is also the further difficulty of distinguishing between the added volume to the stream resulting from the delivery of water therein from a reservoir, and that which may occur at any time from some local cause on the watershed drained by the stream, or in the district traversed by its channel, and while these natural fluctuations are so shown by the gauge rods placed in the streams in manner already described to prevent disputes as between license holders in the stream, it is somewhat difficult to say how these license holders can be entirely prevented from taking water whenever the stream stands at the stage as shown by the gauge rods, at which their license entitles them to divert water. However, as a basis for these needed regulations, the following is suggested:—

1. That any individual or company who constructs a reservoir for the storage of water may deliver such water into any natural channel, and, after its flow therein, to any point where it is again desired to divert the water from the channel for use in irrigation, may take out of the stream the volume of water delivered from the reservoir, less a deduction of such percentage from the volume for each mile, or *pro rata* for fractions of a mile, over which the water is carried in the channel of the stream, as may

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be determined by the Department after completing the necessary investigations on each stream to determine the loss resulting from seepage, evaporation or other natural causes.

2. That the volume of water delivered into the stream from the reservoir and again diverted from the stream shall be measured by suitable rating flumes of a design prepared by an official of the Department charged with the administration of water rights and approved by the Minister, such flumes to be constructed by the individual or company owning the reservoir.

3. That a suitable gauge rod shall be placed in the stream at a point where water is delivered from the reservoir, in such a manner as to clearly show the rise of the stream consequent upon the added volume from the reservoir, and also at the point at which such water is to be again diverted from the stream, so as to show at that point the rise resulting from the volume added to the stream.

4. That when water is delivered into the stream it cannot be diverted at the lower point by the reservoir owner until the gauge rod at that point shows the same rise as that indicated by the rod placed at the point where water is delivered into the stream, less the proportionate loss resulting from seepage and evaporation, as provided by clause 1 above.

5. That during the period of the flow in the stream of the water from the reservoir the owners of ditches heading in the stream between the points where water is delivered and again diverted shall not divert any portion of the added flow, as marked by the gauge rod placed at the point where water is delivered into the stream as above mentioned.

6. That before the owner of a reservoir utilizes the channel of any stream for the carriage of water in manner above described, he shall notify the owners of all ditches heading in that portion of the stream to be utilized of the date at which the volume of water from the reservoir is to be added to the stream, so that they may take the necessary steps to prevent unauthorized diversion of this added flow into their ditches.

With regulations framed on the basis above mentioned, it is probable that much of the difficulty which surrounds this important question can be overcome, for while the figures adopted for loss from seepage and evaporation must of necessity be based on the data regarding these questions obtained from our investigations on the different streams, and these investigations must extend over a considerable period to furnish reliable data, they will have to be fixed in the first instance at a limit which gives the ditch owner the benefit of every doubt. It should also be pointed out that under any circumstances the holder of a low water license will suffer no injustice, for his license only authorizes the diversion of a certain quantity of water at any stage of the stream, and if water stored during high water or flood discharge is subsequently delivered again to the stream so as to cause a rise above low water mark, he suffers no loss in not being allowed to take this water in addition to what his license calls for at low water stage. The probability of interference with rights owned by the holders of high water or flood licenses is also small, and it should be noted that the water taken for storage in reservoirs must be taken during the two latter stages, and therefore the reservoir owner must practically be the holder of a high water or flood license, and if the total flow of the stream at these stages has been granted to the owners of ditches who are content to use water at these stages only without storage, there would be no water available for storage in reservoirs.

From the facts above quoted regarding the total volume of the water supply, the immensity of the disproportion between the area of the arid region and this supply becomes apparent, and the necessity for so distributing the water as to reclaim the largest area, by rendering large districts adjacent to irrigated areas available for pasturage in connection with the cultivation of irrigated lands should not need any argument. To accomplish this end is certainly the greatest problem connected with the development of the arid region, and its fulfilment would only seem possible under some extended scheme of government public works, such as has been undertaken by the British Government in India. That the district near the head of a stream should be able to take all the water available, and leave none for equally good areas further down, seems in a sense unjust, but such has been the history of irrigation development on this continent. To so dis-

tribute the small supply of water as to secure the greatest good to the greatest number, has not been the object aimed at, and as a consequence, in some instances, areas which promise much better results owing to superior soil and favourable climatic conditions, than districts which are being irrigated, are impossible of development owing to lack of available water supply. To a certain extent, this unfortunate condition will be prevented in our Territories by the wise policy now being followed by the Department in making surveys for canals to supply water from the main streams to irrigate the areas which would seem to be properly entitled to water therefrom, and then making the necessary reservation for these areas of the water in question, and the small sums expended in making these surveys so as to render the reservation mentioned possible, are calculated to be followed by the most satisfactory returns in the future development of the arid region as a whole.

In view of the information given regarding the available water supply, and the further fact that the watershed furnishing this supply is useless for grazing or agricultural purposes, and, aside from the small amount of merchantable timber which it supplies in certain districts, is only valuable as a catchment area to furnish water to the thirsty plains and open areas lying to the east, it would seem unnecessary to advance any argument to prove the urgent necessity of preserving this watershed in a condition best calculated to improve or maintain its present usefulness as a catchment area; unfortunately, however, public opinion and knowledge on this subject are very erroneous, and it is important, in the inception of irrigation development, to state the conditions clearly.

In the first place we may assume that any steps calculated to diminish the present water supply are unwise, and if we point out that the rapid destruction of the timber covering the foothill country, which is annually taking place through forest fires, is calculated to seriously affect this water supply, nothing further should be needed to convince the most indifferent observer of the pressing necessity for preventing and checking these fires as far as possible.

The part which forest preservation plays in agricultural development by the aid of irrigation, is very aptly described in the Report on the Forest Conditions of the Rocky Mountains, published by the American Department of Agriculture, from which we extract the following:—

“In all countries the relations between forests and agriculture are more or less intimate. The forests receive moisture from the atmosphere, store it in their recesses, and through springs and running streams send it forth to water the land. Forests in proper proportion meliorate the severities of the climate, rendering a country habitable for man, and adapted to the growth of fruits and grains suited to his needs. Floods and droughts seldom occur in a region of forests. Forest products enter into all human activities, and it may be said that the race could not exist in the absence of forests.

“In the Rocky Mountain region, where arid or semi-arid conditions prevail, the most important office performed by the forests is the conservation and distribution of moisture. The countries at the base of the mountains and surrounding them would be uninhabitable were it not for the forests which partially clothe the latter. Were the mountains wholly stripped of that covering which nature has so wisely bestowed upon them, but little moisture would be gathered from the atmosphere, violent storms would often occur, and torrents and seasons of drought would take the place of existing conditions.

“In this region the direct dependence of agriculture upon the forests is more plainly seen than elsewhere. Except in a few localities, field crops, orchards and gardens are cultivated with the aid of irrigation systems, the water for which is taken from the mountain streams. Should the forests be destroyed, the streams, irrigation systems and crops would meet a similar fate.”

In its present condition, the wooded portion of the watershed of our arid region receives the annual precipitation in the shape of snow and rain, and after sheltering this moisture from the evaporating influences of fierce sun and strong winds, gradually gives it up to feed the numerous springs and small rivulets which, united, form the larger streams bringing the water to points where it can be diverted for useful purposes.

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With the destruction of these forests will come the sudden freshets and rapid run-off of the moisture from this area, due to the lack of shelter from the sun's rays formerly provided by trees and brush, and without the construction of the enormous and expensive storage facilities required to store this run-off until needed for irrigation, the water must go to waste and serve no beneficial purpose. The permanency of our water supply is, therefore, largely dependent upon the protection of the forests at present covering our watershed, and this protection can only be secured by taking steps to prevent the devastating fires which annually sweep over large portions of the area.

Speaking in general terms of the water supply, it may be stated that in the western portion of the arid region the distribution of the streams and the volume of the supply are of a character seldom found in arid countries, and there are very few sections, where the soil and climatic conditions are suited to agriculture, that cannot be supplied with sufficient water to reclaim extensive areas.

In the central and eastern portions of the region, the water supply for irrigation is very limited, but in these portions the annual precipitation each year is sufficient to produce good and nutritious crops of grass, and it is only necessary that the available supply should be carefully conserved and utilized in reclaiming small areas at as widely scattered points as possible, to render these portions available to a very great extent for pasturage and dairy farming undertakings.

CANAL SURVEYS.

Reference has been made above to the policy inaugurated last year by the Department of making surveys for main canals heading in the larger streams to supply water for the reclamation of the large areas which would seem to be best suited for successful irrigation, and to the further steps taken to secure a reservation of the water for these areas.

The surveys of the kind completed last year for canals heading in the Bow and St. Mary Rivers respectively have already been spoken of, and are referred to at length in Part II of this report.

Among the surveys of this character which have been projected, but which have yet to be made, two seem worthy, in view of the important bearing which they are destined to have on the future development of the arid region, of more extended notice than they have yet received. The first of these is the survey for a canal heading in Red-Deer River, and designed to divert water therefrom to the headwaters of the Rosebud River and through the channel of that stream to large areas lying contiguous thereto; the second is the survey for a canal heading in the South Saskatchewan River, which is intended to bring the waters of that stream to portions of the country in the vicinity of the towns of Regina and Moose Jaw.

THE RED-DEER RIVER CANAL.

In the report for 1894, details were given, illustrated by a sketch map, of the explorations which had been made during that season to determine the feasibility of diverting water from the Red-Deer River into the channel of the Rosebud River, and from that source to a larger area adjacent thereto, which at present is too arid to be of use, even for grazing purposes. In the remarks given therein, it was pointed out, in general terms, the beneficial results which would follow the construction of the proposed canal, and reference was made to the desirability of confirming, by a more careful survey, the favourable conditions indicated by the rapid exploration which had been made, for the diversion of the water in manner proposed.

The policy subsequently adopted by the Department, which has been explained above, now renders it probable that the survey will be undertaken at an early date, and it will therefore be of interest to speak somewhat more fully than was done in the report referred to, of the desirability of completing the actual location, and the results which may be looked for from its construction.

Owing to its situation, and to the physical conditions existing along the central and lower portions of its length, the Red-Deer River is only valuable as a source of supply for irrigation canals heading in that portion of the stream lying west of Range 26, west of 4th Meridian, and it is therefore desirable that the large volume of water available from this stream, as indicated by the discharge measurements already given, should be utilized to its fullest extent in the reclamation of areas which cannot be served from any other source. It is true that the waters of this stream must ultimately play an important part in furnishing the supply for canals heading in the South Saskatchewan River below its confluence with that stream, but it is equally certain that unless the Rosebud country is supplied with water therefrom, the district must remain in its present arid condition.

The proposed method of diverting the water from the Red-Deer River to the Rosebud River, is to construct a canal heading in the former stream somewhere in Township 33, Range 5, west of 5th Meridian, and then, following along the valley of the stream until the elevation of the bench land is reached, when the canal would turn sharply to the south and follow a valley which connects those of the Red-Deer and Little Red-Deer Rivers, finally emptying into the latter somewhere near the south boundary of Township 33, in Range 4, west of the 5th Meridian.

After flowing through the channel of the Little Red-Deer River for a distance of some four miles, the water will be again diverted by a canal heading somewhere near the north-west corner of Township 32, Range 3, west of 5th Meridian, and then following up the valley of the Dogpound Creek until sufficient elevation is reached to cross that stream with a level or low level crossing, when the canal would be deflected to the north along the slope of the valley until the headwaters of the Rosebud River are reached, the water from the canal being delivered therein and distributed through the district by following its channel.

The first mentioned section of the canal would be about $12\frac{1}{4}$ miles in length, and the second about 22 miles, making the total length of canal to be constructed about $34\frac{1}{4}$ miles. This with the 78 miles in length of the channel of the Rosebud River and the small portion of the channel of the Little Red-Deer River, would practically give a canal from which water could be drawn off at the points needed of $116\frac{1}{4}$ miles in length, and as the combined low water discharges of the Red-Deer and Little Red-Deer Rivers as given above, indicate that at least 300 cubic feet of water per second can be diverted from these sources during this stage of water for irrigation purposes, some thirty or forty thousand acres of an area at present useless owing to its aridity, would be irrigated and the whole Rosebud district rendered available for pasturage and grazing purposes.

That this volume of water could with safety be turned loose to flow unchecked down the present channel of the Rosebud River is doubtful; it is not, however, proposed that a canal of such large dimensions should be constructed in the first instance, but that only sufficient water to meet present requirements should be provided, and the works so located and designed that they could be enlarged and properly constructed to control the total volume available, as demands upon the water supply necessitated.

The area to be reclaimed by the construction of this canal in the district traversed by the Rosebud River, is one of the most desirable, from some standpoints, of any of the large areas susceptible of irrigation from one source in Southern Alberta. The country is a high open plateau, broken in many places by pronounced valleys, which at one time doubtless contained important streams, but are now marked only with the insignificant channels of small streams misnamed in being called rivers. These streams become perfectly dry, except in isolated spots, early in the summer, and are of importance only during the periods of melting snows and excessive rains, when several of them attain a considerable discharge for short periods. They form, however, the only natural source of water supply at present available, and although the district is well suited in other ways for ranching purposes, particularly for the grazing of sheep, and the soil of the larger portion is rich and fertile, in its present condition this large area is practically useless owing to the lack of sufficient water even for domestic and stock watering purposes. In view of these facts it will be seen that if nothing more is accomplished from

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this canal than the diversion of sufficient water from the Red-Deer River or even from the Little Red-Deer River only, to maintain the Rosebud as a flowing stream throughout the year and thus provide an abundance of water for domestic and stock watering purposes, the value of the work in opening up this district for extensive ranching and dairying development would provide a handsome return for the comparatively small sum needed to construct the necessary works.

SASKATCHEWAN RIVER CANAL.

Under the head "Hydrography of the Arid Region," mention was made in the report of 1894 of the limited character of the water supply available for irrigation purposes in the eastern portion of the arid region, and also of the desirability of demonstrating by actual survey whether this limited supply could not be augmented by diverting water from the Saskatchewan River to the large plains district in the vicinity of the towns of Regina and Moose Jaw.

The solution of this problem is probably the most important question connected with the development of the arid region now outstanding. The aridity of the eastern portion of the region has been demonstrated by the information regarding rainfall given in the report above referred to, during the last eleven years, and by the results which have accrued to the large number of settlers who have suffered almost annually a loss of crops from drought.

This portion of the North-west Territories was opened up for settlement by the construction of the Canadian Pacific Railway in 1882-83, and the completion of the road was followed by a considerable influx of immigrants who, attracted by the exceptionally rich character of the soil, and unacquainted with the existing climatic conditions regarding moisture, and doubtless further misled by the condition in which they found the small streams, lakes and swamps owing to the exceptional rainfall of the season preceding their arrival, were sanguine of being able to make comfortable homes, and looked for the same return from the growth of cereal crops which had been realized in districts immediately east of them.

Unfortunately, this expectation was strengthened by the crops secured in 1884, owing to the abundant moisture of that year, and many farmers broke up large areas and began grain raising on a large and expensive scale. The succeeding seasons became drier as time went on; the creeks and small lakes and swamps dried up, and, finally, many settlers were put to great straits to obtain even sufficient water for domestic purposes, and suffered much hardship in consequence, this condition being accentuated by an almost annual loss of crops from drought. Even the most sanguine resident now realizes that he has located in a region where the climatic conditions regarding moisture render agriculture a very precarious means of livelihood, but to very few has the idea yet occurred that through irrigation this failure in natural conditions may be overcome.

Before proceeding to discuss the possibility of providing water from the source mentioned for the irrigation of any considerable portion of this area, it may be of interest to note that the experience of the settlers there has been but a repetition of the history of the settlement following the advance of railway development in the semi-arid region to the south of us; the facts regarding the disastrous results which have followed attempts at agriculture in the western portions of North and South Dakota, Nebraska and Kansas being too well known to need any repetition. However, the conditions existing in the portion of our Territories under consideration differ in some important particulars from those of the States mentioned, and it is proposed to endeavour to show that by taking advantage of the facilities which nature offers, the present lack of moisture can be largely overcome.

It has already been said that the possibilities of irrigation have not suggested themselves to the inhabitants of this region as a means of overcoming the present natural drawbacks, first, because the principle is comparatively new in Canada, and secondly, because the possibility of obtaining the necessary water has seemed very remote. A careful consideration of existing conditions, however, has led the writer to the conclusion

that the flow of a large portion of the South Saskatchewan River, which carries off the drainage of the great portion of the watershed in our arid region, can be successfully diverted to these plains, and that they need but the transforming influence of water applied through irrigation, to make them capable of supporting a large and prosperous population.

As was explained in the reference to this subject contained in the irrigation report for 1894, the project of diverting a portion of the waters of the South Saskatchewan River so as to flow through this district, is not new, a scheme to accomplish that end having been advanced as far back as 1859, by Professor H. Y. Hind. His object, however, was to create a navigation route through this district by bringing these waters into the channel which nature has provided through the Qu'Appelle valley, and it is doubtful if the more beneficial scheme of endeavouring to carry the waters to the high plains elevation for irrigation purposes suggested itself to him.

Unfortunately, we are not yet in possession of sufficient data to enable us to say definitely that the proposed diversion of the waters for irrigation can be accomplished, but sufficient facts are available to warrant the assumption that the scheme is feasible, and to justify the expenditure of the comparatively small sum needed to make the preliminary surveys which will settle this important question. The proposed method of obtaining the waters may be briefly outlined as follows, these remarks being illustrated by the sketch map accompanying this report.

It is known that the height of land between the head of the Qu'Appelle valley and the South Saskatchewan River is only 80 feet above the summer flow in the latter stream, and that the distance between the head of the valley and the stream is comparatively short. It is probable, that by going a sufficient distance up the river, water can be diverted therefrom and carried in a canal to reach the height of land mentioned, and then be delivered into the Qu'Appelle valley. It is also known that the general slope of the country from the head of the valley is to the east and south, and it remains but to prove that after leaving the height of land the water can be carried to the bench land elevation on the south side of the valley to enable it to be from that point distributed to the area adjoining the Canadian Pacific Railway, in the vicinity of Moose Jaw and Regina.

The South Saskatchewan River, in the portion of its length where it is proposed to divert water, is a stream of such size that practically an unlimited supply of water could be obtained for irrigation purposes, and as it would be necessary that a canal on the location proposed should be of sufficient size and depth to supply water during the winter months for domestic and stock watering purposes, without the possibility of freezing to the bottom, it is proposed that the location should be made for a canal to carry 2000 cubic feet of water, which would irrigate from two to three hundred thousand acres of land, in addition to providing water for the other purposes mentioned.

The proposed route which the canal would take will be more readily understood from the accompanying sketch map, but it must of course be understood that the route laid down is simply to illustrate the above remarks, and that the actual survey will doubtless change the location very much, and possibly, prove the whole scheme infeasible. However, it is hoped that in the extension of the policy inaugurated by the Department of making actual canal locations of this kind, the necessary surveys to demonstrate the feasibility or otherwise of this scheme may be undertaken at an early date, and before leaving the subject, it may be pointed out that if the topographical conditions permit the diversion of water on the route projected, the construction of the canal should not be very expensive, as there would be very little, if any, fixed rock formation met with, and the soil to be moved is of a character which should permit of very cheap canal construction. It is also worthy of note that the construction of this canal would not be undertaken for the reclamation and colonization of an area at present unoccupied, but to meet and relieve the needs of a large number of deserving settlers at present struggling with adverse natural conditions.

THE COLONIZATION OF ARID LANDS.

The facts regarding the aridity of a large portion of the southern part of the North-west Territories, and of the volume and location of the water supply available for the

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reclamation of this area through irrigation, are now sufficiently well determined to justify some attention being paid to the important question of so directing and controlling the colonization of this area as to result in the greatest ultimate good to the country as a whole.

This attention seems the more necessary from the fact that much of the settlement which has already taken place in this portion of the Territories has been attended with unsatisfactory results, and as a consequence the district has been and is being spoken of as largely an arid waste, unfit for settlement or agricultural development.

In dealing with the question of the colonization of any portion of the arid region, it is of course understood that as long as the large area at present open for settlement in the humid portions of Manitoba and the Territories remain available for settlement by the incoming immigrant, the government will not be justified in attempting to further, in any marked way, the colonization of arid lands, but as the region containing these lands is possessed of advantages in the way of grazing and stock raising facilities not possessed by the humid portions, and as these advantages are of themselves sufficient inducement to cause more or less settlement in the arid region, by those who are desirous of going in for stock raising instead of ordinary agriculture, it is desirable that this settlement should be conducted on a basis best calculated to advance not only the interests of individuals but also the whole community. It is claimed and will be proved as far as possible in the following remarks, that the owner of an irrigated farm is in a better position than the settler owning and farming lands under ordinary conditions, but this claim is not advanced with the intention of trying to divert settlement from the humid portions to the arid region, but simply to disprove the assertion that the latter region is unfit for settlement, and as an argument in favour of directing present settlement into the channel best calculated to accomplish the desired ends already mentioned.

Facts have been quoted in this and previous reports to show that in its general characteristics of soil and climate, the arid region is well adapted for human habitation, and its advantages for ranching or stock raising and dairy farming are too well known to need proof here. On the other hand, the lack of sufficient rainfall in the region to render the growth of crops certain or remunerative is equally well understood, and the present conditions may therefore be summarized as follows :

Fifty millions of acres of the North-west Territories are comprised in the area now known to be arid in the sense of insufficient moisture for successful agricultural development. The larger portion of this area offers special advantages for pastoral pursuits and the output of dairy products, and already contains a large population engaged in this means of livelihood. Within this region, investigation shows that there is a sufficient water supply in the streams and rivers now going to waste which, if diverted and utilized in irrigating the lands capable of being served therewith, would render 6,325,450 acres in the region fit for all kinds of agriculture, and would strengthen and permanently establish the stock raising industry by providing feed to tide over the bad winters, and by opening up areas for grazing purposes at present unavailable owing to insufficient water for stock watering purposes.

The question therefore to be solved is, how can this water supply best be utilized and settlement of the tracts irrigated therewith be undertaken so as to accomplish the greatest development of the arid region as a whole?

Before attempting to answer this question, we must first consider some of the features of the present land laws which are unsuitable to the ends sought, and outline necessary regulations regarding the apportionment of the water supply available so as to render the proposed system of colonization possible.

Under existing provisions of the Dominion Lands Act, free homesteads can be obtained on the even numbered sections only, the odd numbered sections having been granted or reserved to aid in the construction of railways and for the purposes of school endowment. The homestead regulations provide for either actual residence on or cultivation by the homesteader of the land granted him, and settlement under these conditions must of necessity be of a very scattered nature ; as a consequence, until the intervening odd numbered sections have been disposed of by sale and occupied by the purchasers, the number of residents in a township will be small. This system of settlement, although

having drawbacks from the standpoint of social intercourse, has worked well in districts where farming is possible under existing natural conditions, but it is entirely unsuited to the settlement and development of arid regions, and it is desirable that some changes to meet the special conditions existing in the arid region should be made.

In all arid countries, there is a great disproportion between the area of land and the volume of water available for the reclamation of the arid area; the greatest development is therefore to be looked for from a distribution of the watered areas in such manner as will permit of the utilization of extensive adjacent areas of unwatered country for grazing purposes, and it is manifestly impossible to accomplish this end unless the lands to be irrigated can be obtained *en bloc*, and the settlement of these lands arranged on some other basis than that requiring each settler to be on a quarter section.

The best results which have been accomplished in the colonization and development of arid areas by the aid of irrigation have resulted from settlement under the colony or hamlet system, and abundant evidence is available of the successful experience resulting from settlement under this system in Colorado, Utah, Idaho and California in the United States, and in the government colonies or hamlets in Australia.

The advantages which the colony or hamlet system of settlement has over the ordinary settlement under the present homestead regulations are very marked. In the first place the opportunities for social intercourse and school and religious facilities are much greater than are possible when the settlers reside each on their own quarter section, and houses are separated by half a mile or a mile as the case may be. Again, the chance of securing the mutual effort required in providing elevators, cold storage, creameries and other industries connected with successful agriculture is greatly strengthened, and opportunity offered for economy in purchase and use of agricultural implements and good male breeding stock, which are not possible when settlement is of a scattered character.

Much more might be said in support of the advantages of the hamlet system of settlement in any new country, but that it is the only system adapted to the successful colonization of arid areas has, we think, been conclusively proved by the experience of the countries referred to, and that its inauguration in our arid region will be followed by satisfactory results is certain.

The necessity for and possibility of bringing this system of settlement into effect has been recognized by the Government in the passage of laws permitting the Canadian Pacific Railway Company to take all the land in certain districts where irrigation is necessary, *en bloc*, and the opportunity of developing the system upon a sound basis has been greatly strengthened by the wise policy above referred to of making the necessary surveys for the main canals to supply certain districts and creating the reservation necessary to supply the water to these canals. It therefore remains to outline, briefly, the basis upon which the system can be brought into active operation.

In the first place the provisions of the Dominion Lands Act regarding the disposal of lands should be so amended as to provide for the granting of lands on liberal conditions for reclamation by irrigation, and to permit of these lands being settled and cultivated under the colony or hamlet system. This end could probably be accomplished by authorizing the withdrawal from ordinary homestead entry of the tracts shown to be irrigable from one source, and the granting of these lands or any portion of them to companies or associations of individuals, or even to one person, who would undertake to colonize them under the community or hamlet system.

Provision would also have to be made for the acquirement by the company or individual, under the provisions of the Irrigation Act, of the water necessary for the irrigation of the tract, and for allowing the settlers to reside in the central hamlet or village, and not upon each individual holding as required by the ordinary provisions of the law.

The necessary amendments to the Act would probably have to be formulated somewhat on the following basis:—

1. To authorize the withdrawal from homestead entry of such tracts of land within the arid region, the boundaries of which should be defined as may be shown by the

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Government Irrigation Surveys, or by private surveys as described hereunder, to be capable of irrigation from any source from which unappropriated water is available.

2. To grant authority to the Governor in Council for the reservation, sale or homestead entry, of the whole or any portion of the tracts above mentioned, which may be applied for by any individual or company, for such time as may be needed to enable the individual or company to make the necessary surveys and file the memorial and plans and publish the notices required by the Irrigation Act to obtain the water right for the irrigation of lands within the reserved tract, and to obtain the right under the Act to construct the necessary works for the utilization of the water right granted.

3. To authorize the granting of or sale to the individual or company of the lands comprised within the proposed scheme, in some fixed proportion of irrigable land to grazing land, upon such terms as may be fixed by Order in Council.

After the amendment of the Dominion Lands Act as above suggested, an Order in Council could be passed containing full regulations regarding the price at which lands applied for are to be sold, the manner in which they are to be settled and irrigated, and the steps to be taken for the cancellation of the agreement and taking over of the lands by the Government in the event of failure to complete the contract under which they were acquired. The provisions of the Order in Council would, of course, need much careful thought and consideration, but it may be well to refer to a few of the principal objects to be kept in view in preparing these regulations.

In the first place they should be framed so as to provide for the colony or hamlet system of settlement of the lands purchased, and for the portion of grazing land which each irrigated acre would carry with it. The question of the price to be paid for lands should be definitely fixed and full provision made for the acquirement of title to water needed for irrigation by any purchaser of land, and the connection of the title to land and water in such a way that they could not be subsequently disassociated. Probably it would also be necessary to define the "duty of water" so that there may be no question arise as to the quantity of water to which each irrigated acre is entitled, and all these provisions should be framed in such a manner that they can be incorporated in the agreement between the purchaser of the tract and those to whom lands may be sold for settlement.

To illustrate more fully the proposed method of colonizing arid areas under the hamlet system and to support the statement already made that the possessor of an irrigated farm in a colony of this character has a better chance of success than the settler in a humid region where farming is carried on under ordinary conditions, we may outline the steps to be taken in creating the colony, and directing its subsequent development.

A company or other association of individuals, or even a single individual, having acquired the right to irrigate and colonize a certain district as outlined above, would proceed at once with the construction of the necessary works for the supply of water for irrigation, and having completed these works, or carried the surveys to that stage which would show exactly what portions of the area could be irrigated, the area would then be divided into districts so as to provide that each district would have its due share of irrigable and grazing lands, and the central colony or village in which the owners of these areas would reside would be so located as to be as nearly central as possible, and at the same time possess the necessary facilities for water supply, convenience to railway communication, good drainage, and the many other considerations requisite to make a healthy and attractive home. The area covering the village or hamlet site should be carefully laid out, with large sized lots, wide streets and abundant space for park, school, church and other public purposes, and in addition to the residence lots, areas of an acre or half an acre should be set aside for cultivation as market gardens by residents.

The area of irrigable and grazing land in each district surrounding the central hamlet would be subdivided so as to provide that each family would have at least twenty, and possibly forty acres of irrigable land with its attendant proportion of grazing land.

The scheme having advanced to this stage, the promoters would be able to fix the price per acre to be charged for each holding, the period over which payments therefor

was to extend, the tax per acre per annum to be paid for maintenance of the irrigation works, the manner in which water was to be supplied for irrigation purposes, both on farm and village lots, and all these features being embodied in a clear and comprehensive contract, to proceed to invite settlement of the lands.

The inducements to be offered for the sale and settlement of the lands comprised in the scheme which could properly be held out, would be somewhat as follows: In the first place, the central village would offer opportunities for the erection and maintenance of comfortable homes with the added advantage of social intercourse, and proximity to school, church, places of amusement, post offices and stores not obtainable under conditions following the ordinary system of settlement. The mutual effort required in obtaining the grist mill, elevator, cold storage, creamery, cheese factory and numerous other industries needed in a prosperous agricultural community would become available, and this effort could be directed more particularly to procuring, as the common property of the settlement, the necessary well bred male breeding stock for the production of good beef, mutton, pork, horses, poultry, etc. In view of the present disinclination to farm life owing to its lack of social opportunities and lonely character, and the great rush of the younger generation from the farm to the already overcrowded cities and professions and trades, the village or hamlet system of colonization should offer particular inducements to those who are disinclined to undertake agricultural pursuits under ordinary conditions.

To the above advantages must be added the certainty of return from agricultural or pastoral pursuits carried on in connection with irrigation, and we have then sufficient foundation for the assertion already made, that the possessor of an irrigated farm, more particularly if he has secured it in a district colonized under the community or hamlet system, has not only many advantages and comforts not possessed by the ordinary farmer in humid regions, but also a better prospect of making a comfortable and assured livelihood, and these advantages should amply justify the experiment of colonizing our arid lands by private enterprise under the system outlined, without in any way interfering with the development which is taking place in the settlement of the vacant lands in the humid portions of the Territories, for it must be borne in mind that immigrants can be obtained to farm lands by the aid of irrigation, who would not come to the Territories under ordinary conditions, and further, that the attractions offered by the hamlet system and assured returns from irrigated land should attract a class of young men who are now leaving the farm for the trades and professions or mercantile pursuits, on account of the lonely character of the life and uncertain returns resulting from agriculture under ordinary conditions.

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PART II.

CANADIAN IRRIGATION SURVEYS.

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in charge.*

The reasons which led to the inauguration of the general irrigation surveys now being carried on in the arid region, were fully explained and the system under which these surveys are being performed, minutely described in the general irrigation report for 1894, published last year.

As was stated in the report referred to, the operations of the surveys are of a two-fold character, viz., topographical and hydrographical, and although these two objects are kept primarily in view in carrying on the field operations, it has been found necessary to devote some attention to closely allied subjects regarding which information is needed to make our investigations complete.

Before proceeding with a detailed account of the work accomplished during the season of 1895, by the two divisions into which the survey is divided, it is necessary to offer some prefatory remarks regarding the work in hand and the general results therefrom.

The assembled results in the way of plans, profiles, discharge sheets and reports of our investigations during 1894, served to convey a fair general idea of the topographical, hydrographical and meteorological conditions existing in the southern and western portions of the arid region, and in projecting the work to be undertaken during the past year, we were able, with the aid of this general information, to so outline the season's operations as to permit of more particular problems being attacked than were attempted during our first year's work.

The system of line levels run during 1894 through the open or prairie portions of the arid region near its western limit, had established definite points, both as to location and elevation, throughout the district, and the measurements of the discharges of streams and springs, and of the volumes of the lakes, had served to give an approximate idea of the water supply available for irrigation, it, therefore, seemed of first importance in projecting the work for the past year, that we should begin some careful and systematic investigation of the topography, hydrography and distribution of timber in the unsurveyed area comprising the foothills, and on the eastern slope of the Rocky Mountains, which form the main watershed of the arid region, with the object of procuring definite information regarding the configuration and area of this watershed, and some reliable data as to the probable run-off therefrom and facilities for storing the same by the construction of reservoirs.

Owing to the broken and rugged character of the district it was evident that the general system under which our general irrigation surveys were being carried on in the open and prairie portions, would have to be modified to meet special conditions in the

area in question, and with the limited means and staff available for the work, it was apparent that the ordinary methods adopted in making topographical surveys in a broken or mountainous region would have to be departed from if any considerable portion of the area was to be covered by our operations last year. It was, therefore, determined to adopt a primary triangulation throughout the district as a ground work of reference for further detailed investigations, but as the facilities for getting to the points suitable for stations of this triangulation, or the approximate location of these points were unknown, it was seen that some general exploration or reconnaissance survey was first needed to provide this information before a scheme of triangulation could be intelligently projected or stations located. To accomplish this end it was decided to utilize the valleys of the main streams intersecting the region as a basis for operations in the intervening areas, and to provide in these valleys definite points of reference both as to location and elevation by carrying an instrumental traverse up the valleys from the most westerly point, where they are intersected by lines of the ordinary land survey system. In making this traverse the bearings of courses were determined by reference to lines of the land survey, checked by frequent azimuth observations, and the length of courses by micrometer measurements, checked when possible by trigonometrical methods. The elevations being determined by barometer, the uncertainty of determinations of this character being corrected as far as possible by using a number of instruments and by referring the reading of the instruments used in the field to a half hourly record from an independent instrument in camp. In the determination of the topography of the valley up which the traverse was being carried, and of the intervening areas between the different valleys, the photographic method of survey was adopted, and the general operations were made a part of the completed system by providing that concurrently with the work in the valleys, suitable points should be selected for the location of stations for the main chain of triangles to cover the district, and signals erected at these points, their position being fixed by reference to the traverse lines.

Some idea of the run-off from the district was obtained by frequent and careful gaugings of the streams flowing through the valleys up which traverses were being carried, and the facilities for storage of flood or freshet discharges determined by careful survey of all sites suitable for the creation of reservoirs by the erection of dams, and, as having an important bearing on the question of the run-off from the watershed intersected by the valleys followed, some attention was devoted to the character and distribution of the timbered areas.

The work outlined above was entrusted to Division B of the survey, under the charge of Mr. A. O. Wheeler, D.L.S., and the methods of carrying it out and the results accomplished will be found fully described in his report further on.

Division A was engaged during the earlier part of the season in extending the ordinary line levels in the Macleod, Lethbridge and Pincer Creek districts. Work was commenced at Bench Mark No. 87, at the north-east corner of Township 12, Range 28, west of 4th Meridian; from this point the line levels were extended easterly along the north boundary of Township 12, across Ranges 27, 26, 25, 24 and 23, west of 4th Meridian, and then turning to the south, the outline between Ranges 22 and 23 was followed for eighteen miles across Townships 12, 11 and 10. From the north-east corner of the last mentioned township the work was carried to the east along the north boundary of the township across Range 22, and as far as the north-east corner of Section 33 in Range 21. At this point a turn to the south was again made, and the centre line of the township followed to the southern outline, this line being then followed to the east as far as the south-east corner of the township.

After reaching the last mentioned point, the outline between Ranges 20 and 21 was followed to the south across Townships 8, 7, 6, 5 and 4, a distance of thirty miles, to the south-east corner of the last mentioned township, from which point work was extended to the west along the north boundary of Township 4, across Ranges 21, 22 and 23, then to the south on the outline between Ranges 23 and 24 across Townships 2 and 3, then to the west along the north boundary of Township 2 across Range 24, and then to the south along the outline between Ranges 24 and 25, across Township 1 to the International Boundary line. The line levels in connection with this portion of the season's operations

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were also run along that portion of the north boundary of Township 2, lying east of the St. Mary River.

In effecting the above described work, 154 miles of line levels were run, 12 permanent bench marks being placed for reference of elevations determined, as shown by the bench mark schedule further on.

The usual topographical information regarding the country traversed by line levels was obtained, an area of 234 square miles being covered. In making our topographical surveys a modification of the system used during the first season's operations was adopted. We had found that in plotting the information given by topographers' field notes doubt sometimes arose as to the probable course of a contour from the point where the topographer left it in making his survey, and also as to other points not sufficiently clear in the field notes. It was, therefore, decided this season to do away with field notes altogether, and to plot the topography in the field direct on sheets of cross-section paper, made of convenient size and scale, and fitted in a case which is used as a sketch board in the field. This system has worked very well, the information regarding contours and general topographical conditions obtained by the system, fully described in the report of 1894, being plotted directly on the sheets in the field, and these sheets, when complete, numbered for convenience in transcribing this information to final topographical sheets in the office.

ST. MARY IRRIGATION CANAL.

After completing the above described work, Division A undertook the survey and location of the St. Mary Irrigation Canal. As this work was of a special character and entirely apart from the irrigation surveys performed under the general system, some space is devoted to an explanation of the reasons which led to the work being undertaken and the manner of carrying it out.

Among the many large irrigable areas in Southern Alberta which only wait the transforming influence of water to make them highly productive and the home of prosperous farmers, none promises more favourable results than the tract of country lying east of the St. Mary River and north of the Milk River Ridge, locally known as the Lethbridge Plains. This section of country comprises a plateau having a general elevation of about 3000 feet above the sea, and from 200 to 300 feet above the St. Mary River, which bounds it on the west, and has a somewhat rapid fall to the north and east. The soil of this district is a rich friable clay loam, and the climate a favourable one, both for outdoor grazing of cattle and sheep during the whole year, and, with the exception of insufficient moisture, for the growth of all cereals and fodder crops. The area of the tract capable of irrigation from the St. Mary River, provided all the available water supply from that source can be diverted on to these lands, is about 250,000 acres, and a very large proportion of this area is susceptible of cultivation.

In carrying on the general irrigation surveys which are being made in the arid portion of the Territories, it was deemed of importance to prove, by an actual canal location, that the waters of the St. Mary River could be diverted to this tract, so that a proper reservation of these waters under the provisions of the North-west Irrigation Act might be made, and the early development of the district expedited by the fact of the feasibility of providing water for irrigation purposes from this source having been proved by a Government survey.

The St. Mary River heads in St. Mary Lakes, situated in Montana, not very far south of the International Boundary line, and is the drainage channel for a large catchment area situated on the eastern slope of the Rocky Mountains. The general course of the stream is north-easterly, and in its upper portion, it flows in a valley of about half a mile in width, with sides of moderate slopes with occasional cut-banks. In this portion of its length, the stream flows at a depth of from 100 to 150 feet below the surrounding prairie level, and has a fall of some 22 feet in a mile. This rapid fall has cut the bed into numerous channels, and gravel bars are very prevalent.

In the middle portion of its length, the stream follows a very tortuous course, but flows in a well defined channel, and the valley becomes much more broken and the banks increasing in height to 300 feet.

The flow of this stream is fairly regular for a mountain drainage channel, and the mean summer flow continues until late in the season, but the extremes between flood and low water discharges indicate the rapid changes to which streams of this character are always subject.

In the absence of an extended series of measurements of the stream, we are of course, unable to speak authoritatively of the available water supply, but our gaugings so far completed as given below, prove that a very considerable quantity of water can be diverted from the stream for irrigation purposes.

Gaugings of St. Mary River.

Location.	Date.	Discharge.	Observer.
Sec. 34, Tp. 4, R. 24, W. 4th Mer.....	Aug. 23, '94...	1208.8	A. O. Wheeler.
Sec. 2, Tp. 1, R. 25, W. 4th Mer.....	Sep. 10, '94...	741.3	J. S. Dennis.
Sec. 25, Tp. 6, R. 23, W. 4th Mer.....	Oct. 4, '94...	821.3	do.
Sec. 18, Tp. 2, R. 24, W. 4th Mer.....	July 19, '94...	2202.3	do.

All the above gaugings were taken at mean summer or low water flow in the stream, but the calculations based on observed flood marks and cross-section, indicate that during that stage the discharge reaches some 6500 cubic feet per second. In the absence, however, of data as to the period of flow at that stage we are unable to calculate with any close degree of accuracy the flood supply for storage and subsequent use in irrigation, but it is evident that the available summer flow can be largely augmented by the storage of these storm or flood waters.

The waters of the upper portion of the stream, except during flood stage, are clear and cold, and very free from silt, and judging from the small deposits of drift and absence of sand bars, the stream, even at flood stage does not carry the usual amount of sediment found in channels heading in a mountain range and having a rapid fall.

An examination of the valley of the stream throughout the middle and upper portions of its length, together with elevations determined by our general irrigation surveys, at once rendered apparent when we undertook the work of actual canal location, that the intake for the proposed canal would have to be located in the extreme upper portion of the stream within Canadian territory, for it is only in that vicinity that the character of the banks and rapid fall of the stream will permit of the diversion, within reasonable financial limits, of the waters to the adjacent bench land elevation.

The first point for a proposed intake was located on section 9, in Township 1, Range 25, W. of 4th Meridian, and from that point we carried a preliminary location northerly along the eastern bank of the valley through sections 9, 14 and 15. This location, in so far as the point of diversion and canal location up to the bench land elevation is concerned, proved an advantageous one, but the length and depth of the cut necessary to reach the bench land on section 14 above mentioned, and the general elevation of the canal at this point with reference to the tract of country to be served therefrom, rendered the location impracticable, and it was therefore abandoned.

We next located a point for the intake some four and a half miles farther down the river on section 36 in the above township and range, and after running a preliminary location from that point, and proving that the bench land elevation could be reached without encountering any very heavy cuts, and having by a further examination of the river below that point proved the impracticability of getting out of the valley at any other point with the canal within reasonable limits of financial cost, we finally decided upon a point in the south-east quarter of section 36 for the location of the head-gates or intake and proceeded with the final survey of the proposed route.

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To make the following remarks regarding the proposed canal clear, it is probably better that they should be subdivided under the following different heads:—

Dimensions of canal.

Route of canal and manner of locating.

Headgates, dams, and other proposed structures.

Lands irrigable from main canal and branches.

Probable cost of proposed undertaking.

Dimensions of Canal.

The main canal between the point of intake and the head of the Pinepound Creek Branch, mentioned below, is designed to carry 500 cubic feet of water per second, the dimensions being, bottom width 35 feet, side slopes 1 to 1, depth of water 5 feet, fall per mile of length 2 feet.

The Pinepound Creek Branch is designed to carry 100 cubic feet per second, and after the point of diversion for this branch is reached, the size of main canal is reduced to bottom width of 24 feet, side slopes 1 to 1, depth of water 4 feet, and fall per mile of length 4.125 feet. These dimensions are maintained until the proposed point of departure for the Pothole Branch is reached, when the dimensions of main canal throughout remaining portions of its length are reduced to, bottom width 16 feet, side slopes 1 to 1, depth of water 4 feet, and fall per mile of length 5 feet.

These dimensions are calculated to give the following velocities through the different sections:—

Intake to Pinepound Creek Branch, 2.5 feet per second.

Pinepound Creek Branch to Pothole Branch, 3.62 feet per second.

Pothole Branch to end of location, 3.75 feet per second.

In considering the questions of the dimensions of the canal, it was first proposed to design it to carry 1000 cubic feet of water per second, but when it became apparent that difficulty would be encountered owing to the rapid slope of the country, as described further on, in getting the water down to the area to be irrigated, it was decided to reduce the dimensions so as to provide for a discharge of 500 cubic feet per second, and thus bring the scheme within reasonable financial limits, leaving the larger undertaking to future requirements as the district becomes settled and developed.

The question of safe velocities for water in an irrigation canal, is one that has received much attention from irrigation engineers, but the data obtainable from text books on the subject is so contradictory in many particulars, and is so dependent on local conditions, that it is evident that each case must be considered by itself, and no safe general rule can be laid down to be blindly followed.

It is of primary importance, particularly in a canal of large dimensions, that the velocity should be as high as possible without serious erosion of the bottom or banks, so that silt may not be deposited in the canal, but carried on to the cultivated land where its fertilizing qualities will be of value, and while it is possible to check too great a velocity by the construction of drops or checks, very little can be done to increase the initial mistake of too small a slope and the resulting too slow velocity in original construction.

These remarks are given in explanation of these seemingly high velocities given in the last two sections of the main canal as above noted, and in addition thereto it may be said that in this instance the chief difficulty met with in locating was excessive general fall in the surface of the country traversed by the canal, as is more fully described further on, and the greatest possible grade in canal was therefore necessary. It may be also explained that while we have very little experience based upon actual velocities in large ditches or canals in our arid region to guide us in projecting new works, what there is available, when taken in conjunction with our experiments in this direction, leads to the assumption that the heavy loam of which the soil of a large proportion of the tract to be served by this canal consists, will stand a high velocity without serious damage to the banks or bottom of the canal.

Route of Canal and manner of Locating.

From the point of intake mentioned above, the canal runs almost due north along the eastern bank of the valley of the river through Section 36 above mentioned, and Section 1, in Township 2, Range 25, west of 4th Meridian, the bench or prairie level being reached in the latter section with a comparatively light cut or excavation. From this point, the general course of the canal is north-easterly through Township 2, Range 24, west of 4th Meridian, crossing the south branch of Rolph or Willow Creek in section 21, and the east branch of the same stream in Section 27, both crossings being effected by high level flumes. After the last mentioned crossing is made, the location deflects rather more to the north until the head waters of Pinepound Creek are reached in section 35 in this township. This stream is crossed at grade, the banks being very low and the channel insignificant, and the flow of the stream can easily be provided for either by an open culvert, or it can be taken into the canal at grade.

From the crossing of Pinepound Creek, the location runs almost due north along the east side of the valley of that stream, two or three minor branches of the stream which flow from the east being intersected. This general northerly direction is followed until the north boundary of Township 3, Range 23 is reached when, after crossing another branch of Pinepound Creek by a high level flume, the location is deflected to the east, and follows along the northerly slope of the Milk River Ridge, through Township 4, in Ranges 22 and 23, west of 4th Meridian, until the head waters of the Pothole River are reached in section 1, Township 4, Range 22; here the location of the main canal ends, its total length from point of intake being 40 miles, and the elevation at last station, 3586.10.

Pinepound Creek Branch.

In Section 35, Township 2, Range 24, west of 4th Meridian, just before the main canal crosses the Pinepound Creek, a branch canal designed to carry 100 cubic feet of water per second, and named after this stream, is projected to the north and west through Townships 1 and 2, in Range 24, west of 4th Meridian. This branch is designed to serve the lands between the canal and the St. Mary River, and although it was not definitely located, the preliminary location proves that a feasible route can be obtained in the vicinity of the proposed route without meeting with serious engineering difficulties. This branch will be about 19 miles in length.

Pothole River Branch.

When the main canal reaches a point to the east of the crossing of the last branch of Pinepound Creek, it is proposed to carry a branch to the north named as above, for the irrigation of a district of country lying between this stream and the St. Mary River. This branch, which will be about 20 miles in length, was not located even by preliminary levels along the proposed route, but our cross-section levels referred to further on, prove that the only difficulty to be met in carrying water along the proposed location, is an excessive slope in the general surface of the country, which will doubtless have to be provided for by an extensive system of drops.

Before proceeding with the location of the main canal or branches, we had carried along a series of line levels along the outline of the townships through which the canal was expected to run, and had tied in these levels to the elevations determined by the general irrigation surveys, and had also carried these elevations to the proposed point of intake. From this data, it was at once apparent that the difficulty to be met with in actual canal location would result from the excessive slope of the country in the direction which the canal would have to take, and in getting the water from an actual elevation of 3854 feet at point of intake down to 3000 feet, which is the general elevation of the plains area which it was desired to reach. This difficulty was the more apparent as the district to be traversed by the main canal was quite devoid of any natural sites having a rocky formation which might be utilized to drop such a large body of water with safety,

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and it was quite evident that any drops would have to be wood or masonry structures erected specially for that purpose. However, as the site located for the intake seemed the best available, there was no other course open than to locate from that point, and make the best arrangements possible to get the water down to the irrigable areas.

The method of location adopted was to run a transit line as nearly as possible along the course which followed the canal grade, the approximate elevation being carried by means of a picket marked in feet, and used in setting the forward stations. The azimuth of the courses were carefully determined by transit readings, and checked by being tied in to the township and section lines intersected, and distances measured with a hundred-foot steel band chain, the stations being suitably marked with wooden plugs for use by the leveller. From the data obtained by the transit lines run in this way we are able to plot the different courses accurately with reference to the land survey system, and to pick them up and re-establish them by referring the azimuth and distance to the nearest section or quarter section corners. The leveller followed along the transit courses, run as above described, and in addition to the line levels along proposed location, completed the necessary cross-section measurements at sufficiently close intervals to enable the quantities to be taken out and cost of construction estimated.

Our location was very much expedited by the cross-section levels, and general elevations previously determined as above described, as we were able with this data to project, with a fair degree of accuracy, the general course which the canal would have to follow, and reconnaissance ahead of the locating party was not needed to the same extent as it would have been had the conditions to be met and general slope of the country been unknown. The elevations along location were marked at frequent intervals with necessary bench marks, and were also tied in to the permanent bench marks of the general survey system situated near the location, so that elevations can be picked up at numerous points along the canal without re-running levels throughout.

After reaching the height of land between the St. Mary River and Pinepound Creek, the country to be traversed by the canal line has a very rapid fall to the north and north-east, and the limits within which the canal could be located were, owing to the high plateau forming the Milk River Ridge which attains an elevation of some hundreds of feet above the surrounding country, very circumscribed, and it was evident that our only course was to follow down the valley of the latter stream, and provide for excessive slopes by locating drops where suitable sites offered themselves.

The first of these drops is located near station 741 of the canal survey, and is followed by five others between that station and station 831. The greatest fall in any of these drops is 13.7 feet, and the total fall obtained by the six is 67.2 feet. These drops were so located as to take advantage of a chain of small lakes lying one below the other, and which, in addition to affording considerable facilities for water storage by the erection of cheap earth dams, will provide the necessary water cushion for the large volume of water to be discharged thereon.

The next drops are located at stations 1317 and 1321 of the canal survey, and are 15 feet and 6.76 feet in height respectively. At these points no natural facilities are afforded for getting the water down to the lower level other than an absence of heavy excavation, but their location materially assisted the general canal location along the northern slope of the Milk River Ridge, the escarpment of which from this point runs almost east and west.

At station 1847, two more drops are located, having a combined fall of 30 feet. These structures are located at a point affording some natural advantages for construction, and bring the canal grade down to an elevation which permits of advantageous location from there to the end of the canal.

Between stations 1986 and 1991, a branch of the Pothole River is crossed, and as the eastern bank of the stream is very much lower than the western, it was found necessary to provide for this difference by locating an inclined flume with penstock, having a fall of 17.09 feet. A portion of this fall could of course be provided for by carrying the canal up the west side of the valley, but as investigation proved that probably not more than five feet of fall could be obtained in this way, it was thought better to adopt the shorter alignment and put in the drop.

The grade of the canal, with the fall secured by the drops mentioned, brings the elevation at the end of the canal location down to 3586.10 feet, which is still some 500 feet above the plains area which it is desirable to reach, but as there are no serious engineering difficulties in the way of getting the water down to the plains other than the excessive slope of the general surface of the country, and as an area of some 71,600 acres of good irrigable land can be served from the located canal and projected branches, thus exhausting the available discharge, it was not considered necessary to continue the location further than the Pothole River, into which stream, as also into the Pine-pound Creek and its branches, such quantity of water as their excessive slope will carry with safety, can be diverted for the irrigation of areas adjacent thereto, by again diverting the water from these streams at the lower elevation.

In locating the main canal, we endeavoured, as far as possible, to follow that route which would provide that the constructed canal shall follow the location which will provide that, on side hill work, not more than three-fifths of the depth of water flowing therein shall be against bank or fill, and on level country not more than three-fourths against bank or fill.

Headgates, Dams and other proposed Structures.

Headgates.—The location for a point of intake for an irrigation canal, and the construction of proper headgates to control the flow of water from the source of supply, call for the most careful consideration at the hands of the locating engineer, and mistakes in these features of the scheme are not only hard to correct but are almost certain to be followed by disastrous results.

In the present instance, two points for the intake of the proposed canal were located. The lower one is situated on the S.E. $\frac{1}{4}$ of section 36 in Township 1, Range 25, west of 4th Meridian, as above described, and the other, some twenty chains farther up the stream in the N.E. $\frac{1}{4}$ of section 25 in the same township and range. The first mentioned contemplates the diversion of the water from the most easterly channel of the river, which is here divided into several channels by a group of islands, and has the advantage of a comparatively shallow cutting, as the general surface of the river bank is only some 12 $\frac{1}{2}$ feet above low water level, and the bank falls away from the stream, leaving the surface only 6 feet above canal grade at station 20. It has also the further advantage that the islands referred to and the small channels separating them afford good sites for the construction of the necessary diversion weir or dam, but, as against these advantages the fact should be noted that in all streams having a mountainous origin the floods and extreme freshets to which they are subject, are liable to cause material changes in these islands, which in reality are simply large gravel bars, and in the channels separating them.

The proposed intake on section 25 is located at a point where the river flows in one channel between well defined banks, showing no evidence of change or serious erosion, and a diversion dam of moderate height would control the total low water of the stream. The cut through the river bank at this point would, however, be an expensive undertaking, being some 33 feet in depth for a length of 1000 feet, and an average of 20 feet in depth up to the point where the canal would join the location from the proposed intake on section 36. However, before actual construction is begun, the advantages of these two different points can be more carefully considered and the best one adopted.

The proposed headgates as shown by detail drawings, will suit either location, and are designed for three gates or openings of ten feet each in width in the clear. The headgate flume is eighteen feet in length, with an apron 12 feet in length, the structure resting on piles driven to refusal, and floor of flume filled in with tamped gravel. The gates are of the arc pattern, working on central pivotal pin with arms of about eight feet in length, and are designed to be raised with power-winch or crab, and falling back into place by their own weight. This style of gate is used by the Calgary Water Power Company in their dam on the Bow River at Calgary, and is the most easily worked and satisfactory gate which I have examined.

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Diversion Dam, or Weir.—To secure a depth of five feet of water in canal at low water stage in the source of supply, will necessitate the construction of a diversion dam or weir at point of intake, for the stream has not a sufficient depth of water at that period of its flow.

The dam proposed is a framed structure resting on piles driven to refusal, but is so designed that everything except the trestles against which flash boards are placed can be removed in periods of high water or flood, and thus offer little or no obstruction to the flow of the stream.

Dams of this character have been erected at several points in the United States with very satisfactory results, and in streams subject to sudden rise or freshet discharge, and when it is only desired to raise the water to a moderate height, they are probably the best kind of structure to erect.

Flumes.—Flumes are needed at seven points on the main canal as located. The structures designed for these points are of the open or box style, constructed on grade, and do not need special mention, being of the ordinary kind erected in connection with a large number of irrigation undertakings. At two or three points where flumes of this character are proposed, it may be considered better to put in barrel flumes laid as a syphon, but until the suitability of this kind of flume for our climate is proved by the experience of those companies now using them, it has been thought better to adopt the simple structure with the many disadvantages to which it is subject.

Drops.—All the drops, with the exception of the inclined flume and penstock across the branch of the Pothole River already referred to, are of the vertical character, with usual head flume and suitable apron. These structures are easily built and comparatively cheap, and although they are liable to be subjected to unforeseen strains from the impact of such a large body of falling water, and will probably cost a considerable sum for maintenance, they are probably the best style of structure to erect until the canal yields a sufficient return upon the money invested to justify the erection of more permanent works.

Lands irrigable from main Canal and Branches.

The total area of land susceptible of irrigation directly from the main canal and projected branches, is about 71,500 acres. The larger portion of this tract is situated on the north and west slopes of the Milk River Ridge, and lies at a considerably higher elevation than the plains in the vicinity of Lethbridge, which it is hoped may be ultimately served by an enlargement of the canal.

The soil of the irrigable tract is, as a whole, well suited for the application of water, being a rich loam with very few stony or gravelly areas. The district does not, owing to its elevation, promise the same satisfactory results from a general agricultural standpoint, as may be looked for from the lands of the plains situated at a lower elevation, but there is little doubt that the growth of all fodder crops and vegetables will well repay the cost of applying water to the lands irrigable from this source, and as the district offers the best facilities for the grazing of cattle and sheep, particularly on the Milk River Ridge to the east and south of the canal, the growth of fodder crops on the irrigable area, combined with the fine grazing above mentioned, should permit of most satisfactory returns in the production of beef, mutton and dairy products.

Probable cost of proposed Works.

We have not attempted to go into the nicety of calculation regarding the total cost of the main canal and branches, and the structures connected therewith, which will, of course, be undertaken before construction is commenced, and the undermentioned figures are merely approximations of the cost of the different items, and of the whole undertaking, based on our plans as far as completed, without going into the many details which would be considered in making a close estimate.

Cost of excavating main canal and branches	\$ 170,000 00
Cost of dam and headgates	8,000 00
Cost of flumes	15,000 00
Cost of drops	11,000 00
Cost of bridges	4,000 00
Incidentals, engineering, management, &c	5,000 00
	\$ 213,000 00

This sum would make the charge against the irrigable area a fraction under \$3.00 per acre, which is probably as high a tax as the land would stand, considering the character of the crops which can be raised, but it may again be pointed out that the estimate of cost is an approximate one, and is framed so as not to err on the side of an under-estimate.

The general location of the main canal and branches, the location of the lands irrigable therefrom, the character of the country through which the canal passes, and the structures to be erected in connection therewith, will be readily understood by reference to the general plan, profile, and plans of details of structures which accompany this report.

After completing the canal survey above described, Division A moved west to the Pincer Creek district, with the object of running certain line levels and establishing bench marks in a portion of the district which was not reached by the operations of Division B during the previous year.

Work was commenced at Bench Mark No. 85, on the west boundary of the Peigan Indian Reserve, and from thence was carried along a portion of the reserve boundary referred to, and the portion of the east outline of Township 6, Range 29, west of 4th Meridian, lying south of the reserve, to the south-east corner of the township.

Returning to the intersection of the north outline of Township 6, in the range mentioned, with the west boundary of the Peigan Indian Reserve, the line levels were run to the west along the outline in question to the 5th Meridian, and were then run north from this point along the meridian as far as the north-east corner of Township 7, and south to the quarter section post on the east boundary of section 12, in Township 6, the total length of line levels run being about 29 miles. Five permanent bench marks were placed in connection with this work, and 45 square miles covered by topographical investigations in the district adjacent to the lines along which levels were taken.

Upon completion of the work in the Pincer Creek district, the Division returned to Calgary, and immediately proceeded with the survey and location of the Bow River Irrigation Canal, which is fully described below.

THE BOW RIVER IRRIGATION CANAL.

Probably the largest area within the arid region which can be supplied with water for irrigation purposes from one source, is that lying along the Canadian Pacific Railway, between Calgary and Medicine Hat, east of the Bow River, north of the South Saskatchewan River and south of the Red-Deer River. This district comprises an area of some 6,000 square miles, or 3,840,000 acres, of which probably 60 per cent is capable of irrigation.

The soil of a large portion of the district is first class, consisting of heavy sandy and clay loams, with a subsoil of gravel and clay, and the climatic conditions are favourable to the grazing of cattle and sheep, and, with the exceptions mentioned below, to the production of all fodder crops, and in the eastern portions of the district to the production of cereals of all kinds, and also the hardier kinds of fruit. The one feature lacking to make this area highly desirable for settlement, is the insufficient rainfall during the majority of years to mature crops and to provide water for stock. It is,

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therefore, of the first importance to the future progress of Southern Alberta, to determine what proportion of the district can be supplied with water for irrigation, and where such water can be obtained.

As a first step in the settlement of this important question, it was decided, during the past year, to survey a preliminary location for an irrigation canal heading in the Bow River, which bounds the area on the west, to serve a portion of the district.

The general irrigation surveys so far completed in the district, together with the levels taken along the line of the Canadian Pacific Railway, had demonstrated that the country has a general fall from west to east, and, that if the water required could be provided at the western boundary, there would be no trouble, other than a probable excessive fall, in distributing it over the country in question. It, therefore, became a matter of importance to determine what quantity of water could be obtained from the Bow River, and where it could best be diverted from the stream.

The necessary surveys to provide the data required in considering this question were undertaken in August and September last, and it is proposed to discuss herein at some length the results of these surveys, so that the general plan, profile and plan of details of structures which have been filed to illustrate these surveys may be clearly understood.

The Bow River is probably the best stream within the arid region for use as a source of supply for irrigation works; the river, even at lowest stage, carries a large volume of water, and the high water stage continues until late into the season when water is most needed for irrigation. The following gaugings of the stream taken during the past two years, will serve to convey an idea of its discharge.

Measurements of discharge of Bow River.

Date.	Location.	Measured discharge.	Calculated flood discharge.	Remarks.
1894.		Cub. Ft.	Cub. Ft.	
June 25.	About 5 miles west of Calgary.....	9271 00	22632 00	River at high water stage.
Aug. 11.	Below mouth of Highwood River	6654 00	26224 00	River at about mean flow.
Sept. 27.	At Mitford.....	2784 00	12540 00	River at low water stage.
1895.				
Oct. 12.	At Calgary.....	2909 70	.....	River at low water stage.

The Bow River heads in the Bow and Cold Water lakes at the head of the Bow Pass near the watershed of the Rocky Mountains. The river throughout its entire length runs in a well-defined channel, with banks and bottom of coarse gravel, some large bowlders and broken masses of sandstone being found in places. Except during periods of flood or extreme freshet discharge, the water in the river is clear and cold, and even at these stages of its flow comparatively little silt or drift is noticeable. Owing no doubt to the fact of its heading in the lakes above mentioned, and receiving therefrom an inexhaustible supply of water from the melting glaciers which cap the Rocky Mountains in that vicinity, the river is very constant in its flow, and while, like all mountain channels, it is subject to rapid and extreme freshets, it does not fluctuate rapidly in its mean discharge, and the period of high water flow is gradual both in its rise and fall, and of considerable duration in its maximum stage.

Between the east boundary of Township 25, Range 4, west of 5th Meridian, and the east boundary of Township 21, Range 28, west of 4th Meridian a distance of about 53 miles, the river has an average fall of 9.75 feet in a mile, but in some portions of its length between these limits, the stream has a much greater fall, up to 18 feet per mile for short distances.

An examination of the valley of the river throughout the above mentioned portion of its length, made it apparent that it was only within the central part of the section that water could be diverted from the stream to the elevation of the bench land within reasonable limits of financial cost.

From its confluence with the Kananaskis River to a point a few miles west of Calgary, the Bow River flows in a deep valley some hundreds of feet below the surrounding bench land, and diversion of its waters, except for the irrigation of the immediate bottom lands along its course, will be a matter of difficulty and heavy cost. Commencing a short distance below the mouth of the Elbow River, the valley again becomes narrow with steep high banks, and it was evident, as has been explained above, that only along the portion of the stream within the above described sections, and in the immediate vicinity of Calgary, would the character of the banks afford an opportunity of reaching the bench land with a canal heading in this stream within reasonable limits of cost.

Preliminary levels demonstrated that the most favourable point for the location of the intake, within the district mentioned, was on the large bottom lying east of the river in Sections 12 and 13, Township 24, Range 1, west of 5th Meridian, about two miles down stream from the city of Calgary, and it was decided to begin the canal location from that point. Before commencing the location of the canal, however, it was necessary to consider the question of the volume of water to be carried and the dimensions and slopes necessary to provide for this discharge, and in view of the large area to be served, and the further fact that the water for this area must, owing to general topographical conditions be provided at the western boundary of the tract, it was evident that as large a volume of water as possible should be provided; it was, therefore, determined to locate a canal to carry 2,000 cubic feet of water per second.

To permit of conciseness and facilitate reference to the different points to be discussed regarding the canal and its location, it is proposed to consider them under different heads, commencing with

Dimensions of Canal.

The discharge of the canal having been fixed at 2000 cubic feet per second, it was necessary, before determining the dimensions of the canal, to make a preliminary investigation of the country to be traversed, so as to permit of the most advantageous dimensions being adopted before the location was commenced. This investigation proved that the canal from the point of intake to the bench land elevation should be constructed of as shallow a depth, and with as small a slope as possible, so as to reach the height of land with a low cut; we, therefore, adopted a bed width of 100 feet, with side slopes of $1\frac{1}{2}$ to 1, depth of water 8.5 feet, and a fall of 0.50 feet in a mile, these dimensions being calculated to give the desired discharge with a velocity of about 2 feet per second. After reaching the height of land or bench elevation, at about 8 miles from the point of intake, the dimensions of the canal have been reduced to a bed width of 75 feet, side slopes $1\frac{1}{2}$ to 1, depth of water 9 feet, and a fall of 0.65 feet in a mile, these dimensions, which are calculated to give the required discharge with a velocity of 2.5 feet per second being continued to the end of the location.

Point of Intake.

As has been stated above, a favourable location for the intake was found on the large bottom lying east of the river in Sections 12 and 13, Township 24, Range 1, west of the 5th Meridian.

The first point located for the intake is situated a short distance below the mouth of Nose Creek on the S.E. $\frac{1}{4}$ of Section 13, where a small inner channel leaves the main stream and flows almost due east until it reaches the foot of the hill defining the valley of the river, when it turns south along the hill joining the main stream again about a mile farther down. This location contemplated the utilization of the bed of this small channel for some distance, and, as the river at the intake of the channel flows within

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well-defined banks, it was thought that the required volume for the canal could be diverted at nearly right angles to the general line of the flow of the stream. The banks of the river at this point are composed of loose gravel or clay, and show some evidences of wash or slide during high water, but they can be easily and cheaply protected. The bottom of the stream is firm gravel, and the cross-section fairly uniform. However, the preliminary location run from this point of intake proved, as is more fully described further on, that the elevation was too great to permit the canal to cross under the Canadian Pacific Railway, which it intersects about two miles from the intake, with sufficient head room for the required structures at that point, and it was therefore found necessary to move the point of intake down stream about a mile to a point just below where the above mentioned inner channel falls into the main stream. The river is here divided into three channels, the easterly two of which are practically dry at low water stage, and it is evident that before either of these two smaller channels can be used for the utilization of the intake, it will have to be widened and deepened so as to permit of a large part of the main stream being diverted through it. The bank and channel of the stream are here of the same character as at the first selected point, and the construction of diversion works and head gates does not offer any serious engineering difficulties, in fact, in its diversion works, and shallowness of cut at point of intake, this canal is most favourably situated.

General Location.

Starting from the point first selected as above described for the intake, the location followed the course of the small channel mentioned until it leaves the foot of the hill on its return course across the bottom to the main stream. This portion of the location will, however, have to be abandoned when construction is undertaken, as it was found that the river was being tapped too far up stream to permit of a favourable crossing of the Canadian Pacific Railway line. However, the location along the foot of the hill bounding this bottom on the east will suit any intake located on the bottom, and it was not, therefore, necessary to change the location to enable the point for the lower intake to be adopted.

From the point where the small channel leaves the hill to return across the bottom to the main stream, the canal location follows closely along the foot of the hill, utilizing in part a small depression or channel which marks this limit of the hill, until the river is reached a short distance above the railway bridge; here, the bottom land ends on the east side of the stream and the valley is defined by a cut-bank with some outcroppings of sandstone. The location passes along this cut bank and then defects slightly to the east so as to cross the Canadian Pacific Railway about two hundred feet east of the east end of the railway bridge. From this point the location follows the railway line for a short distance, and then defects to the south, following along the east bank of the well-defined valley which marks an old channel of the river through Sections 28, 21 and 16, in Township 24, Range 29, west 4th Meridian. When the south-east quarter of the last mentioned section is reached, the location defects sharply to the east, and by a comparatively light cut for a canal of this size, the bench land elevation is reached. From there the location continues east and south-east through sections 15 and 11, but when the centre of the latter section was reached it was found that the general fall of the country to the east and south prevented the continuance of the location on the general south-easterly course which had been hoped for, and a sharp deflection had to be made to the north through section 14, which necessitated another crossing of the Canadian Pacific Railway line in the south-east quarter of this section, about a mile west of Shepard station.

Immediately after crossing the railway line the location turns to the east and follows a course almost parallel to the railway for about two miles; it then defects to the north and north-east and follows that general course through Townships 23, 24 and 25, Range 28, to the end of the location in Section 31, Township 25, Range 27, west of 4th Meridian, which point is 34.1 miles from the point of intake.

At several places along the canal route suitable sites for the storage of water were located, notably in the bed of a large lake, at present dry, in Sections 2, 3, 10 and 11,

Township 24, Range 28, and also in the basins of several other small lakes in the vicinity of the located canal.

It had been hoped when we commenced the location that after crossing the railway line near the river, and reaching the bench land elevation, we would be able to keep on the south side of the railway line until the vicinity of Strathmore station was reached, at which point it was intended to cross the railway line and carry the location to the east through Township 23; that location also contemplated the utilizing of the large basins containing the Weed and Eagle lakes as reservoirs; however, when we reached the point in Section 11, Township 23., Range 29, where the location turns sharply to the north as above described, it was found that the general slope of the country to the east and south-east was so rapid that it was impossible to get the canal down with the small grade of six or seven inches in a mile without locating a drop, which would be a serious undertaking for a canal of the size in a district where there are no natural features which could be utilized for the purpose. It was, therefore, determined to follow the contour trending north-easterly, which affords a favourable location until the general slope to the east became such as to permit of the location being deflected in that direction; however, no favourable line on that course was found up to the end of the location as completed, and the general cross-section levels to the east seem to indicate that the main canal cannot be carried in that direction without the construction of drops to reach the lower elevation; it will, therefore, probably be found better to utilize the main canal as a trunk or feeder, and to locate two or three smaller canals to the east and south-east, which can be given a sufficient fall per mile to permit of their following the general slope of the country without the construction of drops. These smaller canals could in this way be used in distributing the water from the main canal for a very long distance to the eastward, being again divided into smaller works as the limit of distribution is reached.

The location of the main canal as far as completed is an exceptionally favourable one for an undertaking of such large dimensions. There are no serious engineering difficulties involved, and with the exception of the short piece of location along the cut-bank above described, the work will be of the simplest character entirely devoid of flumes or other perishable structures. The river at the point of intake offers favourable conditions for cheap and safe diversion of the volume to be taken into the canal, and speaking generally, with a knowledge gained from an examination of many of the larger irrigation canals on this continent, it may be said that none of those examined possess anything like such favourable conditions for cheap and safe diversion of the water and construction of the main canal as are found in the Bow River canal; most of these larger undertakings in the United States have been begun after irrigation had become well established in the particular district, and the suitable points for the diversion of water and location of canal from the source of supply to the bench land elevation taken by the smaller ditches or canals, which, though small in size, and probably only serving a limited area, had created such valuable vested rights as to prevent the larger undertaking being able to absorb them within reasonable financial limits.

As far as can be seen from surface indications and from the sections exhibited by the few wells in the district traversed, the material to be moved throughout the length of the canal as located will be sandy loam with some clay loam, the subsoil being of gravel of a pretty compact character in places. However, the probability is that the excavation can be done with any of the numerous styles of "Dredge Excavator," if this method be preferred over that of ordinary slush or wheel scrapers, and the material to be moved will make a first class bank for canal purposes, there being sufficient gravel and sand to give it a bond, and at the same time to withstand a high velocity in the flow of water.

In carrying on the location survey the different courses run were tied into the nearest section and quarter section corners on lines intersected and the azimuths checked by reference to section boundaries and township outlines. It will, therefore, be possible to pick up and re-establish any of the courses of the canal survey by referring the azimuth and length to the nearest section or quarter section corner.

The elevations were marked at different points with permanent bench marks, consisting of iron bars firmly driven into the ground, the elevation of the initial bench

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mark at the point of intake having been determined with reference to bench mark No. 1 of the general irrigation surveys. Cross-sections along the preliminary location were taken at each 200 feet from the intake to the bench land elevation, and after that at each 400 feet to the end of the location.

Headgates and Diverting Dam or Weir.

The structure which it is proposed to erect for the headgates at the point of intake will be of framed timbers with pile foundation. There will be eight openings of 10 feet each in width, the headgate flumes being 30 feet in length with aprons of 20 feet in length. The gates are of the arc pattern, working on a central pivotal pin with arms so arranged that impact of head is taken by main timbers of the general structure. These gates are easily and rapidly raised by a winch or crab, and will close with their own weight when winch is thrown out of gear. The floor of the structure carrying the headgates is double, the space of 2 feet between the floors being filled with well packed small gravel, the outer space below the gate sills being faced with sheet piling, this piling being carried along the face of the bank for some distance above and below the structures.

The diverting dam or weir will consist of a double floored platform, 40 feet wide, extending across the stream at right angles to the general line of flow. This platform will be built upon piles driven to refusal, the lower floor being about 2 feet below the general level of the bottom of the stream, and the upper floor about on this level, the space between being filled with small gravel, well rammed. The piles upon which this platform is framed are driven in rows six feet apart in the line of flow, and five-foot centres in the rows, being capped with 12 in. by 12 in. timbers, drift bolted and properly cross-tied between the timbers. The superstructure of the dam will consist of a series of V shaped trestles, framed from 12 in. by 12 in. timbers, and placed with six-foot centres along the platform, the toe of trestle being 10 feet from upper end of platform. These trestles are secured to the platform by being framed into the caps on piles, and properly bolted thereto; they are also connected by a light platform on the lower side near the top, which serves as a bridge in placing and removing the flash boards which are slid, as needed, down the up-stream face of the trestle so as to raise the water to the desired height.

The advantages of a structure of this kind are ease and cheapness of construction compared with works of a more permanent character, and the fact that during high water or flood stages of the stream the flash boards can be removed, and thus leave the stream entirely unobstructed except by the trestles against which the boards rest when in place. This style of structure is particularly well suited to our streams which, even during flood discharge, carry a very small amount of drift or material that would cause a jam or be likely to carry away the trestles. The detail drawings of these proposed structures, which accompany the general plan of location, will serve, with the foregoing brief descriptions, to give a full idea of the material to be used and the proposed manner of erecting the works.

Estimated cost of Canal and Structures.

Any estimate of the cost of the completed canal as far as located, with necessary headworks, diverting dam, weir or other structures, must of necessity be of an approximate character, unless much more time is devoted to the obtaining of detailed measurements and drawings than has been possible in this instance. In considering the question of cost it should also be borne in mind that the survey herein described was only of a preliminary character, and, although it was sufficiently exact to determine the main fact of the possibility of diverting the water to the area under examination and to prescribe possible limits within which the constructed canal would have to be located, it did not include many main points having a direct bearing on the cost, which should, and doubtless will receive careful consideration before the construction of a large undertaking of this character is commenced. As has already been explained, cross-sections were taken

along the location at sufficiently frequent intervals to enable us to determine, with a fair degree of accuracy the quantities of earth to be moved in constructing the thirty-four miles of the canal located ; we are also able from the detail drawings of the proposed headworks, diverting dam and other structures, to estimate approximately the cost of these works, and with this data the following estimate of the cost of the completed undertaking has been compiled :—

Excavation of canal from point of intake to end of location, 34 miles ; average quantity of earth to be moved, 150,000 cubic yards per mile at 10 cents per cubic yard	\$ 510,000 00
Headworks and dependent structures.	4,500 00
Diverting dam or weir	9,000 00
Two crossings of C. P. R. Co.'s track	2,000 00
Five road bridges	3,000 00
Engineering and supervision	5,000 00
Incidentals	10,000 00
Total cost.	\$ 543,500 00

To this sum must be added the amount necessary to build the main distributing ditches, so that the area capable of irrigation with the volume carried by the canal may be reached. Under the duty of water, as defined by the regulations, the 2,000 cubic feet per second carried by the canal will irrigate 200,000 acres of land. Probably 50,000 acres of this area can be served direct from the main canal, but the remaining 150,000 acres will have to be reached and served from large distributing or lateral ditches, and it is estimated that to construct these main distributaries will cost about \$75,000. We, therefore, have the total cost of the completed system as follows :

Cost of 34 miles of main canal, with necessary headgates, diverting dam, and other structures	\$ 543,500 00
Cost of main distributing canals to serve 150,000 acres not susceptible of irrigation directly from main canal.	75,000 00
Total cost of irrigating 200,000 acres	\$ 618,500 00
Cost of providing water for irrigation per acre, or sum which must be charged as capital expenditure for water right per acre	\$ 3 09

As has been stated above, the estimate of cost given is only approximate, based on the information which we have, but care has been taken to make ample provision for unforeseen expenses and to estimate the cost of construction at outside figures, both as to quantities of material to be moved or provided for the necessary structures, it may, therefore, be assumed that the figures given are probably in excess of the sum which will be required to complete this undertaking, but it is much better that the estimate should be excessive in the first instance than that the work should be undertaken and the discovery then be made that the necessary expenditure had been underestimated.

Lands irrigable from main canal and principal laterals.

A reference to the general plan accompanying this report will show that all the lands situated on the south and east of the main canal in Townships 22, 23, 24 and 25, in Ranges 27, 28 and 29, west of 4th Meridian, as located, comprising an area of 161,920 acres, have been marked as irrigable. This is quite true in the sense that this area lies under the main canal, and can be supplied with water therefrom, and the general physical conditions of the district are such as to warrant us in assuming, without a close examination of the ground, that a very large proportion of the area can be irrigated ; to

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be on the safe side, however, it is better to deduct 50 per cent to cover broken or undesirable areas, and we then have 80,960 acres shown by this plan as being susceptible of irrigation directly from the main canal.

The general cross-section levels of the country, which have been made in connection with our irrigation surveys to the east of the district shown on the plan accompanying this report, indicate that the country for a long distance east can be served from this canal, and its general characteristics are such as to justify us in assuming that the larger portion of any given area can be cultivated by the aid of irrigation.

In view of these facts, it is quite evident that 200,000 acres are available in the immediate vicinity of the main canal as located, and that the principal distributing laterals will not have to be carried very far east before the whole of the 200,000 acres become available for reclamation; however, as the development of the district will probably result from a combination of mixed and dairy farming, it would doubtless be to the advantage of the district as a whole that the irrigated areas should be scattered over a considerable portion of the whole district, so that the dependent grazing and unirrigated areas may be as large as possible, and while the cheapest scheme would doubtless be that which permitted of the irrigation of the total area capable of being supplied from the canal with the shortest possible canal line, it is quite certain that the best interests of the district will be served by scattering the irrigated area over as large a tract as possible, so as to open up the largest possible adjacent areas for grazing, and in this connection it may be mentioned that some allowance for the construction of the works on the latter mentioned basis has been made in the estimate of cost given.

The soil of the district to be served by this canal is of a first-class character, consisting of sandy and clay loams with subsoil of clay and gravel. In some places the district is broken by small local ranges of sand hills or gravel ridges, but the area of sections of this character is small, and the broken nature of the country at these points adds to its value for grazing purposes. The growth of grass all over the district is good, and while this growth is probably not so luxuriant as that along the foot-hill country, or farther south in Alberta, there is little doubt that this large area needs but the application of water through irrigation to make the growth of all fodder and most cereal crops certain, and thus open up the whole district to successful grazing and mixed farming by settling the question of winter feed and water for all domestic and stock watering purposes, as well as for irrigation.

Colonization of the reclaimed area.

The area to be reclaimed by this canal is practically unpopulated, and it is therefore highly desirable that any settlement resulting from irrigation development should be of that character most likely to benefit both the settlers, and the irrigation or land owning company and the country at large. There is little doubt, in view of the fact that all arid countries have much more land than water wherewith to irrigate it, that the most desirable settlement of an arid region is that which so distributes the irrigated portions so as to reclaim the greatest adjacent areas for grazing, and this desirable end seems to be best secured by settling the district on the colony or hamlet plan.

The advantages of the hamlet or colony plan of settlement over the ordinary methods followed in humid regions are very marked, particularly in the way of social intercourse and in the direction of education, religion and amusement, which are not possible when each settler lives on his own quarter section, and houses are from half a mile to a mile apart. The hamlet system also renders possible the mutual effort and co-operation required in the construction of the grist mill, creamery, elevator, cold storage and numerous other industries needed in connection with successful farming or dairying pursuits, including economy in farm implements and in the purchase of well-bred male stock for breeding purposes. Many of these advantages are not possessed, and are hard to obtain where the settlement takes place under ordinary conditions, and in view of these facts, and of the history of the successful instances of the colonization and reclamation of arid lands by the hamlet system in Utah, Colorado, California, Idaho and other States and Territories, it may be accepted as a fact proved by some

years of experiment in the countries mentioned, as well as by the success which has attended the Mormon colony in Southern Alberta, that the hamlet system should be adopted in colonizing the area to be reclaimed by the Bow River Irrigation Canal, and although the scheme for accomplishing this colonization or settlement is one requiring much thought and study of detail, discussion of which would be out of place here, there are one or two points in which the location of the main canal and laterals will have such an important bearing upon the colonizing scheme, that it is proper they should be referred to briefly.

In the first place, any company undertaking the construction of this canal and the colonization of the areas reclaimed thereby, should carefully examine the whole district and set aside the blocks of land which are to be irrigated, and then so arrange the main laterals that water may be taken by the most direct route from the main canal to the different areas.

The different tracts of land to be irrigated should be as evenly distributed as possible throughout the whole district in blocks of about 10,000 acres, and so arranged that each irrigated block of 10,000 acres shall have at least 20,000 acres of grazing land attached thereto. The total volume of water in the canal should be apportioned to the scattered irrigable blocks, and land for cultivation, or water wherewith to irrigate it should not be disposed of anywhere outside these irrigable blocks as originally defined. In each of the irrigable blocks, one section should be set aside for the central hamlet or village, this section being subdivided into half acre and acre lots with wide streets and large park reserves, the necessary water being provided for domestic and irrigation use, and each purchaser of 160 acres should be entitled, free of charge, to a half acre lot with water right therefor, or an acre lot for a purchase of a half section.

Each acre of irrigated land sold should carry with it the right of pasturage on two acres of the tract reserved for grazing, these lands being held in common by the owners of irrigated lands in the proportion mentioned, and not to be disassociated therefrom.

The settlement of the district capable of being served by the Bow River Canal on this system is sure to be followed by success and by the rapid springing up of numerous small prosperous villages peopled with contented settlers. The soil, climate, fuel supply and possibilities of the district for the grazing of cattle and sheep are now thoroughly understood and appreciated, and it only remains to provide, by irrigation, the moisture which nature fails to supply, and which is needed to mature growing crops, to ensure the colonization of the district in such a manner that its natural advantages for pasturage may be combined with the successful growth of all fodder, root and cereal crops on the irrigated portion, and further, to minimize the labour, loss of social intercourse and general hardship endured by the pioneer settler by providing for the colony or hamlet system of settlement, and it does not need any very great stretch of imagination to look forward to the time in the almost immediate future when this district will be peopled with a large number of prosperous and contented citizens producing the beef, mutton, pork, butter, cheese and other dairy products which will, when the nutritive qualities of the native grasses are supplemented by winter feed grown by irrigation, obtain a world wide reputation.

When the field work connected with the survey of the above mentioned canal was completed, the line levels of the ordinary system which had been run in the district traversed by the canal during the season of 1894, were extended to the east and north, so as to provide some definite information regarding the general slope of the country to be traversed by the main branches of the canal as above described. This work was commenced at bench mark No. 42, and from that point the levels were run north along the outline between Ranges 25 and 26, west of the 4th Meridian, through Townships 24 and 25, and south along the same outline to the south boundary of Township 23. Commencing again at bench mark No. 42, the work was carried east along the north boundary of Township 23 for a distance of twelve miles across Ranges 25 and 24, and then to the north and south along the outlines between Ranges 23 and 24, across Townships 23 and 24. In completing these operations, 42 miles of line levels were run, six permanent

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bench marks were placed and 80 square miles of country contiguous to the lines levelled over were covered by topographical investigations.

Upon completion of the above described operations, it was decided, owing to the lateness of the season, to discontinue the general field work, and the larger part of the staff of Division A was discharged, two or three men only being engaged during the remainder of the season under the direction of Mr. T. D. Green, D.L.S., in placing the gauge rods in the streams, as shown by the following schedule :—

SCHEDULE showing positions and elevations of Gauge Rods placed during Season of 1895, with location and elevation of governing Bench Marks.

Stream.	Location of Gauge Rod.	ELEVATIONS.			No. of B.M.	Location and description of Bench Mark.	Elevation of Bench Mark.
		Low water.	High water.	Flood level.			
Bow River.....	On first pier from north shore of Langrevin Bridge in the city of Calgary.	Ft. 3374.53	Ft. 3377.33	Ft. 3379.03	1	Bench mark of general irrigation surveys on N.W. corner of Post Office building in the city of Calgary.	Ft. 3401.00
Bow River.....	On pile of wing dam under north end of southerly bridge of C. P. R. twin bridges on Sec. 3, Tp. 25, R. 2, W. of 5th Mer.	3403.15	3405.10	3407.60	6	Bench mark of general irrigation surveys on N. bdy. of Sec. 34, Tp. 24, R. 2, W. of 5th Mer., near intersection with W. bank of Bow River.	3468.40
Elbow River.....	On centre pier of highway bridge across river in the city of Calgary.	3369.10	3371.30	3375.58	0	Rail level of C. P. R'y., on line with E. side of most easterly frame building of N. W. M. P. barracks, initial elevation of Irrig'n. Surveys.	3387.00
Elbow River.....	On pile bent under highway bridge across river on road allowance between Secs. 7 and 8, Tp. 24, R. 2, W. 5th Mer.	3571.90	3574.50	3577.20	110	B. M. on iron post, 3 ft. N. of 4 Sec. corner on E. bdy. Sec. 7, Tp. 24, R. 2, W. 5th Mer.	3577.40
Fish Creek.....	On pier of highway bridge across stream on Calgary-Macleod trail.	3360.38	3362.08	3361.88	111	B. M. on iron bar on E. bdy. Sec. 4, Tp. 23, R. 1, W. 5th Mer., about 25 ft. N. of N. bank of Creek and 75 ft. W. of highway bridge	3365.03
Fish Creek (N. Fork)	On post attached to highway bridge across stream near mouth on Sec. 22, Tp. 22, R. 3, W. 5th Mer.	3757.85	3759.05	3760.80	112	B. M. on iron bar, 3 ft. N. of S. W. cor. of school plot in S. E. cor. Sec. 22, Tp. 22, R. 3, W. 5th Mer.	3768.00
Fish Creek (S. Fork)	On pier of highway bridge across stream on road allowance, between Secs. 3 and 4, Tp. 22, R. 3, W. 5th Mer.	3860.17	3862.17	3863.64	20	Bench mark of general irrigation surveys at N. E. cor. Sec. 4, Tp. 22, R. 3, W. of 5th Mer.	3890.60
Sheep River.....	On pier of highway bridge across stream on Macleod-Calgary trail near Dewdney.	3414.47	3415.57	3418.07	.....	B. M. on 6 in. spike in black poplar tree immediately W. of south end of bridge, and about 2 ft. above ground.	3421.17
Highwood River.....	On pile bent of highway bridge across stream at village of High River.	3356.17	3358.72	3362.25	.....	B. M. on railroad spike in willow stump 4 in. diam. and 1 ft. high, 100 ft. S. of south bank of river near bridge.	3363.35
Mosquito Creek (N. Branch)	On pile bent of C. & E. Railway bridge across stream.	3306.70	3307.30	3308.70	.....	B. M. on top of E. end of cap of bent of bridge, near top of south bank of stream.	3320.60
Mosquito Creek (S. Branch)	On post attached to C. & E. Railway bridge across stream.	3302.25	3303.35	3304.60	114	B. M. on iron bar on line of telegraph posts, and 10 ft. S. of first post north of stream.	3315.25
Willow Creek.....	On 4th pile bent from S. end of C. & E. Railway bridge across stream.	3116.30	3117.25	3119.60	115	B. M. on iron bar at S. angle of mound at N. E. corner Sec. 36, Tp. 3, R. 27, W. of 4th Mer.	3130.65
St. Mary River.....	On E. side of centre pier of highway bridge across stream, Sec. 23, Tp. 3, R. 25, W. 4th Mer.	3600.75	3602.25	3605.50	116	B. M. on iron bar, 3 ft. N. of centre of pits marking trail survey at W. end of bridge.	3615.95

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The part which the gauge rods placed in the streams are expected to play in the administration of water rights has been described in Part I. of this report, but some information regarding the size and style of these rods and the manner of placing them, is necessary to make the remarks referred to perfectly clear.

The rods placed during last season as shown by the above schedule, are made of British Columbia fir $1\frac{1}{4}$ inches thick by 3 inches in width, and of varying lengths from 4 to 10 feet. They are first given a coat of good boiled oil and then two coats of pure white lead, and are then divided into feet and half feet with sharp black lines, the feet being marked in Roman numerals. The low-water, high-water and flood-water marks are prepared on small independent sections, 4 inches wide by $1\frac{1}{2}$ inches thick and 8 inches long, the terms "high-water," "low-water" and "flood-level," being painted thereon in black letters $1\frac{1}{2}$ inches in height. The rods are placed in the stream by being firmly attached to a bridge pier, pile bent, or any firm structure at a point where the stream has a permanent cross section, the rod being placed on the bottom of the stream at point where located, and the small boards marking low-water, high-water and flood-level, are then placed alongside the gauge rods at the proper places to mark these stages in the stream, and the elevation of these stages of water referred to our general datum by carrying levels from the nearest permanent bench mark, facilities for replacing the marks being provided by establishing a special bench mark in the immediate neighbourhood.

Should the rod become obliterated or destroyed from any cause, it is easily and rapidly replaced by reference for elevations to the special bench marks established when rod was first placed in position.

As a rule, the rods are placed in position when the streams are at their lowest period of flow, and that stage of water is therefore marked at water level. The elevations of high-water and flood-level are determined from information previously acquired when the stream is at these stages, or from existing evidence, and it should be noted that the difference between these elevations at different points as shown by the gauge rods may be very marked owing to local conditions which cause the water during high-water and flood stages to rise much higher above low-water stage at some points than at others. However, it is expected that by noting carefully the marks of these stages of water at the different points where gauge rods are placed, these stages can be properly marked so that all the rods in a stream will show the same stage of water at any given date.

HYDRAULIC INVESTIGATIONS.

Comparatively little was done during the past year by Division A in the way of the gauging of the discharge of streams or measurement of other water supply. The measurement of the discharge of streams completed by both divisions of the survey during the previous year had served to give a fair approximate idea of the volume of the discharge in the different streams at different stages, and it was quite evident in beginning this season's operations that isolated measurements would add little to the information already obtained, and that until systematic and continued measurements could be undertaken on the streams in manner indicated in Part I. of this report, special effort should not be directed to separate gaugings.

In connection with the survey of the St. Mary Canal, a measurement of the St. Mary River was made, and a measurement of a like character was completed of the Bow River near the point of intake for the Bow River Canal. Certain discharge measurements were made of streams in the Pincer Creek district during field operations in that vicinity already described. The discharge measurements completed by Division A during the year are given hereunder in detail.

SCHEDULE showing the measurement of the Discharge of certain Streams by Division A, Canadian Irrigation Surveys, during the year 1895.

Name of Stream.	Point of Measurement.	Date.	Measured discharge.	Remarks.
		1895.	Second Ft.	
Oldman River (N. fork)...	At intersection with 5th Mer.	Aug. 28...	70 27	Riv. at mean summer flow.
do (S. fork)...	On E. bdy, Sec. 25, Tp. 7, R. 1, W. of 5th Mer.	do 29...	303 35	do do
St. Mary River.....	N. E. $\frac{1}{4}$ Sec. 18, Tp. 2, R. 24, W. of 4th Mer.	July 19...	2202 30	River at high-water stage.
Pincer Creek.....	N. E. $\frac{1}{4}$ Sec. 4, Tp. 7, R. 20, W. of 4th Mer.	Aug. 29...	4 99	Stream at low-water stage.
Bow River.....	At crossing of C. & E. Railway bridge.	Oct. 12...	2909 75	River at low-water stage.

In carrying out our discharge measurements of 1894, we had found that the Lallie current meters, which are fully described in the report of last season's operations, were rather too light and delicate for use on streams of considerable depth and high velocities. We, therefore, procured last spring, one of the large size "Price" current meters, manufactured by Messrs. W. & L. E. Gurley, of Troy, New York, with electric registering attachment, and used this meter in the determination of velocities in the larger streams during the past season with very satisfactory results.

SCHEDULE of Bench Marks established by Division A, during season of 1895.

No.	Location.	Elevation.	Remarks.
70	At N. E. corner Tp. 12, R. 25, W. 4th Mer.	3156 10	Line levels.
72	do do Tp. 12, R. 23, W. 4th Mer.	3237 25	do
74	do do Tp. 10, R. 22, W. 4th Mer.	3167 80	do
76	At N. E. corner Sec. 33, Tp. 9, R. 21, W. 4th Mer.	2907 10	do
78	At N. E. corner Tp. 7, R. 21, W. 4th Mer.	2993 85	do
80	do do Tp. 5, R. 21, W. 4th Mer.	3187 12	do
82	do do Tp. 3, R. 21, W. 4th Mer.	4187 50	do
84	do do Tp. 3, R. 22, W. 4th Mer.	3693 30	do
86	do do Tp. 3, R. 24, W. 4th Mer.	3678 35	do
88	do do Tp. 1, R. 24, W. 4th Mer.	4068 74	do
89	do do Tp. 2, R. 24, W. 4th Mer.	3924 56	do
90	do do Tp. 1, R. 25, W. 4th Mer.	3937 84	do
91	On S. E. $\frac{1}{4}$ Sec. 36, Tp. 1, R. 25, W. 4th Mer.		Intake of St. Mary Irrigation Canal.
92	On N. E. corner Sec. 17, Tp. 2, R. 24, W. 4th Mer.	3823 66	On location of do do
93	On $\frac{1}{4}$ Sec. Md. E. bdy. Sec. 2, Tp. 4, R. 22, W. 4th Mer.	3588 36	End of location of do do
95	At N. E. corner Tp. 7, R. 1, W. 5th Mer.	3753 89	Line levels.
96	do do Tp. 6, R. 30, W. 4th Mer.	3619 24	do
97	do do Tp. 6, R. 1, W. 5th Mer.	3854 91	do
98	$\frac{1}{4}$ Sec. Md. on E. bdy. Sec. 12, Tp. 6, R. 1, W. 5th Mer.	4031 77	do
99	At N. E. corner Tp. 5, R. 29, W. 4th Mer.	3730 15	do
100	On S. E. $\frac{1}{4}$ Sec. 13, Tp. 24, R. 1, W. 5th Mer.	3564 39	Intake of Bow River Canal.
101	At N. E. corner Sec. 11, Tp. 25, R. 29, W. 4th Mer.	3351 31	On location of do do
102	At N. E. corner Tp. 25, R. 28, W. 4th Mer.	3333 91	do do
103	At S. W. corner, Tp. 23, R. 25, W. 4th Mer.	3232 20	Line levels.
104	At N. E. corner, Tp. 24, R. 26, W. 4th Mer.	3046 14	do
105	do do Tp. 25, R. 26, W. 4th Mer.	3051 63	do
106	do do Tp. 23, R. 24, W. 4th Mer.	3087 54	do
107	do do Tp. 24, R. 24, W. 4th Mer.	3034 98	do
108	At intersection of E. bdy. Tp. 23, R. 24, W. 4th Mer., with C. P. Ry. near Namaka.	2924 00	do

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EVAPORATION INVESTIGATIONS.

The important part which evaporation plays in the use of water for irrigation, and the absence of any local data upon which to base an estimate of the probable loss of water in ditches, canals and reservoirs from this cause, has been referred to in Part I. of this report, and reference has also been made therein to the investigations which are to be carried on during the present year as part of the general irrigation survey work, with the object of securing some information regarding evaporation under different conditions.

To obtain reliable and conclusive data regarding the loss by evaporation from the surface of ditches, canals and reservoirs, necessarily involves great care in conducting the investigations, and results extending over a considerable period of time before any measure of the loss can be definitely laid down.

That the loss from evaporation is deserving of careful consideration, particularly as affecting the question of the storage of water in reservoirs, is recognized by all authorities on the use of water for irrigation, but, unfortunately, little has been done in the western part of this continent towards collecting information upon which to base an estimate of the loss from this cause. It is, however, claimed by reliable authorities, and the claim is to a certain extent borne out by results, that the depth of water evaporated annually does not materially differ in America, Europe, India and Egypt. The facts upon which this claim is founded are illustrated by the following statement:—

STATEMENT of evaporation in America, Europe, India, Egypt, etc.

Place.	Period.	Mean annual evaporation in inches.	Authority.
California, U.S.A.	1881-85	36.85	State Eng. Dept.
Boston, U.S.A.	1885	39.11	Trans. Am. Soc. C. E.
New York, U.S.A.	1864-70	39.21	J. T. Fanning, C.E.
Emdrup, Denmark	1849-59	27.90	do
Lancashire, Eng.	1844-53	25.60	do
Lee Bridge, Eng.	1860-73	22.20	Trans. Inst. Civ. Eng.
Madrid, Spain	1867	65.00	Geo. Higgin, C.E.
Northern India.		91.00	Trans. Inst. Civ. Eng.
Upper Egypt.		72.00	M. Willecocks, C.E.
Lower Egypt.		28.00	do

From the above statement it is quite evident that we may expect an annual loss of from two to three feet in the depth of water stored in reservoirs, and a considerable loss in the volume of water flowing in ditches and canals owing to the influences of evaporation; however, we purpose obtaining some more definite measure of this loss by actual experiment, and for this purpose have established two stations at Calgary, where measurements are to be made. Both these stations are provided with evaporating pans of sheet iron three feet square and two and one-half feet in depth; the gauges for measurement of loss being of the Boyden "hook" pattern, manufactured by Messrs. Gurley, of Troy, New York, with verniers reading the scale to thousandths of a foot. One of the pans is kept floating in the pond near our rating station, the other being sunk in the ground for about two-thirds of its depth at a point exposed to the sun and wind. We hope that by compiling the readings of the gauges at these stations with the records at the local meteorological station regarding precipitation and temperature, to be able to arrive at a close approximation of the evaporation, both from the earth and water surface during the summer months.

DIVISION B.

REPORT OF ARTHUR O. WHEELER, D.L.S.,

Member American Society of Irrigation Engineers, in charge.

DEPARTMENT OF THE INTERIOR,
TOPOGRAPHICAL SURVEYS BRANCH,
OTTAWA, 15th April, 1896.

To J. S. DENNIS, Esq., D.T.S., C.I.S.,
In charge of Canadian Irrigation Surveys.

SIR,—I have the honour to submit the following report of the field operations of Division B of the Canadian Irrigation Surveys during the year 1895.

By a letter of May 8th, from the Surveyor General, I was instructed to place myself under your direction, and in accordance therewith, I proceeded to Calgary, and reported to you upon the 21st of the same month, having been detained in Ottawa a few days to complete the returns of the previous season.

I immediately received from you the following instructions:—

“CALGARY, ALBERTA, May 22nd, 1895.

“SIR,—I have the honour to give you the following instructions for your guidance in carrying on the work of Division B of the Irrigation Surveys, during the present season's field operations.

“It is desired to obtain by a rapid reconnaissance survey some idea of the topography of the foothill district in Southern Alberta, lying to the west of the surveys so far completed under the Dominion lands system, and to the east of the immediate slope of the Rocky Mountains; and of the location and discharge of the streams heading in these foot-hills. It is proposed to conduct these surveys in the following manner:—

“Commencing at the points where the valleys of the undermentioned streams are intersected by the most westerly lines run and marked under the land survey system, topographical traverses are to be carried up the valleys of the streams until the immediate slope of the mountains is reached.

“These traverses are to be effected by starting from some known corner of the land survey system, and reading all angles between stations with the transit, and measuring distances with a micrometer. The azimuth of the line of origin for the traverse should be determined by astronomical observation, and the azimuth by account checked during progress of the work. Where it is possible to do so, readings between traverse stations on opposite sides of the valley should be taken in such a way as to make traverse points stations in a chain of triangles so as to afford a check on the micrometer measurements of distances between stations.

“By keeping the stations of the traverse on the high and open sides of the valleys, it is expected that the work can be carried on with a very small amount of line cutting; should the sides and bottoms of the valleys become too heavily timbered to permit of the work being proceeded with without opening lines through the brush or timber, operations will be stopped at the point where such obstruction is encountered.

“The topography of the immediate valley through or along which the traverse is being carried, will be shown by sketch notes on cross-section sheets, these notes being based on the traverse lines run, and it is desirable that the information regarding the valley and the course of the stream flowing therein should be made as full as possible. The elevations along the traverse for use in determining the fall of the stream and the

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differences of elevation of topographical features are to be determined from barometer readings.

"When the conditions permit of such being done, the main topographical features of the country adjoining the valleys on either side should be located, and the contours sketched in, but it is not intended that the main operations should be seriously delayed to accomplish the latter work.

"At suitable points along the traverse, the method of photographic surveying is to be resorted to for the purpose of procuring data from which to map the topography of the adjacent district; and it is desired that work of this nature should be effected at all points where the valleys afford sites suitable for the construction of reservoirs for storage of the water flowing therein.

"The streams up which traverse lines are being carried are to be gauged at the highest point reached, the actual discharge at the date of measurement and the elevation of the high-water and flood-water stages of the streams above the water level as shown by existing marks being noted.

"When suitable sites are found, trigonometrical stations should be erected for use next year in the system of triangulation which it is intended to extend over the foothill country as a basis for a photographic survey of the district. These stations should be made of a permanent and prominent character, and their location, which should be tied in to the traverse lines, should, as far as possible, be made dependent upon the suitability of the site as a station in a well proportioned scheme of primary triangulation.

"It is expected that in addition to the particular topographical and hydrographical information provided by the above described survey, you will keep notes of such facts regarding the general character of the streams, valleys and adjacent country, and of the distribution of the timber, as may be of value in discussing the probable location of catchment areas in the district, and the run-off therefrom.

"The strength of the party which you will employ on the above work will be as follows:—1 assistant, 1 topographer, 1 picketman, 1 teamster, 1 cook.

"The transport will consist of, 3 carts, 1 buckboard, 7 horses, 1 pack outfit.

"Work will be commenced on the Jumpingpound Creek, and will then be conducted in the valleys of the following streams in the order given:—Elbow River, Fish Creek (N. and S. branches), Sheep River (N. and S. branches), Highwood River (N. and S. branches), Willow Creek, Oldman River (N., S. and Middle branches), Pincer Creek, Drywood Fork of Waterton River, Waterton River.

"In connection with your other operations on Jumpingpound Creek, you will make such investigations as may be necessary, at the head waters of the stream, to enable you to report upon the possibility of diverting the water which is reported to flow to the west into the Kananaskis River, from the muskeg in which the Jumpingpound heads, into the latter stream.

"You will report the progress of your operations from time to time, and keep me informed of your movements, and the probable location of your camp.

"I am, sir, your obedient servant,

"J. S. DENNIS,

"Chief Inspector of Surveys."

"A. O. WHEELER, Esq., D.L.S.,

"In charge Division B, Irrigation Surveys,
"Calgary, Alta."

From the foregoing it will be seen that the programme outlined for Division B was widely different from that of the previous season, and had in view three principal objects:—

1. To ascertain what storage facilities in the foothill region could be counted upon to augment the natural water supply available for irrigation purposes from the eastern watershed of the Rocky Mountains, and at the same time to increase the existing knowledge of the extent of this supply by further measurements of the discharge of the several streams draining the watershed to the east.

2. To obtain sufficient topographical information to provide a fairly approximate map representation of the district covered by the survey, and thereby some idea of the drainage basins of the several principal streams, the locations of such reservoir sites and storage basins as might be found, the definition of the principal summits and heights of land between the different water systems, and the distribution of the timbered areas.

3. The placing of signals at convenient points to be used as stations in the extension of the general trigonometrical survey of the mountain and foothill region, and the approximate location of the signals so placed; also to obtain such other information as pertains to the construction of a reconnaissance map for the purpose of projecting a well conditioned scheme of primary and secondary triangulation, upon which to base a comprehensive photographic survey, having in view the production of a complete topographical map on a scale of $\frac{1}{25000}$, with a contour equidistance of 100 feet.

METHODS AND INSTRUMENTS.

The traverse of the main streams, enumerated in your instructions, was commenced in each case at the point where the valley is intersected by the most westerly township subdivision line run under the Dominion lands system of surveys.

The correct azimuth of the initial course was ascertained by astronomical observation, usually of polaris, and the subsequent courses projected from side to side or along the valley of the stream, the angles being carefully read by a Troughton & Simms four inch transit (D. L. pattern).

The azimuth by account was frequently checked by observations of the sun or of polaris.

For branch streams, tributary to the main streams referred to, where no great length of traverse was involved, a vernier pocket compass, $3\frac{1}{2}$ inch needle, with tripod, was used. This instrument also supplied data to ascertain the extent of reservoir sites.

For measuring distances, it was decided to use a modified form of the Lugeol micrometer, with a 15 link base. The nature of the traverse especially adapted it to the use of this form of micrometer, in that it eliminated, to a very large extent, the principal cause of error, viz., irregular refraction. Traverse stations being selected, in the majority of cases, on opposite sides of the valley or from point to point across bays or indentations in the slopes forming the sides, the sights were taken at a considerable distance above the ground, where the atmosphere would likely be of a uniform density and not disturbed by coming in contact with the heated surface.

Although, owing to the rapid nature of the survey, the greatest refinements possible in the use of this instrument were not brought into play, as being outside the required standard of accuracy, the work done has since shown very fair results, the error ranging from 1 in 250 to 1 in 300.

In the use of this form of micrometer, it is first necessary to establish a table giving the values corresponding to revolutions and parts of a revolution of the screw for certain known distances at equal intervals apart. In the present case, two such tables were made, one at the beginning and one at the end of the season. The distances commenced at five chains; and readings were taken at every additional five chains up to 60. It is only under exceptional circumstances that the micrometer can be relied upon for a greater distance than 40 chains; although in the survey under discussion the greatest distance read was 70 chains, and the least about 3.50 chains, which is near the limit of the instrument.

The two tables referred to furnished results showing a considerable difference; in most part due to wear of the micrometer screw from constant use. In consequence, it was found necessary when reducing the readings to distances, to construct a table of mean values to apply to the traverse during the middle period of use of the micrometer. It is advisable when using a similar instrument upon an extended traverse, that tables of values be made at fairly frequent intervals during the progress of the work, in order to confine the change of values arising from wear of screw within the least possible limits.

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It may be here stated that an estimate of the proportion of error, resulting from wear of screw and other causes to which the instrument is subject, was obtained by connecting the traverse of the Elbow River with that of the north branch of Sheep River, giving a complete circuit of very nearly 50 miles, the initial point of each traverse being at established corners in the Dominion lands surveys. Part of this circuit was made during the earlier portion of the season, and part during the later portion, and should consequently furnish a fair criterion. The maker seems to have intended the micrometer to be used, either by holding it in one hand while working the screw, or by resting it upon the transit or other instrument for obtaining direction. Both methods are clumsy, and liable to uncertainty in making contact of targets. The compass tripod, before referred to, was employed to obviate the difficulty. A block of wood not quite so long as the telescope, was hollowed to fit it, the under part of the block receiving the horizontal axis of the ball and socket joint of the tripod; a couple of rubber bands held the telescope in contact with the block. This simple arrangement was found all that could be desired, allowing the observer perfect freedom to note his readings without disturbing the instrument.

The approximate elevation of traverse points and principal topographical features were ascertained by aneroid barometer readings. Barometers were also used to obtain some knowledge of the general fall of the streams and the capacity of the reservoir sites and storage basins located. The readings were referred to the nearest bench mark to the initial point of traverse that had been placed during the previous season with the spirit level. Corrections for atmospheric change were applied to the travelling barometer by data obtained from a stationary barometer read half hourly at camp.

The elevation of trigonometrical stations where signals were erected and of camera stations was derived from vertical angular readings with the transit at the traverse points where readings for azimuth were taken on the said stations.

In the case of triangulation stations, the elevations so obtained were checked by barometer readings carried from a traverse point up, and when the signal had been erected and the camera work completed, down again to the same traverse point. The results at best are an approximation depending upon the accuracy with which the elevation of the traverse points used for reference has been arrived at.

The barometers were of two kinds; one manufactured by H. Hughes & Son, London, England, $3\frac{1}{2}$ inch face, has a movable scale of feet which enables the needle to be set at any given altitude and the subsequent elevations to be read directly, subject, however, to correction for temperature and the changes of the stationary barometer. The foot-scale is graduated to 25 feet, and by using a magnifier, can be estimated to five feet. The scale of inches is divided to tenths.

The other is of a smaller pattern, $2\frac{1}{2}$ inch face, manufactured by Dollond of London, England. In this the scale of feet and inches are fixed and on the same plate; the first is divided to 50 feet and can be estimated to 10 feet, the second is divided to tenths. The elevation cannot be ascertained directly from the instrument, but must be referred to the initial point of reference. In each is a small movable pointer enabling any movement of the needle or scale to be detected. By means of a small screw set in the back, either barometer can be adjusted to agree with a standard mercurial. Of the two instruments, the larger is of somewhat more delicate mechanism and requires great care in handling. Owing to the rough usage it is liable to receive in mountain climbing, it soon gets out of order, the needle becoming sluggish and erratic in its movements. The smaller pattern by Dollond was found to give more serviceable results, although the readings cannot be defined beyond 10 feet.

Readings taken with it from a traverse point to the top of a high hill or mountain, 1000—2000 feet above the point of reference, and down again, at intervals separated by some hours, have given, when corrected by the stationary barometer, elevations agreeing to 5 feet and seldom differing more than 30 feet.

As no accurate triangulation of the area covered by the survey has yet been made, it is impossible in this report to make a comparison of barometric and trigonometric heights. It is, however, strongly recommended that when the triangulation is performed,

barometric observations may be taken in conjunction therewith for the sake of the valuable information that may be gathered in this somewhat uncertain field.

In the measurement of the discharge of streams, the operations employed were similar to those of the previous season, of which full description is given in the irrigation report of 1894.

The streams were gauged much nearer their origin and consequently were not nearly so deep or wide. In only two cases, the Elbow River and south branch of Sheep River, was it found necessary to use the wire cable and acme boat.

The principal difficulty consisted in finding points with flow sufficiently even to enable a fairly accurate cross-section to be made.

Throughout the foothills, the fall is so great that the flow of the streams is little better than a series of rapids over gravel and rocky beds, and the course of the water is much obstructed by fallen timber, overhanging brush and other detritus. The banks, moreover, are broken and cut by the force of the current.

To ascertain the velocity, Lallie current meter, No. 25, was used. Only measurements of actual discharge were taken.

One rating of the meter was made at the Calgary rating station prior to commencing the survey, and before it had been used since reconstructed by J. S. Lallie of Denver, Colorado, in accordance with your suggestions based upon the experience of the previous season. Another rating was made at the same station on the close of the season's operations.

In all, thirty-nine separate cross-sections and accompanying measurements and observations for discharge were obtained. These have been separated into three equal groups of thirteen observations. The discharges of the first group are determined from data supplied by the first rating, the third group from the last rating, and the middle group from a rate bearing a mean ratio to the other two.

Appended is the reduction of both sets of observations for rating meter No. 25.

The computations have been made by J. I. Dufresne, D.T.S., of the Topographical Surveys Branch. A method for finding a mean ratio to the other two rates, likewise computed by Mr. Dufresne, is also appended.

REDUCTION of observations for rating Meter No. 25, taken at Calgary, Alberta, on the 27th June, 1895.

A. O. Wheeler, D.L.S., Observer.

J. I. Dufresne, D.T.S., Computer.

No.	r	t	x	y	$x-x_0$	$y-y_0$	$(x-x_0)^2$	$(y-y_0)$	Remarks.
2	24.1	136.8	0.176	0.731	-0.439	-1.827	.193	0.802	Observation No. 1 rejected.
3	23.9	105.3	0.227	0.950	-0.388	-1.608	.151	0.624	
4	24.1	123.5	0.195	0.810	-0.420	-1.748	.176	0.734	Meter vanes immersed 9.6 inches.
5	24.3	118.0	0.206	0.847	-0.409	-1.711	.167	0.700	
6	23.5	120.0	0.196	0.833	-0.419	-1.725	.176	0.723	
7	23.7	53.0	0.447	1.887	-0.168	-0.671	.028	0.113	
8	23.8	48.6	0.490	2.058	-0.125	-0.500	.016	0.062	
9	23.8	48.8	0.488	2.049	-0.127	-0.509	.016	0.065	
10	24.0	50.0	0.480	2.000	-0.135	-0.558	.018	0.075	
11	24.0	52.8	0.455	1.894	-0.160	-0.664	.026	0.106	
12	24.0	20.3	1.182	4.926	+0.567	+2.368	.321	1.343	
13	24.1	22.8	1.057	4.386	+0.442	+1.828	.195	0.808		Length of base 100 ft.
14	24.2	23.7	1.021	4.219	+0.406	+1.661	.165	0.674	
15	24.1	21.9	1.100	4.566	+0.485	+2.008	.235	0.974	
16	24.2	21.5	1.126	4.651	+0.511	+2.093	.261	1.070	
17	24.0	20.1	1.194	4.975	+0.579	+2.417	.335	1.399	
18	24.4	58.5	0.417	1.709	-0.198	-0.849	.039	0.168	
			10.457	43.491			2.518	10.440	

$x_0 = 0.615 \quad 2.558 = y_0$

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NORMAL EQUATIONS.

$$b + 0.615 a = 2.558 \text{ whence } a = 4.146$$

$$2.518 a = 10.440 \qquad b = 0.008$$

EQUATION FOR RATING.

$$y = 4.146x + .008 \text{ (1)}$$

REDUCTION of observations for rating Meter No. 25, taken at Calgary, Alberta,
on the 19th October, 1895.

A. O. Wheeler, D.L.S., Observer.

J. I. Dufresne, D.T.S., Computer.

No.	r	t	x	y	$x - x_0$	$y - y_0$	$(x - x_0)^2$	$\frac{(x - x_0)}{(y - y_0)}$	Remarks.
2	23.5	19.6	1.199	5.102	+ .602	+ 2.918	.478	2.019	Observations Nos. 1, 3 and 5 rejected.
4	23.5	22.2	1.059	4.505	+ .552	+ 2.321	.305	1.281	
6	23.1	20.0	1.155	5.000	+ .648	+ 2.816	.420	1.825	
7	23.0	52.7	0.436	1.898	- .071	- 0.286	.005	0.020	
8	23.3	45.9	0.508	2.179	+ .001	- 0.005	.000	0.000	
9	23.3	49.3	0.473	2.028	- .034	- 0.156	.001	0.005	Meter vanes immersed 9.6 inches.
10	23.1	47.8	0.483	2.092	- .024	- 0.092	.001	0.002	
11	23.4	50.8	0.461	1.969	- .046	- 0.215	.002	0.010	
12	23.2	52.4	0.443	1.908	- .064	- 0.276	.004	0.018	
13	22.9	93.8	0.244	1.066	- .263	- 1.118	.069	0.294	
14	22.8	93.4	0.244	1.071	- .263	- 1.113	.069	0.293	
15	22.8	96.9	0.235	1.032	- .272	- 1.152	.074	0.313	
16	22.8	100.2	0.228	0.998	- .279	- 1.186	.078	0.331	
17	22.8	100.0	0.228	1.000	- .279	- 1.184	.078	0.330	
18	22.9	109.8	0.209	0.911	- .298	- 1.273	.089	0.379	
			7.605	32.759			1.673	7.120	

$$x_0 = 0.507 \quad 2.184 = y_0$$

NORMAL EQUATIONS.

$$b + 0.507 a = 2.184 \text{ whence } a = 4.256$$

$$1.673 a = 7.120 \qquad b = 0.027$$

EQUATION FOR RATING.

$$y = 4.256 x + .027 \text{ (2)}$$

A METHOD FOR OBTAINING A MEAN VALUE OF TWO RATINGS.

J. I. Dufresne, D.T.S., Computer.

Given two equations of the form $y = ax + b$, to find a third equation of the same form which will be a mean between them.

$$\begin{aligned} \text{Given } y &= ax + b && (a) \\ \text{and } y' &= a'x' + b' && (b) \\ \text{required } y_0 &= a_0x_0 + b_0 && (c) \\ &\text{a mean between (a) and (b).} \end{aligned}$$

Equations (a) and (b) represent two straight lines, which when referred on a plane to the same rectangular axes have to intersect if they are not parallel. Let v be this angle of intersection. Now, in equations (a) and (b), a and a' are respectively the tangents of the angles which the lines make with the axis of abscissæ, hence

$$\tan v = \frac{a' - a}{1 + aa'} \quad (1)$$

from equation (1) the angle of intersection v is determined.

$$\text{Let } m = \tan \frac{1}{2} v$$

then, since the value of the tangent on the axis of abscissæ of a line making any required angle with a given line is

$$a_o = \frac{a + m}{1 - am} \quad (2)$$

in which m is the tangent of the given angle.

We have also in this case by making $m = \tan \frac{1}{2}v$,

$$a_o = \frac{a' - m}{1 + a'm} \quad (3)$$

which is obtained by making m negative in equation (2). Equation (3) can be used as a check.

Since a_o is the tangent of a line which would bisect the angle of intersection made by the lines (a) and (b) it follows that a_o is the coefficient of x_o in the mean equation (c) required.

Now b and b' in equations (a) and (b), are respectively the distances from the origin to where the lines intersect the axis of ordinates, then make

$$b_o = \frac{1}{2}(b + b')$$

and the final equation is

$$y_o = a_o x_o + b_o \quad (c)$$

Hence equation (c) thus determined will be the equation of a line both passing by the middle point of the intersections of (a) and (b) on the axis of ordinates, and also equally inclined to the given lines (a) and (b), which conditions solve the problem.

RATINGS of Meter No. 25.

The equations for rating meter No. 25, computed from observations taken at the Calgary rating station respectively on the 27th June and on the 19th of October, 1895, are

$$\begin{aligned} y &= 4.146 x + .008 & (a_1) \\ y &= 4.256 x + .027 & (b_1) \end{aligned}$$

Meter No. 25 was used in making thirty-nine gaugings of streams during the season. It was required to compute the discharge of these streams in three distinct groups with different values for the rate of the meter. Equation (a₁) to be used in computing the first thirteen gaugings, the last thirteen gaugings to be computed by equation (b₁) and the balance by a third equation for rating, which should be a mean between equations (a₁) and (b₁).

This last equation was obtained in the following manner:—

In equations (a₁) and (b₁) the constant terms (b and b') are both plus, then both lines cut the axis of ordinates above the origin; and the coefficients of x (a and a') are also plus, then each line makes an acute angle with the axis of abscissæ and inclines to the right.

Equation (1) gives:—

$$\tan v = \frac{4.256 - 4.146}{1 + 4.256 \times 4.146} = 0.0058995$$

$$\text{and } v = 0^\circ 20' 24''$$

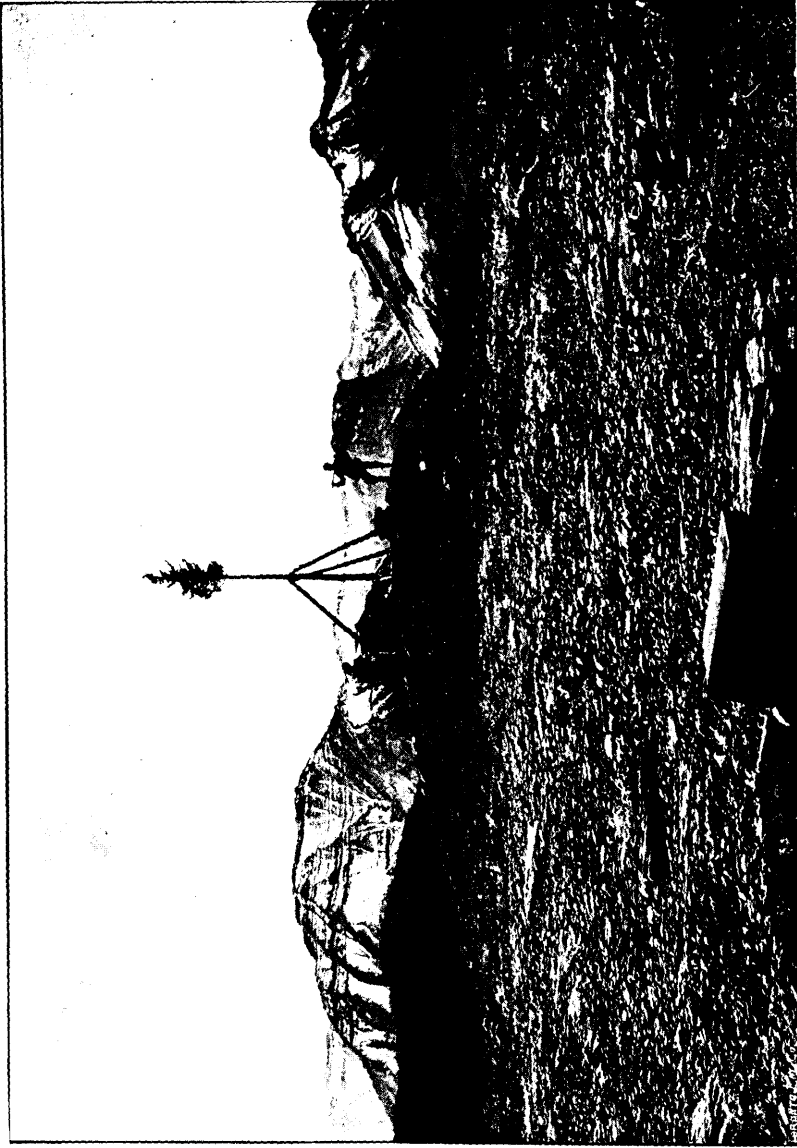
$$\frac{1}{2} v = 0^\circ 10' 12''$$

$$\tan \frac{1}{2} v = m = 0.003$$

and from equation (2)

$$a_o = \frac{4.146 + .003}{1 - 4.146 \times .003} = 4.199$$

PLATE No. IV.



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or again by equation (3)

$$a_0 = \frac{4 \cdot 256 - \cdot 003}{1 + 4 \cdot 256 \times \cdot 003} = 4 \cdot 199$$

which checks the above result.

$$\text{Now } b_0 = \frac{1}{2} (b + b') = \frac{1}{2} (\cdot 008 + \cdot 027) = \cdot 0175$$

Hence the mean equation for rating is

$$y = 4 \cdot 199 x + \cdot 0175 (c_1)$$

With regard to the third principal object of the survey, viz., the placing of signals and gathering of information for the projection of a primary and secondary triangulation, including the data requisite to the construction of an approximate map of the tract covered, the methods employed were as follows:—

When conducting the traverses up the main streams, the highest suitable summits on either side were occupied and signals erected for use in the proposed triangulation of the following season. In selecting these stations, care was taken that they should fill, as far as possible, the conditions necessary: 1. That they should command a wide view of country. 2. Should be fairly easy of access. 3. That the summits be clear of timber and other obstructions. 4. That a number of other signals on stations surrounding them be visible. 5. And, finally, that the distance between them be not too great to enable the topography to be plotted from camera views taken from them. It may be incidentally mentioned that the stations selected have enabled an excellent scheme of primary triangulation to be projected.

As, with very few exceptions, all points selected as signal stations were commanding summits, standing conspicuous among the surrounding hills, the signals erected did not require to be of very great height.

The manner of erecting them may be described as follows:—First, the exact spot having been chosen, a wooden hub about 8 inches in diameter is driven solidly into the ground, and a hole bored in the centre of the upper surface with an inch auger to the depth of 2 inches. If the summit happens to be of solid rock, a hole is chiselled out. When sufficiently near timber, a straight tree, 12 to 20 feet in height and 6 to 8 inches at the butt, is trimmed of all branches, except a thick bunch at the top; the heavy end is then brought to a sharp point. Three supports, pointed at the ground end, are next attached in the shape of a tripod, and secured to the pole by a single 6-inch wire nail to each support. The signal is erected, the sharp end being placed in the hole in the centre of the hub, and is plumbed so as to be vertical from all directions; this is done by using a plumb-line, and shifting the supports until the pole is true. Stakes are solidly driven beside the hub, and at each of the ground ends of the tripod. These are secured to the centre pole and the supports by a single 4-inch wire nail, the object being to prevent the pole jumping the hub, or the supports slipping when subjected to the strain of a heavy wind. If it is found impossible to drive these stakes, rock is piled around the hub and ground end of the supports. Care must be taken to give the supports a sufficiently wide spread. When subsequently occupying the station for the purpose of reading angles, it is only necessary to detach the stakes, and lift one leg of the supporting tripod; the pole will then swing to one side and allow the transit to be set over the centre hole in the hub.

During the past season, a number of stations were selected at a considerable distance above timber line. The signals were here carried up in sections and spliced together at the station. Hubs were placed as usual, and the poles surrounded by stone cairns in lieu of the supports mentioned above. The accompanying illustration of the signal erected at "Hoffmann" station serves well to exemplify the method.

It was intended to gather general topographical information of the country, lying between the streams traversed, by means of photographs taken from the summits occupied for the purpose of erecting signals, and from such other supplementary stations, (styled

camera stations) as might be required for the purpose. Unfortunately, at the time of leaving Ottawa, the camera, especially built for the class of work, was still in the maker's hands, and the necessary outfit did not reach the Division until July 31st, at which time the Elbow River and Jumpingpound Creek traverses had been completed. Prior to that date general topography was obtained by making sketches from the signal stations, the relative positions of the signals to one another being ascertained by compass bearings.

On receipt of the camera, photographic views were substituted for sketches and the relative position of signals ascertained by angular readings with the three-inch Troughton and Simms transit used to obtain azimuths to orient the views when plotting the ground plan. Vertical angular readings were also taken upon surrounding signals, thus furnishing relative elevations to one another, and at the same time a check upon the elevations obtained by vertical readings at traverse stations and by the barometer referred to above.

The photographic work of the past season was somewhat of an experiment, and the data obtained not sufficiently complete, owing to the numerous other duties of the Division. It is, therefore, not desired to enter into a full discussion of it in this report, preferring that another season's experience should be added, when the results attained would be based upon an accurate triangulation projected from the past season's reconnaissance survey. It may also be stated that up to the present, the method has only been applied in Canada to the mountain regions, where the contours are bolder and more striking, and the identification of points in the photographs much easier. It appears, however, from the observations of Division B, that the method is quite as applicable to the foothill country as to the mountains, but necessitates the occupation of a considerably larger number of camera stations.

The application of photographic surveying to the mountain and hilly regions of Canada, is due to E. Deville, Esq., Surveyor General of Dominion lands. The instruments and methods employed in the field, and their application to the construction of complete topographical maps, are most ably and graphically described in his work entitled "Photographic Surveying," first published by him in 1889.

Mr. Deville has bestowed a very large amount of investigation and experiment upon the subject and the numerous elements it involves, particularly the photographic operations, the attendant development of negatives and the bromide enlargements therefrom for working prints from which to plot the survey. His new and enlarged edition of 1895 includes the elements of descriptive geometry and perspective, and their application to the reduction of photographs obtained in the field, to a ground plan or topographical map. It is a concise and comprehensive work leaving very little to be said upon the subject.

The instruments and methods employed during the past season were those set forth in this work. Edward's "medium" isochromatic plates were used in the camera, but have not been found wholly satisfactory. The scope of the camera is very nearly sixty degrees of arc. It requires, however, seven views to complete the circuit from one station, as views should slightly overlap to be certain of covering the entire field and lack of definition, if any, at the extreme edges of the plates. It is exceptional that a complete set will be taken from any one place; the most suitable points are chosen as camera stations from which to obtain such views as may best command the special features or portions of the landscape required.

The experience of the past season shows that in these latitudes during the summer months, the best photographic results can be obtained in the early morning hours, from 7 to 10 a.m. Later, the distance is liable to become hazy. In the fall—the latter part of September and October—work cannot be commenced much before 9 a.m. The sun is low, and consequently the shadows long and deep. By commencing to expose as near the sun as the landscape is distinct, and working round to the right, no time will be lost and good results obtained. When the last view of a circuit is reached in this manner, the sun will have moved forward sufficiently to offer no hindrance.

The sketches and transit readings for azimuth of points in the views are made subsequently.

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HYDROGRAPHY OF RIVERS AND STREAMS.

For purposes of classification, the rivers and streams dealt with are divided under the four following heads:—1. Jumpingpound Creek System. 2. Elbow River System. 3. Fish Creek System. 4. Sheep River System.

In order to locate points where streams were gauged, reservoir sites, storage basins, trigonometrical stations and other topographical features that may be referred to, the township and subdivision lines of the Dominion lands system have been projected upon the accompanying topographical map.* As, however, no section numbers are shown, it must be remembered that section 1 is situated at the south-east corner of a township, and that the numbers progress in order from east to west, and west to east, until section 36 in the north-east corner of the township is reached.

JUMPINGPOUND CREEK SYSTEM.

The Jumpingpound Creek is a tributary of the Bow River, joining it in Section 4, Township 26, Range 4, west of the 5th Meridian. In section 30, Township 24, Range 4, it is joined by a stream known locally as the Little Jumpingpound. This feeder has a small drainage basin, and does not at any time contribute a large amount of water to the main stream. Lying, as it does, in previously surveyed territory, it was not within the scope of the survey under discussion.

In Sections 2, 3, 10 and 11, Township 24, Range 5, is situated the principal reservoir site of the Springbank Irrigation District. About four miles above this site, the traverse of the Jumpingpound valley was commenced at its intersection on the north side by the meridian outline between Ranges 5 and 6.

The main stream has its origin in the south-west corner of Township 23, Range 7; the original supply is, however, largely augmented by run-off from the slopes of the high rocky ridges lying between it and the Kananaskis River, in the eastern portion of Township 23, Range 8.

The general direction is northerly through Township 23, Range 7; north-easterly through Township 24, Range 7; and nearly due east through Township 24, Range 6.

Township 24, Range 6.—Proceeding up stream from the point of commencement of the traverse, the creek winds through a valley 10 to 30 chains in width, with banks ranging from 40 feet in the eastern portion of the township to 150 feet in the western. It lies between long sloping hills whose summits are from one to two miles distant. The slopes are thickly timbered on the south side with scrub pine, and encumbered by standing and fallen dry timber (brulé) in great quantity. On the north side, however, are seen numerous grassy slopes rising from the timbered benches immediately above the valley of the creek, and in sections 16 and 21 a muskeg valley of considerable extent.

In the valley of the creek patches of serviceable spruce and pine are met with, but the prevailing characteristic in this respect is fallen and standing dry timber that has evidently, like that on the south slopes, been killed by fire. Some of the benches, also, will yield pine timber having an economic value.

A cross section and measurements for discharge of the main stream were made in the N.E. $\frac{1}{4}$ of Section 11, on the 26th of June. For results see schedule below.

*The topographical map referred to was not completed at date of issue of this report, but will be issued separately.

MEASUREMENT of actual flow of water in Jumpingpound Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
5	1895. June 26...	In N.E. $\frac{1}{4}$ Sec. 11, Tp. 24, R. 6. W. of 5th Mer., near west boundary.	133.26 second feet.

REMARKS.—Stage of water, average high. Very high water probably rises 1 foot. Flood, probably 2 ft. to 2 ft. 6 in. Bed of stream, gravel, stones and small boulders. Left bank, sandy loam, grown with willows; at flood, water extends over flat; flat timbered with spruce, small cottonwood and willow. Right bank, cut-bank of light clay with stones, gravel, boulders and rock exposure. Flow of stream, uniform. Bottom and water line regular.

The first tributary stream worth mentioning drains the muskeg valley in Sections 16 and 21, joining the main stream in the S.E. $\frac{1}{4}$ of Section 16. It is probably spring fed and of constant flow throughout the year, but was not considered of sufficient volume to expend the time necessary for discharge measurements.

In Section 8, three streams contribute to the main creek. That flowing from the south-west is largest. It heads south of "Coxcomb" signal station, probably in Section 28, Township 23, Range 7. A cross section and measurements for discharge were made in the N.W. $\frac{1}{4}$ of Section 8, immediately below the point where it is joined by the smallest of the three streams mentioned. For results see below.

MEASUREMENT of actual flow of water in stream tributary to Jumpingpound Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
4	1895. June 25...	In N.W. $\frac{1}{4}$ Sec. 8, Tp. 24, R. 6. W. of 5th Mer., at S.W. corner.	17.60 second feet.

REMARKS.—Stage of water, average high. Very high water probably rises 1 ft. to 1 ft. 6 in., flood from 2 ft. to 2 ft. 6 in. Bed of stream, small stones and gravel. Banks, light clay with stones and gravel; at flood, water extends over gravel bed on right side. Flow at point gauged, fairly even. Water line, regular. Bottom, uniform. Evidently subject to freshets.

The third stream joining in Section 8 drains the muskeg valley reaching northerly and north-westerly through Sections 13, 14, 23, 24 and 26, in Township 24, Range 7. It is spring fed, and most probably flows constantly throughout the year. No measurements were made for discharge. The flow at the time of the survey was about three or four second feet.

In Section 8 a valley leading south-easterly to the Elbow River opens to the creek, and will most likely afford an easy pass through the hills from one stream to the other. (See topographical map).

In Sections 8, 17 and 18 on the north side, and Section 7 on the south side, the ground above the creek valley extends back from half to three quarters of a mile in thickly timbered benches before rising to the steep slopes of the adjacent hills.

Township 24, Range 7.—Half a mile above the east boundary of Township 24, Range 6, the Jumpingpound valley opens in a park-like expansion, known locally as the "Jumpingpound Park." It has a length of one and one half miles, an average width

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of 25 to 30 chains, and is surrounded on all sides, except the south-west where the grades are long, by cut-banks or very steep slopes from 100 to 150 feet in height. It is a fine natural reservoir site, and is treated of below under the heading of "Storage facilities" (see reservoir site A). At the present time the park is utilized by one Sibbold as a winter cow-camp. A good waggou road has been constructed along the north side of the Jumpingpound Creek to this point from the Morley trail. The Indian pack-trail from Morley up the Jumpingpound valley to the Kananaskis and Elbow River valleys also crosses here.

The upper portion is a muskeg, and naturally yields a certain amount of hay. Mr. Sibbold has assisted nature by constructing a small irrigation ditch and system of laterals, thereby placing a larger portion under contribution. (See accompanying sketch of reservoir sites A and B.)

The principal feeder of the Jumpingpound Creek joins it here. It enters the park from the west, and flowing close to the north bank, empties into the main stream in the S.W. $\frac{1}{4}$ of Section 13. A traverse was carried up this branch to near its head, and will be referred to later.

The main creek flows along the south side of the park, entering from the south about the east boundary of section 11.

Each of the streams referred to was gauged in the park. The results are shown below in schedule form.

MEASUREMENT of actual flow of water in Jumpingpound Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
1	1895. June 13.	In S.W. $\frac{1}{4}$, Sec. 13, Tp. 24, R. 7, W. 5th Mer., near S.E. corner.	67.12 second feet.

REMARKS.—Stage of water about 6 in. lower than ordinary high water; flood stage, probably 1 ft. to 2 ft. higher. Bed of stream, stones and gravel. Banks, light sandy loam, grass grown. Water, turbid; carries a large amount of silt, but stream too swift to deposit here. Flow, fairly even at point of cross section. Water line, regular. Bottom, fairly uniform; subject to freshets. Snow and rain storm of June 13th, 14th and 15th, caused water to rise from 1 ft. to 1 ft. 6 in. higher than when measured.

MEASUREMENT of actual flow of water in stream tributary to Jumpingpound Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
2	1895. June 13.	In N.E. $\frac{1}{4}$, Sec. 11, Tp. 24, R. 7, W. 5th Mer., close to north boundary.	6.40 second feet.

REMARKS.—Stage of water, near average high-water; flood stage probably about 1 foot 6 inches to 2 feet higher. Bed of stream, muddy; silt and scanty weeds over gravel and sand. Banks, clay loam, grass grown and bordered with overhanging willow in places. Course of stream, winding. Evidently spring fed. Does not appear subject to freshets. Snow and rain storm of June 13th, 14th and 15th caused a steady rise in creek of from 1 foot to 1 foot 6 inches higher than when gauged.

Continuing up the main stream, about a quarter of a mile from the entrance to the park the sides of the valley close together. The stream has here cut a path through the rock, forming a narrow gap suitable to the construction of a dam. A storage basin supplementary to the park reservoir site could thus be obtained. (See reservoir site B).

From this point on, the character of the valley changes considerably, and the creek becomes distinctly a mountain stream. The timbered benches found below the park disappear, and the sides of the valley are the immediate slopes of high rocky hills rising from 800 to 2000 feet above the bed of the creek. Numerous small water-courses and several larger ones contribute to the main stream. Nearly all serve as drainage channels to carry the run-off from melting snows of higher altitudes, and are only factors of supply during the early summer or after severe snow and rain storms. On this account none were gauged. The only one of importance, in Township 24, Range 7, joins the creek in the south-west quarter of section 4. It carried at the time of survey about one sixth the volume of the stream below the point of junction.

Township 23, Range 7.—The main stream heads in this township, most likely in Section 6. The course is northerly. The character of the valley is similar to that just described above, with the addition that the slopes become steeper and more rugged, and the water courses more numerous as the head is approached.

The larger drainage channels may be referred to briefly as follows :—

From west, joining main stream in the north-east quarter of Section 29 ; considerable flow at time of survey. From east, joining main stream in north-west quarter Section 20 ; about one-fifth of volume below junction. From south-east, joining main stream in south-east quarter of Section 19 ; about one-fourth of volume below junction. Two water-courses from west and south-west, which united, join the main creek in south-west quarter Section 17 ; about one-half of volume below junction. From south-west, joining main stream in north-east quarter Section 8 ; about one-half of volume below junction.

In south-west quarter Section 8, the main creek, or rather, the main flow of water during the early part of the year, comes from the south-west, originating in the high rock ridge about two miles distant. By following a smaller branch in a more southerly direction, the muskeg mentioned in your instructions is reached within a distance of half a mile.

When it is called to mind that all the channels enumerated run dry, or very nearly so, during the summer months, although at the time of survey they might well be classified as torrents, it is easy to realize how a stream like the Jumpingpound, of large volume in the earlier portion of the year, can dwindle to such small proportions later on, and be subject to freshets, that in a few hours will cause it to discharge a large amount of water in the lower country for no apparent reason.

The muskeg referred to is situated at the height of land between the Jumpingpound Creek, the Kananaskis River and the Cañon Branch of the Elbow River. It is a very small affair, the superficial area of the portion situated on the height of land not exceeding eight acres.

The impression that the Jumpingpound heads in the muskeg is a mistake. As a matter of fact, very little water was found to flow in this direction, and, in all likelihood, later in the season there would be none. The basin it drains is inconsiderable, and the supply of no value as an irrigation factor.

The Indian pack-trail up the valley of the creek divides here, one branch leading to the Kananaskis valley, the other to the Elbow valley.

Above the park the timber is principally *brulé* and scrub pine, and has no special economic value. Near the head of the creek, some spruce and pine of useful proportions were observed, but the timber would be difficult to get out, and is in no great quantity.

Township 24, Range 7.—As previously stated the principal feeder of the Jumpingpound Creek joins it in this township, in the S.W. $\frac{1}{4}$ of Section 13.

It is referred to as the principal feeder, from the fact that it appears to receive its supply chiefly from muskeg sources and not from run-off as in the case of the main stream. For this reason, it is surmised that the flow is constant throughout the year. The bed winds through a narrow valley between steep rugged hills rising directly from 500 to 1000 feet, and has a comparatively low grade for the last three miles of its course. The valley for the greater part of its length has a muskeg bottom. The course is easterly and south-easterly.

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A tributary stream joining in the N.E. $\frac{1}{4}$ of Section 16, discharged about one-fifth of the flow below the junction.

In Sections 20, 17 and 18, the valley expands a little, affording a good reservoir site. A narrow gap at the mouth of this expansion offers a location for a dam in the S.E. $\frac{1}{4}$ of section 20. (For details, see reservoir site C.)

The creek was gauged a short distance down stream from the mouth of the reservoir site. See schedule below.

MEASUREMENT of actual flow of water in stream tributary to Jumpingpound Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
3	1895. June 24	In S.E. $\frac{1}{4}$, Sec. 20, Tp. 24, R. 7, W. 5th Mer., near south bdy.	9.04 second feet.

REMARKS.—Stage of water, average high. Flood from 1 ft. to 2 ft. higher. Bed of stream, small stones, sand and gravel. Banks, light clay with gravel and stones. Water, dark in colour but clear. Stream largely fed from muskeg in reservoir site above. Flow, even at point of cross section. Water line, irregular. Bottom, uniform.

Two tributary streams join above the mouth of the proposed reservoir site; one from the south in S.E. $\frac{1}{4}$ of Section 20, the other from the north in the S.W. $\frac{1}{4}$ of Section 20. The southerly one discharged about one-fourth of flow below junction; that from the north not so much. Both will probably run dry during summer.

The traverse was not carried beyond the N.E. $\frac{1}{4}$ of Section 18. The main valley here turns south-westerly, and the height of land between the Jumpingpound system and Kananaskis River is reached. The stream does not, however, head at the height of land referred to, but comes from the north down a narrow timbered valley. It is here of very small size, and is evidently not far from its origin.

Small bunches of timber, spruce and pine, are met with along the creek and up the tributary valleys. They are not in sufficient quantities to be of merchantable value, but would afford plenty of material for building a dam at the point indicated.

Storage Facilities.

In the portion of the Jumpingpound Creek system covered by the season's operations, three opportunities were presented for storing the water supply, in addition to the reservoir site already selected in Township 26, Range 5, by the Springbank Irrigation District. These sites are respectively lettered A, B and C, on the accompanying sketches, and may be briefly referred to as follows:—

Site A.—This site is the park-like expansion of the valley already mentioned, where the main creek is joined by the stream which appears to be its principal contributor during the low water of the summer months. The basin has an average width of 20 chains, a length of 140 chains, and a superficial area of 290 acres. On the north-east and south side in section 12, the boundaries are either cut-banks or very steep slopes, a hundred feet or more in height. On the south side in section 11, the bounding slopes are less abrupt and the grades easier.

The accompanying sketch shows the most suitable location for a dam. A dam 60 feet high at the point indicated would have a bottom length of about 400 feet, and a top length of about 560 feet. At point of abutment, the banks consist of sandstone beds lying at an angle of 30° overlaid by light clay mixed with stones and gravel.

Specimens of the rock were submitted to Dr. Dawson, Director of the Geological Survey Department, who reports on them as follows:—"Rather fine grained, thin and

evenly bedded sandstone. Would be readily quarried, if it could be obtained in sufficiently large blocks for building purposes, but specimens are too thin and flaggy for that use. A strong durable rock that would doubtless hold back the water of a reservoir if it is not too much jointed and fissured in the mass." He further adds, "If the sandstone beds are lying nearly flat and form the banks on both sides of dam site to full proposed height of dam, I should suppose that they would form an excellent foundation. The same may be said, though not so confidently, if they are at some high angle. The little specimens have an appearance which makes me think that they do not represent any considerable thickness, but that they may alternate with shales or heavier bedded sandstones. This might change the conditions considerably."

Assuming the height of the dam at 60 feet, and the superficial area as given above, a rough estimate of the capacity may be placed at 6400 acre feet. It must, however, be borne in mind that the elevations shown on the accompanying sketch are obtained from barometer readings, and are approximate only.

The next question, and most important one, is that of supply available to fill a reservoir of the above capacity. To ascertain some information upon this head, the respective volumes of the two streams emptying into the basin were measured upon the 13th June. The main stream was found to discharge 67.12 second feet (feet per second), and the tributary stream 6.40 second feet upon that date. The water in the main stream was then about six inches lower than ordinary high water, and a subsequent snow and rain storm of three days' duration caused it to rise from 1 ft. to 1 ft. 6 in., above the level when gauged. The discharge, therefore, of 73.52 second feet by no means represented the greatest discharge of the two months previous, when the supply would be particularly available to fill the reservoir. Owing to the unusual amount of precipitation in Southern Alberta during the earlier part of the past year, the streams retained their high-water level for a much longer period than usual, and on this account, the discharge above quoted may be taken as a probable estimate of the average high-water discharge during a year of ordinary rainfall.

Taking the measurement of 73.52 cubic feet per second as a basis, the two streams at high water would discharge 6,352,128 cubic feet per day of 24 hours, or a quantity equal to 145.8 acre feet.

If there were no loss from seepage and evaporation, it would require 44 days to fill the basin. Seepage and evaporation, particularly the former, are the unknown quantities. The west end and a strip along the northerly bank of the site have a muskeg bottom, and the soakage in these parts should be very little. Placing the total first loss at 25 per cent it would require 55 days to fill the basin, provided the entire flow were used for that purpose.

For the construction of a dam, plenty of building timber and stone will be found in the immediate vicinity.

A small pond of about 25 acres in extent, is situated on the bench land in Section 14, immediately above the north bank of the reservoir site. (See sketch). It receives its supply from the muskeg valley in Sections 14, 15 and 22, and the area which said valley drains. The natural overflow channel from the pond is shown on sketch by a dotted line. It drains into the creek flowing through the north-east portion of Section 13, but might easily be diverted to the park reservoir site at the north-east corner as shown by dotted line. The capacity of the pond was not measured. It appeared to be deep, and would be worthy of an investigation at such time as a special detailed survey of the reservoir site may be made.

The elevation above sea level at the mouth of site A, as ascertained from barometer readings, is 4,720 feet and at the point of commencement of the traverse at the township outline between Ranges 5 and 6, 4,265 feet, a fall of 455 feet in a distance of about 10.5 miles, following the windings of the creek. This gives an average fall of 43 feet per mile, but is not evenly distributed. In the first mile from the reservoir site, the fall is over 100 feet, and in the last, only about 30 feet. Continuing down stream, the distance along the creek from the point of commencement to the head of the Spring-bank Irrigation District's reservoir site, is approximately 4.5 miles. Placing the average fall for this distance at 25 feet per mile, the total fall between the two sites would be 570 feet in a distance of about 15 miles.

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Site B.—The basin here referred to might be used either independently, or as supplementary to site A. The location for a dam is shown on the accompanying sketch. At the point indicated, the banks of the valley close together, and the stream has cut a path through the rock. The gap is about 150 feet in width. The rock, of a hard and apparently solid mass, presents a good foundation for a dam. A dam 50 feet high would create a reservoir with an estimated capacity of 1,150 acre feet. The measured discharge of the main stream on 13th June, viz., 67.12 second feet, may be used as a basis for an estimate of supply.

There is plenty of rock here for construction purposes, and the same could be used if required in constructing a dam for site A. Timber can be had in the vicinity.

The approximate elevation at the mouth of site B is 4,870 feet, and at the entrance to site A, 4,790 feet. The distance is less than half a mile.

Site C.—Reservoir site C is shown on the accompanying sketch. It is situated in parts of sections 17, 20 and 18, Township 24, Range 7, west of the 5th Meridian.

The location for a dam is also shown on the sketch. The banks here are of light clay, gravel and rock. A dam 60 feet high would have a bottom length of about 150 feet, and a top length of about 440 feet. The estimated capacity is 1950 acre feet. The sides of the basin are steep, and at the upper end, rock walls. The bottom is muskeg throughout, and the upper portion was practically under water at the time of survey. There would be little or no loss through seepage, except immediately at point of dam.

Two drainage channels of considerable volume during the early part of the year join the stream in section 20, one from the north, and one from the south.

On 24th June, the stream was gauged a short distance below the mouth of the reservoir site, and discharged 9.04 second feet on that date. This appeared to be about average high water.

Plenty of stone and building timber for all requirements of dam construction will be found on the site.

The approximate elevation at mouth of site C is 5,066 feet, and at head of site A, 4,780 feet. The distance traversed by the stream is about 3.5 miles.

General Remarks.

It will be understood that proper detailed surveys and investigations will be necessary in the case of each site enumerated, the rapid surveys of the past year being only for purposes of location and general information.

From the foregoing it will be seen that there is no lack of opportunity for storing the waters of the Jumpingpound Creek system. Including the one already selected by the Springbank Irrigation District, four good sites are available. It only remains to select such one or more as may be best suited to the requirements of the community, and can be constructed with the most judicious outlay.

In connection with the three sites, A, B, and C, it would be advisable to segregate the lands enumerated in the following table, pending more detailed surveys.

LANDS to be segregated.

Site.	Part of Section.	Section.	Township.	Range.	Meridian.
A	N. 1/4	12	24	7	West of 5th.
A	S. 1/2 & N.W. 1/4	13	24	7	do
A	N. 1/4	11	24	7	do
A	S. 1/4 & N.E. 1/4	14	24	7	do
A	N.E. 1/4	10	24	7	do
B	S. 1/4	11	24	7	do
B	N. 1/4	2	24	7	do
C	N. 1/4	17	24	7	do
C	S. 1/4	20	24	7	do
C	N.E. 1/4	18	24	7	do

ELBOW RIVER SYSTEM.

The traverse of the Elbow River was commenced on July 1st, at the intersection of the right bank by the north boundary of the Sarcee Indian Reserve, and carried up stream to a point where two branches emerging from the narrow valleys bounding Tombstone Mountains and Mount Rae join together, and flow north-westerly between the outlying peaks of the Fisher and Misty ranges of the Rocky Mountains.

For convenient reference, the stream and its adjuncts are reported upon in order of townships through which it flows, proceeding up stream from point of commencement. A glance at the accompanying topographical map will enable the position of the features touched upon to be located.

The most westerly subdivision line of the Dominion lands surveys intersects the river four miles farther west, but no traverse having yet been made across the reserve it was considered advisable to commence at the point stated, the more particularly that the headgates of the Calgary Irrigation Company's main ditch are situated within 20 chains down stream.

Across the Indian Reserve, the river flows swiftly over a bed of gravel and boulders in a north-easterly direction. At time of survey the water was high, and the main channel had an average width of from 1.25 to 1.50 chains.

The valley through which it flows varies from one-half to three-quarters of a mile wide with banks of slight elevation. It is bounded by comparatively low hills and ridges, partially wooded. The ground is swampy in the hollows.

Near the west boundary of the reserve a wide valley leads north-westerly to the Jumpingpound Creek, but becomes narrow and presents many muskeg bottoms as that stream is approached. A corresponding valley on the south side leads south-easterly to Fish Creek.

A good wagon road extends up the valley on the south side of the river, a branch crossing the stream leads up the valley first mentioned to the home of a rancher named Greyson.

The first suitable point at which to gauge the stream was obtained about a mile below the intersection of the west boundary of the reserve. The results are given below.

MEASUREMENT of actual flow of water in Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
6	June 29. . .	At a point one mile below the intersection of the west boundary of the Sarcee Reserve and the Elbow River.	761.28 second feet.

REMARKS.—Stream at about average high water; has been probably a foot higher. Flood-water stage would probably be 2 to 2½ feet higher. Bed of stream, stones and gravel. Gravel bars extend on both sides of present flow. Cross-section taken between two rapids. Flow not very even. Bottom, fairly uniform. Water line, regular. Water has a milky appearance, caused by silt carried in suspension. From headgates of Calgary Irrigation Co. to point of cross-section is one continuous rapid.

The approximate elevation above sea level at point of commencing traverse is 3,968 feet, and at west boundary of reserve 4,149 feet, representing a fall of 181 feet in a distance of 5 miles, or an average fall of 36 feet per mile.

Townships 22 and 23, Range 5, W. of 5th Meridian.—The river winds north-easterly through these townships, and the valley becomes irregular in form; now narrowing as the stream flows between steep hill sides, and again opening into flats where the bed lies in a number of channels distributed over a gravel bottom. Frequent cut-banks from

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100 to 180 feet in height are seen and in the westerly portion of Township 22, a number of rock exposures.

On the south side, timbered benches extend back from the valley about a mile, the ground then rising in steep hills, timbered in places with scrub pine, but chiefly burnt over. On the north side the benches are of less extent and more open, as also the hill sides.

A number of grassy valleys largely consisting of muskeg bottoms extend northerly and north-westerly to the Jumpingpound Creek. The most extensive is that known as Bragg's Valley. Bragg Creek flows along the valley, joining the Elbow in the N.E. $\frac{1}{4}$ of Section 12, Township 23. The creek rises near the centre of Township 23, Range 6, in the valley previously referred to as opening to the Jumpingpound Creek in Section 8, Township 24, Range 6. It receives its supply from run-off from the slopes of Moose Mountain, and from a large muskeg situated near the south end of the last mentioned valley, which shortly afterwards opens to Bragg's Valley. The creek was gauged near its mouth; see schedule.

MEASUREMENT of actual flow of water in Bragg Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
7	July 4. . . .	In N.E. $\frac{1}{4}$ of Sec. 12, Tp. 23, Rge. 5, W. of 5th Mer., near N.W. corner.	10' 56 second feet.

REMARKS.—Stream a little below average high water. Bed, stony. Banks, gravel, with covering of clay loam on left side. Overhanging willows. Water, dark in colour. Flow, fairly even at point of cross section.

In Sections 33, 34 and 35, Township 22, and Section 2, Township 23, a low timbered bench separates the head-waters of Fish Creek (north branch) from the Elbow River. A rough survey made by Division A, in 1894, established the feasibility of diverting water from the Elbow River across this bench to Fish Creek.

During the past season a traverse was carried from the Elbow to connect with Fish Creek, and the probable course of such a diversion ascertained. It is referred to farther on, accompanied by a sketch showing the topography of the proposed route.

The Elbow River was again measured for discharge in the south-west $\frac{1}{4}$ of Section 11, Township 23. The measurement was made immediately subsequent to three and a half days' continuous rain, which will account for the increased result over that obtained from cross-section of June 29th. It serves to illustrate how rapidly the stream is affected by freshets.

MEASUREMENT of actual flow of water in Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
8	July 7. . . .	In S.W. $\frac{1}{4}$ Sec. 11, Tp. 23, Rge. 5, W. of 5th Mer.	972' 75 second feet.

REMARKS.—Cross-section taken after 3 $\frac{1}{2}$ days continuous rain. Water from 6 to 8 inches higher during freshet than when measured. Right side, cut-bank of soft shale. Left side, gravel bar. Very high water, at least 1 foot higher than at present stage. Extreme flood stage, probably 2 to 4 feet higher. Flow, fairly even for so high a grade. Bed, stones and gravel. Bottom, uniform. Water line, irregular.

The next tributary stream gauged joins the river in the north-west $\frac{1}{4}$ of Section 30, Township 22. Like Bragg Creek, it receives its supply from the slopes of Moose Mountain, and probably to some extent from the same muskeg.

The course is south-easterly. A cross-section was taken close to the mouth, resulting as follows:—

MEASUREMENT of actual flow of water in stream flowing to Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
16	July 15...	In N.W. $\frac{1}{4}$ Sec. 30, Tp. 22, Rge. 6, W. of 5th Mer., near 7.37 second feet. mouth of stream.	

REMARKS.—Water between high and low stages. At point of cross-section, flow fairly even. Water line and bottom, fairly regular. A mountain stream, obstructed by brush, logs, willows, &c. Water, dark in colour but clear.

The wagon road, previously referred to, crosses the river at the boundary line between Sections 11 and 12, Township 23, and proceeds up Bragg's Valley to the house of a rancher in Section 15. There is no travel for vehicles up the Elbow River beyond this point. The Indian pack trail from Morley passes through a valley joining Bragg's Valley from the north in Sections 14 and 15, and crosses the river in Section 12.

Patches of spruce are met with in the river valley and along the side slopes, but they are of small size and extent.

The approximate elevation at the west boundary of the Sarcee Reserve is 4,149 feet, and at the west boundary of Township 22, Range 5, 4,506 feet; a fall of 357 feet in nine miles, giving an average of 39.7 feet per mile for that distance. The distance from point of commencement to last mentioned point is 14 miles, and average fall per mile, 38 feet.

Townships 21 and 22, Range 6.—The river flows through the townships named in a northerly and north-easterly direction. Two miles up stream from the east boundary of Township 22, the sides of the valley close together, forming a cañon for a distance of $3\frac{1}{2}$ miles before again opening out. At the upper end of the cañon, in the S. W. $\frac{1}{4}$ of Section 16, Township 22, the river drops 20 feet through a gap in the rock 16 feet wide. Its course for the distance mentioned is over a rocky bed, and is one series of falls and rapids. The sides of the cañon are chiefly steep cut-banks and rock walls from 70 to 150 feet in height. Back of the cut, on the south side, a thickly timbered bench extends about a mile to steep rugged slopes, partially timbered. On the north side, timbered slopes approach the river more nearly.

Cañon Branch.

In Section 15, Township 22, the Cañon Branch (so called upon Dr. G. M. Dawson's reconnaissance map of the Rocky Mountains, dated 1886), joins the main stream. The name is suitable as regards the topographical features of the valley in which the bed lies; for some three miles from the mouth, the stream flows through the cañon with rock walls rising to a height of 500 feet. In respect of size, however, it can scarcely be termed a branch.

On July 25th, the discharge was only 17 second feet, but in the spring and early summer, the stream will doubtless be a torrent, forming, as it does, a drainage channel from the centre of the rocky range, between the Elbow and Kananaskis River systems, as well

Department of the Interior.

as for the run-off from the southerly and westerly slopes of Moose Mountain, and the northerly slopes of the high rocky hill entitled "Prairie Creek Signal Station," upon the accompanying topographical map.

MEASUREMENT of actual flow of water in Cañon Branch of Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
15	July 25...	In S. E. $\frac{1}{4}$ of Sec. 15, T _p . 22, R. 6, W. of 5th Mer., near west boundary	17.25 second feet.

REMARKS.—A mountain stream of great fall; a series of rapids. Stream largely snow fed during early part of year; partly spring fed. Water not pure below cañon, owing to Sulphur Creek joining it in that portion of its bed. Water at average stage. Bed; rock, boulders, stone and gravel. Course much obstructed by logs and other detritus. At point of cross-section, flow not very even. Bottom, fairly uniform. Water line, irregular. Evidently much subject to freshets.

Between the junction with Elbow River and the cañon, the valley is deep and narrow, presenting steep wooded slopes (scrub pine and brulé) on the west, and open grass land with patches of timber on the east.

Beyond the cañon, which is about three miles in length, the valley expands somewhat, showing patches of open, and is bordered by easy timbered slopes until the mountains are arrived at.

The actual source of the stream is in the muskeg previously referred to as lying at the head of the Jumpingpound Creek. In early spring, however, the main bulk of the flow is conducted down a wide gravel bed or channel from the centre of the rocky range before mentioned, joining the stream some distance below its origin.

A good opportunity is presented to construct a dam at the mouth of the cañon for the purpose of water storage.

The usefulness of the site as a reservoir is referred to below, accompanied by a sketch map. (See reservoir site D.)

In the same place are given the approximate elevation as far up the stream as it was ascertained, and the fall per mile between the mouth of the cañon and the junction with the Elbow River.

Above the falls in the S.W. $\frac{1}{4}$ of Section 16, the valley of the main stream opens out somewhat, but closes together again in Section 8. The surrounding hills are steep and rugged, rising over 2,000 feet above the bed of the river. The slopes fall directly to the valley, and there are no benches of any extent. On the north and west sides they are thickly timbered with scrub pine and windfall, and on the south and east present rugged rocky faces.

In the S.E. $\frac{1}{4}$ of Section 17 two streams unite and join the river from the north-west. They have their origin in the timbered hills west of "Prairie Creek Signal Station" (see topographical map). The most northerly, for the sake of distinction, has been named "Prairie Creek," from a number of open patches along its bed.

Both streams at time of measurement discharged more water than the Cañon Branch. This, however, would not be the case in early spring, as they drain very much smaller run-off areas. They are evidently spring fed. For result of discharge measurements see schedule below.

MEASUREMENT of actual flow of water in Prairie Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
13	1895. July 25...	In S. E. $\frac{1}{4}$ Sec. 17, Tp. 22, R. 6, W. of 5th Mer. above junction of two streams.....	21.02 second feet.

REMARKS.—A mountain stream. Stage of water high, owing to melting snow caused by last few hot days. Bed of stream, stones and gravel. Banks overhung by willows. Course obstructed by logs, boulders, etc. Water, muddy owing to freshet. Flow at point of cross section, even. Bottom, uniform. Water line, regular.

MEASUREMENT of actual flow of water in stream joining Prairie Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
14	1895. July 25...	In S. E. $\frac{1}{4}$ Sec. 17, Tp. 22, R. 6, W. 5th Mer., above junction of two creeks.	22.07 second feet.

REMARKS.—A mountain stream at average water stage. Bed; stones, gravel and weeds. Banks overhung by willows and brush. Course obstructed by logs, etc. Water, dark in colour and very cold. Creek doubtless spring fed. At point of cross-section, flow fairly even. Bottom, fairly uniform. Water line, regular.

In N.E. corner of S.E. $\frac{1}{4}$ of Section 5 the river flows through a narrow gap in the limestone beds, affording a good location for the construction of a dam. Immediately above, the valley opens out to an average width of about half a mile, and furnishes a site for a reservoir. This site is referred to below in detail, with an accompanying sketch. (See reservoir site E.)

In S.W. $\frac{1}{4}$ Section 4, above the gap mentioned, the river is joined by a stream flowing from the south-east. It has its origin from muskeg sources in or about Section 12, Township 21, Range 6, close to the cañon of the north branch of Sheep River. In the early part of the year it also receives considerable contributions from the run-off of the eastern slopes of the high ridge lying between it and the Elbow, on the central point of which "Forget Me Not" signal station has been established in the N.W. $\frac{1}{4}$ of Section 8 of the above mentioned township.

The creek flows through an open grassy valley presenting many muskeg bottoms, from which spurs extend westward along the several water-courses draining from the high ridge referred to.

To the south, the valley opens to the cañon of the north branch of Sheep River, but at a height of several hundred feet above the bed of that stream. An Indian pack-trail through this valley crosses from the Elbow River to the north branch of Sheep River.

The measured discharge of the creek is herewith given.

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MEASUREMENT of actual flow of water in stream flowing to Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
12	1895. July 25...	In S. W. $\frac{1}{4}$ Sec. 4, Tp. 22, R. 6, W. 5th Mer	18.58 second feet.

REMARKS.—Stage of water probably higher than usual at this time of year. Stream fed from spring sources. Water dark in colour. A regulation foot-hill stream; rapids, stony bed, willow and overhanging brush, logs and other obstructions. Flow, fairly even at point of cross-section. Bottom, uniform. Water line, fairly regular.

Through Township 21, Range 6, the river flows north-easterly over a gravel bottom averaging half a mile in width, and is split into a number of channels. On the north are the steep slopes of high-wooded hills, and on the south wooded slopes rising to the bare rocky ridge referred to as lying between the Elbow River and the tributary stream last mentioned.

The approximate elevation at west boundary of Township 21, Range 6, is 5,164 feet, and at east boundary of Township 22, Range 6, 4,506 feet, an average fall of 54.8 feet per mile in a distance of 12 miles. From said west boundary of Township 21, to point of commencing traverse, the distance is about 26 miles, and the average fall 46 feet per mile.

Townships 20 and 21, Range 7.—A short half mile from the east boundary of Township 20, a small creek enters the Elbow from the north-west. It is of small volume, and was not measured for discharge. The valley through which it flows is, however, worthy of mention, as it affords a pass to the Cañon Branch and up that stream to the head-waters of Jumpingpound Creek.

The summit between it and the valley of the Cañon Branch is at a comparatively low elevation. The Indian pack-trail previously referred to as branching from the Jumpingpound and Kananaskis trail leads down the valley of the Cañon Branch across the summit mentioned and so on to the Elbow River.

To the east lie high timbered foot-hills and immediately to the west rise bare rugged peaks capped with snow.

Half a mile above, the river divides, one branch flowing directly from the south, the other from the west. That from the south is generally accepted as the main stream, but that from the west, or so-called "Fisher Branch," was found by measurement to yield a slightly larger flow. The two streams were measured within four days of each other, during which time there was no reason for an increased discharge of the Fisher Branch. The valley of the main stream certainly indicates that it has at some time conveyed the larger body of water, and the characteristics are more distinctly those found below the junction of the two branches, viz., the stream flows in a number of channels over a gravel bed from a quarter to half a mile wide, while the Fisher Branch for the most part is in one channel in a narrow valley.

The valley of the main stream is here the demarcation line between the higher foot-hills and the high castellated peaks situated east of the Kananaskis River. These peaks rise 3,000 to 4,000 feet above the bed of the river, and are geographically known as the "Fisher Range."

In Section 23, Township 20, Range 6, the gravel valley ends and the river emerges from the mountains.

The survey was discontinued at a point in the N.E. $\frac{1}{4}$ Section 23, where the main stream is joined by a tributary of considerable size flowing from the mountains lying to the south. Beyond the junction the river flows in a narrow valley bounded by steep mountain sides, seamed and scored by numerous watercourses and run-off channels, and presenting many precipices and rock slides.

An Indian pack-trail leads up the valley on the west side of the stream, but its objective point was not ascertained. A fringe of timber—spruce and fir—extends along the borders of the stream and some little distance up the slopes, but soon becomes small and scraggy. Patches of fair timber were seen on both sides of the gravel valley, between the point of terminating traverse and the mouth of reservoir site E, particularly on the flat in Sections 13, 14 and 24, Township 21, Range 7. The bulk of timber has, however, been destroyed by fire.

Cross-sections and measurements for discharge were taken of the stream joining in N. E. $\frac{1}{4}$ of Section 23, Township 20, and of the main stream immediately below the point of junction. For results see below.

MEASUREMENT of actual flow of water in stream flowing to Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
10	July 20.	In N. E. $\frac{1}{4}$ Sec. 23, Tp. 20, R. 7, W. 5th M., near north boundary	39.12 second feet.

REMARKS.—A mountain stream flowing over a bed of gravel and stones. Is a series of rapids. Was gauged at a point of comparatively even flow. Water probably high for time of year.

MEASUREMENT of actual flow of water in Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
9	July 20.	In N. E. $\frac{1}{4}$ Sec. 23, Tp. 20, R. 7, W. 5th M., near north boundary	148.79 second feet.

REMARKS.—A mountain stream flowing over a bed of gravel and large stones. Grade very heavy. Water probably high for time of year owing to unusual amount of precipitation. Gauged at a point of comparatively even flow.

The approximate elevation at point of terminating traverse is 5,626 feet, and at east boundary of Township 21, Range 7, is 5,164 feet; showing in a distance of about 8 miles an average fall of 57.7 feet per mile. The total distance traversed for main stream is about 34 miles, and the difference in elevation as obtained from barometer readings, 1,656 feet, or an average fall of 48.7 feet per mile.

Fisher Branch.

Township 20, Range 7.—Three miles from the junction with the main stream, the Fisher Branch emerges from the mountains and flows westerly along a gradually widening gravel valley. Above this point the valley is narrow, bounded by the steep and, in many places, perpendicular rock faces of the surrounding mountains. On either hand the sides are broken and cut by ravines and gorges, and between the several peaks wide gravel drainage channels bear witness to the quantity and force of the run-off supply during spring and early summer.

In the south-west $\frac{1}{4}$ of Section 21 a narrow rock gap presents an opportunity to store water. (Referred to further on, reservoir site F.)

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The traverse was not carried up the stream further than 7 miles. From here on the valley gradually widens to 40 chains at about 9 miles from the mouth where the stream branches. The larger branch comes from a little south of west, and the other from the south. The latter contains about one quarter the flow below the junction.

The stream was measured for discharge not far from the end of traverse. For results see schedule below.

MEASUREMENT of actual flow of water in Fisher Branch of Elbow River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
11	July 23.	In N. E. $\frac{1}{4}$ Sec. 18, Tp. 21, R. 7, W. 5th M., at south-east corner	163' 44 second feet.

REMARKS.—A mountain stream flowing over a gravel bed. Water probably high for time of year owing to unusual amount of precipitation. At point of cross-section, flow fairly even by comparison. Grade very heavy. Stream a series of rapids.

Some good timber is found near the mouth of the Fisher Branch upon the flat on south side and timbered bench on north side; also along the narrow timbered benches bordering the bed of the stream. The timber extends but a short distance up the mountain sides.

Storage Facilities.

On the Elbow River system three basins suitable for storing water were located, one on the main stream, one on the Cañon Branch and one on Fisher Branch. They are lettered respectively D, E and F on the accompanying sketches.

Reservoir site D is situated on the Cañon Branch of the Elbow River in Sections 28 and 29, Township 22, Range 6, west of 5th Meridian.

A location for a dam is presented at the mouth of the cañon in the south-west $\frac{1}{4}$ of Section 28. The gap here is cut through a hard limestone rock, and has a width of 70 feet for about the same height, the sides being nearly perpendicular. It is questionable, however, if a dam 70 feet high would retain a sufficient quantity of water, owing to the heavy grade and small extent of the basin above, to return an equivalent for the cost of construction. By increasing the width of the dam on top of the 70-foot ledge to about 300 feet, it could be carried to any height up to 200 feet, the setting being in the solid limestone rock.

The sides of the basin are perpendicular rock faces with sloping bases, rising 200 to 400 feet, and gradually opening out to a width of 20 chains.

In the south-east $\frac{1}{4}$ of Section 29, the stream has cut a narrow channel through a layer of sandstone to a depth of 40 feet. The timbered ledges on either hand extend back to the rock faces of the cañon.

Owing to the irregular formation, it is difficult, without a proper survey of contours, to form an estimate of the capacity. Roughly, it may be placed as follows:

With a 70-foot dam.	1,700 acre feet.
With a 100-foot dam.	4,000 do
With a 150-foot dam	8,000 do

Nearly $2\frac{1}{2}$ miles up stream from the mouth of the cañon, a second point was noticed, suitable for the construction of a dam. The sides here are sandstone, and rise perpendicularly. They would admit of a dam being built to a height of about 60 feet, having a width of 100 feet. No estimate has been obtained of the water that could be so stored.

In the north-west $\frac{1}{4}$ of Section 29, a small stream joins the Cañon Branch. It either originates in a sulphur spring, or has springs of that nature along its course. At point of confluence, its bed is covered by a deposit of sulphur half an inch thick, and the waters of the Cañon Branch are strongly impregnated for the remainder of the course through the cañon.

In the matter of supply available to fill the basin, although the Cañon Branch when gauged near its junction with the Elbow River on the 20th July only showed a discharge of 17.25 second feet, it is quite certain that a large body of water is carried during the early part of the year, owing to the extensive run-off area which it drains; referred to previously in this report.

The approximate elevation at the mouth of the cañon is 4,877 feet, and at the junction with the Elbow River 4,701 feet, an average fall of nearly 61 feet per mile in a distance of about three miles.

Above the point indicated as suitable for a dam, the stream has a fall of 62.5 feet per mile. A 70-foot dam would, therefore, cause the water to back up a little over a mile, a 100-foot dam about 1.7 miles, and a 150-foot dam about 2.3 miles, or to the point up stream previously mentioned as suitable for building a second dam.

All requirements in the matter of stone and timber for construction purposes can be met within the site.

Reservoir site E is situated on the Elbow River in Sections 4 and 5, Township 22, Range 6, and Sections 32, 33 and 29, Township 21, Range 6. It comprises the lower end of the gravel valley previously referred to.

The most suitable location for a dam is in the north-east $\frac{1}{4}$ of Section 4. The gap here is through limestone rock, the sides rising abruptly, on the left about 120 feet, and on the right to a much greater elevation.

The top width of a dam 115 feet in height would be about 350 feet, and the bottom width about 200 feet.

On the right side of the cut is an immense slide of broken limestone, extending 175 to 200 feet above the river bed. This material could be readily used in the construction of a dam.

Specimens of the rock were submitted to Dr. G. M. Dawson, Director of the Geological Survey Department, who reports as follows:—

“Small fragments of compact, light gray limestone. The rock in itself is strong and compact enough for all requirements, unless it should prove to be shattered in the mass. This can only be told by inspection on the spot.”

Above the gap, the valley widens to a little over half a mile. The stream is divided into a number of channels flowing over a gravel bed. On either hand are timbered or partially timbered flats at a very slightly greater elevation than the bed of the river.

The sides of the basin are comparatively easy slopes rising to no very great elevation. A dam of the height indicated would cause the water to back about two miles up the valley, and would restrain a volume roughly estimated at 25,500 acre feet.

As a source of supply may be quoted the gaugings made at the terminal points of traverse of the main stream and the Fisher Branch on the 20th and 23rd of July, respectively, 148.79 second feet and 163.44 second feet; also of the creek joining in the south-west $\frac{1}{4}$ of Section 4, Township 22, Range 6, gauged 25th July, 18.58 second feet. In all a total of 330.81 second feet. In addition to this, the minor influx between the points of gaugings mentioned and the mouth of the basin must be taken into account. The supply would doubtless be more than doubled during the early part of the year.

Large building timber for construction purposes can be had from the heavily timbered flat previously mentioned as lying between the main stream and the Fisher Branch at their confluence, a distance of about five miles. The timber could be easily floated to the place of requirement.

The average fall of the stream in feet per mile, above and below site E, has been already given.

The principal objection to the utilization of the above described basin for storage purposes, is that it is situated directly upon the main stream, and would require a dam

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of great strength, and corresponding cost, to withstand the pressure brought to bear by the volume and force of the stream during the spring freshet. This, however, is a matter for special and more detailed investigation.

Reservoir site F is situated on the Fisher Branch of the Elbow River in Sections 17, 20 and 21, Township 21, Range 7, west of the 5th Meridian.

A location for a dam is found in the south-west $\frac{1}{4}$ of Section 21, where the stream flows between limestone rock walls. Here, either a dam 60 feet high, and about 100 feet wide, could be built; or a dam 100 feet high and about 200 feet wide for the portion above the 60-foot ledge. In the first case the estimated capacity of the site would be approximately 1,320 acre feet, and in the other 3,550 acre feet.

The sides of the basin are the steep rocky slopes, and in some places precipitous rock faces of the surrounding mountains.

As a basis on which to estimate the source of supply, may be taken the gauging of July 23rd in the north-west $\frac{1}{4}$ of Section 18, about half a mile above the point to which the water would be backed up by a 100-foot dam, showing a discharge of 163.44 second feet. This supply would most likely be more than doubled during the spring freshet.

Plenty of building material for dam construction, both timber and rock, can be had in the vicinity.

The same objection mentioned in connection with site E may be cited in this case, although in a lesser degree, viz., that the storage basin is situated directly on the bed of a swift, and in the early part of the year, powerful stream.

The approximate elevation at point suitable for dam is 5,528 feet, and at confluence of the main river 5,224 feet, showing in a distance of about 4.4 miles an average fall of 69 feet per mile.

General Remarks.

The three sites above described, show a possible water storage for the Elbow River system of about 32,500 acre feet.

In connection therewith it would be advisable to segregate the lands enumerated in the following schedule, pending surveys of a greater accuracy.

LANDS to be segregated.

Site.	Part of Section.	Section.	Township.	Range.	Meridian.
D	S.W. $\frac{1}{4}$	28	22	6	W. of 5th.
D	E. $\frac{1}{4}$	29	22	6	W. of 5th.
D	N.W. $\frac{1}{4}$	29	22	6	W. of 5th.
D	N.E. $\frac{1}{4}$	30	22	6	W. of 5th.
D	S.E. $\frac{1}{4}$	31	22	6	W. of 5th.
E	W. $\frac{1}{2}$	4	22	6	W. of 5th.
E	S.E. $\frac{1}{4}$	5	22	6	W. of 5th.
E	W. $\frac{1}{2}$	33	21	6	W. of 5th.
E	Whole	32	21	6	W. of 5th.
E	N. $\frac{1}{2}$	29	21	6	W. of 5th.
F	S.W. $\frac{1}{4}$	21	21	7	W. of 5th.
F	S.E. $\frac{1}{4}$	20	21	7	W. of 5th.
F	N. $\frac{1}{2}$	17	21	7	W. of 5th.

The two basins shown in Sections 15 and 16 on the sketch of reservoir site D, are not suitable for storing water. They are of small extent, and would require costly dams, subject to the full force of the river.

FISH CREEK SYSTEM.

North Branch

The north branch of Fish Creek originates from spring sources in the hills in the centre of Township 22, Range 4, west of 5th Meridian.

During the earlier portion of the year when the supply is augmented by run-off, the creek spreads through a meadow in Sections 27, 26 and 35 of the above township, and flowing north-westerly, joins the more distinctly defined bed in the south-west corner of the Sarcee Indian Reserve. Early in the summer, however, this flow disappears, and the apparent head of the stream is found in two springs situated in the north-east $\frac{1}{4}$ of Section 36 of the same township. From here the flow is constant, and the course north-westerly to the junction of the high-water channel first mentioned, about $1\frac{1}{2}$ miles from the two springs.

The first measurement of the stream was made in the south-west corner of the Sarcee Reserve, a little more than a mile from the springs indicated. The creek is at this point of very small proportions, as will be seen from the results of gauging shown below.

MEASUREMENT of actual flow of water in North Branch of Fish Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
17	1895. Aug. 7...	In S.W. corner Sarcee Indian Reserve (S.W. $\frac{1}{4}$ Sec. 6, Tp. 22, R. 4, W. 5th Mer.) near E. boundary of $\frac{1}{4}$ section.	186 sec. feet.

REMARKS.—A small stream winding through a grassy valley. Bed of stream; clay, weeds, small stones and gravel. Banks; loam, grown with grass and overhanging willow scrub. Flow, even. Cross-section was cut out to uniform shape for purposes of measurement.

From the point of junction of the high-water channel referred to, the course of the creek is westerly and south-westerly through the Sarcee Reserve. It winds along a muskeg bottom full of springs, which rapidly add to the volume of the creek.

In the north-west $\frac{1}{4}$ of Section 35, Township 22, it leaves the reserve, and shortly after, the muskeg along the creek practically disappears.

The second gauging was made in the north-west $\frac{1}{4}$ of Section 25, of the above township, and showed considerably increased results.

MEASUREMENT of actual flow of water in North Branch of Fish Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
18	1895. Aug. 9...	In N.W. $\frac{1}{4}$ Sec. 25, Tp. 22, R. 4, W. 5th Mer., near south boundary of quarter section.	284 sec. feet.

REMARKS.—Stage of water, probably high for time of year. Cross-section made after a day and night of steady rain. Bed; stony, in places grown with weeds and silted. Banks; grown with grass, and frequently overhung by willows. At point of cross-section; flow, fairly even. Bottom, uniform. Banks, irregular.

Department of the Interior.

The traverse of the stream was carried from that of the Elbow River in the south-west $\frac{1}{4}$ of Section 2, Township 23, Range 5, and tied into bench mark number 18, at the north-east corner of Section 24, Township 22, Range 4, which had been established the previous season by spirit levelling.

Bench mark 18 is situated at the head of a good reservoir site, located during the season of 1894 by Division A. For details, see report of that Division.

The valley of the North Branch provides excellent pasture lands, and yields a large quantity of hay, particularly from the meadow at the head of the creek. A portion of it, south of the Indian Reserve, is under lease to R. G. Robinson, who has a winter cow-camp established in the south-east $\frac{1}{4}$ Section 35, Township 22, Range 4. The bounding slopes consist of the outlying elevations of the foot-hills. They attain no great altitude, are partially timbered, and present a number of nice benches above the muskeg bottom along the creek. Most of the timber, however, has been overrun by fire, and little of value for economic purposes, other than for fire wood and fencing, remains.

A good hay trail extends from the Robinson camp up the valley to the big meadow, and down the valley to connect with the main Calgary trail across the reserve. The old pack trail from Morley crosses the valley at the south-west corner of the reserve, and passes southerly through section 31, Township 22, Range 4.

Across the Sarcee Reserve, a wide valley trends north-westerly to the Elbow River. It has been previously referred to as continuing on the north side of that stream to the Jumpingpound Creek.

Diversion of Water from the Elbow River to North Branch of Fish Creek.

As already stated, the feasibility of diverting water from the Elbow River to the north branch of Fish Creek across the low bench land in Sections 34 and 35, Township 22, Range 4, lying between the two streams, was established by Division A during the season of 1894. It now only remains to add a few details drawn from the general investigations of Division B during the past season.

The height of land between the two streams on the proposed route is not greater than 50 feet above the Elbow River. The river has here a fall of about 40 feet per mile. Thus, by placing the intake from the Elbow at the north-west corner of the south-east $\frac{1}{4}$ of Section 33, Township 22, Range 4, where the main flow is close to the south bank, it is believed that little difficulty will be experienced in engineering a canal as shown on the accompanying sketch.

On the same sketch, a second route is shown with the intake in the S. E. $\frac{1}{4}$ of Section 32 of the same township. No detailed examination was made of the latter route, and it has only been assumed possible from a view of the locality obtained from "Big Meadow" camera station. It will, undoubtedly, be worth an investigation, for could the Elbow River water be thus diverted, not only would the route be more direct and shorter, but the meadow could be converted into a reservoir by constructing a dam in the north-east quarter of Section 35, as shown on sketch, to hold a portion of the flood water of the river. Such a dam would have a length of 600 to 700 feet, with a height of 25 to 30 feet. The approximate elevation at the Elbow River opposite the northerly extremity of the low bench land between that stream and Fish Creek is 4,270 feet, the lowest elevation of the height of land is 4,310 feet, and the elevation at the high-water channel leading from the meadow opposite the same extremity of the bench land is 4,235 feet. From this point to a point opposite bench mark No. 18, at the north-east corner of Section 24, Township 22, Range 4, the distance traversed by the stream is about 10 miles, and the total fall as ascertained by barometer readings 270 feet, being equal to an average fall per mile of 27 feet.

General Remarks.

Until an accurate and detailed survey has been made to ascertain the desirability of the big meadow, referred to above, as a reservoir site in connection with water diverted

from the Elbow River to north branch of Fish Creek, it is advisable that the following lands be temporarily withdrawn from other disposal :

Section 27, Township 22, Range 4, W. of 5th Meridian.

N. $\frac{1}{2}$ Section 26, Township 22, Range 4, W. of 5th Meridian.

Section 35, Township 22, Range 4, W. of 5th Meridian.

South Branch.

The north and south branches of Fish Creek are separated by a spur of the lower foothills extending in an easterly direction. It is cut by a number of grassy valleys with muskeg bottoms, reaching north-westerly from the south to the north branch.

The traverse of the south branch was commenced at its intersection by the meridian outline between Ranges 3 and 4, west of the 5th Meridian, and carried up the stream to a point in Section 4, Township 22, Range 5, where it is a mere thread winding through a muskeg valley. Two good opportunities for storing water were located ; one immediately above the place of commencing traverse, the other in Sections 10, 11 and 14, Township 22, Range 5 ; they are referred to below in detail as reservoir sites G and H.

The first measurement of the stream for discharge was made in the south-west quarter of Section 14, Township 22, close to the head of reservoir site G. For results see schedule.

MEASUREMENT of actual flow of water in South Branch of Fish Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
19	1895. Aug. 14.	In S.W. $\frac{1}{4}$ Sec. 14, Tp. 22, R. 4, W. 5th Mer., near centre of $\frac{1}{4}$ section.	11.22 second feet.

REMARKS.—Stage of water, low ; is probably higher than usual for time of year. Grade, low. Stream presents small rapids at intervals. In many places grown with weeds and silted. At point of cross-section ; flow, even and slow. Banks were cut regular. Bed, stones and gravel with scattering weeds. Bottom, uniform.

The second measurement was made in the south-east $\frac{1}{4}$ of Section 14, immediately below the mouth of reservoir site H, with results as follows :—

MEASUREMENT of actual flow of water in South Branch of Fish Creek.

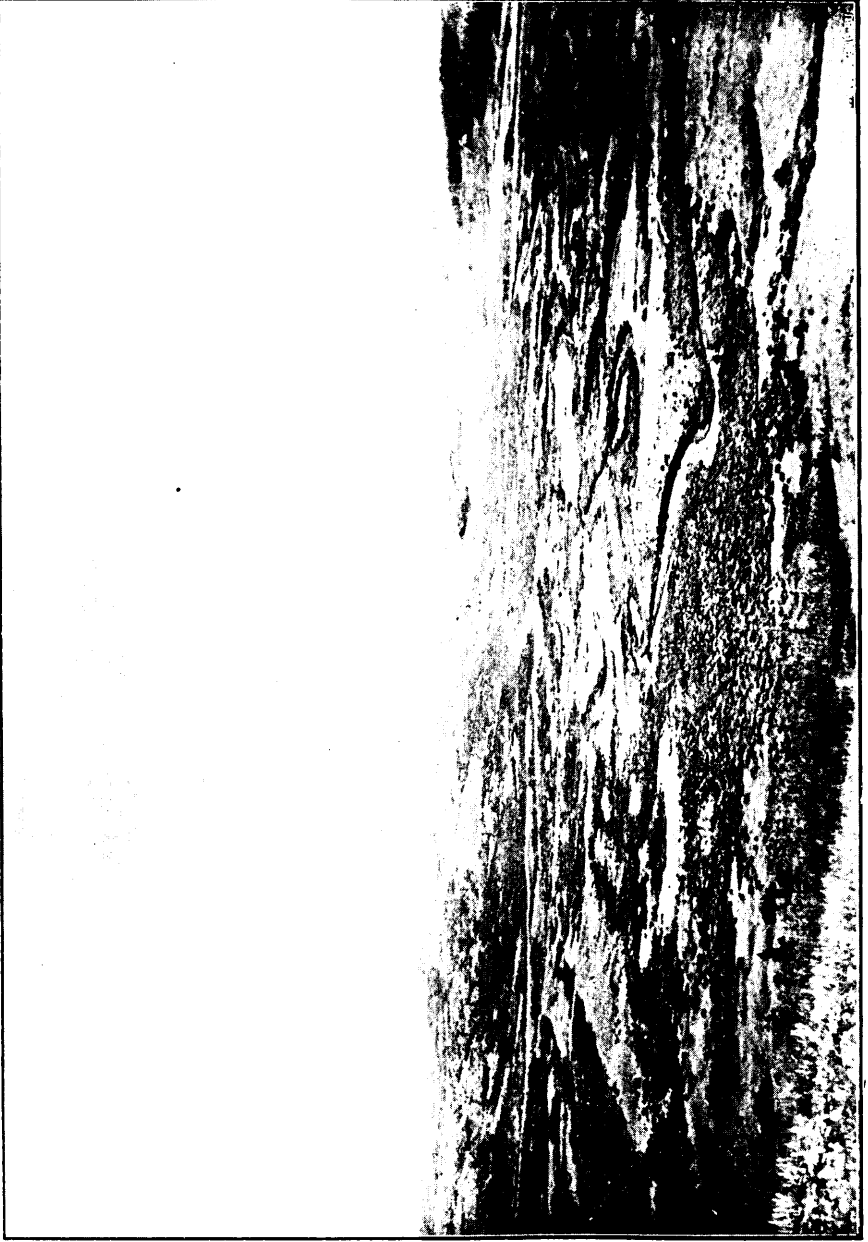
Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
20	1895. Aug. 20.	In S.E. $\frac{1}{4}$ Sec. 14, Tp. 22, R. 4, W. 5th Mer., near E. boundary of $\frac{1}{4}$ section.	3.91 second feet.

REMARKS.—Stage of water, low. Point of cross-section not a good one. Bottom ; uneven, stones and rock. Flow, fairly even. Banks, irregular. Bed of stream ; obstructed by fallen logs, large stones and rock. Banks, light clay and rock.

In Township 22, Range 4, the stream winds through a grassy valley and is fed by springs from many small muskegs. The easterly portion of the valley has a width of from 30 to 40 chains ; the westerly portion narrows to 10 chains. Throughout this





LOCATION FOR DAM, RESERVOIR SITE "H" ON SOUTH BRANCH OF FISH CREEK.

Department of the Interior.

township the bench lands and side slopes of the valley present excellent pasture lands, and much good hay land is found along the creek bottom and in the branch valleys leading northerly and southerly therefrom.

The valley is inclosed by lower elevations of the foot-hills. They are open or partially covered by timber which lies more thickly on the south side, or on the north slopes of the hills and ridges. Most of the larger timber has been killed by fire, and is now only seen in belts and patches. In its place a thick growth of scrub pine and poplar brush has sprung up, through which the ground is heavily encumbered by windfall.

The valley of the creek and adjacent valleys, as well as the open hill sides, are in places thickly dotted with willow brush and scrub.

In Township 22, Range 5, the valley is narrower and much obstructed by timber, brush and windfall for about 4 miles of its course, beyond which point it is an open muskeg bottom, joined by several tributary valleys of a similar character, and so appears to continue to the origin of the stream.

In this township it is inclosed by the slopes of higher and more broken hills. On the south side of the valley they are thickly timbered by scrub pine, and on the north side covered with brulé. Near the head of the creek the slopes on both sides are thickly timbered. Patches of fair sized timber are found, but in no great quantity. They would furnish a limited supply of building material.

In the south-west $\frac{1}{4}$ of Section 9, a muskeg valley branches from the main valley, and trending north-westerly, opens to the Elbow River about 4 miles distant, affording a pass to and from that stream.

Storage Facilities.

Reservoir Site G is situated in Sections 11, 12, 13 and 14, Township 22, Range 4, west of 5th Meridian. It consists of a wide grassy bottom, dotted with low scrub, through which the stream winds.

The most suitable location for a dam is in the north-east $\frac{1}{4}$ of Section 12, near the east boundary, and close to the house of a settler named Evans, as shown upon the accompanying sketch. At the point indicated, a dam could be built to a height of 35 feet, having a bottom length of about 130 feet, and a top length of about 350 feet. The contact would be a sandstone rock outcrop on the right side, and a bank of clay and gravel on the left.

By this means the water would be backed up the valley for a distance of about two miles, and a reservoir created with an estimated capacity of 6,100 acre feet.

The grade of the stream is here low for the foot-hill country; about 12 feet per mile.

The discharge measurement of 11.22 second feet, obtained in the south-west $\frac{1}{4}$ of Section 14, on the 14th August, is the only data at hand at the present time wherewith to gauge the supply available to fill the reservoir.

Although the discharge is much larger in the early part of the year, yet, owing to the small area of the drainage basin, it is never of very great volume.

A diversion of water from the Elbow River to the north branch of Fish Creek would relieve the demands made upon the south branch by irrigable areas situated below the junction of the north and south branches, and as the area directly dependent upon the south branch for water supply is a small one, an opportunity would be furnished to fill the reservoir, and provide for a season of extended drought.

Abundant material can be obtained in the vicinity, and a dam built sufficient for all requirements at no very considerable cost.

The accompanying illustration will furnish some idea of the basin. The position suitable for the dam is immediately below the patch of timber on the left hand side of the rounded hill near centre of the picture.

Reservoir Site H is situated in Sections 10, 11 and 14, Township 22, Range 5, west of 5th Meridian.

The accompanying illustration shows a suitable location for a dam in the south-east $\frac{1}{4}$ of Section 14. A dam built here to a height of 80 feet would have a bottom length of about 50 feet, and a top length of about 300 feet, and would hold water back for a distance of one and three-quarter miles up the valley.

The basin is partially timbered and thickly spotted with brush, and the south slopes of the valley clad with spruce and scrub pine. There would be very little loss from seepage, as the entire bottom is of a muskeg character. The estimated capacity is 7,680 acre feet.

To the right of the point suitable for a dam, it would be necessary to build a retaining wall, not exceeding 10 feet in height or 200 feet in length, owing to a depression in that locality, as shown approximately on the accompanying sketch. This depression might be used advantageously as an overflow channel.

Building material is very easily obtained: rock from the hill to left of and immediately below dam, and timber a short distance above.

In the matter of supply available to fill the basin, but little can be said with any degree of certainty. A measurement for discharge made immediately below the location for dam showed 3.91 second feet on the 20th August. This discharge would be largely increased during the early portion of the year, but to what extent is not known. It is unlikely, however, that there would be a sufficient supply to maintain both the sites G and H. A more detailed survey will be required to ascertain which is the most desirable of the two; for while the construction of the dam for site G would probably be less costly, it is likely, that presenting a much larger surface area, the loss by evaporation and seepage would be more extensive, and would more than balance the larger supply available to fill the basin.

The approximate elevation at mouth of site H is 4,609 feet, and at head of site G is 4,115 feet, a fall of 494 feet in a distance of about 8 miles, or 61 feet per mile.

General Remarks.

In connection with the two sites above described, it would be advisable to temporarily set aside the following lands:—

LANDS to be segregated.

Site.	Part of Section.	Section.	Township.	Range.	Meridian.
G	N. ¼	12	22	4	W of 5th
G	S. W ¼	13	22	4	do 5th
G	N. E ¼	11	22	4	do 5th
G	S. ¼	14	22	4	do 5th
G	N. W ¼	14	22	4	do 5th
H	S. E ¼	14	22	5	do 5th
H	N. ¼	11	22	5	do 5th
H	E. ¼	10	22	5	do 5th
H	S. W ¼	10	22	5	do 5th

SHEEP RIVER SYSTEM.

North Branch of Sheep River.

The traverse of the north branch of Sheep River was commenced at the north-east corner of Section 28, Township 20, Range 4, west of 5th Meridian, and carried up the stream to the head of its most northerly feeder in Section 30, Township 20, Range 6.

From this point a connection was made with the Elbow River traverse for the purpose of checking the micrometer measurements and elevations carried from barometer readings.

The distance between the two streams is here less than one and one-half miles.

Connection was made with the Elbow traverse close to its termination.

The feeder above referred to originates in the outflow from a spring in the north-west quarter of Section 30, Township 20, Range 6. Its volume is augmented early in



"THREE POINT" SIGNAL STATION

Department of the Interior.

the year by run-off from the slopes of "Three Point" signal mountain, in the eastern flank of the Rocky Mountains. (See Plate VII.)

In the north-east quarter of Section 30 of the same township, a valley leading north-westerly furnishes a pass from the Elbow River. An Indian pack-trail, crossing through it, traverses easterly along the north side of Sheep River.

A branch of slightly greater magnitude joins the stream in the north-west quarter of Section 29. Above the junction is a small basin with a muskeg bottom, suitable for a reservoir site if a sufficient supply of water were available to maintain it. This can only be ascertained by measurement of the stream during high-water and flood stages. There certainly was not sufficient at the time traverse was made.

Through Township 20, Range 6, the stream is in a narrow valley, confined by the slopes of rugged rocky hills, rising to an elevation of 6,000 to 7,000 feet. They are partially timbered by scrub pine, and traces of their having been swept by fire remain in the fallen and standing *brulé* visible in all directions.

In Section 33, the bed of the stream lies in a cañon with sides composed of broken limestone rock slides and perpendicular ledges of the same rock. It is impassable for horses. At a point here in the north-east quarter of Section 33, it would be possible to construct a dam to a height of 150 feet to 200 feet by simply filling up the cañon, which is very narrow, with broken rock from either side. The basin above, however, though deep, is of small extent, and it is questionable if the amount that could be so stored would defray the cost of building and maintenance of a dam. More detailed investigation will be necessary in this case.

Below the cañon, just referred to, the stream flows in a trough cut through beds of carbonaceous shale. In the south-east quarter of Section 2, Township 21, Range 6, it falls 150 feet at one drop, and a little farther on in the south-west quarter of section 1, makes a second drop of 150 feet. Immediately below the latter fall it joins a stream from the south, discharging at time of measurement about twice the volume, and flowing through a cañon of a similar character. There is also a high drop on this stream situated in the south-west corner of the south-west quarter of Section 1, and from this point to the junction of the streams a series of smaller falls, descending altogether from 300 feet to 400 feet in a distance of about 20 chains.

The results of measurements made on the same date within a short distance of each other are shown below :—

MEASUREMENT of actual flow of water in "Three Point" branch of North Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
23	1895. Sept. 11.	In S.E. $\frac{1}{4}$ Sec. 2, Tp. 21, R. 6, W. 5th Mer., near centre of $\frac{1}{4}$ Sec.	1.12 second feet.

REMARKS.—A mountain stream of high grade. Bed, where cross-sectioned, gravel and small stones. Bottom, regular. Flow, fairly even. Water line of average uniformity. Generally, the stream winds its way along a gravel bed over stones, rocks and rock falls. Is very irregular in its course and flows between steep banks of carbonaceous shale clothed with vegetation; in many places cut-banks appear. Is overhung by willows, and the course intercepted by logs, fallen trees, &c. At flood, indications show that the stream carries a considerable amount of water.

MEASUREMENT of actual flow of water in "Allsmoke" branch of North Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
24	1895. Sept. 11	In S. W. $\frac{1}{4}$ Sec. 1, Tp. 21, R. 6, W. 5th Mer., near 270 second feet. W. boundary of $\frac{1}{4}$ section.	

REMARKS.—A mountain stream of high grade. Bed, shale and small stones. Water line, fairly regular. Bottom, uniform. Flow, even. The stream, where gauged, flows over a shale bed in cañon. The sides rise 200 to 250 feet above the bed of the stream at point of cross-section. On right side, 3 feet from water line, meets rugged perpendicular shale rock. On left side, 7 feet from water line, meets a similar rock. At high water and flood, stream must carry a torrent of water down the steep grade between the high falls and the junction with the northerly, or "Three Point," branch.

Below the junction the stream flows in a cañon, the sides of which rise from 400 to 500 feet above its bed, and are composed of ferruginous shale with intervening layers of sandstone, 10 feet or less in thickness, dipping at a small angle from the horizontal. The bed of the cañon is rough and broken, and impassable for horses.

In the north-west corner of Section 1, Township 21, above the bed of the cañon at an elevation of about 400 feet, is situated the southerly extremity of the valley, previously referred to in this report as leading from the lower end of reservoir site E, on the Elbow River, south-easterly to the north branch of Sheep River. It has many muskeg bottoms, and the slopes on either sides are thickly timbered. An Indian pack-trail traverses the valley and joins the trail along the north side of the latter stream.

On the opposite side of the cañon rise the steep, rugged and partially timbered slopes of "Allsmoke" signal hill.

The cañon continues to about the centre of Section 8, in Township 21, where the valley commences to open out a little and the slopes become easier. A few benches of grass land are found on either side. The bed of the stream here lies between the slopes of "Barwell" signal hill on the north, and "Allsmoke" signal hill on the south. The course is easterly. The timber found on the hill side in patches is short and scrubby pine and small poplar, the predominating characteristic being brulé and scrub.

Continuing east, the hills are found lying in long lateral ridges of no great elevation, extending north-west and south-east, broken by dips and watercourses, draining in an easterly direction. They are timbered in patches with brulé and scrub in the more open portions, and scrub and bunches of small spruce and poplar in the valleys.

The stream was measured for discharge in the north-east quarter of Section 1, Township 21, Range 5, with the following results.

MEASUREMENT of actual flow of water in North Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
22	1895. Aug. 27	In N. E. $\frac{1}{4}$ Sec. 1, Tp. 21, R. 5, W. 5th Mer., near centre of $\frac{1}{4}$ section.	12.48 second feet.

REMARKS.—Stage of water probably high for the time of year. Bed, gravel and stones. Bottom, uniform. Water line, regular. Flow, fairly even. A foothill stream of high grade. A series of small rapids obstructed by logs, rock, etc. Overhung by willows, brush and scrub. On left side, gravel and stony bed extends back about 1 chain. On right side, bed extends about 50 links from present water line; grown with alder and vegetation.

Department of the Interior.

In south-west $\frac{1}{4}$ of Section 5, Township 21, Range 4, is situated the headgate of John Quirk's upper ditch. This is very nearly at the head of irrigation. Easterly, the valley widens out, presenting the finest of grass land and meadows produced by the intelligent application of water.

The last measurement of the stream was made in the south-west quarter of Section 33, Township 20, Range 4, with results as below:—

MEASUREMENT of actual flow of water in North Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross section.	Measured discharge.
	1895.		
25	Sept. 16	In S. W. $\frac{1}{4}$ Sec. 33, Tp. 20, R. 4, W. 5th Mer., near E. bdy. of $\frac{1}{4}$ section	8 52 second feet.

REMARKS.—Stage of water, probably high for time of year. Bed, stony. Water line, uniform on left side, not so on right. Flow, not very even. Bottom, fairly regular. At flood and high-water stages, stream extends over a wide gravel bed reaching back 50 links to 1 chain on either side; has a high grade and is a series of small rapids. Cottonwood and willows with scattered detritus along bed show that a large quantity of water comes down at spring time. Water, clear; does not appear to carry any silt at this time of year. • A fine white incrustation left on meter would point to lime or some alkali being carried in suspension.

In the north-east $\frac{1}{4}$ of Section 22 of the last mentioned township, the stream is joined by its main tributary, Ware Creek.

From the junction, eastward, extend the lower elevations of the foot-hills, gradually decreasing to long rolls as the prairie is approached.

Timber (small spruce, poplar and cottonwood) is chiefly found in the valleys, and brush, scrub and standing and fallen brulé in scattered patches on the slopes.

Numerous irrigation ditches are in operation in the meadow bottoms along the stream, and abundant crops of hay are seen on all sides.

The approximate elevation of the point on the Elbow River to which the traverse of the north branch of Sheep River has been tied on is 5,561 feet, and the elevation of the terminal point of said traverse, 6,543 feet. The shortest distance between the two points is slightly over half a mile (47.13 chains).

The elevation at the spring head of this branch of Sheep River, previously referred to, is 6,251 feet, and at the head of the first fall in Section 2, Township 21, is about 5300 feet, a distance of 5.25 miles, giving an average fall of 181 feet per mile.

The elevation at the foot of the second fall in Section 1 of the same township is 4,962 feet, or 338 feet drop in a quarter of a mile.

From the foot of the second fall to Quirk's headgate, the distance is 11 miles, and the average fall 58 feet per mile.

The approximate elevation at Quirk's headgate is 4,326 feet, and at a point about 20 chains above the junction of Ware Creek, 4,142 feet; equal to a fall of 38 feet per mile.

From the foregoing it will be seen that the grade throughout is very high.

Water Storage.

It is much to be regretted that the opportunities afforded by this stream for water storage are few and of doubtful utility. The two noticed have already been alluded to above.

The basin in Section 30, Township 20, Range 6, though small, could be readily utilized, if a sufficient supply of water were available to fill and maintain it. This can only be ascertained by observation in the locality during the spring run-off.

That in Section 33 of the same township would require careful consideration before an accurate report can be submitted. It is, moreover, subject to the same possible lack of supply to fill and maintain it as the upper one, though in a lesser degree, owing to the fact that it would be fed from a larger drainage area.

No great difficulty would be encountered in the construction of a dam. At the most suitable point for building it, the cañon is narrow, with walls of hard rock; above which, on both sides, are rock slides consisting of broken fragments of limestone. This material could be easily utilized to fill cribwork, and would naturally fall into place where wanted.

On the south side, the rock slide rises to a height of about 400 feet above the bed of the creek, and above this again, is perpendicular rock for another 150 feet. On the north side, the slope is not so steep, but of a somewhat similar character. The basin above is of small extent, though deep, and even if a sufficient supply of water were available, it is questionable if the amount that could be stored would be sufficient to justify the cost of construction.

Two deeply cut watercourses join the body of the reservoir, one from either side, that appear to discharge a large amount of water during the spring flow, although at the time of survey they were quite dry.

As already stated, a careful survey and measurement of flood discharge is necessary before the capabilities of the site can be definitely pronounced upon.

This deficiency of reservoir sites is a great drawback, owing to the large demands now made, and likely to be made in the immediate future, upon the resources of the north branch of Sheep River. It is, however, a matter for satisfaction that a large percentage of the present supply returns to the stream by the process of percolation, having done its duty at higher levels, and thus enables the same water to be utilized by several parties in rotation.

Ware Creek.

This is the principal tributary stream of the north branch of Sheep River, which it joins in the north-east $\frac{1}{4}$ of Section 22, Township 20, Range 4.

Through the township mentioned, and the easterly half of Township 20, in Range 5, the general course is a little south of east.

The valley here presents a number of small flats where good hay crops can be raised by the aid of irrigation. One ditch is already in operation in Section 21, Township 20, Range 4.

Measurements were made of the creek and of a branch stream joining it in Section 20, with the following results.

MEASUREMENT of actual flow of water in Ware Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
26	Sept. 22	In N.E. $\frac{1}{4}$ Sec. 20, Tp. 20, R. 4, W. 5th Mer., near W. boundary of $\frac{1}{4}$ section.	5.80 second feet.

REMARKS.—A foot-hill stream of high grade. Is a series of small rapids. Course obstructed by stones, boulders, logs, &c. Stage of water, probably high for the time of year. Gauged three days after September snow storm, when melting snow caused an additional supply. Bed of creek, stones and scattering weeds with slight deposit of silt on left side. Flow, fairly even. Water line, irregular. Bottom, not uniform. On right side, cut-bank about ten feet high of loam, clay, gravel and stones. On left side, gravel bed extending back about 1 chain, grown with willows and fringed with small spruce and cottonwood. From a mound of stranded detritus along high-water bed, it is assumed that a large quantity of water comes down in the spring, and that the creek is subject to freshets.

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MEASUREMENT of actual flow of water in stream joining Ware Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
27	Sept. 22	In N.W. $\frac{1}{4}$ Sec. 20, Tp. 20, R. 4, W. 5th Mer., in S.E. corner of $\frac{1}{4}$ section.	0.84 second feet.

REMARKS.—A small foothill stream cross-sectioned between two rapids. Is a series of small rapids obstructed by stones, boulders, logs, willow brush, &c. Bed, small stones and gravel. Water line, uniform. Bottom, regular. Flow, even. On left side, cut-bank of clay, gravel and stones, about 10-15 feet high. On right side, stony high-water bed of creek extends about 30-40 links, grown with willow brush and scrub. Creek will convey a much larger quantity of water at spring flow.

The last mentioned stream heads in Section 1, Township 20, Range 5, within a short distance (three-quarters of a mile) of the south branch of Sheep River.

Proceeding up the main creek an expansion of the valley is arrived at, locally known as "Gleeson's Meadow," and covering parts of Sections 26, 27, 34 and 35. It consists of open grass land, with a sprinkling of small spruce, poplar and scrub, and is susceptible of irrigation.

The Indian pack-trail up the valley of Ware Creek, branches off up the valley of a small stream joining it in the north-east $\frac{1}{4}$ of Section 27, and passing south-westerly over the height of land, joins that along the south branch of Sheep River in Section 32, Township 19, Range 5.

As far as Gleeson's meadow the character of the surrounding country is similar to that described for the easterly portion of the north branch of Sheep River, viz., long lateral ridges with patches of timber, scrub pine and poplar, lying on the north and west slopes, and brulé and scrub in the more open ground.

Beyond the meadow, the creek flows from the south-west and the course lies between the slopes of broken and rugged hills, thickly clad with scrub pine and brulé, extending to the foot of the mountain range. To the north-east, about two and one half miles distant, lies "Allsmoke" signal station. The valley here is narrow and the confining slopes steep and broken.

The traverse was terminated in the north-west $\frac{1}{4}$ of Section 17, Township 20, Range 5. The creek at this point is formed by the junction of a number of branches flowing from narrow thickly timbered valleys. They are all of small volume and of the same character.

The approximate elevation at terminal point of traverse is 5,050 feet, and at a point 20 chains above the junction of the creek with the north branch of Sheep River, 4,142 feet. The distance between the points named is about 11.5 miles, giving an average fall of 79 feet per mile for that distance.

No good opportunities for storing water were met with in the valley of Ware Creek.

South Branch of Sheep River.

The traverse of the south branch of Sheep River was commenced where the bed is intersected by the meridian outline between Ranges 3 and 4, west of the 5th Meridian, at a point on the east boundary of Section 24, Township 19, Range 4, and carried up stream to the south-east $\frac{1}{4}$ of Section 15, Township 19, Range 6. It here emerges from a gap in the mountains and enters the timbered foot-hills. Behind, in wild confusion, rise the snow clad summits of the Misty and Highwood ranges of the Rocky Mountains. Close to the mouth of the gap, on the south side, a bold isolated rock cliff stands out as a sentinel, distinctly marking the identity of the stream. The valley is narrow, the steep bare slopes containing it descending directly to the bed of the river;

here a mountain stream swiftly flowing over a gravel bottom. It is fringed with scrub pine extending a short distance up the mountain sides.

Along the base of the mountains a stream from the south joins the river in the south-west $\frac{1}{4}$ of Section 14, while one of smaller size joins it from the north-west in the same quarter section, about half a mile farther on. These two, together with the main stream, were gauged on the same date, with the result shown in schedule form below:—

MEASUREMENT of actual flow of water in South Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
37	Oct. 6	In S. E. $\frac{1}{4}$ Sec. 15, Tp. 19, R. 6, W. 5th M., near south boundary of $\frac{1}{4}$ section.....	93.33 second feet.

REMARKS.—Stage of water, high for time of year; volume augmented by recent snow and rain storms in the mountains. At point of cross-section, stream flows down a very steep grade. Bed, stones and gravel. Bottom, fairly regular. Banks; uniform, rising 6 to 9 inches above present water line. Flow; not very even, jerky in places. During high water and flood stages the stream will probably rise 2 to 2 $\frac{1}{2}$ feet, extending back on left side 6 to 10 feet from present water line to fringe of spruce and willows. On right side is a sloping cut-bank of friable rock, with intervening layers of sandstone, rising almost directly from the water's edge to a height of 50 feet. Cross-section made at a point of comparatively even flow between two rapids. Water: clear and cold, and of limpid appearance peculiar to mountain streams receiving their supply directly from melting snow.

MEASUREMENT of actual flow of water in stream joining South Branch of Sheep River from the south.

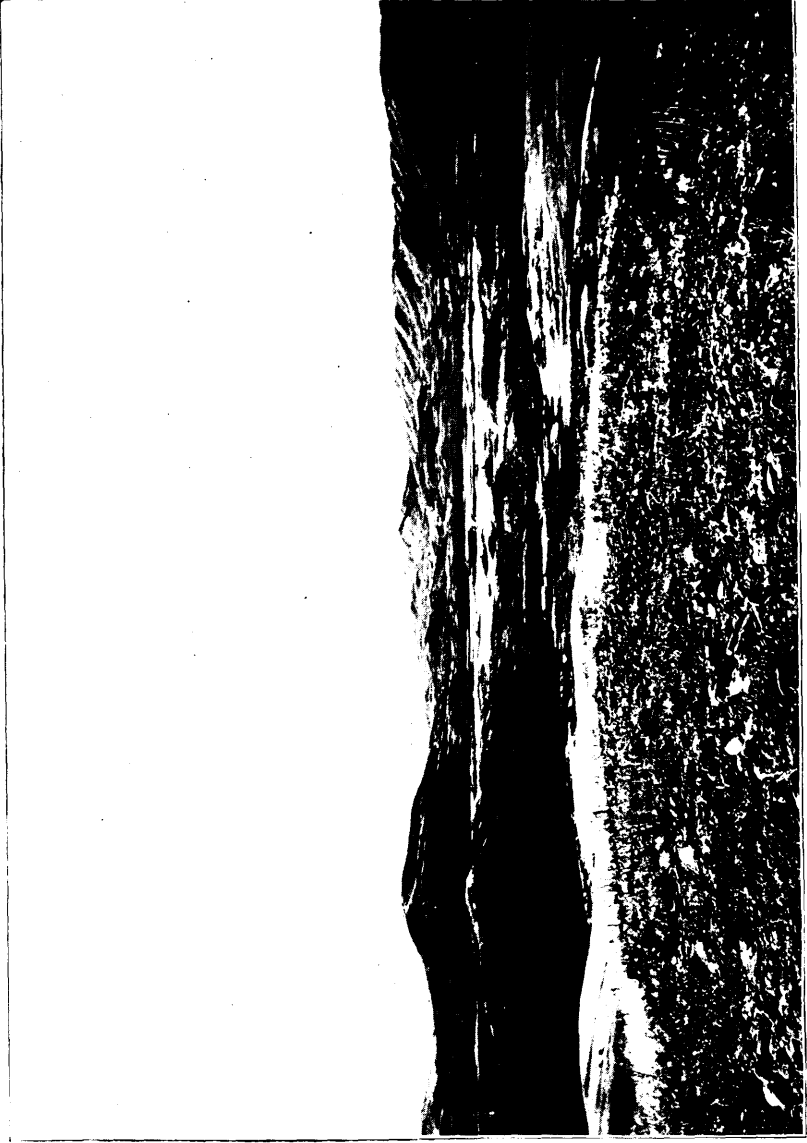
Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
36	Oct. 6	In S. W. $\frac{1}{4}$ Sec. 14, Tp. 19, R. 5, W. 5th Mer., at SW. cor. of $\frac{1}{4}$ Sec. 23.61 second feet.	

REMARKS.—Stage of water probably high for time of year; rises two to three feet above present water line. Cross-sectioned in a quiet place between two rapids. Bed, small stones and gravel. Bottom, fairly uniform. Water line, irregular. Flow; not very even, jerky in places. On right side is overhanging rock, perpendicular for about two feet above water line; on left side, gravel bed extends back about 20 links to a rocky point.

This stream is similar to the river but with smaller discharge and consequently less power. The bed is a series of rapids, broken by leaps and falls. Below cross-section, the cut is narrow, and the stream flows between rock banks. Above, the bed opens out to a gravel flat as it emerges from the mountains.



"OKOTORS" SIGNAL STATION.

Department of the Interior.

MEASUREMENT of actual flow of water in stream joining South Branch of Sheep River from the north-west.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
35	1895. Oct. 6	In S.W. $\frac{1}{4}$ Sec. 14, T _p . 19, R. 6, W. 5th Mer., near N. boundary of $\frac{1}{4}$ Sec.	4' 51" second feet.

REMARKS.—Stage of water is probably high for time of year; will rise about two feet above present water level. Cross-section at mouth of rocky gorge between two rock walls. Bed, small stones and gravel. Bottom, fairly uniform. Water line, regular. Flow, fairly even. A mountain stream of small size and very steep grade. On right side the rock overhangs the stream, then rises back in ledges; on left side it is perpendicular for ten feet, then slopes back. Stream, a series of rapids and falls.

Township 19, Range 6, west of 5th Meridian. Through the east half of this township, the course of the stream is north-easterly. In Section 14 it flows in a narrow rock cut, but in Section 13, the bed opens to a gravel flat about ten chains wide. In Section 24, it again lies between rock walls.

On the north, the slopes rise slowly to the mountains, and are more or less thickly timbered with scrub pine. On the south, rise the steep thickly timbered slopes of "Junction" and "Hoffmann" signal hills.

In the east $\frac{1}{2}$ of Section 24, several dams have been erected in the bed of the river by John Lineham, for lumbering purposes.

An Indian pack-trail follows the north bank of the stream, and passing up the gap joins a trail leading down Mist Creek and north branch of Highwood River.

Township 19, Range 5. The course of the stream through the above township is north-west and west. It flows in a narrow trough cut in the beds of carbonaceous and calcareous shale found in this locality. Above the trough, the valley widens out considerably, from 1 to 1 $\frac{1}{2}$ miles, consisting of benches thickly timbered with spruce and fir of merchantable value.

In the south-west $\frac{1}{4}$ of Section 30, is situated John Lineham's upper lumber camp, from which point easterly a fairly good wagon trail extends for the most part along the north side of the valley of the stream. Immediately above the bed of the river, open bench land is found in many places, which yields a quantity of good hay. Similar small patches of hay land are found scattered through the timber, and in the adjacent tributary valleys.

A stream flowing from the north-west joins the river in the north-east $\frac{1}{4}$ of Section 29, at a point locally known as the "Forks." It flows in a deeply cut bed between thickly timbered slopes, rising slowly to the mountains on the west, and on the east the steep sides of "Missing Link" signal hill. The slopes on the west side are scored by numerous water-courses and drainage channels. The timber is chiefly scrub pine and brulé, with bunches of spruce in the valleys. Between two and three miles up the creek a valley branches north-easterly, leading to Ware Creek. It is through this valley that the Indian pack-trail, along Ware Creek, passes to join that along the north side of the south branch of Sheep River.

At the "Forks" above referred to, is situated the only possible opportunity for storing water on the south branch of Sheep River, that came within the observation of Division B during the past season. It is described below under the heading of water storage.

Measurements for the discharge of the main stream and its tributary were made on the same day with the following results.

MEASUREMENT of actual flow of water in South Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
33	Oct. 3rd . . .	In N.-E. $\frac{1}{4}$ sec. 29, Tp. 19, R. 5, W. 5th Mer., near W. bound- ary of $\frac{1}{4}$ section	102.67 second feet.

REMARKS.—Stage of water high for time of year; is probably increased by recent snow and rain in the mountains; will rise about 3 to 4 feet higher at flood stages. Stream cross-sectioned below where it comes forcibly out of a cañon and immediately above a rapid. A fairly good cross-section for a stream of so high a grade. Bed, stones and gravel. Bottom, fairly uniform. Water line, not very regular. Flow; generally even, but owing to point at which, of necessity, cross-section was taken, it is jerky in places. On right side, gravel and stony high-water bed extends back about 60 links to corner of small flat grown with spruce, back of which rises 100 to 150 feet a steep slope timbered with spruce. The flat is 4 to 10 feet higher than bed of stream. On left side, sand and fine gravel bed extends back about 25 links to steep grassy slope, grown with cottonwood and poplar brush and scattering spruce. About 1.50 to 2.00 chains above the point of cross-section, the stream emerges from a deep cañon, where the water has cut a narrow bed in the shale formation. Here, the layers of rock are tilted on end at a slight angle from the vertical. The sides of the gorge rise 100 to 150 feet. The stream rushes through with great force, and has worn holes in the bed to a depth of 10 to 15 feet. Below the cañon, it widens to a small basin, referred to above as possibly suitable for a reservoir site.

MEASUREMENT of actual flow of water in stream joining South Branch of Sheep River from north-west.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
34	Oct. 3 . . .	In S.W. $\frac{1}{4}$ Sec. 32, Tp. 19, R. 5, W. 5th Mer., in S.E. corner of $\frac{1}{4}$ section.	14.66 second feet.

REMARKS.—Stage of water probably high for time of year; supply augmented by recent snow and rain in the mountains. Water rises at highest stage at least 2 feet above present level, at which time stream would likely be a torrent. Bed, small stones and gravel. Bottom, uniform. Water line, regular. Flow, fairly even. On right side, bed extends back 5 feet to shale cut-bank, almost perpendicular; on left side, 4 feet to sloping shale cut-bank. This is a regulation foot-hill stream of very high grade. It flows in a deep bed cut out of the shale hills. The sides are either perpendicular or very steep cut-banks, with scrub, brush and spruce reaching down to the water's edge in places. The stream is one continuous rapid, obstructed by bowlders, stones, logs, rock, etc.; at intervals it presents falls and pitches, and the cañon of the bed becomes very narrow.

Through the east half of the township the stream flows in a nearly east direction, turning southerly in Section 36.

The valley here varies from one-half to three-quarters of a mile wide, the bench land extending back on either side from the deeply cut bed of the stream. On the north are scattered patches of hay land, and bunches of poplar and small spruce. On the south the bench is thickly timbered with spruce, fir and scrub pine, lying within the limits leased to John Lineham. Beyond the bench land, on either hand, are high, rough, wooded hills, scrub pine and brulé being the chief characteristics.

Department of the Interior.

In the S.W. $\frac{1}{4}$ of Section 34, a small stream joins the river from the south-west, at a point locally known as "Tie Camp." It was measured for discharge with following results:—

MEASUREMENT of actual flow of water in stream joining the South Branch of Sheep River from the south-west.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
38	1895. Oct. 8	In S.W. $\frac{1}{4}$ Sec. 34, Tp. 19, R. 5, W. 5th Mer., in S.W. corner of $\frac{1}{4}$ section.	9.37 second feet.

REMARKS.—Stage of water probably high for time of year. Cross-section made in cañon at mouth of creek between two rapids; sides of cañon rise 100-150 feet. Bed, shale rock and fine broken shale. Bottom, fairly uniform. Water line, irregular. Flow, fairly even. During high water stages creek will probably rise 2 feet above present level. On left side at point of cross-section, cut-bank of calcareous shale rises perpendicularly 30 feet, then ground rises back, in a steep timbered slope. On right side, cut-bank of same formation rises very steeply from water's edge about 50 feet, then perpendicularly 20 feet more to timbered slopes. The stream is a continuous rapid, broken by leaps and falls, and obstructed by boulders, stones, rock, fallen trees and logs.

Near the centre of Section 36, at the bend where the stream turns south-east, is situated John Lineham's lower lumber camp. The wagon road here crosses to the south side of the river, recrossing to the north side at the "Tie Camp." The change is necessitated by the steep slopes of "Lower Camp" signal hill. This hill is the summit between the drainage to south branch of Sheep River and Ware Creek, and it is on its northerly slopes that the creek, previously referred to as joining the latter stream in Section 20, Township 20, Range 4, originates.

Township 19, Range 4.—Through the west half of the township, the river flows south-easterly and through the remaining portion nearly east. The hills are now lower and not so rugged.

On the north side in Sections 30, 31, 29 and 28 lies a thickly timbered flat, through which are scattered grassy opens. The flat extends back from three quarters of a mile to one mile. The timber is chiefly scrub pine and small fir, with scattering bunches of poplar and spruce near the river. A number of patches of hay land are found on the bench land immediately above the deep cut bed of the stream. Two isolated hills stand on the edge of the stream, in the flat above mentioned. They present on their south faces steep cut-banks descending directly to the river bed. Lineham's wagon trail passes through the centre of the flat on the north side of the two hills, and crossing over a low ridge, descends the valley of Macabee Creek.

On the south side of the river rise steep rough wooded hills. A stream of some size joins the river in the south-east quarter of Section 30. It has its origin in the mountains to the south-west. Passing along the north edge of the valley lying to the west of the high wooded ridge, called for the sake of identification "Whaleback" signal ridge, it flows through a deep cut in the hills to the point of junction.

In the valley above referred to, is the height of land between the south branch of Sheep River and Highwood River. It is largely timbered, but presents many opens.

The stream was gauged close to its junction with the river. For results see schedule on the following page:—

MEASUREMENT of actual flow of water in stream joining South Branch of Sheep River from the south-west.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
32	1895. Sept. 30....	In S. E. $\frac{1}{4}$ Sec. 30, Tp. 19, R. 4 W. 5th Mer.....	19.94 second feet.

REMARKS.—Stage of water probably high for time of the year; will doubtless rise 3 feet above present level during highest water. Cross-section taken between two rapids. Bed, small stones and gravel. Water line, regular. Bottom, uniform. Flow, fairly even. On right side is a cut-bank of shale and sandstone, stones, boulders and clay, about 50 feet high. On left side is stony high-water bed, rising back to a distance of 50 links from present water line to a thin fringe of willows and poplar and cotton-wood brush. Stream is a continuous rapid, obstructed by stones, boulders and fallen logs. In places, are overhanging willows and spruce growing to water's edge. There is an outcrop of coal in the cut-bank, a short distance above the point of cross-section.

In Sections 17 and 20, a valley timbered with spruce and fir of some size, and scrub pine, leads south-easterly to the valley of Highwood River. On the west side near the height of land are the steep timbered slopes of the Whaleback ridge. A number of open muskgs are scattered through the timber in the northerly portion of the valley.

Two creeks—one from each side of the Whaleback ridge—join at its northerly extremity, and flowing north-easterly across the valley, enter a deeply cut channel in the hills, joining the south branch of Sheep River near the centre of Section 21.

A measurement for discharge of the stream was made near its mouth, resulting as follows:—

MEASUREMENT of actual flow of water in stream joining South Branch of Sheep River from the south-west.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
29	1895. Oct. 12	In S. E. $\frac{1}{4}$ Sec. 21, Tp. 19, R. 4, W. 5th Mer., in N. W. corner of $\frac{1}{4}$ section.....	2.13 second feet.

REMARKS.—Cross-sectioned between two rapids. In highest stages, water probably rises two to three feet above present level. Bed, gravel and stones. Water line, irregular. Bottom, uniform. Flow, fairly even. Is a small foothill stream, flowing near its junction with the main stream between high rock ledges, forming cut-banks about 100 feet in height, grown with scattered spruce and poplar brush. Stream is a series of rapids, obstructed by rock, boulders, stones, logs, etc. Farther up, the banks are low and the valley widens. It is here that the two streams from either side of Whaleback ridge join. In early spring, a considerable quantity of water undoubtedly comes down this channel.

An Indian pack-trail branches from the Sheep River trail, and, crossing through this valley, leads around the north end of Whale-back ridge along the most westerly of the two creeks referred to, and so across the dividing ridge into the valley leading to Highwood River.

Through the east half of the township, the south branch of Sheep River flows very little south of east.

Department of the Interior.

On the south side, above the deeply cut bed of the stream is a wide flat extending back about a mile. It occupies parts of Sections 22, 23, 24, 13 and 14. It is partly open with bunches of poplar, willow brush and scrub and scattering spruce. Beyond are long lateral sandstone ridges reaching south-easterly to Highwood River. In Sections 24 and 13, a valley leads to the same stream, a low ridge reaching across it indicating the height of land. This valley, particularly on the Highwood River side, yields some excellent hay. To the east of it rises "Okotoks" signal hill, a ridge of same formation, but not of so great a length as those adjacent to it. It is seen on the left in the accompanying illustration (Plate VIII.)

On the north side of the river, the hills are lower, and to a large extent, as also on the south side, open grass land.

The same formation of long lateral sandstone ridges prevails, broken by the valleys of the several streams intersecting them in their eastward flow, and cut by smaller watercourses and depressions.

Bunches of spruce and poplar are scattered in the valleys and on the northerly slopes of the ridges, while patches of brush and scrub are seen on the more open southerly slopes.

The river was gauged a short distance below the point of intersection by the meridian outline between Ranges 3 and 4. Two gaugings were made consecutively on the same day at the same cross-section, for the purpose of comparison of results. They are given below.

MEASUREMENT of actual flow of water in South Branch of Sheep River.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
	1895.		
30	Sept. 26	In S. W. $\frac{1}{4}$ Sec. 19, Tp. 19, R. 3, W. 5th Mer., at west boundary of $\frac{1}{4}$ section.	171.35 second feet.
31	do 26	do do do do	168.46 do

REMARKS.—Stage of water probably high for time of year. Indications show that water rises at least 4 feet above present level during the highest stages. Cross-section taken at a bend of the river between two rapids. Bed, stones and gravel. Rock (a highly siliceous carbonaceous shale) is seen in the centre of the bed, also at right bank. Water line, fairly regular. Bottom, uniform for a stream of this description. Flow, even for so high a grade and so large a volume. On right side, rock rises from water line perpendicularly 3.5 feet; the ground then extends on a level about 10 feet, rising from the point reached 100 feet in a steep sloping grassy bank, merging immediately below the point of cross-section into a shale cut-bank. The bank above water line is fringed with alder and small spruce. On left side, the high-water bed of gravel and stones rises gently back to a steep sloping bank about 1 chain from water line. In general terms the character of the trough of the stream in this locality, and indeed, for the greater part of its length up stream, is alternating shale cut-banks, nearly perpendicular, varying from 100 to 300 feet high, and more or less steep slopes, presenting small bottoms along the cañon, from 1 to 3 chains wide, liable to be flooded at high-water flow. The sides of the valley either rise in one steep slope, or extend back in open or partially timbered benches to high-land level.

In the adjoining township to the east, the valley widens considerably and presents fine bottoms, well suited to the application of irrigation. There will, however, be difficulty in applying water from Sheep River, owing to the deep cañon-like trough in which it flows, and the frequent occurrence of shale cut-banks. One ditch is here in operation, but it takes water from Macabee Creek, referred to below.

The surrounding hills are for the most part open, and are here the lower elevations of the foothills, soon succeeded by the long rounded ridges of the prairie land to the east. Scattered bunches of poplar and willow are seen in the valleys, and patches of scrub on the ridges. Odd spruce, also, appear in the valleys and along the streams and water-courses.

Through Sections 24 and 25, an open valley leads northward to Macabee Creek, distant about a mile. This stream heads in the hills north of Sheep River, and flowing

parallel to it for some distance through, for the most part, an open grassy valley, joins Sheep River in Section 29, Township 19, Range 3. It was gauged a short distance below its intersection by the meridian outline between Ranges 3 and 4, with results as below :—

MEASUREMENT of actual flow of water in Macabee Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
28	1895. Sept. 24.	In S. W. $\frac{1}{4}$ Sec. 30, Tp. 19, R. 3, W. 5th Mer., in N. W. corner of $\frac{1}{4}$ section.	1.66 second feet.

REMARKS.—Stage of water probably high for the time of year. At highest water, will rise 1 to 1½ feet above present level; will not extend much beyond present bed, probably 3 feet on right and 2 feet on left side. Banks slope gradually back for these distances. Bed, clay and fine gravel. Banks, clay; were cut regular. Bottom, fairly uniform. Flow, even. Stream is a very small one winding through a grassy valley. In places flows through spruce and cottonwood bush and willows. Bed is much obstructed by willow brush, weeds, &c. Does not appear at any time to carry a large amount of water, although, in early spring, considerably more than at present.

North of Macabee Creek, in Section 36, is situated "Dutchman's Hill" camera station. This elevation is part of the ridge on which "Nigger John" signal station in Section 14, Township 20, Range 4, has been set, but is separated from it by the valley of Lineham Creek. "Okotoks" signal station is evidently set upon the same ridge, but the connection is broken by the valleys of Macabee Creek and Sheep River.

The character of the country is here similar to that on the south side of Sheep River, with the exception that the ridges are lower and the country more open. Open grass land prevails, with scattered bunches and clumps of poplar and willow, lying more thickly on the northerly slopes. Scattering small spruce are seen in the valleys and along the edges of the drainage lines. To the east, the ridges decrease in elevation, and occur at longer intervals, while the poplar and brush become more scattered, until the open rolling prairie is reached. A lot of good hay land is seen in the locality, but the application of water is impossible, owing to the fact that Lineham and Macabee Creeks are too small to furnish a supply of any account, and Sheep River is too deeply bedded to be taken out for application to these lands.

Lineham Creek heads in the hills a short distance west of "Dutchman's Hill," and flowing nearly straight east, joins the south branch in Section 2, Township 20, Range 3. It was gauged close to its intersection by the meridian outline between Ranges 3 and 4, as shown below.

MEASUREMENT of actual flow of water in Lineham Creek.

Meter No. 25.

Observer, A. O. Wheeler.

No.	Date.	Location of Cross Section.	Measured discharge.
29	1895. Sept. 24.	In N. W. $\frac{1}{4}$ Sec. 31, Tp. 19, R. 3, W. 5th Mer., at W. boundary of $\frac{1}{4}$ section.	0.82 second feet.

REMARKS.—At highest stage, water probably rises from 1 to 2 feet above present level, and extends on either side from 2 to 2½ feet. Does not appear to carry a large amount of water at any time. Bed, gravel and small stones mixed with sandy clay. Banks, made regular at point of cross-section. Bottom, uniform. Flow, even. Stream is a very small one flowing in a narrow grass valley dotted with green and dry willow brush and scrub. Is a series of small rapids, and obstructed in its winding course by long grass, overhanging willows, weeds, &c. Present banks rise about 8 inches above water surface, from which point they slope gently back. Sides and slopes of valley through which creek flows are muskeg.

PLATE No. IX.



RESERVOIR SITE "K" ON SOUTH BRANCH OF SHEEP RIVER.



LOCATION FOR DAM, RESERVOIR SITE "K" ON SOUTH BRANCH OF SLEEP RIVER.

Department of the Interior.

The length of the stream, from the point of commencing traverse to the gap where it leaves the mountains, is approximately 18 miles.

Water Storage.

The only opportunity for storing water met with on the south branch of Sheep River was that previously referred to as situated at the "Forks," and now shown on the accompanying sketch, designated by the letter K. It occupies parts of Sections 28, 29, 32 and 33, in Township 19, Range 5, west of 5th Meridian.

The site is of small extent, but deep, and a dam built at the mouth would back water for a considerable distance up the main stream, and also up the tributary stream from the north-west, joining in the north-east $\frac{1}{4}$ of Section 29.

At the point where a dam would be necessarily located the stream flows in a deeply cut bed, between banks of carbonaceous and calcareous shale, reaching, on the left side, a height of 150 feet, and on the right side about 230 feet.

On the north banks of the site, the shale is overlaid by a gravel bed, forming the walls of the basin, and extending as far as the branch creek referred to. It also forms the point of land between the two streams. This gravel could be readily used in the construction of a dam.

The south side of the site is a timbered slope. (See Plate IX.)

The most probable objection to the location would be the uncertainty of the foundation for a dam. Specimens of the shale forming the banks at the most suitable point were submitted to Dr. G. M. Dawson, Director of the Geological Survey Department, who reports upon them as follows:—

"A thin bedded carbonaceous and calcareous shale, very much slidden and cracked along the lines of bedding. It would be of no service as a building stone, and is so much slicken sided that it would require to be regarded with caution as support for a reservoir dam."

Plate X. shows the location referred to.

As an estimate of the source of supply, the gaugings made of the main stream and its tributary, a short distance above their junction, may be taken. Both cross-sections were made on the 3rd of October.

The main stream showed a discharge of 102.67 second feet, and the tributary stream 14.66 second feet; a total of 117.33 second feet flowing into the reservoir site on that date.

The width of the bed at bottom of the narrowest point, where a dam would be located, is about 130 feet, and at top of bank, 150 feet above the bed of the stream, about 300 feet. The bed of the stream is here, stones, bowlders, broken shale, gravel and sand, lying on the rock.

Approximate elevation at the mouth of the reservoir site, as deduced from barometer readings, is 4,545 feet, and at the point of commencing traverse, where the stream is intersected by the meridian outline between Ranges 3 and 4, 4,100 feet. The distance is 12.25 miles, showing an average fall of about 37 feet per mile.

Throughout the entire length, below the reservoir site, the stream flows in a deeply cut bed, and no opportunity is presented to convey the water to the bench land above, owing to the numerous cut-banks of shale, without having recourse to a large amount of costly flume construction.

Owing to the peculiar formation of the beds of the streams flowing into the site, it was found impossible to arrive at an estimate of the capacity, without making a special and detailed survey with suitable instruments.

When the waters of the south branch of Sheep River become more valuable and storage a necessity, it will no doubt be found advisable to make a thorough investigation of the capabilities of this site. In the meantime, however, it will be advisable that the following lands be temporarily set aside, pending further information:—

LANDS to be segregated.

Site.	Part of	Section.	Township.	Range.	Meridian.
K	N. W. ¼	28	19	5	W. of 5th.
K	N. E. ¼	29	19	5	do
K	S. E. ¼	32	19	5	do
K	S. W. ¼	33	19	5	do

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

ARTHUR O. WHEELER, D.L.S.,
In charge Division B,
Canadian Irrigation Surveys.

Department of the Interior.

PART IV

IMMIGRATION

Department of the Interior.

IMMIGRATION.

PREFATORY REPORT OF THE CLERK OF IMMIGRATION, OTTAWA.

DEPARTMENT OF THE INTERIOR,
OTTAWA, 16th February, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—Following the practice of previous years, I have the honour to submit a brief report of work performed in the immigration branch at headquarters, by way of preface to Part IV. of Departmental blue book for 1896.

CORRESPONDENCE.

Since the period covered by my last report 7,817 attachments have been made to the files of the immigration branch, which, as you are aware, are kept separately from the general correspondence files of the department.

Most of these attachments have consisted of letters of inquiry from prospective immigrants, and all, in whatever language or from whatever part of the globe, have been promptly and adequately replied to.

IMMIGRATION LITERATURE.

We have continued, as in previous years, to distribute large quantities of literature of various kinds, relating to Canada, and the ground has been well prepared in this way, in many directions, for the personal work of our agents.

The publications brought out under my supervision since the period covered by my last report have been the following :—

	Pages.	Issues.
Official Handbook, 1896 (reprint).....	85	15,000
“ Western Canada ” (new edition).....	39	20,000
Hedley Smith on Canada.....	7	5,000
“ The Edmonton District ”.....	10	2,000
“ The Settlers’ Guide ”.....	53	5,000
Letters from Swedish Settlers.....	31	15,000
A Danish pamphlet on Manitoba.....	16	200
Letter from Mr. Wannop, a successful Settler.....		3,000

In addition to the above the department has purchased and distributed ordinary and special numbers of newspapers and other periodicals, printed in Canada, but principally in foreign languages, and containing useful matter for our purposes.

LOCAL DEMAND FOR IMMIGRANTS.

We manage to find places every year for a considerable number of immigrants who make Ottawa their objective point in the first instance.

Since my last report no less than 513 persons of this class have been so placed through the efforts mainly of our Scandinavian interpreter, Mr. Akerlindh.

Some of these people will remain permanently in this neighborhood, but many have already gone on to the farming districts of northern Ontario and the North-west, and others will adopt the same course when they have gained a little knowledge of the English language and of the ways of this country. They all do these two things here, and at the same time add a little to their supply of cash by the wages they earn.

CONCLUSION.

Our work for the year has been to a greater extent than usual of a routine character, but it has been performed, I believe, with unfailing promptness and efficiency, and with a constant desire on the part of all members of the staff to contribute as far as possible to the success of the immigration service.

Respectfully submitted,

L. M. FORTIER,

Clerk in charge.

Department of the Interior.

No. 1.

REPORTS OF THE HIGH COMMISSIONER AND EUROPEAN AGENTS.

REPORT OF THE HONOURABLE SIR DONALD A. SMITH, G.C.M.G., P.C., HIGH
COMMISSIONER FOR CANADA.

VICTORIA CHAMBERS, 17 VICTORIA STREET,
LONDON, S. W., 27th January, 1897.

The Honourable
The Minister of the Interior,
Ottawa.

SIR,—I beg to transmit the reports of the agents of your department in the United Kingdom on emigration matters during the year 1896.

AGENTS EMPLOYED.

At the present time the regular agents are Mr. John Dyke, 15 Water Street, Liverpool; Mr. Thomas Grahame, 52 St. Enoch Square, Glasgow; and Mr. J. W. Down, Bath Bridge, Bristol.

The special agents are Mr. E. J. Wood, 78 Beaufort Road, Birmingham; Mr. Peter Fleming, 44 High Street, Dundee; Mr. W. G. Stuart, Nethy Bridge, Inverness; and Mr. Bodard of Paris.

Within the last few days I have also been advised of the appointment of Mr. John Webster as agent for Ireland. Mr. Webster has commenced work, and his address for the present is 30 Upper Leeson Street, Dublin.

Mr. Thomas Roberts is also engaged in special work in Wales, and his address for the present is Ty Mawr, Morfydd, Corwen.

All the agents have rendered reports with the exception of Messrs. Webster and Roberts who have only arrived since the commencement of the present year. Mr. Bodard being in Canada made his report direct to you.

DUTIES OF AGENTS.

Messrs. Dyke, Grahame, and Down remain, more or less, in the cities in which they are stationed, in order to conduct the large correspondence they receive, and to answer the personal inquiries that are made of them. They also look after the interests of Canadian trade in the important centres in which they reside. They are kept fully occupied by the work they are called upon to perform.

Messrs. Grahame and Down, I should add, go occasionally into the country districts to visit agricultural shows, markets and fairs, for the purpose of meeting farmers, and of distributing our printed matter in a judicious manner in places where its circulation is likely to benefit Canada.

Messrs. Wood, Fleming and Stuart are continually on the move, delivering lectures, visiting enquirers and steamship agents, attending markets and fairs, and doing everything possible to direct attention to the great advantages Canada offers to the classes recommended to emigrate. So satisfied have I been with the nature of the work these gentlemen are performing that I have recommended the appointment of a travelling

agent to be attached to the London office, and one to the Liverpool office. Their duties would be much the same as those now performed by Messrs. Wood, Fleming and Stuart. The agent attached to the London office would also be required to inspect the other agencies occasionally, and keep in touch with the steamship agents in the course of his travels, and endeavour to stimulate their activity in every possible way.

METHODS OF WORK.

Your department is fully aware, from the voluminous reports that have been made, of the measures that are taken, and the further action I recommend, in order to attract attention to Canada, to stimulate inquiry and to promote emigration, which I regard as the most important question that can engage the attention of the government. When money is available newspaper advertising is resorted to, with the satisfactory result of initiating a large correspondence. Every post office in the country exhibits a bill setting forth the advantages of the Dominion. The steamship companies and their agents advertise freely in the daily and weekly papers, and posters, many of them illustrated, referring to Canada, are displayed throughout the country. The same remarks apply to the Canadian Pacific railway company, and to the local agents of the different provinces in the United Kingdom in a lesser degree. Pamphlets are also distributed in large numbers in many ways and through many channels.

LECTURES.

About 1,000 lectures are delivered each year, illustrated by the Government slides alone, apart altogether from the lectures arranged by the steamship and railway companies. The clergy and schoolmasters in the country take an active interest in emigration, and I may also in this connection mention the emigrants' information office, the Imperial Institute, and other organisations.

Lectures are not only valuable in themselves, as interesting considerable numbers of people and impressing upon their minds the advantages of Canada, but they lead to the country being advertised and talked about, and naturally the very essence of our work is of an educational character. Greater attention is also being devoted to the teaching of the history, geography, and resources of Canada in the ordinary and evening schools, and large numbers of our pamphlets are being used as readers in those institutions. In fact I may say that every means at our command, so far as the appropriation will permit, is being utilised to direct attention to Canada, and to the advantages it offers to emigrants.

REASONS WHY CANADA DOES NOT GET MORE IMMIGRANTS.

It is frequently asked why Canada does not get more immigrants. In the first place it must be remembered that the records of emigration from the United Kingdom are deceptive. They include all second and third class passengers, whether emigrants or not, and every man coming to the United Kingdom on a visit from any country is classed as an immigrant when he arrives, and as an emigrant when he leaves. It is evident, therefore, that the actual emigration is very much less than the records indicate, and I believe that on the whole we get a very fair share of the movement that has taken place. A part of the emigration we cannot touch—that is the portion consisting of persons who go out to join their friends. The importance of this will be readily recognised when it is stated that of the steerage passengers who cross the Atlantic to the United States 60 per cent either have return tickets or have their passages paid for by their friends in the States. The proportion in the case of Canada is not, I am credibly informed, greater than from 7 to 10 per cent.

Then again our efforts in this direction are largely confined to the St. Lawrence route, and to the three lines of steamers which engage in that trade, whose vessels do

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not compare with the faster and more commodious steamers on the American route. The New York lines, however, take little or no interest in the encouragement of emigration to western Canada, or, to put it in another way, the influence of all their agents, so far as Manitoba, the North-west Territories and British Columbia are concerned, is of a negative character. This arises from the fact that the railway fares from Quebec to Manitoba and the North-west are lower than those via New York.

The farming class proper in the United Kingdom is comparatively small. It is also most conservative, and the people show a great disinclination to move, even under adverse circumstances. We do all we can to reach them, and to bring before them the advantages of Canada. The difficulty in the case of farm labourers is generally the passage money, and the apparent attractions of town life. In the case of domestic servants there is naturally a disinclination on their part to leave their families, and to venture abroad; but this feeling is aggravated, so far as Canada is concerned, by the fact that by some of the Australasian and other colonies free passages are given. The following letter from a domestic servant received a few days ago serves to emphasize this point:—

“ Thank you very much for books received.

“ Would you tell me where I could find out the name and address of the people who advertised in the ‘Daily Mail’ for young women domestic servants to go out to South Australia, free passage was given to willing and healthy girls. My friend and I are anxious to go abroad but we cannot afford the passage. If you could help us in any way, we are quite willing to work, we would be very thankful.”

It is also as well to bear in mind that it costs as much for a passenger to reach the western portions of Canada as it does the Cape and some of the provinces of Australasia.

The greater part of the people who want to emigrate from this country are those without any special training or experience, and without the money to pay their passages. Such people as mechanics, navvies, and general labourers, are not encouraged in their intentions, unless they are going to join friends, or to work that has been secured for them.

These considerations show the comparatively small field there is to work upon in regard to Canadian immigration, but by some means or another we must get even a greater share of it.

MORE MONEY SHOULD BE SPENT.

More money might, and, it appears to me should, be spent in promoting emigration; but it would have to be very much on the lines now adopted, and it is doubtful whether, even in those circumstances, the increase in emigration would be in proportion to the additional expenditure. There is little doubt, however, that, with larger and more systematic expenditure, greater results could be achieved, both as regards the United Kingdom and the continent. The latter presents a very wide field for our work, but it is hampered to a certain extent by want of funds, by the foot-hold the United States have obtained there, and by the repressive laws of the different countries which place many obstacles in the way of emigration. The United States also present an encouraging field for the prosecution of our work.

CANADA'S DISADVANTAGES.

Of course Canada has to contend with some disadvantages, more nominal than real, as compared with some of the other colonies; but I believe that much that occurs in Canada itself tends to somewhat discourage desirable immigration. More might be done in Canada to attract immigration, to keep it when it is there, and to co-operate in the endeavours made in this country to stimulate a flow of desirable immigration in the direction of the Dominion. The provision of a greater extent of free land nearer the railways and settlements would be a considerable attraction.

COLONIZATION. ASSISTED PASSAGES.

As an alternative to the emigration policy that has hitherto been adopted there is that of colonization, which includes the advance of money to desirable settlers to enable them to settle upon the land, and the granting of assisted passages to intending settlers who are able to show that they possess a limited capital, and to domestic servants. It was also at one time proposed that the government, the Canadian Pacific railway company and the steamship companies should co-operate in order to provide for the assisted emigration of a number of farmers, farm labourers and domestic servants from the different parts of the United Kingdom, which would tend to attract attention to the Dominion in the centres from which they came, and, if successful, probably lead to a steady current of emigration in the future. All schemes of this kind involve the expenditure of considerable sums of money which so far have not been provided by Parliament.

EDUCATIONAL WORK.

I believe that the proper course to adopt is to continue our educational work, to spend more money upon it, to keep the country continually before the public; and I am sure, if that is done, the desired results will be achieved in course of time. Assisted passages in certain cases are certainly worthy of consideration, but what would help us still more would be a system of nominated or prepaid passages under which people in Canada could send for their friends in this country. If persons settled in Canada would also communicate more freely with their friends here, both in the ordinary way through the post, and through the medium of the press, it would be beneficial to our work, especially as the agricultural advantages of Canada are impressing themselves upon the public mind through our increasing exports of farm and dairy produce, and fruit of all kinds. It is a truism that the successful settler is the best immigration agent; but the low prices of farm produce in Canada in the last few years have no doubt acted as a deterrent to emigration from the United Kingdom,

LETTER TO THE STEAMSHIP COMPANIES.

A few days ago I addressed the following letter to the steamship companies. They have printed and sent it to all their agents in the United Kingdom:—

“You are aware that the Canadian Government attach the greatest possible importance to the encouragement of immigration.

“The various provinces of Canada from the Atlantic to the Pacific—Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, the North-west Territories and British Columbia, offer advantages to settlers that are not excelled in any other part of the world. The country possesses a varied climate to suit all comers, and a most fertile soil. All agricultural produce grown in the United Kingdom and in Europe is raised in Canada, as well as many other articles that are not cultivated to any extent on this side. Canadian beef, mutton and bacon are exported in largely increasing quantities. Its cereals are much appreciated, its cheese is popular, and its butter is in a fair way to achieve an equal reputation. Canadian apples have also a large sale; other fruits and vegetables in great variety are produced in abundance, and many other commodities from the Dominion are well known on the British markets.

“In the various provinces unlimited opportunities exist for the investment of capital, either in manufactures or in the natural industries connected with the forests, the mines, the fisheries and agriculture. The mineral development, both of Ontario and of British Columbia, is attracting much attention. Persons with moderate incomes will find in the Dominion many advantages not to be obtained elsewhere, and for those with growing families the facilities for education and for starting young men and young women in life deserve special consideration. The classes chiefly in demand are those with capital, persons with moderate incomes, and farmers, farm labourers and domestic servants. Free grants of 160 acres of land are given to male settlers above the age of

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18 years in Manitoba and the North-west Territories. Crown lands can be obtained in the other provinces either free of charge, or on nominal terms; while improved farms, ready for occupation and cultivation, may be purchased in every part of the Dominion at reasonable prices. Farm labourers receive good wages and comfortable homes, with the prospect in the future of becoming farmers themselves, and domestic servants of good character may rely upon the assistance of the Government agents in Canada, and of the ladies' committees to be found in all the leading cities, in securing satisfactory places. The indiscriminate emigration of navvies, general labourers and mechanics, is not encouraged, but they may safely be advised to go out when they have friends in the Dominion, or have employment offered to them. And, besides, it must be remembered that good hard-working men and women can invariably find employment if they are sober, industrious and thrifty, and prepared to adapt themselves to the ways of the country.

"In order to facilitate the dissemination of information about Canada, and to enable intending settlers to obtain advice of a practical character on any matters that may interest them, special illustrated pamphlets are issued under the auspices of the Imperial and Dominion Governments, and may be obtained post-free from my office or from the following agencies of the Dominion Government in the United Kingdom:— Mr. John Dyke, 15 Water Street, Liverpool; Mr. E. J. Wood, 78 Beaufort Road, Birmingham; Mr. J. W. Down, Bath Bridge, Bristol; Mr. Thomas Grahame, 52 St. Enoch Square, Glasgow; Mr. Peter Fleming, 44 High Street, Dundee; and Mr. W. G. Stuart, Nethy Bridge, Inverness. These agents are prepared to deliver lectures in every part of the country where their services may be useful, and will be ready to co-operate with your agents in every possible way. There are also government agents in the different parts of Canada who will gladly be of any service to new arrivals that may be in their power. Cards of introduction to those agents may be obtained either from my office or from any of the government agents in the United Kingdom, and will be found useful by intending settlers.

"The object of this letter is to ask you to impress upon your local agents the importance of making special efforts to bring the advantages of Canada before the public of the United Kingdom, and of the continent also, as far as may be practicable. In order to stimulate their activity, the government adopted a suggestion submitted to them as likely to achieve the objects in view, but so far it cannot be said that the results have been of a very encouraging nature. It is hoped that your agents will see the desirability of co-operating to the utmost possible extent with the government representatives. I may add in conclusion that if either you or your agents have any suggestions to make which may tend to ensure wider publicity for the resources and capabilities of Canada, and its advantages from an immigration point of view, and lead to their becoming better known and appreciated than they are now, I trust that you and they will not hesitate to communicate with me. Any suggestions made to me will at all times receive the earnest consideration both of myself and of the government."

A copy of the letter was also inclosed to the government agents, urging upon them to leave no stone unturned to attract immigration to the Dominion.

LETTER TO THE PRESS.

The following letter was also addressed to the press. It was inserted in all the leading London papers, and in those of the provinces, and I feel greatly indebted to the editors for the consideration they have shown to my communication:—

"The Canadian Government attach the greatest possible importance to [the resources and capabilities of the Dominion becoming better known and understood in the United Kingdom than they are at present, and a similar feeling prevails among the 5,000,000 of Her Majesty's subjects who form the population of its different provinces.

"A considerable emigration takes place every year from the United Kingdom, some of which goes to Canada, some to the other colonies, and the larger proportion apparently to foreign countries. Canadians would like to see a much greater part of this movement going to Canada, which offers advantages to immigrants not excelled by any

other part of the world. The various provinces, Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, the North-west Territories and British Columbia, stretch from the Atlantic to the Pacific Ocean, and offer a wide variety of climate to suit all comers, and a fertile soil which has been highly spoken of by the tenant farmers delegations which have visited the country in recent years. Only a fringe of the territory is at present inhabited, and there are countless millions of acres of fertile soil, ready, with cultivation, to grow all the products of the temperate zone, and to provide happy homes for large numbers of people. All agricultural produce grown in the United Kingdom and in Europe is raised in Canada, as well as many other articles that are not cultivated to any extent in Great Britain.

"In all the provinces unlimited opportunities exist for the investment of capital, either in manufactures or in the industries connected with the forests, the mines, the fisheries and agriculture. The mineral development both of Ontario and of British Columbia is attracting much attention. Persons with moderate incomes will find in the Dominion many advantages not to be obtained elsewhere, and for those with growing families the facilities for education and for starting young men and young women in life deserve special consideration. The classes especially desired are those with capital, persons with moderate incomes, and farmers, farm labourers, and domestic servants. Free grants of 160 acres of land are given to male settlers above the age of 18 years in Manitoba and the North-west Territories. Crown lands can be obtained in the other provinces either free or on nominal terms, while improved farms, ready for occupation and cultivation, may be purchased in every part of the Dominion at reasonable prices.

"It cannot be too strongly urged upon persons about to emigrate that they should obtain the fullest possible information about the country they may have decided upon as their future homes. In order to make this easy, so far as Canada is concerned, the government have established agencies in the United Kingdom as follows:—Mr. John Dyke, 15 Water Street, Liverpool; Mr. J. W. Down, Bath Bridge, Bristol; Mr. E. J. Wood, 78 Beaufort Road, Birmingham; Mr. Thomas Grahame, 52 St. Enoch Square, Glasgow; Mr. Peter Fleming, 44 High Street, Dundee; and Mr. W. G. Stuart, Nethy Bridge, Inverness. It is also proposed to appoint an agent in Ireland and one in Wales. These agents are prepared to correspond with, or to see, intending emigrants, to give them every possible advice, and to supply them gratis with illustrated pamphlets (issued under the authority of the Imperial and Dominion Governments) maps, and other information bearing upon the subject. The same remarks apply to my own office. There are also government agents in the different parts of Canada who will gladly be of any service that may be in their power to new arrivals. Cards of introduction to those agents may be obtained either from my office, or from any of the government agents in the United Kingdom, and will be found useful by intending settlers.

"If you will be so good as to give publicity to this letter, it will, I am sure, be much appreciated by Canadians. It may also be useful to their fellow subjects in the United Kingdom, who are contemplating emigration but do not know how to obtain proper and reliable information on the subject."

EFFECT OF THE HIGH COMMISSIONER'S LETTERS.

The effect has been to stimulate inquiry and the correspondence with all the government offices has increased during the last few weeks in a remarkable way. If this can be followed up by direct advertising in all the papers in the United Kingdom, and by the large and judicious distribution of suitable pamphlets, of which our stock has run very low, we may hope to see a very desirable stream of emigration setting out in the direction of the Dominion during the coming spring.

THE TENANT FARMERS' DELEGATES.

I also communicated with the tenant farmers' delegates, all men of influence in their respective districts, to ask them their opinion as to the probabilities of agricultural

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emigration, and as to the best means of attracting the attention of that part of the community to the Dominion. I quote extracts from the replies received from these gentlemen :—

Mr. GEORGE BROWN, of Watton Mains, Caithness, writes :—

“ I have your note of the 9th with respect to Canadian emigration. It is rather a difficult problem, but I shall state very briefly a few ideas that have occurred to me. The probabilities of emigration for a year or two are not very encouraging, as store cattle will be comparatively high in price, until the breeding stocks of this country are very considerably increased. Small farmers are the backbone of the multitudes who emigrate, and they will be comfortable so long as young cattle are high-priced, as now-a-days they depend generally on a few cattle for rent and living. Along the coast fishing has been fairly remunerative, so this factor will tend to keep these men in this country. If a line was drawn from north to south of Scotland bisecting the country towards the centre, and the west coast left severely alone by our agents, and their whole time devoted to the eastern portion including the Orkneys and Shetland, the results would, in my opinion, be more satisfactory. * * * * *

Why cannot the Canadian Minister of the Interior get up a series of meetings in the different provinces and enlist the assistance of homesteaders by showing them that an increase of population will tend to their well being by increasing the amount of wealth in the community? If this could be thoroughly impressed upon them by showing it means £50 to them, they would after a bit become each an emigration agent in a small way by writing home to their friends the advantages they would have in such a country where food is cheap and land unlimited.” * * *

Mr. W. H. DEMPSTER, of Cliff House, Laugharne, St. Clears, writes :—

“ Your favour just to hand, (*re* agricultural emigration to Canada). I would say as I have before said that a lecturer with views of homesteads, &c., should visit South Wales.” * * *

Mr. R. H. FAULKS, of Langham, Oakham, writes :—

“ I beg to acknowledge the honour of having received a letter from you concerning emigration to Canada and the best means of promoting the same in England amongst the agricultural class.

“ The most probable class to emigrate are the small farmer and agricultural labourer, the former possessed of a little capital, and perhaps a growing family, makes a valuable settler; the latter, though perhaps without considerable capital, yet possesses the necessary experience in matters agricultural. With respect to the best means of bringing Canada before them, certainly the delegations which have visited Canada from time to time have done much toward that end, and the English farmer, though slow to move, is awaking to the fact of the agricultural value of Canada and its advantages. Letters from successful settlers to their friends, or to local papers, if honestly written, would do much to promote emigration in the desired direction.

“ I have been thinking it would be an admirable thing toward emigration in the future if attractive maps of British North America were presented to the country schools of Great Britain. Such maps should show where the great agricultural lands lie, the forests, the mineral regions, and the abundant fisheries both in and around her coasts, &c.

“ Lectures provincially might be beneficial, if given by a man well experienced.”

Mr. TOM. PITT, of Oburnford, Cullompton, writes :—

“ Thank you for your letter of the 9th, which only reached me yesterday.

“ You are quite right in saying I have taken an interest in Canada, I may add ‘ very great interest.’ I have great hesitation in replying, as I fear I can give you no information worth having, but I will honestly give you my opinion, viz.: that our farm labourers do not like emigration. Very rarely do they leave their native locality, much less country, save when they change their occupation and become railway porters, miners, &c. Then as to farmers I find they are very loth to leave the old country. The

yeomen, that is, men who own and farm their own land, are a little too well off to make a change. The working farmers, men who with their wives and families do nearly all the work on the farm, can get farms, especially in the upper counties, so cheap that before migrating they explore the length and breadth of the land before doing so. Both classes are doing very badly now, but the late dry season accounts for it to a great extent. We have had a few cases, notably at Starcross and Northlawton, where farmers have had a special train and conveyed their total belongings to the upper counties, and I hear some are doing well. I heard from a young fellow who went over to Ontario under my directions. He is pleased and comes home in the spring, visits me and returns and starts for himself."

Mr. R. PITT, of Crickett Court, Ilminster, Somerset, writes :—

"In reply to your letter of 9th instant I would say that since my report was made upon Canada, after the tour of inspection in 1890, I have received piles of letters from intending emigrants. These have come from all parts of Great Britain—not only from the part I represent. I have answered all letters coming to me in a fair and friendly spirit to the best of my ability.

"The same people have written making repeated inquiries before leaving this country, and I have always asked them to favour me with a letter after they have been in Canada a while. This, however, they will not do to any extent. Only one or two have answered my invitation.

"I suggest that a good way of testing the efficacy of advertising Canada by way of farmer delegates would be for me to make another journey of inspection through the country this autumn, and then all the people who have gone out after communication with me, and probably a great many others, will make a point of seeing or writing to me whilst I am in Canada. I have found that emigrants are always anxious to see people from the old country if they come anywhere near their new homes.

"Indeed last time I was out several men wrote asking for interviews only because I came from their county.

"I could then make a full report to you giving the status of each emigrant met with on my journey, and the position they left in this country.

"I should also be able to give a description of the progress of the country generally since my last visit in 1890."

Mr. JOHN ROBERTS, of Plas Heaton Farm, Trefnant, R.S.O. writes :—

"In reply to yours of the 9th instant I may state that since my visit to Canada I have watched Canadian affairs, and have had several opportunities of discussing the future of Canada with persons whom I consider to be authorities on the subject—men who have travelled in Canada and the States. Their unanimous opinion is that if the Government do not undertake the formation of a Welsh settlement, Canada will draw but few emigrants from Wales.

"I would also refer you to the report of the Welsh Land Commission under the heading 'Emigration', see also 'The Welsh Land Commission, a digest of reports', D. H. Thomas, Whittaker & Co., White Hart Street, E. C.

"I may state further that in to-day's issue of the 'Banner' I am replying to a correspondent who was writing on emigration who appealed to me for my opinion on Canada.

"This correspondence has been the cause of private inquiries. With to-day's post I am replying to a farmer's son who, after stating his case, wanted my opinion as to what prospect Canada would have for him. I believe that correspondence such as this is the best means of bringing emigration under the notice of a large number of young men in Wales, but as I have hereinbefore stated that if a Welsh colony is not established in Canada the States will draw their attention.

"If I can do anything further in creating interest in Canadian affairs it will be my pleasure to do so."

Mr. D. W. STEVENSON, of Drumaweir, Moville, Londonderry, writes :

"I have your esteemed favour of 9th January, and regret that absence at sea, off the Irish coast, delayed my replying sooner.

Department of the Interior.

“ Nothing would give me greater pleasure than to assist in the great work of peopling your fair (but unfortunately too little understood) Dominion. The subject you broach is a large one and cannot easily be dealt with in a letter. Were it possible for you to visit me here and spend a week or two among our people you would gain more practical import than any amount of writing on my part could give you. If you can come over Mrs. Stevenson and I will be glad to have you as our guest, and delighted to assist you in making the acquaintance of our people.

“ The great drawback to emigration to Canada is owing to the fact that the mass of our people know nothing of the country, and the little they hear they suspect of being circulated by interested parties in aid of emigration, and altogether too good to be true.

“ Besides, most of our people have friends in the States or Buenos Ayres, and naturally gravitate towards those they know. Many who leave Ireland have had what they consider quite enough of lack of prosperity and high taxes under the British flag, and prefer a new flag and different fiscal laws.

“ I cannot say any more as time at my disposal will not allow me to go more fully into the subject.”

Mr. JOHN STEVEN, of Purroch Farm, writes :—

“ I have much pleasure in answering your the letter of 9th January in connection with Canadian emigration.

“ A much larger share of the emigration that leaves this country would in my opinion go to Canada if there were a greater variety of industries established in the country, such as gold mining, railway making and general manufacturing. Farming, as you are well aware, is under a cloud just now in almost every country in the world, more especially in countries where wheat raising is the chief item of production.

“ When I visited Canada in 1893 I formed the conclusion that it would be only a matter of time when a large portion of our emigration in Scotland would settle in Canada as farmers and labourers. Now I am less sanguine in this matter, seeing landlords are as a rule tiding tenants through the bad times, and labourers who are not required at agricultural work find plenty of employment and good wages in connection with our national industries. Food being cheap, this latter class was never better off than at present, consequently they have less desire to emigrate than if the opposite condition was the rule.

“ The best means to bring the many advantages of settling in Canada prominently before the intending emigrant would be to write the country more up than at present in our national and local agricultural newspapers. I was speaking on this subject to the editor of the *Kilnarnock Standard* on Friday last, and he told me he would be delighted to insert agricultural articles weekly in connection with Canadian agriculture, I might say the same regarding the *North British Agriculturalist* and the *Scottish Farmer*, both being the leading national newspapers of our country north of the Tweed.

“ Should you wish to adopt a more vigorous policy, lectures and limelight views of the country by qualified parties, and the distribution of much more emigration literature, would do no harm. A new delegation to visit and report on the country on the lines of the one of 1893 would do good. A further report from one or two perhaps of the old members of the same, to report on the progress of the country since that date, would also be beneficial. A bonus given to settlers who work out the conditions of their homestead lands, and farm them two years afterwards creditably, would encourage emigration. A tax to defray the bonus might be levied on speculators who hold land in the vicinity of towns unfarmed, and who cause the settler to go far back from centres of population to homestead.

“ Another cause of the falling off in Canadian emigration is because farmers in Canada are not writing home here so encouragingly as they used to do in the eighties. Since my visit in 1893 I have been hearing from many different parts of the country. Most of these letters contain complaints regarding the low price of wheat, beef and fruit. None of the writers say, however, that they are tired of the country. They seem hopeful and full of energy, and are looking forward to much better times in the near future, and I believe better times will come and before long too.

“A great mistake in connection with emigration is giving government aid, as in the Crofter cases. This sort of assistance ought never to be attempted again. Dependence on any source for assistance undoes individual effort and ultimately causes dissatisfaction and leads to failure. If these Crofters had been left to their own resources after they landed in the country their long list of grievances would never have been heard of, and one source of harm would have been avoided.”

Mr. REUBEN SHELTON, of Grange Farm, Ruddington, writes:—

“In reply to your letter of 9th instant I am afraid I can add but little to what I have already said on previous occasions re-emigration to the Dominion of Canada.

“I think it is quite inconceivable to believe that in view of the ever increasing world's population, that the millions of acres of fine wheat-growing lands in the great North-west Territories, full of virgin fertility, and a very considerable quantity already accessible to railway, can for long remain in a state of uncultivation, especially when it is remembered that every inducement is offered by the Dominion Government to agriculturists to develop its agricultural resources. Should the present higher values for wheat continue through the coming spring, I am of opinion that emigration to the Dominion will receive an impetus which has been lacking for some years past, owing to the extremely low prices which have prevailed for this most important of Canadian cereal crops.”

“As to the best means of bringing the advantages offered by Canada before the British emigrating public, I would respectfully suggest that in the event of the Dominion Government again sending out delegations of farmers, that a much smaller number (of suitable men) be sent, and a much longer time be allowed them to make their investigations. The time taken by the members of the last delegation was, I consider, far too short to enable them to get a thorough insight into the various phases and customs of Canadian farming, many of which differ much in various localities, and are quite new to the experience of British farmers.”

Mr. H. SIMMONS, of Bearwood Farm, Wokingham, writes:—

“The very low price of corn for the past few years is, I think, the great cause of the Dominion receiving fewer agricultural emigrants than formerly. Attention seems turned to the Cape and other places in that direction. Should corn continue at present prices, which for long together seems unlikely, it might again bring Canada to the front, but farmers in this country have done so badly that corn growing has no charms for them.

“I have a young man here now home for the winter, he went out $3\frac{1}{2}$ years back, he has managed to keep himself, he has a little money left him and will return to Canada this spring and buy land.

“I have also letters from another young man I sent out anxious to buy with some money he comes into—so it is not all on one side. Money is the one thing wanted in Canada, and the class we send out, as a rule, have none.

“I really cannot offer any plan just now likely to assist your cause. I think I read the other day in one of the papers, the idea instead of sending delegates to Canada, to have some Canadians to lecture, &c., in England.”

Mr. W. WEEKS, of Cleverton, Chippenham, writes:—

“I am convinced that within the next three years, if there is no improvement in the price of agricultural produce, a large number of enterprising farmers and farm labourers will try their fortunes in some other country as the best farmers cannot improve their position with the high rents, rates, tithes, and taxes they have to pay at home. These men if properly placed in Canada would make fortunes for themselves, and while doing so would add to the wealth and prosperity of the Dominion.

“Since I visited Canada in 1893 I have placed about two hundred men and boys on farms west of Winnipeg. In a few cases the father and family followed as the boys spoke well of the country, and I have represented that 160 acres of good land could be had free, with neither rates, tithes or taxes to pay on it. That I considered my trump card, as I knew it would induce more good men to go than anything else I would tell

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them. Some of the Canadian farmers who have land to sell tell the boys it is no use their parents to go out thinking to take a homestead as the free grant land is no good. This stops the family from going out. As to the best means of bringing the advantages of Canada to the notice of the agricultural emigrant, my opinion is nothing is better than the report of a farmer who is well known. For instance I have taken the position of organizing secretary to the British milk producers' union, and have made the acquaintance of hundreds of farmers within the last 12 months, and shall make the acquaintance of thousands before this year is out. Now if I could get away, say in 1898, I could write a report showing the improved position of farmers whom I met in 1893, and who have done well since, and the position some of my own protegés will have reached by then. If I advertised I was going and that I was willing to look out good homestead lands for those who would enter for them, I should get plenty of applicants, and when I returned if I could say there was still more land for homesteads, and could tell the farmers just where it was located, that would make the doubtful ones decide to go; and it would increase the number of single men I could send out if I could tell them I had seen the homes I was going to send them to. In fact, I believe the experience I have had since 1893 would enable me to do more real good than the whole party of delegates did in 1893."

MR. J. T. WOOD'S VIEWS.

Mr. J. T. Wood, of the Court, Halewood, near Liverpool, did not write to me in reply to my inquiries, but was good enough to call at my office. He tells me that ever since he went to Canada he has had a good many applications for information, and that they still continue to be addressed to him, although not in such large numbers as formerly. He states that by far the largest proportion of emigration of agriculturists in the counties round Liverpool go to Canada, and that he never hears of emigration elsewhere. He is of the opinion that we ought to keep on advertising and lecturing and he does not think that personal canvassing among the farmers, such as has been mentioned in some of the Canadian papers recently, would have any good effect. A very large number of agents would be required; owing to the scattered nature of the farms only a very few farmers could be seen every day, and the travelling expenses would be heavy. Besides, farmers often do not like it to be known that they are even considering or talking about emigration, and many of them would therefore be chary of meeting an emigration agent for the discussion of the matter. Then again the agent might call at unfavourable times; but the strongest objection Mr. Wood raised was that farmers would look with distrust upon a man who went round to them for the purpose of impressing upon them the question of emigration. They would say it was his business, and mistrust his statements. Mr. Wood thinks it is far preferable by lectures, by articles in the press, by giving publicity to facts relating to agricultural progress in Canada, to attract the attention of the farmers, and to stimulate them on their own account to make further inquiries.

MR. SPEIR'S OPINION.

Mr. John Speir, of Newton, near Glasgow, called to see me on the subject. He expressed very much the same views as those held by Mr. Wood, especially in the matter of canvassing the farmers. He said that Canada was becoming very well known in Scotland, not only as the result of lectures, but by the contributions to the agricultural press. He stated that the reports of the experimental farms and the increasing imports of agricultural produce from Canada were gradually having their effect upon the agricultural mind. To get farmers to move, however, he said was a slow process. They are not only conservative, but are always expecting that the action of parliament will do something towards improving their condition.

THE IMPERIAL INSTITUTE.

The following interesting report has been made to me by the curator of the Canadian section of the Imperial Institute:—

“The number of applications received during the year 1896 from persons contemplating settlement in Canada was considerable. In the spring a large number of the inquiries referred to Manitoba and the North-west, due probably to the excellent harvest of the preceding autumn, but as a rule by far the larger proportion of applications have been for information concerning British Columbia. Of these latter nearly all were in consequence of the mining development, and comprised many with a knowledge of mineralogy, including several foreigners. A considerable number of persons from the city have also called with a view to obtaining information about the gold fields. My personal knowledge of the Trail and Slovan districts has stood me in good stead, but it is to be regretted that the government of British Columbia does not respond to my request and forward specimens of the principal mines that are being worked, with photographs and other information. Nearly all the applicants have possessed capital, and such exhibits would be of the greatest interest to them.

“It is also to be regretted that the court of the North-west Territories still remains practically devoid of exhibits. Persons calling here for information about these much talked-of districts are certainly justified in taking it for granted that they will find at the institute samples of produce, photographs of farms, ranches and cattle. The absence of such exhibits not only creates disappointment, but certainly prevents my doing work which should have valuable results in many cases.

“Many inquiries are made relative to fruit farming, both in British Columbia and Nova Scotia. I understand that the Pacific province is already preparing a collection of its fruits, but the absence of any agricultural or fruit exhibits from Nova Scotia creates a distinct gap. Several persons, possessing a little capital, who have, acting under my advice, settled in the Annapolis valley, seem to have been well satisfied, and if the Maritime provinces took as active steps to attract desirable settlers as other portions of the Dominion they could certainly obtain a larger share of immigration than they do at present.

“The collections from the various experimental farms, made by professor Saunders, which, it is understood, will be sent here shortly, should be of great service.

“The colonisation lecture upon Manitoba delivered by Mr. A. J. MacMillan last March was very well attended, largely by persons contemplating settlement there. Its success caused me to propose to the secretary the arranging of an experimental course of four free popular illustrated lectures, devoted to the different sections of the Dominion of Canada. The proposal has been accepted, and, with the co-operation of the office of the High Commissioner and the other agents, I was able to secure promises from four gentlemen, of lectures. Their intimate knowledge of Canada should render the information most valuable. Posters with complete details were sent to nearly 400 polytechnic institutes, clubs, reading-rooms, &c., in London and its vicinity.

“About twenty persons applying to this office joined Mr. McMillan personally conducted party to Manitoba, and at least another dozen accompanied succeeding parties of this nature.

“The Canadian Pacific railway has, as usual, taken advantage of the opportunities of the section and furnished regular supplies of pamphlets, sailing lists and other information, which are circulated together with the official handbook. The number of pamphlets, &c., distributed during the year would amount to between 8,000 and 9,000.

“Enquirers, mostly females, made to the office of the United British Women's Emigration Society in the building, concerning Canada, are generally referred to me for advice, and domestic female servants applying to me are invariably sent to Miss Lefroy, the secretary. This mutual system is found to work satisfactorily, and the assistance of the society is of incalculable benefit to these women.

“In consequence of information acquired whilst in Canada in 1895 from the several immigration agents, I have, except in special cases, not encouraged city lads and young men to proceed to Canada with a view to working upon farms. Canadian farmers were

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reported as a rule as having strong objections to hiring lads with no knowledge at all of country life.

“The class of persons applying for information has been superior to that of the past few years, and I have provided most of those considered as desirable with letters of introduction to agents.

“On the whole, whilst the number of persons actually proceeding to Canada this past year through information acquired at this office has not been above the average, the condition both physically and financially has been decidedly better than usual.

“There is one class of applicants to the Institute in reference to which I would respectfully beg to make a suggestion. I have during each year quite a number of visits from persons of means who, having sons just about terminating their education, are desirous of settling the young men in Canada. Their idea is that a small capital should produce better results in Canada than in this overcrowded country. As the young men are, even if they have lived in the country, practically without experience either of farming or life in general, it is not unnatural that the relations are unwilling to advance the capital which they are ultimately quite desirous of providing, until the young man shall have a proper knowledge of the country and its conditions. The difficulty of inducing experienced and comparatively well-to-do farmers to proceed to Canada as long as they have any capital at all remaining, points, according to my views, to the desirability of encouraging a class of settlers who possess the double advantage of youth and a certain amount of capital. It is generally acknowledged that some young men would greatly benefit by proceeding almost direct from school to their Canadian destination. Here, however, at the outset I have encountered a very marked difficulty. The unscrupulous methods of certain persons connected with what is generally known as the farm-pupil agency has resulted in the issue by the authorities of a general warning that the payment of premiums of any kind is quite unnecessary. This course has undoubtedly in many cases been of great service. Whilst at the present moment the government officials appointed for the purpose certainly do in many cases render very effective assistance to persons endeavouring to obtain work upon farms, there exists upon the part of most parents or guardians a very strong desire to know beforehand something about the farmer to whom the young man is going, and be assured that whilst being made to work the young man is actually acquiring as rapidly as possible the details which he must possess before commencing farming on his own account, and further that in the meantime someone, in a country where he may have no friends, is keeping an eye upon him. Into the merits or the contrary of this view I have found it quite useless to go. Parents, and I consider not unnaturally, have very fixed ideas upon the subject, and on this account I find that many boys are detained here until they shall have reached an age at which parents consider young men to be self-reliant. In some cases they are sent to English agricultural colleges. Often they change their plans and follow other callings. There can be little doubt that they would do much better to proceed direct to Canada. In the west particularly, to which the open air life attracts many, whilst employment during the summer months is comparatively easy to obtain, there is, particularly in the newer districts, great difficulty in securing regular work for the whole year. Although the class of farming is undoubtedly improving, it is also probable that even if the immigrant does secure work, he will generally not learn that scientific farming, a knowledge of which tends so greatly to improve his chances of success. In Ontario there is, of course, the agricultural college at Guelph, but as this is a provincial institution, there prevails an impression that its benefits are intended mainly for Ontario people. Further very different conditions rule in some respects regarding the requirements and conditions of the two provinces.

“So desirous are many parents of their sons being properly looked after that most of them are perfectly willing to pay some small sum for the first year or so in return for adequate instruction and supervision.

“When visiting in 1895 the admirably kept experimental farm at Brandon it occurred to me that the establishment of some institution in connection with the same, where, in return for a fee that would cover expenses, young men could be sent, would be of immense service in this connection.

“Close to the finest wheat country of the province young men could easily be placed upon the farms which abound in the neighbourhood, during the spring, summer and autumn, and, in return for their labour, receive board and lodging and perhaps some small payment. In the late autumn and winter they could follow a regular course at the college and be taught scientific farming, dairying and other useful knowledge. By this means young men would specially under supervision attain a knowledge of farming that would enable them in a very short time not only to take up land on their own account, but to farm that land in a manner which experience has shown should produce the best results. The cost to pupils would be only nominal, whilst the addition of such an establishment to an existing institution should not be an expensive matter. From experience I am positive that numbers of desirable young men would proceed almost direct from school to an institution of this kind instead of, as at present, wasting a deal of time acquiring habits and tastes which are obstacles to their ultimate success in the North-west. I am constantly asked for an establishment of this kind and I find that, apart from the sentimental desire of having sons properly fed and treated, the desire of most persons is that the young men should really acquire a thorough effective knowledge of farming. An institution of this kind could be made almost self-supporting, whilst its benefit to the whole North-west should be very great.

“We are still having about half a million visitors annually and comparatively a large number of enquiries are made by foreigners, French and German, speaking practically no English. The Institute is being much more extensively utilised by the public as it is becoming more widely known.”

SMALL RESULTS.

The emigration to Canada has remained normal for the last few years. It has somewhat fallen off as compared with former times. Although the expenditure of the government in connection with emigration has decreased, the expenses of the steamship and railway companies have been more or less maintained, and there have been other agencies at work, notably the agencies of the provincial governments. Our own agencies have also been increased in number. Notwithstanding all this combination of efforts, the movement to Canada is not so large as it was ten or twelve years ago, a fact which seems to indicate that the diminution in the emigration does not arise from any want of attention on this side.

CONCLUSION.

In conclusion I may state it appears to me, as the result of my inquiries, that more money might, with advantage, be spent in connection with the encouragement of emigration to Canada, and that in the long run it would really be in the direction of economy. At the same time, however, my recommendation is accompanied with the qualification that it should be systematic and properly controlled, as I certainly do not favour any indiscriminate or purposeless expenditure.

I have the honour to be, sir,

Your obedient servant,

DONALD A. SMITH.

Department of the Interior.

APPENDIX TO THE HIGH COMMISSIONER'S REPORT.

Since writing the above report I have received two or three further letters from the Tenant Farmer Delegates from which the following are extracts :—

Mr. A. J. DAVIES, of Upper Hollings, Pensax, Worcester, writes :—

“In reply to your letter of the 9th inst. I would beg to say I have received a considerable number of letters during the past year from persons about to emigrate, asking for information concerning Canada, and I have in all cases but one, where the address was omitted, given all information in my power. The position of affairs in our agricultural districts is in my opinion at present undergoing a change not altogether favourable for any increase in emigration amongst farmers or their sons, but more so as regards farm labourers. Where formerly the farmer placed his sons in trades or professions they are to-day, in the majority of cases, through the depression in agriculture, kept on the farm to do the manual labour. No doubt in the future they will form a most desirable class of emigrants for any country. As regards our farm labourers each year sees an exodus from the country to town, nor do I think that any great amount of emigration is taking place to foreign countries. You ask what are the best means of bringing Canada before the notice of intending emigrants. I would say by disseminating throughout the country a knowledge of Canada's capabilities, not in single attempts but continuously. If in every county in England one of the county papers contained one single column devoted each week to passing events in Canada, agricultural and mining affairs, you would at once associate the minds of a large portion of the people with the Dominion, thousands of whom to-day look upon it as a second Siberia. I cannot but believe this might be carried out without any great cost, and with advantage to both countries. I would again draw your attention to the desirability in my opinion of placing greater facilities in the way for female emigration. Many thousands of our farmers' daughters in this country are going into situations in many cases as general servants, or what is even less desirable, as mothers' helps. A large number of these would emigrate were the facilities better. Not as regards the cost of emigration, but for the provision of a temporary home on their arrival, I would suggest that a list of names of respectable citizens or farmers in the Dominion should be obtained by the government agents where respectable girls could find a home for a few weeks at a reasonable charge. Another matter which has been brought to my notice and which seems to require some enquiry is the necessity of some provision being made if possible to prevent young men with capital entering Canada and falling into the hands of unprincipled agents. I have received since my visit in 1893 several offers of commission from such on any men I could introduce with capital. A young man who went out from this locality to the Edmonton district some two years ago is I believe shortly returning, having lost quite a little fortune, and from what I hear he has been regularly fleeced of his money.

“I would also suggest that a supply of up-to-date information regarding Canada should be sent to the various farmers' clubs throughout the country periodically for distribution. I should be pleased to receive some for Witley and Cleobury Mortimer, with which I am connected.”

MR. ALEX. FRASER, of Balloch, of Culloden, Inverness, writes :—

“I duly received yours of the 9th inst., and regret that absence from home has prevented me from replying sooner.

“For a considerable time past I have had a great deal fewer applications for information regarding Canada than formerly; and know only of one or two, as yet, who intend going to the Dominion this spring. I will be pleased to communicate with you when they have made their final arrangements with a view to giving them information that will be useful at the other end.

“Last year a very considerable proportion of the people who left Inverness and district have left for the Dominion, and in my opinion the advantages of the country are being kept before the people in a very able manner by ex-Baillie Stuart; also there is a periodical letter in one of the Inverness papers from Calgary, which, to some extent serves to keep up the interest.

“For some time back there seems to be a great inclination on the part of emigrants to go to Africa, and this to some extent has interfered with Canada. I believe, however, that it will only be temporary. As this is the proper season for making a start for the Dominion, I have little doubt that before long I will have numerous applications for information.

“I may say that since my return from the Dominion I have lectured on various occasions, and answered a very considerable amount of correspondence, giving information, all of which I was very pleased to do, but which, at the same time, occasioned me actual outlay, and took up a considerable amount of time.”

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No. 2.

REPORT OF LIVERPOOL AGENT (MR. JOHN DYKE.)

CANADA GOVERNMENT AGENCY,
15 WATER STREET, LIVERPOOL, 31st December, 1896.

The Honourable CLIFFORD SIFTON,
Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit my twenty-first annual statement from this agency on emigration matters.

When the Hon. T. Mayne Daly, Q.C., inspected the office in June last, he requested me to prepare a short report as to the work which was being done here, and to furnish him with suggestions for further operations which in my opinion would have a beneficial effect. As all the matter it contains properly belongs to the present report I cannot do better than insert the memorandum which I then presented.

The district served by the Liverpool agency comprises Lancashire, Cheshire, Shropshire, Staffordshire, Derbyshire, Yorkshire, Westmoreland, Cumberland, Northumberland and Durham, and the whole of the principality of Wales, with a total population of 13,000,000. In addition, now that the Irish agencies are closed, this office has part of the business with Ireland. Then, as the continental propaganda is conducted under the High Commissioner's supervision from the Liverpool agency, the countries of France, Belgium, Holland, Germany, Switzerland, Austria, Denmark, Norway, Sweden, Finland and some other parts of Russia, must be added.

The work of the office consists of :—

1. Answering correspondence. Letters are received from all parts of the United Kingdom and the continent, and in the English, French, Dutch and Flemish, German, Norwegian, Danish, Swedish, Finnish, Bohemian, Hungarian and Polish languages. Reference to the letter copying books shows that in the four months just passed of this year 2,523 answers to inquiries have been written; this is well within the average, which for some years has been about 8,000 per annum.

The correspondence of the Rev. J. Bridger, organising secretary of the emigration committee of the society for promoting Christian knowledge, is all done by my staff, and indirectly therefore I am in communication with the whole of the clergy of the Church of England, and with intending emigrants all over the country in whom they are specially interested. This society through the spring and summer sends a chaplain on one and sometimes on two Canadian steamers each week, and this is widely advertised.

2. Receiving callers. Very large numbers of personal inquiries are made at the office. Liverpool being within easy reach of quite 5,000,000 of people it is not surprising that so many take advantage of the office to have a personal interview either in place of or in addition to writing. This also being the port from which the great majority of the emigrants sail it is natural that they should look in this direction for information, and it very frequently happens that those who have friends or acquaintances in the neighbourhood ask them to call here on their behalf for whatever particulars may be required. Some of the government pamphlets also suggest to emigrants that they should call here on their way through, and a great many avail themselves of the invitation.

The head offices of nearly all the shipping companies engaged in the emigration trade being situated in Liverpool the principal steamship agents from all over the

country are often here, and every opportunity is taken to arouse their special interest in the Dominion. Most of the chief agents from the continent also make an annual visit.

3. Advertising in the newspapers in the counties named, throughout Wales, and on the continent as deemed advisable, is resorted to from time to time, and special news paragraphs are prepared and inserted whenever and wherever possible.

4. Outgoing ships are visited and emigrants and others interviewed and advised. Supplies of pamphlets are placed on each steamer for perusal during the voyage so that all passengers no matter whither bound may have an opportunity of learning what advantages are offered in the Dominion.

5. All parties of children are inspected in accordance with the regulations of the department.

6. All the English and foreign emigrants' boarding houses are kept supplied with pamphlets for free distribution, and through this means large quantities of our literature have been carried into the United States.

Parcels of pamphlets are also sent in special cases to steamship agents up and down the country.

7. Three sets of magic lantern slides are in constant use during the lecturing season, and from October to April last there was scarcely a vacant date. The lectures cost the government nothing as they are given by school teachers (it being understood that the childrens' parents and friends are to be invited), by gentlemen who have visited the Dominion, and by clergymen, many of whom have visited Canada as chaplains of the society for promoting Christian knowledge. Parcels of pamphlets are always sent, and it is found that the books are eagerly taken after interest has been aroused by the exhibition of the views.

Latterly owing to a newspaper paragraph emanating from the London office, numbers of applications have been received from schools for pamphlets for use as reading books, and parcels are being sent out daily in response.

8. Last year the department did not see its way to take part in any of the agricultural shows, but for a number of years in succession I prepared, under instructions, for the Royal agricultural show, an exhibit of Canadian products, and attended at the meetings, being brought into contact there with most of the leading agriculturists of the country and with just the kind of people Canada requires. 25,000 pamphlets can be easily and most advantageously distributed at one of these shows, which last six days.

I have also at various times had the exhibit at the shows of the Royal Manchester, Liverpool and Lancashire Society, which are of a similar character, but not on quite so extensive a scale.

9. Inward bound ships have occasionally to be met and calls are received from Canadians who intend while visiting Europe to do what they can to promote emigration: advice is tendered to such, literature supplied, and all the assistance possible given.

10. Each year since 1883, with one or two exceptions, I have prepared and supervised the printing of pamphlets and leaflets in some of the following languages:—German, Flemish, Dutch, Norwegian and Danish, Swedish, Finnish, Bohemian, Hungarian and Polish; and have distributed them through the steamship agents on the continent and from this office direct. In the aggregate some 1,922,550 foreign publications have been issued from this office.

It is only possible to say approximately how many English pamphlets are sent out from this agency, but it is within the mark to say the number approaches 50,000 per annum.

In addition to what is specified above there are a number of duties and matters of small detail in connection with the receiving and forwarding of advice lists of English and foreign bonus passengers, the payment of the bonus to continental agents, etc., etc.; and I am in daily communication with the steamship and railway companies and the High Commissioner's office upon numberless points connected with the business.

With regard to suggestions for a future policy I would respectfully recommend:—

a. A continuance of the present policy so far as it goes.

b. More extensive and continuous newspaper advertising.

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c. Taking part in the Royal and other agricultural shows and making our exhibit more comprehensive and complete with regard to other products than grain and grasses. Fresh samples should be sent every year. Those remaining over from the shows could be sent with great advantage to steamship agents for exhibition in their windows and offices and to school museums &c. Many applications for specimens from such have been received. The samples at present in my possession have been in use for many years.

d. The adoption of some system of nominated passages such as obtains in connection with emigration to Queensland and Western Australia, or some system under which the friends or relatives of settlers could be assisted out on security given for repayment of advances.

A most important movement, and one which I have advocated for years, is the establishment of bodies in the Dominion whose duties it will be to make an interest in new arrivals, assist them to locate successfully, and encourage settlement generally. This I see from the report of the immigration convention is now likely to be accomplished. The municipality of South Qu'Appelle has had prepared and has sent to me a sectional plan of their district showing the lands occupied and the sections vacant, and have had leaflets printed setting out briefly the advantages of the locality. Their example might profitably be followed by other municipalities.

In the above I have confined myself to the emigration work of the office and have not touched upon its utility as a trade and, as it were, a consular agency. It is annually becoming more important in this respect and the enquiries I have received from business men with regard to exports and imports, customs duties and regulations, the statutes, the probabilities of successfully engaging in this or that trade, etc., are very numerous indeed. Canadian trade interests of all kinds have to be carefully watched and guarded, and many special reports have to be made concerning them.

In conclusion I will repeat a suggestion that has been made in previous annual reports, namely, that files of all the principal daily and weekly newspapers be sent regularly to this office; one or other of them is always being asked for, market reports and other Canadian news being wanted, and it is for the general benefit that I should be able to keep myself posted on all Dominion affairs.

The emigration returns for 1896 give the number of passengers leaving Liverpool as follows: to the United States 18,622 saloon, and 52,288 steerage and intermediate, including 24,466 foreigners; to Canada 4,429 saloon, and 17,109 steerage and intermediate, including 7,202 foreigners. The figures for 1895 were, to the United States 19,596 saloon, and 70,578 steerage and intermediate, including 29,769 foreigners; to Canada 4,591 saloon, and 17,005 steerage and intermediate, including 5,807 foreigners.

It will be seen that while there has been a great decrease in the numbers leaving for the United States ports, the Canadian returns are substantially the same as last year's, and it may be safely concluded that the emigration to the Dominion was larger in 1896 than in 1895, because there is no doubt that each year a greater proportion of our people travel *via* United States ports owing to the attractions possessed by the faster lines of steamers. The defective nature of the English Board of Trade returns has been more than once alluded to in reports to your department, and care must be exercised that false deductions are not made from the figures presented. It has often been pointed out that a large proportion of the so-called emigrants credited to the United States are not emigrants at all in the sense usually understood, and in this fact is found an explanation of part of the large decrease in the United States figures. The exceedingly low ocean passage rates of 1895 (£4 return), induced a larger number than usual (over 50,000, excluding saloon), to come over to Europe to visit friends, especially as business was not good in America at the time; on their return all those who did not travel saloon were classed as emigrants. The great rise in the fare (to £10 return) naturally checked such a movement. The reasoning does not apply to the Dominion to anything like the same extent; a glance at the Canadian figures shows a different state of affairs, and goes to prove the contention that the higher rate of passage money has no material effect on bona fide emigration, of such a character as that which constitutes by far the larger part of the emigration to Canada. I do not mean to say that there would have been absolutely no more emigrants to Canada had the rates been lower; but with the

exception of domestic servants (a very limited class) those who would be kept here by the difference in the fare are few and are not the people we are anxious to secure.

The foreign emigration to Canada had been decidedly better this year than last, and my advices from the continent lead me to expect an even more pronounced increase next season. I must reiterate my opinion that we must look more and more to the continent of Europe for the numbers required to people the great North-west; it is true that our every movement is hampered there and every possible impediment is put in the way of emigration by the various governments, but there is a tremendous field for our work, the people are industrious and thrifty, used to an existence of hardship and exceptionally well fitted for pioneer life. As the High Commissioner pointed out in his report in 1894, the farmers in Great Britain are after all a comparatively small class and very conservative, unwilling to take such a decided step as emigration until absolute necessity compels it. The whole number of farmers between the ages of twenty and fifty in England and Wales is not more than 125,000, and the male farm servants of similar ages 510,000; whereas in Germany alone out of a population of 51,000,000 there are 19,000,000 agriculturists, and in South Russia, Norway, Sweden and Denmark the proportion of inhabitants engaged on the land is almost equally great. The migration from the country to the towns which has been so marked for some years in this country is also taking place in Germany, and recent statements respecting the census of occupations taken at midsummer show that the agricultural workers are now only 36 per cent of the population, whereas in 1882 the percentage was 43.

The desirable character of the emigration both British and foreign to which of late years we have been accustomed has been maintained during 1896, and probably owing to the higher rates of passage money it has been noticeable that fewer applicants of a poor and unsuitable class have had to be warned of their unfitness. On the other hand no opportunity has been lost to bring before the public the advantages which Canada offers to the right kind of people. Under the direction of the High Commissioner I advertised in the spring in all the principal newspapers through my district, and the response showed a widespread desire to obtain information. Newspaper advertising is one of the best methods of attracting public notice, but to be thoroughly effective it must be persistent, and I would suggest that a standing advertisement should be kept in some of the leading provincial papers. Besides the direct benefit to be derived we should have the advantage of finding these papers more willing to insert paragraphs of Canadian news, and by a judicious forwarding of items relating to the progress of the Dominion in various directions further very effective advertising could be obtained without much extra expense. Something is already done in this way, but the newspapers do not lend themselves to it as readily as they might do were our advertising more extensive.

I am glad to say that so far as my observation goes there have been fewer attacks made upon Canada in the press than during the previous year, but one of the worst emanated from Winnipeg. As in former years some detraction of the country has been heard from discontented people who have returned; they may have been themselves unsuitable or they may have been simply unfortunate, but the country gets the blame and it is difficult to counteract the bad impression that is thus created. One of the complaints most often heard, and one in which I fear there is some truth, is of difficulty and often failure to obtain wages for work done for farmers in the west. If those who are satisfied would take a little trouble to make their success known in their native places, they would do an immense amount of good. This is a matter which the Western Canada immigration association might well take up, and it would justify its existence if it did nothing more than prevail upon a few settlers in each district to send one or two letters home every year to the various newspapers which circulate in the neighbourhood. If individuals would supplement the efforts of the government in the way suggested our work would be easier and far more fruitful.

Good work continues to be done with the three sets of magic lantern slides placed at my disposal. Last season they were in constant use for six months; since October they have again been engaged almost every day, and they are now fully booked for lectures and addresses until the end of February.

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The society for promoting Christian knowledge has carried on the work which has been fully described in previous reports, and as the correspondence is done in my office I have evidence day by day of the value of its wide-spread organisation.

The children emigrated by philanthropic individuals and societies have been rather more numerous than last year, notwithstanding the increase in rates. I have inspected 67 parties, comprising 1,773 children, and have almost invariably found them in good health.

Canada was again unrepresented at the Royal agricultural show which was held this year at Leicester. In omitting to take advantage of this and kindred agricultural exhibitions the Dominion loses one of the best advertisements it could possibly obtain. They are attended, the Royal in particular, by many thousands of the very class that we are anxious to secure, and to show them samples of the produce of Canada is the surest way to arouse their interest. A farmer may hear or read of the fertility of a country without being very much impressed, but show him some wheat and let him understand that it can be raised at so many cents per bushel and you get his attention directly. At Leicester there was an attendance (including members of the society &c.) of over 150,000. The next show is to be held at Manchester in June next, and as it will be of unusually large dimensions, and the place of meeting is one of the greatest industrial centres in the Kingdom, a record gate is expected. If circumstances will permit your department to make an entry, an entirely new set of samples will be necessary; and I would urge that a more complete representation of the products of the country should be made than has ever hitherto been shown. It should not only include samples of grain and grasses but specimens of canned fruits of all kinds, condensed milk, cheese, butter, &c., and great care must be taken that everything is the best of its kind as it will come before one of the most critical assemblies of experts in the world.

Speaking of samples leads me to again mention the fact that we are constantly in receipt of applications for specimens of produce, and if collections of grain and grasses could be made from the shows in Canada and sent over here every year for distribution amongst steamship agents and others, who would be only too willing to exhibit them, a very valuable advertisement would be obtained at a comparatively trifling cost.

I have not touched upon the agricultural returns of the United Kingdom feeling that perhaps the subject will be more in place in my report to the Minister of Trade and Commerce, to whom I will supply the customary tables.

In conclusion I beg to thank my colleagues in this country and in Canada for their hearty co-operation, and the representatives of the steamship and railway companies for the willingness with which they have always given me information and assistance. My special acknowledgments are owing to your department for the consideration which has been extended to me during a prolonged period of sickness; my health is now almost restored, and my thanks are due for the leave of absence that enabled me to take the rest and change which have had so beneficial a result.

I have the honour to be, sir,

Your obedient servant,

JOHN DYKE,

Canadian Government Agent.

No. 3.

REPORT OF BRISTOL AGENT (MR. JOHN W. DOWN.)

BATH BRIDGE, BRISTOL, 31st December, 1896.

To the Honourable CLIFFORD SIFTON,
Minister of the Interior,
Ottawa.

SIR,—I beg to hand you my annual report upon emigration.

The total emigration from this country this year I learn has been very unsatisfactory as far as Canada is concerned. No doubt the falling off in the returns must be attributed to several causes; but I think the principal reason will be found in scarcity of money throughout the year, as, although the departures from the west of England have been below the average of past years, the correspondence with this office has actually increased, and I have had more people calling personally upon me than in any previous year. These facts clearly show that there are thousands giving their attention to emigration, and who would have left this country this season only they have been prevented by want of sufficient capital to make a fair start in the colonies. I find the people who are giving attention to emigration may be divided into tenant farmers with ample capital,—a very desirable class of colonists,—small tenant farmers with limited capital, agricultural labourers, and then follow thousands of mechanics, artisans, general labourers, clerks, &c.

I commenced the year by distributing pamphlets freely at the local agricultural gatherings of farmers and country cattle sales. I had conversations with hundreds of farmers who appeared to be very favourably inclined towards the Dominion, and I rather expected later on in the year that there would have been a good number of farmers emigrating from this district to Canada; but, notwithstanding my efforts, I found farmers still held on to their farms and were reluctant to give notice, with the intention of emigrating at the expiration of their tenancy. In the spring prices for cattle and other things gave signs of improvement and prospects got brighter, in fact so much so that many farmers considered that times in this country were going to change and that agriculture would become much more profitable, and for the time being gave up all ideas of emigration.

I look upon the distribution of pamphlets as one of the best methods of bringing Canada prominently before the farming classes, and consider the sooner such a movement is started the better, having found by experience that the earlier in the year new pamphlets are in the hands of the public the better results are shown in the spring when the bulk of emigration takes place. Some farmers will decide in the course of a few weeks whether they will emigrate, but in the majority of cases a farmer does not settle this question until he has considered same for several years, and I am now in negotiation with Somersetshire and Devonshire men, with whom I have been in correspondence for more than three years. These are generally farmers with sufficient capital to hold on for a few years, in spite of continual losses, but who will ultimately be compelled to give up their farms in this country, unless agriculture improves considerably, which is now regarded as exceedingly improbable, if carried on upon the old fashioned lines.

From short advertisements in the country papers which were inserted during a portion of this year I have traced good results. This is an economical mode of bringing Canada before the public and I trust will be adopted again during the year 1897. These short advertisements of course do not give much information in themselves, but

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place me in communication with farmers throughout the country and I am enabled to supply them with just the information they require upon any one or other particular province of the Dominion.

The rates to Canada last year it will be remembered were down to the low figure of £2 per adult, steerage, and during this year numbers of families have given up the idea of emigration for the simple reason that they had based their calculations upon the passage rates given them of £2 per adult last year, and were not inclined to pay the advance of £3 or £4 per adult. This no doubt had a great deal to do with checking emigration, not only with the poorer class of farmers, but also with those who could afford to pay the advanced rates.

I am very pleased to report that during the summer I had the pleasure of seeing at this office many old emigrants I had sent out to Canada some 10 or 15 years ago, and who had done exceedingly well in the Dominion. I did not hear a single complaint from any source, and in fact all my visitors were unanimous in praise of the country they had adopted, and did their utmost whilst here to assist me in getting others to follow them. One of my visitors was a Mr. Thomas Snell from Manitoba who went to Canada some 17 years ago. His home in this country is at Chippenham, Wiltshire, and he returns next month. He has done remarkably well and like my other visitors has nothing but good words for Canada, and I have no doubt that while staying in his birth-place he will do his best amongst the farmers of the locality to place the advantages of Canada well before them.

During the year a considerable portion of the people calling at this office for information upon Canada have shown great prejudice against the country, fearing it should have climatic disadvantages, and being more favourably inclined towards New Zealand, South Africa and the United States. As a rule I have been able to dispel these fears and have always done everything in my power to secure for Canada every emigrant likely to prove a useful settler, and at the same time doing my utmost to weed out the worthless and undesirable class of men who are attempting to reach the Dominion. Wherever possible I have given emigrants leaving this district letters of introduction to people in Canada, and find that all my emigrants have been well looked after.

My correspondence with the steamship agents has considerably increased of late and I find there is a great demand amongst them for pamphlets upon the Dominion of Canada, and I have from time to time completely cleared out my stock to supply the steamship agents throughout this district.

The present pamphlets in use are capital little handbooks, and it would be difficult to improve upon them, containing much useful information, setting forth the advantage of the country in a plain, straightforward and attractive manner. I trust to be able to distribute large numbers of pamphlets during January, February and March, and have no doubt good results will be obtained the ensuing spring.

The number of people returning to Canada upon prepaid tickets still increases, which shows that Canada must be maintaining her prosperity, otherwise farmers could not be visiting this country in increasing numbers, spending three or four months expensive holiday, year after year. All my visitors have been delighted with Canada and especially with the advance of prices they have secured this year for their stock. There is no doubt there is a grand future in store for the North-west.

The year opened well for the English farmers owing to the mildness of January and February and a lot of early corn was planted, but March was very wet, and all tillage operations had to remain in abeyance until April, when there was plenty of work for farm labourers, and the demand for this class of people kept many from emigrating in the spring of this year. Later on drought set in and the seed failed to germinate, with the result that the crops of barley and oats were complete failures. The returns show an increase in the amount of wheat harvested, and the average yield appears to be about 32 bushels. This has in fact been the best crop of the year and prices opened at 25/2 per imperial quarter and then declined until they reached the bottom at 22/4 in August. In the last week of November they were at high water mark, namely 33/4 and since then there has been a decline and now the last week in the year they stand at 30/9. Consequent upon the rise in the price of wheat, the chief serial of this neigh-

bourhood, larger acreage than usual has been laid down this autumn, and there are indications of at least a temporary revival of wheat growing in several districts throughout the west of England. Certainly the wheat crop has been the one redeeming feature of English farmers in the southern portions of the United Kingdom, the continued drought having enabled them to harvest it in the best possible condition. But farmers in the north of England were less fortunate; their harvest came at the break up of the drought, and the greater portion was irretrievably spoiled.

The barley acreage shews a decrease for this neighbourhood. That planted very early turned out exceptionally well and sold at high figures, malting samples making from £2 upwards. The average at the beginning of the year was 24/7 and in July went as low as 16/2, but at the end of October advanced to 29/7, the top price, and since then has declined to 24/1.

The dairy farmer here has had a trying time owing to adverse climatic changes. A wet March gave promise of early grass in April, but a scorching sun burnt up all the pasture. Butter rose in value but not to any great extent, owing to the importations from foreign sources, Canada sending large quantities this year, but the extra prices obtained did not make up to the local farmer the deficiency of his average yield.

The general opinion expressed by the leading agricultural journal is that the outlook for farmers is not so dark and gloomy as last year; but it is still far from encouraging, and they recommend farmers to give more attention to commerce, as by so doing can they only hope to strive with the tide of foreign competition, which gets ever stronger year by year; thus for the 11 months ended 30th November of the present year, as compared with the corresponding period of 1895, the imports from foreign countries and British possessions show an increase in value of over 18½ million pounds sterling.

I am strongly of opinion that we shall see a brisk emigration next spring and summer, after the lull of last year, I recommend a free distribution of pamphlets throughout this district, as, although many thousands were sent out from this office, last year, I doubt if very many are now in existence, having been in many cases simply once read and then cast aside and destroyed, but now that emigration will certainly receive better attention from the farming classes it will be a great pity if the opportunity to secure emigrants for Canada is neglected.

I beg to remain, sir, your obedient servant,

JOHN W. DOWN.

Department of the Interior.

No. 4.

REPORT OF GLASGOW AGENT.

(MR. THOMAS GRAHAME.)

52 ST. ENOCH SQUARE, GLASGOW, 31st December, 1896.

To the Honourable CLIFFORD SIFTON,
Minister of the Interior,
Ottawa.

SIR,—I have the honour herewith to submit this my twenty-fifth annual report for the year ending 31st December, 1896.

During the winter months I took advantage as usual of all opportunities of disseminating information regarding the various provinces of the Dominion. At markets, shows, &c., I met with large numbers of people who had the intention of going to some new part of the world, and to the best of my ability I drew their attention to the advantages possessed by our various provinces, and the best course to pursue as to time of going, &c., in case they made up their minds to go to any of them. In some cases those inquiring were not suitable for settlement in our country, but when they were I advised them as to the procedure they should adopt, more particularly with agriculture in various ways, and especially those who had more or less capital as well.

As in the past I had a very large number of engagements to meet people at this office who had ideas of going to some part of our country, and in all instances gave them all the information I could, letting them know as to ocean and railway fares, &c., and generally informing them so far as lay in my power as to the manner in which they could get most satisfactorily to the part of our country to which they had made up their minds to go. The majority of those consulting me in the early months of the year went out in the spring or early summer. The districts principally inquired about were Manitoba, the North-west and British Columbia, at the same time there being numbers of inquiries regarding some of the older provinces. I had likewise inquiries regarding Newfoundland; I also gave a great variety of information by correspondence. The inquiries, both personal and written, are constantly increasing at this office. I may make reference in this connection to the numerous reports which I have made during the year to the High Commissioner on matters pertaining to trade and emigration.

In regard to female domestic servants I may say the demand for good ones is constantly increasing in the country. Women who formerly used to take service in that way find employment in works of various kinds in and about towns, such as factories, etc., and also large numbers are employed in various ways in which young men used to be employed in the past, such as clerks, etc.; as a consequence there is not the opportunity we could desire for inducing many of that class to go out to our country.

The pamphlets, etc., which I have received for distribution I have utilized to the best of my judgment, large numbers of them being sent to various steamship agents throughout Scotland, as well as important agricultural shows through mechanics institutes, free libraries, schoolmasters, etc. The tenant farmers delegates reports were inquired for as in the past; but, as it is some years since the last delegation was sent out, I would submit the question of the advisability of another set being selected for next season, on the lines that may be thought most advisable. I would venture to suggest also that there should be more extensive advertising, more particularly in the chief agricultural papers in Scotland, the having exhibits regularly at the chief agricultural shows throughout the country, and the distribution of our literature at

at these, the having a greater quantity of small leaflets printed with condensation of information for distribution at shows, fairs &c., where the people receiving them frequently will not take the trouble to read a larger pamphlet, also more small pamphlets on the authority of all the provincial governments for distribution, as many inquiries are made regarding each particular province. That in special cases where worthy and appropriate families, and of unexceptionable character, are in poor circumstances, on your being consulted and approving such cases, a considerable amount of assistance might be given towards payment of their expenses in going out, and this might also apply to female domestic servants who were found to be of first class character and suitable for our country. That lectures should be given during the winter and early spring months by men who are competent for such a duty and who have been resident in our various provinces for a number of years, especially Manitoba, the North-west, and British Columbia; to have these lectures given in the district or county from which they originally went to Canada, say none eligible for such duties excepting those who have not been out more than 15 years, so as to enable them to have influence with their friends, relations and connections before they have got out of touch with them in this country. That it might be advisable for government in the new and prairie districts of the country to put up small houses on quarter sections, and have a few acres in cultivation in suitable localities, so that the proposed occupier would have a place so to speak ready made for him, those settling on such lands to recoup to government by annual instalments any expenses that may have been incurred in such preparation, and they being a lien upon the land. There might be difficulty in the way of selection of appropriate people for such places. I have referred to this matter on former occasions, and on full consideration think it would be worth while to make the experiment on a small scale at first, and of course whoever has the authority for the selection of the individuals to be settled would require to be very careful as to the suitability of the persons getting this privilege. As a rule I think it would be well for all connected with emigration to advise people going out not to take up lands till they have some experience of our country. Of course there may be cases where people accustomed to farming, and going to join friends, or those with capital and experience, as well as under former clause of my recommendations, where the circumstances might warrant immediate settlement, but as a general rule there is nothing like experience of a country before committing oneself to anything in the way of permanent settlement. The sending out of personally conducted parties of emigrants, especially early in the season, and after careful advertising, is a good plan. There should, I think, be a statement in our literature bearing on the position of British emigrants going to the United States instead of to Canada, the oaths of allegiance they have to take, &c.

I, as usual, attended the Highland society's show, which was held at Perth this year, where I met with large numbers of farmers and others, with whom I had conversations, and saw to the distribution of some of our literature. It was a very good show of horses and cattle particularly.

I have had a large number of applications for my magic lantern slides. The Rev. John MacLean, amongst others, had the use of them for a considerable time. The slides, I may say, have now been in use for a considerable time, and a number of them have been more or less damaged. I hope by another season to get a fresh supply, with some, as suggested by Mr. MacLean, of an amusing character, such as referring to tobogganing, Indian scenes, &c.

As in the past I continue to keep on the most friendly relations with the various steamship companies connected with Canada, affording information to them and they to me for the benefit of all concerned; and I as usual keep them supplied with our various pamphlets to the best of my ability whenever they may require them, and make a rule of seeing the various passenger ships leaving for Canadian ports, and giving a supply of our literature in each case.

I may say I always take an interest in the emigration of suitable children from various homes in this country to their places of reception in our various provinces.

The Canadian Pacific Railway continues to attract a large amount of attention in this country, many of those connected with it having friends in Scotland. There are

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many inducements therefore for large numbers here being interested in its progress. It would appear that for trips round the world this line of route is being increasingly patronized from year to year.

I have had a very considerable number of Canadians calling here, on all sorts of subjects, both as regards emigration and matters of trade, travel, &c., and have in all cases done my best to afford the most satisfactory information to them.

Trade in this country has been as a rule fairly prosperous of late, though from an agricultural point of view there has not been a great deal of improvement. Grain certainly has increased in value to a considerable extent, but the value of fat stock and stores has as a rule not been reassuring, and root crops generally have not been very profitable. The result is that people continue to flock to the towns in large numbers and the purely rural population is not increasing. The consequence is that there are not the superabundant numbers that there used to be in past years of farm labourers. I have, as always in the past, been very particular in dissuading unsuitable emigrants from going to our country, such as those who are only accustomed to sedentary pursuits, having no knowledge of agricultural work, and having no capital. I was very much pleased to see the exposure of the farm pupil business which was made in Ontario early in the year.

There is much comment in this country upon the increased prices of grain all over Canada, and particularly in the districts chiefly relying upon this source of production, and it is anticipated that this will prove a fair incentive to increased emigration next season. I am very much pleased in this connection to see that farmers all over are going into mixed farming, finding by experience that it is not advisable to have all their eggs in one basket. The developments that have been made in stock raising of all descriptions in the west are very satisfactory, and will be no doubt productive of great benefits to all concerned in the future, and especially if the proper and necessary increase in the number of such animals is made from year to year, commensurate with the increase of population and lands under cultivation.

In a general way, so far as I could judge, the emigrants who went out during the past season were of a very suitable character for settlement in our country, they being as a rule well adapted for life in our country districts.

The prospects for next season, from all I can gather from correspondence, callers here, and the general outlook in our country, should prove satisfactory as there is nothing to look forward to in the way of improvement in agriculture in this country; and there is also this to be said that in various parts of Canada the developments in minerals having proved much greater than anticipated, there will in all probability be a considerable impetus given to people connected with these industries going to these various parts, this proving an inducement for those connected with agriculture likewise to go in larger numbers, as wherever towns or villages spring up the necessaries of life in the shape of food will have to be obtained in sufficient quantities for the population that may be settled in these pursuits. Then the rise in prices of grain which has been so considerable in Manitoba and the North-west, from all that can be gathered, is likely to prevail for some time, as there are such great deficiencies existing in numbers of the other great grain producing countries of the world. I think also the tendency is more and more for the very best class of people adapted to settlement in our country going out.

As I have so frequently referred to in my former reports, there being only one line of passenger steamers sailing to Canada from the Clyde, large numbers of Scotch immigrants go via Liverpool, and are thus classed as English emigrants. During the winter months very few people go out from here, and then chiefly towards spring, when passengers are taken by vessels going via Halifax. I may say a considerable number of people go to our various provinces by United States ports, both by the Allan and State lines, and by the Anchor line and are classed as immigrants to that country instead of Canada. I think it would be of great importance that a practicable decision should be come to as quickly as thought desirable in regard to the proposed fast line of steamers from some port in this country to some Canadian port. There has been a great deal of discussion on this subject in the papers of this country as well as in those

of our own, and when anything definite is determined upon in this respect it will no doubt prove of immense benefit to the interests of our country, as it would be the shortest line of route to a great proportion of North America, both the northern part of the United States and Canada, and it therefore should be patronized to a very large extent, and would cause an immense change in the way of transport from the northern United States ports on the Atlantic to Canadian ports. When this is accomplished it would also have a strong tendency to accelerate the speed of the ordinary freight steamers from the various ports here to Canada.

I continue as in the past to be under great obligations to the High Commissioner and staff for affording me information on all kinds of subjects which might be of use to me in the performance of my duties.

I continue also to have the greatest courtesy accorded to me by the press of this country in regard to all matters affecting the interests of Canada.

I have the honour to be, sir,

Your obedient servant,

THOMAS GRAHAME,

Canadian Government Agent.

Department of the Interior.

No. 5.

REPORT OF SPECIAL AGENT IN MIDLAND COUNTIES OF ENGLAND.

(MR. ERNEST J. WOOD.)

78 BEAUPORT ROAD, BIRMINGHAM, 30th December, 1896.

The Honourable
The High Commissioner for Canada,
17 Victoria Street, London, S.W.

SIR,—I have the honour to submit my report for the period extending from October 21st to December 31st, 1895 (not included in the report for the year 1895) and for the year ending December 31st, 1896.

My work has been carried out on the following lines, viz;—

VISITS TO MARKET TOWNS, FAIRS, STOCK, SALES, ETC.

The following list gives 55 fairs, etc. visited by me, viz.:—Birmingham Cattle Show, 4; Hampton-in-Arden, 2; Bromsgrove, 2; Waterorton, 1; Rugeley, 2; Henley-in-Arden, 1; Lichfield, 3; Wolverhampton, 4; Warwick, 2; Alecester, 1; Coventry, 2; Knowle, 2; Northfield, 1; Barut Green, 2; Sutton Coldfield, 2; Tamworth, 1; Dudley, 1; Alvechurch, 2; Brownyard, 2; Cannock, 1; Wenlock, 1; Nemeaton, 1; Rugby, 2; Redditch, 1; Derby, 1; Stourbridge, 1; Dunchurch, 2; Kenilworth, 1; Studley, 1; Nottingham, 1; Stafford, 1; Fazeley, 1; Banbury, 1; Wellington, 1; Newcastle, 1.

On these occasions I have distributed pamphlets, exhibited cereals, etc., and entered into conversation with farmers and especially farmers' sons. In this way the advantages offered by Canada to this class are cheaply and effectively advertised.

A COURSE OF ILLUSTRATED LECTURES ON CANADA.

The following list gives 83 lectures delivered by me, viz.: Abingdon (grammar school)—Bradfield College (great public school)—Oursdle School—Ashley de la Touch (grammar school) (Leicestershire County Council, course of 9 lectures)—Osgathorpe (do)—Barrow-on-Soar (do)—Quorn (do)—Loughborough (do)—Market Bosworth (do)—Market Harborough (do)—Kibworth (do)—Hinckley (do)—King's Norton (Working Men's Club)—Fort Hill—Trent College—Repton School (great public school)—Birmingham (Sunday Lecture Society) 2—Durham School (great public school)—Sheffield School (Old Boys' Conversazione and Literary Society)—Reading School—Loucing College (great public school)—Buckingham-Leighton Buzzard (Young Men's Christian Association)—Kellering (Church Institute)—Aston (Library Course)—Bristol Street School (Birmingham Evening Classes for young men)—Retford School—Lincoln (grammar school)—Denstone College—Winson Green (Congregational men's meeting)—Stratford-on-Avon (King Edward VI school, distribution of prizes)—Wednesbury (The Institute)—Abingdon (per request of the mayor)—Banbury Municipal Technical School (Popular Lecture series)—West Bromwich (The Institute)—Crawford-Wiltshire County Council (17 Lectures) viz.: (Downton, Cholderton, Atworth, Neston, Hilmarton, Lea, Wanborough, Bratton, Erchpont, Keevil, Bishop's Cannings, Savomake, Oare, Shrewton, Ramsbury, Little Bedwyn, Burbage, Wahall (working men's Popular Lecture

Series)—Newcastle High School—Tindal Street (Birmingham School Board)—Rugby (great public school)—Middlemore's Emigration Home (by request)—Colonial College (Hollesley Bay)—Malvern College (great public school)—Basingstoke (Queen Mary's School, Distribution of Prizes)—Wellington College (great public school)—Sevenoaks (grammar school)—Winchester College (great public school)—Marlborough College (great public school)—Coleford (No. 1) (Gloucestershire County Council Course)—Coleford (No. 2) (Gloucestershire County Council Course)—Epson College—Cranleigh School—Charterhouse (great public school)—Halesowen (grammar school)—Bronesgrove School—Bristol School (great public school)—Bury (grammar school)—Manchester Grammar School (great public school)—Pailton (Warwickshire County Council)—Christ's Hospital (great public school)—Berkhamsted School—Merchant Taylor's School (great public school)—Horton Kirby—Dulwich College (Science Society)—Eton College (Eton Literary Society and the great school)—

All these lectures (press reports of which having been enclosed from time to time in my monthly reports) have been illustrated with lantern-views free of expense to the government, and have been given before all classes of society under most representative auspices. They have been well attended, and, in the case of the schools, parents and friends of the boys have been present on most occasions as well as the boys themselves.

ENQUIRIES—INTERVIEWS—CORRESPONDENCE—DISTRIBUTION OF PAMPHLETS.

This portion of my work has been about the same as in years past.

SETTLERS WHO HAVE EMIGRATED TO CANADA.

The number of settlers sent out by me in April and May together with my special party which I took over in June last is about 200 being about the same as for the corresponding period in past years; it is impossible to give any accurate estimate of the total number which I may have induced to settle eventually in the Dominion. Regarding the aggregate amount of capital, I should estimate it at £300 per settler, or about £60,000 altogether.

MY VISIT TO CANADA.

My visit to Canada from June 11th to August 24th in connection with a special party of 120 settlers was most satisfactory. Owing to the admirable arrangements made at Winnipeg by the immigration officials, no difficulty was experienced in their satisfactory distribution throughout the West; also the same admirable arrangements were made in the East. My sincere thanks are due to the officials of the government, the Allan Line, and the Canadian Pacific Railway, for all the courteous assistance which I received at their hands. I received a letter from one of my party, Mr. Roscuroll of Alberta, expressed in terms of such complete satisfaction that I took steps, upon receipt of the same, to ensure publicity through the valuable columns of the Canadian Gazette in its issue of November 19th, 1896. The notes which I compiled during my trip throughout the Dominion, together with a personal observation of the various districts after an absence of nearly four years, have been and will continue to be highly advantageous in the prosecution of my work to promote the emigration of suitable settlers.

CONCLUSION.

I am deeply indebted to the clergy and the head masters of the schools where I have lectured, for all the interest they have taken in my work and the help given by them. I inclose, amongst many expressions of opinion, letters from the head masters of Winchester and Marlborough Colleges. I have to thank the Canadian Pacific Railway, the steam ship companies and their agents in the midlands as well as the Canadian

Department of the Interior.

Gazette for all their co-operation which has been of much assistance to me. I beg to tender my thanks to you, sir, Mr. Colmer and Mr. Reynolds especially, and to the staff of your office generally, for many valuable suggestions, useful advice and unvarying courtesy. My thanks are also due to the Department of the Interior for statistical and other information sent to me from time to time.

I trust that my report will meet with your approval.

Your obedient servant,

ERNEST J. WOOD.

Copies of letters appended to Mr. Ernest J. Wood's Report.

The College, Winchester, 24th October, 1896.

Mr. E. J. Wood gave an attractive lecture on Canada at Winchester College on October 21st, 1896. The lecture was full of valuable information with regard to the great resources and immense possibilities of the Canadian Dominion, and was lighted up with flashes of humour and amusing anecdotes; it was abundantly illustrated with a series of charming views. The boys were greatly interested in the lecture and spent a pleasant and most enjoyable evening.

W. A. FEARON, D. D.

Head Master of Winchester College.

Marlborough College, October 24th 1896.

Mr. Ernest J. Wood gave to a large audience of masters and boys on Thursday last a clear and interesting account of the chief features, the resources, and the importance of Canada, illustrated by excellent slides. As he acts under the direction of the Dominion Government, one of his objects is to point out the advantage of Canada as a field for emigration, and to give some practical suggestions. Such information is interesting to public school boys, many of whom are destined for colonial life. And all would enjoy the picture that Mr. Wood draws of the greatness and the rapid development of the Dominion.

G. C. BELL, M. A.

Head Master of Marlborough College.

No. 6.

REPORT OF SPECIAL AGENT IN THE LOWLANDS OF SCOTLAND.

(MR. PETER FLEMING.)

44 HIGH STREET, DUNDEE, 31st December, 1896.

The Honourable
High Commissioner for Canada,
London.

SIR,—I have the honour to submit my annual report of work done by me on behalf of immigration to Canada.

METHODS OF WORKING.

My last annual report, in accordance with instructions, was sent in October, 1895, and during the fourteen months which have elapsed since then I have visited 127 places, held meetings and delivered lectures, the evening ones being illustrated by magic lantern views from the set kindly provided by you.

Almost every one of my lectures has been well attended, and indeed, at a number of the places, more especially during the present winter, the audiences have largely exceeded my expectations, and the intelligent interest displayed by them has been a most gratifying feature.

THE PEOPLE APPEALED TO.

I may at the outset state that it is to the agricultural and female domestic servant classes that I devote my whole attention, having the idea, and rightly so I think, that these are the only classes it is advisable to induce to go to Canada. They are the pioneers of civilization. The virgin soil of Canada's vast prairies awaits the application of their brain and muscle—too many of them in fact cannot be got. As they go on improving their homesteads they are adding to the wealth of the country of their choice, and at the same time creating a demand for the labour of the skilled artisan. These latter need no advising; the most of them have their various trade societies which, being affiliated with kindred societies abroad, keep them very accurately posted in their various trade circulars as to the position of the labour market in their own particular line of business; thus to a considerable extent checking the tendency to overstock a market which is necessarily limited. Not so with the agriculturists; so long as Canada can offer fertile unoccupied land, so long should vigorous efforts continue to be made to attract these desirable people to her shores.

THE TOWNS AVOIDED.

Thoroughly recognizing this, I invariably avoid all large towns and urban centres for the holding of my meetings, and betake myself to the rural districts. Of course I find it necessary at times to go to some of the minor towns which are the centres of good agricultural populations, as meeting rooms are not available in some of the more remote parishes. This, however, does not affect the composition of my audiences to any extent, as the method of advertising my meetings makes them unknown to the town artisan.

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METHODS OF ADVERTISING MEETINGS.

The meetings are all announced by circulars addressed and mailed to the small farmers, working farmers, and married farm servants by name, and as the names of the unmarried men are not given in the valuation rolls, one packet is simply addressed "the farm servants" to each farm, when it is delivered at the bothy, as their living room is termed, and thereby comes under the notice of all the unmarried men on the farm. My circulars (a copy of each issued during the past 14 months, also specimens of packets mailed to small farmers, farm servants and small country tradesmen for exhibition in their workshops, are sent herewith for the information of the department) extend a general invitation to any agricultural friends and neighbours to accompany them, and also state that female domestic servants are in great demand in Canada.

In this way it will be seen that my idea of bringing the claims of Canada under the notice of the purely agricultural community is practically carried out, and that my audiences are not of a promiscuous character, but solely belong to the farming classes, which it is the aim of the Dominion to attract to its vast territories.

STYLE OF LECTURES.

I invariably adopt the conversational style of lecture, and at the outset invite my audience to put any question to me even during the course of my address, and in this way get facts driven home to them and give information and advice on points they are specially desirous of being enlightened upon, in a way which is not possible in a formal lecture with the usual paraphernalia of chairman and other accompaniments. The people are quite at their ease, feel quite at home, and, judging from the intelligent questions which are put to me, they are as eager for information and as interested as if I were sitting *vis a vis* with each individual in my own office. At the conclusion of each meeting numbers of my audience invariably remain behind and an interesting and effective chat with them is the result. This method, after many years' experience in dealing with this class, I have found to be the most effective.

USE OF THE MAGIC LANTERN.

The magic lantern is of course an immense help towards the success of the meetings, the pictures thrown on the scene helping to impress the facts on the minds of my auditors, those illustrating the practical side of Canadian farming being specially interesting and instructive.

At my meetings I distribute large quantities of literature.

WHERE MEETINGS WERE HELD.

The following is a complete list of the places at which I have held meetings and delivered illustrated lectures. Some of the places have necessarily been visited twice, as this report covers a period of fourteen months' work.

Birkhill,	Downfield,	Muirhead,	Belmont,
Dronley,	Auchterhouse,	Eassie,	Kingsmuir,
Errol,	Murthly,	Cargill,	Alyth Junction,
Forgandenny,	Strathord,	Inchture,	Meigle,
Abernethy,	Bridge of Earn,	Cupar,	Guardbridge,
Stravithie,	Gateside,	Glenfarg,	Danhead,
Auchtermuchty,	Mawcarse,	Balado,	Falkland,
Kettle,	Thornton,	Freuchie,	Cameron Bridge,
Elie,	Kingsbarns,	Milnathort,	Aboyne,
Tarland,	Torphins,	Banchory,	Kintore,
Kemnay,	Inverurie,	Laurencekirk,	Stonehaven,
Craigo,	Fourdon,	Alford,	Kildrummy,
Huntly,	Gartly,	Insch,	Muryculter,
Old Meldrum,	Ellon,	Strichen,	Lormay,

Mintlaw,	Cuminestown,	Turriff,	Aberhirder,
Mauchline,	Old Cumnock,	Sanquhar,	Monaive,
Thornhill,	Auchterhouse,	Ardler,	Rosemount,
Ratray,	Woodside,	Forgandenny,	Dunning,
Forteviot,	Auldbar,	Clocksbriggs,	Coupar Angus,
Glasterlaw,	Kingsmuir,	Bankfoot,	Kinbuck,
Crieff Junction.	Balbeggie,	Muirhouses,	Guthrie,
Friockheim,	Leysmill,	Farnell Road,	Letham,
Inchbare,	Careston,	St. Cyrus,	Dubton,
Marykirk,	Bervie,	Bridge of Dun,	Letham Grange,
Johnshaven,	Barry,	Easthaven,	Inverkeillor,
Newtonhill,	Cove,	Kintore,	Woodside,
Murtle,	Inverurie,	Wartle,	Macduff,
Huntly,	Inveramsay,	Kennethment,	Cornhill,
Wardhouse,	Oyne,	Turriff,	Glenbarry,
Keith,	Kemnay,	Pitcaple,	Rothie Norman,
Fyvie,	Rothiemay,	Insch,	Grange.
Moneyusk,	Old Meldrum,	Parkill,	

PERSONALLY CONDUCTED PARTIES.

On the 18th May, at the request of the High Commissioner, I proceeded to Liverpool, where Messrs. Grahame, Stuart, Wood and I had a consultation with Mr. Colmer in Mr. Dyke's office, on the subject of personally conducted parties to Canada, when it was arranged that Messrs. Stuart, Wood and I should accompany separate parties who intended leaving during the ensuing month.

The party under my charge sailed from Liverpool by the S.S. "Lake Superior" on 13th June, and after a very pleasant passage via cape Race reached Quebec on 23rd, where those who had relatives or friends whom they wished to join in the Maritime provinces left the steamer. The Ontario contingent continued the voyage to Montreal, and from thence took rail to their respective destinations in that province.

Most of those for the North-west remained a couple of days in Montreal before proceeding on their western journey. Among these were several farm servants and a few Scotch farmers who had their minds made up to work as ordinary farm servants for a year in order to master the details of mixed farming and to acquire a practical knowledge of the various kinds of soil in the North-west Territories. Having occasion to call upon Mr. McNicoll, the passenger agent of the Canadian Pacific railway company, I mentioned the circumstance to him, and he readily granted them special transportation facilities to enable them to accomplish their object. Reaching Winnipeg on the 27th, they spent a few days in visiting the immigrants' depot, stockyards, farms and other places of interest in the neighbourhood, and from thence proceeded to southern Manitoba, visited some Scotch settlers with whom they were acquainted, and were shown over several creameries, cheese factories, &c. At Brandon a most profitable day was spent on the experimental farm, where the details of the experiments made upon the various kinds of grain, root crops, stock feeding, &c., proved very interesting. I accompanied them to Calgary and introduced them to the government agent there who was highly pleased with their appearance and remarked that they were the right sort of men to send to Canada, and that for such there was no difficulty in finding suitable employment.

FALKLAND ISLANDS.

In addition to the party which I conducted in the "Lake Superior," there were some shepherds from the Falkland islands with whom I had been in correspondence for two years, and had sent them out to that colony all the pamphlets and other information I could obtain regarding sheep farming in Western Canada, with the result that they had made up their minds to go there, and with that object had arrived in this country. They called upon me about a fortnight before I left. It was their intention to join my party, but, unfortunately one of the children took ill, and under medical advice they put off going for several weeks. Before I left they again called and asked

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me to make some special personal inquiries for their benefit in Alberta and British Columbia, promising to keep me advised of the name of the steamer and date of their departure for Canada, so that I could meet with them somewhere on my return journey.

USEFUL INFORMATION.

While in Calgary I met two Scotch shepherds who recognized me, and mentioned having attended my lectures in Perthshire before leaving; and I was introduced to several extensive sheep farmers resident in the district, from whom I obtained some useful information for the benefit of the Falkland islands men. Continuing my journey west, I remained a couple of days at Kamloops, and saw Mr. Nash, from whom I got his views on sheep farming in that locality; and afterwards visited Vancouver and Victoria, where I spent a few days interviewing some settlers with whom I was acquainted, and picking up such information regarding farming, sheep and cattle ranching as would enable me to answer the frequent inquiries which I receive both by letter and orally at my meetings for information on these matters.

RAINY RIVER DISTRICT.

Upon reaching Calgary on my return journey I learned that two of the Scotch farmers who accompanied me out had settled upon mixed farms in that district. On my eastern journey, having been informed that large blocks of good agricultural land existed in the Rainy river district, I took steamer at Rat Portage for Fort Francis, and was much impressed by the excellence of the soil along the north bank of the Rainy river and its suitability for men of moderate capital. The soil is timbered, but the trees are not large, and, as there is a good demand for fuel by the river steamers, the settler can have what is termed a "winter harvest," that is he can earn wages while clearing his land. Considerable numbers are already settled along the north bank of the river, and I was informed are doing well.

I reached Montreal just in time to meet the Falkland islands shepherds on their arrival there by the S.S. "Sarmatian" from Glasgow. Gave them all information I had acquired, and saw them off by train for Alberta. One of them named Mclean (who is possessed of means) I have been informed is now settled near Kamloops in British Columbia. He promised to write me regarding his prospects after a year's experience.

CORRESPONDENCE.

A considerable correspondence has been handled during the year, and needless to say all letters received by me have received most careful and prompt attention. The advertisements which you caused to be put in the leading newspapers during the busy spring months, and in which the names and addresses of the various agents appear, necessarily create a large response from those who are wishful of obtaining the latest reliable information regarding Canada.

SPECIALLY DESIRABLE IMMIGRANTS.

I am in communication with another party resident at the Falkland islands and am hopeful that they will follow the others who have left these islands for Canada. They are a most desirable class, being picked Scotch shepherds who have been in the service of the Falkland islands company for periods of from 15 to 20 years, and having saved some money are anxious for an opportunity to commence sheep raising on their own account, principally in the interests of their families for whom there are few openings at the islands.

RESULTS.

While the results of this year's work, in so far as the actual numbers who have emigrated to Canada is concerned, may appear rather disappointing, yet, if measured by their proportion to the total agricultural emigration from this country, they will present a much more encouraging aspect. So far as I have been able to learn from the agents of the different companies, more of the agricultural classes have emigrated to Canada this year than to all the other colonies combined; and the number would have been greater still but for the two causes which have operated adversely to the movement: First, the abnormally high wages earned in this country by farm servants, and, second, the depression of the farming interest in Canada in consequence of the decreased price of wheat and stock, reports of which coming home from friends resident in Canada soon found their way to the columns of our newspapers, and no doubt had a retarding effect upon the emigration of that class.

Now, however, a marked change has taken place in both instances. The wages paid to agricultural labourers in this country have fallen considerably during the past 6 or 8 months, while on the other hand the price of wheat in Canada has materially increased.

Neither of the adverse causes referred to being now in operation, I look forward to the future hopefully in view of next year's work.

I have the honour to be, sir,

Your obedient servant,

PETER FLEMING.

Department of the Interior.

No. 7.

REPORT OF SPECIAL AGENT IN THE NORTH SCOTLAND.

(MR. W. G. STUART.)

CANADIAN GOVERNMENT AGENCY,
INVERNESS, 30th December, 1896.

The Honourable Sir Donald A. Smith,
High Commissioner for Canada.

SIR,—I have the honour to submit the following report on emigration work in the north of Scotland for the year ending 31st December, 1896.

METHODS OF OPERATION.

I have found the most successful way to fan and stimulate an interest in Canada is by lectures illustrated by magic lantern slides. The people like to see, as well as hear, and in country districts, by far the most profitable field for emigration work, an illustrated lecture is a never failing attraction; and a crowded meeting means enthusiasm, rivetted attention, eager inquiry, and sometimes public discussion. After the lecture is over pamphlets are distributed which are carried home and read. People talk about Canada at their own firesides, and often write for further and fuller information. If at all practicable a personal visit is arranged and a decided impetus is given to emigration from that district, for the experience of the last four years has clearly demonstrated that it is only by earnest concentration of effort that a desirable class of emigrants can be secured. The Scotch are proverbially cautious; and they will not leave their homes nor change their mode of life until they have looked at the matter carefully in all its bearings, and come to the conscientious conviction that it is to their advantage to do so.

180 ILLUSTRATED LECTURES.

As I attach great importance to this department of work I have delivered 180 lectures and addresses in English and Gaelic. Having strict regard to economy and the benefit derived from co-operation, I arranged as far as possible to lecture, as in previous years, under the auspices of Young Men's Christian Associations, Church Guilds, Temperance Societies, Farmer's Clubs and Literary Associations. My recent visit to Canada awakened fresh interest in the Dominion, and my lectures have been remarkably well attended. By arrangement with Mr. Fleming I visited the south of Scotland and addressed enthusiastic audiences throughout the counties of Midlothian, Haddington and Berwick.

Illustrated addresses were delivered in the following places.

Aberdeenshire.—Aberdeen, Aboyne, Alford, Aucterles, Braemer, Crathie, Cairney, Culsalmond, Drumoak, Echt, Fraserburg, Gartly, Huntly, Kinnethmont, Kilvumuy, Kincardine, O'Neil, Logie Coldstone, Lumphanan, Skene, Torphiur, Tuwiff, Westhills,

Banffshire.—Aberlour, Alvah, Banff, Boyndie, Craigellachie, Crofftness, Deskford, Dafftown, Forglen, Glenlevat, Grange, Inveraron, Inverkeithny, Keith, Kirkmichael, Macduff, Newmill, Ordequille, Portessie, Port Gordon, Port Knockie and Rothiemay.

Berwickshire.—Channelkirk, Gordon, Earlston, Lander.

Caitness.—Bower, Brawlbin, Canisby, Downreay, Halkirk, Lathervon, Leury, Mey, Olvig, Murkle, Thurso, Tuna and Wick.

Haddingtonshire.—Blackshiely, East Linton, Humbie, Innerwick, Invercoll, Ormiston, Tencaitand and Stenton.

Invernesshire.—Alvie, Ardenseir, Beade, Boat of Garten, Boleskine, Brin, Clara, Dalzill, Daviot, Dalwhinnie, Dunlichty, Duthil, Dulnan Bridge, Fort George, Glenbrown, Glentvinmi, Glencarguhart, Kilmovack, Kiltarlity, Kirkhill, Lenevily, Moy, Newtonmore and Titty.

Morayshire.—Advie, Alves, Audunarrow, Balnacoal, Burgie, Burghead, Birnie, Canicavel, Cromdale, Dava, Edenkillie, Findhorn, Garmouth, Grantown, Hopeman, Killas, Kentessack, Kivdals, Knockauds, Lhanbryd, Logie, Losiemouth, Ruscisle, Rothes, and Urquhart.

Nairnshire.—Ardelach, Cawdor, Clunas, Nairn and Relugas.

Orkney Islands.—Burness, Burray, Cross, Deerness, Dounby, Eday, Firth, Hotta, Holm, Hoy, Kirkwall, Longhope, Rendall, Ronsay, Sandy, Sandwick, Scapa, Stronsay and Swannay.

Perthshire.—Aberfeldy, Aberfoyle, Blair, Athole, Fortingall, Kinloch, Rannoch, Grandtully, Glenlyon, Perth and Titlochry.

Ross-shire.—Applecross, Auctercairn, Aultbea, Ardgay, Ardan Juane, Barvas, Conanbridge, Contin, Ferrintosh, Gairloch, Grainard, Hilton, Invervasdale, Marybank, Kilmuir Easter, Knockbain, Newhall, Ness, Nigg, Torlewe, Shildaig, Strathpeffer, Torridon and Urray.

Sutherlandshire—Creich, Dornoch, Farr, Forsinard, Kildman and Lairg.

MARKETS AND TRADE RELATIONS.

I have attended 51 market-sales and cattle shows in the principal towns and villages, distributing pamphlets and illustrated hand books, and giving verbal information about the Dominion. I have also exhibited samples of cereals, and in this connection I have endeavoured to promote trade relations by getting distillers interested in the use of Canadian barley. The distilling has developed so enormously of late years that the supply of home-grown barley is quite inadequate to meet the demand. In what is termed the "Elgin collection of distilleries" alone about 1,600,000 bushels of barley is consumed yearly, and of that quantity only a little more than half is home-grown.

VISIT OF THE REV. ALEXANDER GRANT OF WINNIPEG.

The Rev. Alexander Grant, pastor of the First Baptist Church in Winnipeg, who is a native of the north of Scotland, paid a visit to this country during the summer, and, as he kindly agreed to utilize his twenty years' experience in Canada for the benefit of his countrymen in the Highlands, I arranged a series of meetings for him in Strath-naivin, Strathspy, Dyke, Petty, Calbin, Darnaway, Birnie, Grantown, Abernethy, Badmoch and other districts. Notwithstanding the season of the year the meetings were well attended, and of all the return men who have endeavoured to make Canada known in the north Mr. Grant was undoubtedly the most successful in attracting attention, and creating a favourable impression. His racy, brilliant, and eloquent speeches, and genial personality is still the theme of conversation in the districts he visited. At his different lectures pamphlets were distributed, and the local newspapers commented very favourably on Mr. Grant's platform utterances.

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INFLUENTIAL SCOTCHMEN VISITING CANADA.

I need only refer to the number of travellers, clergymen, capitalists and others from the north of Scotland who visit Canada yearly as a striking proof of the interest taken in its development, and its popularity with holiday seekers. This year Sir Charles Ross of Balnagown, Ross-shire; Rev. Mr. Cowan, of the Free High Church, Elgin; Capt. Dixon of Inveran, Ross-shire; John Smith, Esq., of Inverallan, factor for the Countess of Seafield, on her estates in Strathspy, Elgin, Birnie and Rothes; J. Hedley Smith, Esq., factor for Mr. Balfour, First Lord of the Treasury; Rev. Mr. Thomson, Fodderty, and others visited Canada and travelled extensively in the different provinces. Sir Charles Ross, who made his maiden speech as chairman at a lecture I delivered on Canada, in Kilmuir, Easter, three years ago, has shown his practical faith in the country by investing his capital largely in Canadian mines and other ventures. The Rev. Mr. Cowan has contributed a number of chatty and favourable letters about the Dominion to the *Elgin Courant*, besides giving a lecture on his impression of the country to the Free High Literary Society. Captain Dixon, of Inveran, arranged a series of meetings for me in the west coast of Ross-shire, sent his carriage with me to the different districts, and entertained me during my stay of over a week entirely at his own expense. I also observe that he delivered a lecture last week to the Poolewe Young Men's Association on the forest trees of Vancouver.

The Messrs. Smith are gentlemen of great influence in their respective districts, and they were delighted with their impressions of the country. They have both made their observations public—Mr. John Smith at a public meeting in Grantown, and Mr. Hedley Smith in the form of a very able and exhaustive article contributed to the *Haddington Courier*. At my request the paper was also published in the *Moray and Nairn Express* where it attracted favourable attention in the north, where Mr. Hedley Smith is well known.

PERSONALLY CONDUCTED EMIGRANTS.

This year it was arranged that personally conducted parties of emigrants should sail from Liverpool in June. Owing to the time of year, the short notice, and Liverpool not being a suitable port for Scotch emigrants, I had not such a large party as I would have had if we had sailed from Glasgow. Notwithstanding the drawbacks mentioned, I mustered a party of over 60 men and women, and as they were all a respectable class of settlers, possessing more or less capital, I had no difficulty in getting them all placed before returning home. By permission of the department of the Interior, and for the purpose of acquiring fresh information about the resources and development of the different provinces, I visited them all, and met many people from the north of Scotland who had emigrated during the last two or three years. Many of them are doing well, especially those who are combining ranching with farming. I might mention in particular the Campbells, at Innisfail; the Urquharts, Macdonalds, and Simpson, at Lacombe; and Thompson, at Red Deer. In south Manitoba also I called on a number of old friends, and met many more at the Winnipeg show. After spending nearly two months in Canada, and seeing as much as possible of the country, I returned with additional information that will be very useful to me in my work, and bearing a great many messages from Canadians to their friends and relatives in Scotland. The idea of personally conducted parties is a very happy one, and if properly arranged is of itself an inducement for many to emigrate. Since my return I have had several letters from members of the party who went out under my charge in June, and with few exceptions they are contented and apparently doing well. Mr. William Smith, Vancouver, writes: "I have great pleasure in informing you how I am getting along in British Columbia. I arrived on Sunday night and went to work on Thursday. I could not content myself in Scotland now. I can do better here than there if I have to hire with another man, I can get all the fish I like to catch in the creeks, so a person can live very cheaply, etc."

DOMESTIC SERVANTS.

I had a number of inquiries during the year from domestic servants desirous of going to Canada, and, when I was satisfied with their characters and qualifications, I put them in communication with families requiring help in Ottawa, Quebec, Montreal, Winnipeg and other places.

As the majority of servant girls do not save money only a few were able to pay their ocean passage, and it will be necessary to offer some assistance towards the cost of transportation before they will be induced to go out in large numbers.

THE PRESS FAVOURABLE TO CANADA.

The newspapers in the north of Scotland with very few exceptions are always willing to publish articles of interest about Canada, and this year scarcely a week passed but favourable reports of lectures, short articles and letters full of valuable information, have appeared. The newspaper cuttings sent with my monthly reports will best indicate how persistently Canada is kept before the public, and the following leaderette from the Moray and Nairn *Express* of a few weeks ago is a fair sample of many similar criticisms on the work of this agency.

"THE TIDE OF EMIGRATION."

"It is not very flattering to us in the home country to be told that every year 'the flower of our race' leave us for foreign parts. To a certain extent, however, it is true, though they also take along with them a goodly portion who will never be missed, because 'they leave their country for their country's good.' But fashion changes in emigration as in everything else. A few years ago almost every one went 'to the West, to the West, to the land of the free'—to the great new world on the American continent. But within the last year or two America has been going considerably out of the fashion, and the great rush of our aspiring youth has been flowing to South Africa, the land of gold, where a fortune can be made in an hour, and where, in the view of some, the streets are paved with the precious metal and there are golden apples growing on the trees. It strikes us that South Africa, as the receptacle of 'all sorts and conditions,' cannot be quite such a comfortable place to live in as some people imagine, and it is almost certain that the recent troubles in the Transvaal and Rhodesia have given a rude shock to the progress of the country. Possibly, therefore, fashion will change again, and intending emigrants will be turning their eyes westward to the continent where, if rapid fortunes may not be made, there is at least a competency to be had for all who are willing to work. Recent emigration returns have shown a considerable decrease in the number of those bound for America, but not to the same extent in Canada as in the United States. Canada is without doubt gaining greater popularity relatively as a field for emigration, and this is due mainly to the efforts being used by the Canadian Government to bring the Dominion under the direct notice of the people of the United Kingdom. In the north of Scotland, which is always one of the greatest nursery grounds of Canadian emigration, this work has for some time been very persistently and effectually done by ex-Bailie W. G. Stuart, of Inverness. Mr. Stuart has not been wholly confining his labours to the North, but has been making frequent lecturing tours in many other parts of Scotland, from the Midlands down to the Borders, a kind of work for which every one who knows the ex-Bailie will say he is most admirably adapted. Of course there are meetings *and* meetings, as there are lecturers *and* lecturers, but in almost every instance ex-Bailie Stuart's well-known reputation as a humourist and a delineator of Highland character has preceded him, and the result is he crowds the house. It is no hyperbole to say that his 'services are much in request,' for it is within our knowledge that he has often to refuse many requests to take part in lectures and entertainments, where he would be willingly advertised on the bills as the 'principal performer.' But he almost invariably does so unless permitted at the same

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time to say a word on behalf of Canada. It may be said, then, that through him and by other means the north of Scotland is being well supplied with information regarding the great Dominion, which sooner or later will bear fruit in inducing those of our rural population desiring to emigrate to direct their steps thitherward.

RESULTS.

Notwithstanding all the efforts put forth the year has been a discouraging one in results. This may probably be accounted for by dull trade and low prices, as the falling off is principally amongst the steerage class of emigrants. From inquiries I have made at the different shipping agents it appears that the numbers booked to Canada from the north of Scotland are about the same as last year, and in respect to capital and knowledge of farming they are a superior class of settlers.

Grant & Co., Inverness, who do the largest business as shipping agents in the north of Scotland, write under date 28th December: "I have been looking at the Allan line bookings, and find that they are about the same as last year. The bulk of the passengers were booked to Canada.

The business for the other lines we act for here—those going to the United States—has been poor, but taking it all over Canada has got the big share of the emigration from our district this year."

THE OUTLOOK HOPEFUL.

I have received an unusually large number of inquiries lately from intending settlers and others interested in colonization. One correspondent writes from the west coast of Ross-shire: "How could the 60th year of Her Majesty's reign be better commemorated than by the formation of an emigration and colonization society in every county in the north?" &c., &c.

On the whole I regard the future prospects as very hopeful, and, if the improvement in the wheat industry continues, I am confident a very large increase in emigration to Canada will begin in the spring. Many have definitely arranged to leave as soon as the season opens, and I shall continue doing all in my power to encourage and promote the emigration of a class of settlers that will enrich Canada and benefit themselves.

CONCLUSION.

I have again to express my deep sense of indebtedness to the teachers of the public schools for advertising my meetings and otherwise assisting in making them successful; to the press for the very favourable way in which emigration work has been brought before the public; to Mr. Young, of the New Market, Inverness, for kindly distributing emigration literature and supplying information in my absence; to the Highland Railway Company for granting travelling privileges over their system at a nominal charge; and to Mr. Colmer and Mr. Reynolds for prompt and hearty co-operation in all efforts to promote desirable emigration to Canada.

I have the honour to be, sir,

Your obedient servant,

W. E. STUART,

Canadian Government Agent.

No. 8.

REPORT OF MR. A. BODARD, AGENT IN FRANCE AND BELGIUM.

MONTREAL, CANADA, 31st December, 1896.

To the Honourable SIR DONALD A. SMITH, G.C.M.G.,
High Commissioner for Canada, London.

HONOURABLE SIR,—I think the emigration from France and Belgium to Canada has been about the same in 1896 as in the previous year; from Belgium there is probably a slight increase. I came myself to Canada at the end of April, on board the S.S. "Sarnia," with about 140 French and Belgian settlers, two thirds of whom had previously been in correspondence with me.

I was happy to come with them to Canada because I was anxious to know, *de visu*, the state of the French and Belgian colonies in the west of Canada, and obtain information about the wants of the settlers. I had learned of some complaints against the settlers, and on the other side a few French settlers had complained to the French government against the present state of emigration in the Canadian West; and before continuing my work in France it was my duty to be assured of the success of the people sent by me.

From the inquiry held by me during the summer I found my settlers generally satisfied with the country, notwithstanding two bad consecutive crops.

Many good farmers of Europe worth from \$300 to \$500 would come to Canada if the costs of the passage, about \$300 per family, were not so high; and I beg leave to suggest in this relation that the government would do well to advance the money for their passages, to be paid back with interest at 6 per cent at the end of 5 years, to all families worth at least \$300. If the government is not willing to do this, it would do well to help any colonization loan societies and give them during 10 or 15 years an annual bonus of \$3,500 for each \$100,000 lent to settlers in sums of \$300, the interest charged to be limited to 3 per cent. This plan would in my opinion promote greatly the colonization of the country.

The starting of additional government creameries, where needed, or giving to settlers facilities to buy the plant, etc., would also help the country.

In my opinion it would be well if the physicians of the Indian reserves, or of the industrial schools, were men who could speak the languages of the emigrants settled in their vicinity, and give them medical assistance at low prices.

I communicated at the beginning of June with the department of the Interior about the work of the Brazilian agents in Canada. It was my duty and my interest to do that, because I consider Brazil a good country for people of southern Europe, but not for those of north and centre of the continent; and if the Brazilian agents had been successful it would have hurt my work in France, Belgium and Switzerland, and many would say: "Why do you try to bring our people to Canada, when Canadians themselves leave their country for Brazil, the best possible proof that your country is not good."

I trust that the department will see fit to print, for distribution at the Brussels exhibition, say 200,000 French and Flemish pamphlets on Canada.

The prospects of emigration for 1897 are good. I found nearly all the French and Belgian settlers satisfied with their adopted country. The letters they write to the old country are very encouraging.

I have the honour to be, sir,

Your obedient servant,

A. BODARD.

Department of the Interior.

OPERATIONS IN THE UNITED STATES.

No. 1.

REPORT OF MR. P. F. DALY.

CANADIAN BUREAU OF INFORMATION AND IMMIGRATION,
STOCK EXCHANGE BUILDING, CHICAGO, 31st December, 1896.

To A. M. Burgess, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—In accordance with letter from the department, I submit my report of this office from the day of its opening, November 1st, 1895, up to December 31st, 1896.

After a lengthy correspondence it was decided by the department to open this office as an experiment for five months from November 1st, 1895. Captain A. F. Holmes, then chief agent for the United States, was instructed to come to Chicago and confer with me as to the best location and means of operation. We decided on this building, as it is without doubt the best location in the city. My long and varied experience as travelling passenger agent for the Erie and Delaware, Lackawana and Western railroads brought me in close contact with the immigration business, which I have studied very closely. This led me to believe that Chicago was the right place to open an office, not only for immigration, but for general information about Canada.

I am pleased to say that after the expiration of the five months the department saw the necessity of continuing the office. It was to be regretted that the funds at the disposal of the department were not sufficient to allow me to advertise as I would have liked to have done, but under the circumstances I did the best I could. I got a good notice and several "write-ups" in the *Farmers' Voice*, Mr. David Ward Wood, proprietor, being a personal friend of mine and a great believer in the future of our glorious North-west. From a very small advertisement in his paper I got, in five months, three hundred and sixty-five letters. These were from leading farmers in almost every state, from Maine to California, Mexico and Texas. I sent a very large percentage of these to the department for inspection.

I also had remarkably good results from the Scandinavian newspaper, viz., sixty-eight letters of inquiry in five months. I even got letters from Europe in answer to my advertisements in this paper, one of which I sent to the department.

In my opinion this office has far surpassed the most sanguine expectations, and I can readily see its necessity from the good results that have been obtained. My observations while agent for the United States railroads in Canada gave me an experiment never to be forgotten. At that time the Rock Island, Northern Pacific, and the famous Albert Lea route, were taking from Ontario hundreds of young men, landing them in the Dakotas, Minnesota, Kansas, Nebraska and other points in the United States, and a large percentage of the immigration that has gone during the past two or three years from the United States to Manitoba and the North-west Territories has consisted of Canadians, sons of our oldest and best Ontario farmers.

To go into the details of the advantages of this office would take up too much space. I can only say that up to the first day of July, 1896, and with the small appropriation that was at the disposal of the department of the Interior at the time, the results were marvellous; and if the department had been able to continue its advertisements in the *Farmers' Voice*, *Scandinavian* and other papers up to the present time, it would have made a showing far beyond expectations.

It is my opinion that this office should not be looked upon simply in the light of an immigration bureau, as since it was opened I have received numerous inquiries from capitalists and others regarding all parts of the Dominion as to its mining interests, etc. Although, for example, I have had large supplies of literature from British Columbia, I have been unable to keep it more than two or three days in the office, the demand for it being so great.

If I might be permitted to make the suggestion, an office on the ground floor of this building, combining both the mining and the agricultural interests, is what is required. There would be no object in doing this, however, unless the exhibits put in were such as would do credit to Canada. In my humble opinion, and from long experience, I say this is the best point on the American continent to get capitalists and immigration from. The prepaid immigration business, of which I submit you a report, will show that New York in its palmiest days never had as many prepaid passengers as this city has had in the past four years. This is from the results of the World's Fair.

I cannot just decide in my mind which would be the better way to get the desirable class of immigrants to our country. One drawback is the high rate at present. I cannot do better than about \$29.75 Chicago to Calgary. Of course you can readily see this is a very stiff rate and keeps many a good settler back.

Last summer, through the hard work of Captain Holmes and myself, we made a very good showing from Michigan and Indiana. I agree with him, in his report of last year, as to the need of four or five good agents distributed through the United States, with authority to appoint agents on commission. This is an excellent idea. The only drawback to this is not paying such agents promptly. Where I made my great success as travelling passenger agent in connection with the Erie and Lackawana railroads, was in insuring that commissions be paid promptly. This gave the agents new life and an interest in their work.

I have always received great courtesy from the newspapers of this city, and anything of interest they are always ready to put in. I have at the present time a young colony of ten going out in April. Their purpose is to go into ranching, and they will take at least \$10,000 with them. From inquiries I might say that many more contemplate this idea. It is now getting to be a vital question in this country, what are rich men going to do with their sons; and this is one feature I work upon, showing the advantage of starting them up in the ranching business in the North-west Territory.

If permitted, I would like to make another suggestion; that is, to have literature devoted entirely to the United States, and gotten up in as small a space as possible. The present literature is so bulky that it is impossible to send a sufficient quantity to inquirers for less than four cents a package. Of course if you have forty or fifty of these packages to send out in a day it counts up very rapidly.

Old country literature is of little use in this country, as pounds, shillings and pence are a thing of the past.

The farming community of the United States was never in a more unsettled state than at present, and it only wants money spent in the right direction to take hundreds of good settlers from this country into Manitoba, the North-west Territories and British Columbia.

I have sent out a very large supply of literature from this office, and it has gone from one end of the United States to the other. Quite a lot of this literature I got from the office of J. Francis Lee, District Passenger Agent of the Canadian Pacific Railway. Mr. Lee has always been a very strong advocate of Alberta and the North-west in general. He and his staff have always been most anxious to help me in any way possible to further the interest of immigration. As a rule I always consult with him on matters of importance.

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I had a long interview with Mr. Johnson of the firm of A. Mortensen & Co. Mr. Johnson has had charge of their emigration business in the United States for a number of years, and is perhaps the best posted man in America on prepaid business. These figures, he claims, are a very conservative estimate, and are only the emigrants that come to Chicago :—In 1896, Scandinavians 10,000, British 15,000, Continental 20,000. Mr. Monett, their manager, is going to give me a complete list of all business from Ellis island, which I will forward to the department. This will show the total emigrant business of the United States. Taking the Dominion land agents' reports for the first eleven months of 1895, and 1896, the United States makes a very fair showing in comparison with other countries, and by referring to them you will notice the settlers are principally from states surrounding Chicago, or west of Chicago.

I have the honour to be, sir,

Your obedient servant,

P. F. DALY.

REPORT OF C. O. SWANSON.

(SPECIAL SCANDINAVIAN AGENT IN THE UNITED STATES.)

WATERVILLE, January 7th, 1897.

To the Deputy Minister,
Department of the Interior,
Ottawa.

SIR,—I have the honour to submit to you the following report of work done by me the past year, or since I made my last report on October 29th, 1895.

Have made two trips to some of the western states, namely North and South Dakota, Minnesota, Wisconsin and Michigan, with very good results; three trips to the eastern states, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont. I have also made three trips to the North-west as far as Edmonton, and have taken out parties of settlers and delegates each time.

In May last I took a party of settlers up to Haileyburg, Ont., where I had previously sent two families from Connecticut.

I have been to Halifax once and to Quebec twice to meet special parties from Sweden. Have had more immigrants from Sweden this last year than I had the year before, and the servant girls who came out this year have been of a better class than formerly, and a good many of them. There are more calls for them than I can supply.

My correspondence has increased the past year; have received and answered 1,003 letters, and have sent out about that number of packages—average weight twelve ounces—containing maps, pamphlets, reports from delegates and letters from settlers, &c. I have advertised in three Scandinavian papers in Minneapolis, Chicago and Boston, and, judging from the letters of inquiry I have received as a result of this advertising, I think we shall soon have an increased immigration of Scandinavians.

I have just returned from Alberta. I took special pains while there to visit the settlers and found them better satisfied, and in better spirits than last year; but the long drought injured the grain crop a good deal.

Our Scandinavian colony near Wetaskiwin is making good progress. The people are building good school houses, and have built one Swedish church this summer. They have both Swedish and Norwegian ordained ministers settled there.

The people of the colony have purchased two new threshing machines, one twelve horse power, the other eight. They also own three binders, and a good many mowing machines and horse rakes. As yet they haven't as many cattle as I would like to see them have.

While there I got several letters from farmers who have lived there from two to four years, in which they speak well of the country, and which I shall get printed in pamphlet form in connection with reports from delegates, &c.

The new Scandinavian settlement, west of Leduc, which we established last year, is also making good progress. Several good families have gone in there from Minnesota this year. It promises to be a good settlement.

We have also a few stirring settlers at Lacombe, and the Scandinavians at Red Deer are doing very well. They are doing considerable at raising cattle. I am in hopes to settle a good many more there next season, as there is plenty of room.

In December I made a trip and visited several places in the New England states, and I find wherever I have been able to bring to the knowledge of the Scandinavian people the subject of free homestead grants there is great interest taken and many

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would come and settle in Canada, but on account of the hard times, especially with people who are renting farms, or who have any property to dispose of and find it impossible to convert it into money. I might say that out of fifty good citizens and hard working men not more than two or three can arrange to go, but I hope when times get better we shall get a larger percentage of Scandinavians.

The twenty letters which I got from the settlers and which are now printed in pamphlet form, will be sent out not only to people who are inquiring about the country, but also to people whose addresses we have, and I am sure they will be a means of bringing delegates and settlers to the country; and by working with Mr. Akerlindh, who will take charge of the correspondence the coming year, I am in hopes to be able to do better work and bring in more people.

After having had four years experience in this immigration work, however, I am more and more convinced that the quality of settlers we get is of far more importance than the quantity.

I am, sir, your obedient servant,

C. O. SWANSON.

No. 3.

REPORT OF COLONIZATION WORK PERFORMED BY THE REV.
FATHER MORIN.*(Translation.)*

To A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit to you my sixth annual report on my work of colonization and repatriation in the North-west Territories.

FEW SETTLERS DURING THE YEAR.

The requests for information in regard to Manitoba and the North-west have been as numerous as during the preceding years, but the number of the settlers who have carried out their projects for coming to settle amongst us is far smaller. We observe a noteworthy diminution in the number of immigrants. The outlook for next year however is better and leads us to hope for the best results.

THE HARVEST GOOD.

The harvest has been very good; the seeding was done in good time, the grain and vegetables have ripened perfectly, the mean yield per acre being a little over 40 bushels. The settlers are well satisfied and consider that they are sufficiently remunerated for their labour. It is to be understood that this applies generally to all the products of the farm.

DISTRIBUTION OF SEED GRAIN.

The help given with seed grain, granted to the poor settlers last spring, has not given entire satisfaction. The conditions exacted seemed a little onerous, and in certain districts the grain advanced left something to be desired as to its quality. In consequence of this some fields, ploughed and ready to receive the seed, have remained unproductive. Discontent has resulted, but one can readily conceive the difficulties in satisfying every one in these matters.

NEW TELEPHONE LINE.

The new telephone line between St. Albert and Morinville is in operation and works very well. It would be desirable if all the colonies were thus connected with Edmonton, the chief town of the district. If the department of Public Works, as in the case of Morinville, would furnish the wire and the telephonic instruments, the settlers would willingly cut down, cart and place the posts. There would be nothing further than a small grant to pay the workmen who put up the insulators and arrange the electric wires.

CULTIVATION OF MILLET AND CLOVER.

The question of making artificial meadows, of sowing millet and clover, has already come up in different places. The colony extends itself every year, and the number of animals increasing considerably, the meadows near the centres are turned into pastures

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and the colonists are obliged to go away several miles to obtain their stock of fodder. Several attempts at this culture have already been made, notably at St. Albert and at Fort Saskatchewan, and the result has been satisfactory. Each time it is necessary to renew the seed every second or third year, because the snow in winter does not sufficiently protect the root of the plant, and the frost makes it perish in less time than it does in the eastern provinces.

HEALTH OF THE COLONISTS.

The sanitary state of the population is most satisfactory. The climate of Alberta is so salubrious that any contagious or epidemic illness is absolutely unknown. We have registered several deaths but almost exclusively among the children.

INCREASED MEANS OF TRANSPORT REQUIRED.

The surplus production and the want of easy communication for the transport of agricultural products paralyze the success of our colonies. The time has come to look beyond the district for a market where we can export our fat stock, our butter, our cheese, our pork, our grains and our vegetables. This place found, this difficulty settled, we should be the most favoured colonists of the globe.

WHERE MARKETS MAY BE LOOKED FOR.

There is, certainly, the mining district of Kootenay, where a crowd has been going for the last year, capitalists and workers, attracted by the rich deposits of minerals of all kinds. But we are some hundreds of miles from this place and the freight tariff for the transport of our produce does not allow us to realize any profit in exporting there. It is most desirable that the Canadian Pacific Railway Company should make more acceptable rates for us.

THE HALF-BREEDS.

The desertion of the half-breeds continues and seems to increase. Our civilization wearies them, and contact with the whites is not for their good. Some families have gone to the colony of the Rev. Father Lacombe; their farms, in debt and mortgaged, pass into the hands of speculators or remain uncleared. It would appear to be a good time for a small farmer from the east to come and increase his domain, to choose for himself a farm of 300, 1,000 or 1,200 acres of land, where he could settle down comfortably with his sons.

I have twice visited the half-breed colony of the Rev. Father Lacombe, to the north of the Saskatchewan, about 20 miles from the eastern limits of the reserve of Lac La Selle. I was sent by the reverend Father, with the authorization of the department, to state exactly the instructions given to the surveyors and to see to their execution. I do not doubt that with a wise administration and a more than ordinary share of patience on the part of the director, the plan of redemption of the half-breeds, termed *the dream of Father Lacombe*, will succeed.

If I had not myself chosen the site of the colony I would tell you that the choice is a very judicious one. One finds united there all the advantages to be desired for a settlement of this kind:

1. Isolation from the settlements of the whites.
2. Soil of superior quality.
3. Wood and water in abundance.
4. Fish and game in the neighbourhood.
5. Communication with Edmonton by land and by water.
6. Magnificent prairies for pasturage.
7. Government telegraphic line across the colony.
8. In the proximity of the reserves: Onion lake, White Fish, Gold lake, Saddle lake.

WORK IN THE UNITED STATES AND QUEBEC.

As my instructions are not to encourage emigration from the province of Quebec in favour of the Canadian North-west, but rather to promote the repatriation of our compatriots settled in the United States, I direct my work to that side. Nevertheless it sometimes happens that I meet farmers of Quebec who for one cause or another are obliged to leave the province; I make it my duty to inform them as to the resources and natural riches of Alberta.

Some delegates of the United States of the west visited us during last summer and returned satisfied with what they saw. They left us a written testimony of the good impressions which they carried away of the country. The counties of Montcalm and of Terrebonne also sent us visitors; the favourable reports which they made to their friends will bring us some good families for the spring.

ARTISANS.—A TANNER WANTED.

There come to us every year a certain number of artisans, whom we only require for the time. Our population being very restricted and made up almost exclusively of farmers, one can imagine that the houses are not all built in accordance with the laws of architecture. Ordinarily it is the colonist himself who makes the plans of his building and executes the work. The only artisan we require is a tanner. We do not doubt that a tannery managed by a skilled and honest man would bring in handsome profits and render great services to the colony.

SCARCITY OF MONEY.

My colonists are amply supplied with the necessaries of life: they have pork, butter and cheese; they harvest wheat to make their flour, barley and oats to fatten their stock, and vegetables to use in the kitchen. They have reason to be satisfied in this respect. That which is wanting in the colony is ready money; it is scarce and very difficult to procure. Our produce is paid for in merchandise; and this state of affairs will last as long as we have no manufactures to support a larger population, and a market where we can dispose of our produce.

TRAVELS AND OTHER LABOURS.

In the course of the past year (1896) I have made three journeys to Edmonton from Montreal; two from Edmonton to St. Paul des Métis; I superintended the construction of the telephone line between St. Albert and Morinville; I have made a general census of my compatriots settled in the district; I have received, more from the United States than Canada, 370 letters asking me for information in regard to Manitoba and the North-west; I have distributed 1,000 pamphlets; I have written 400 letters giving circumstantial details as to the advantages offered by our district to every courageous man who has at heart the purpose to make for himself a fine future.

A word as to each of our colonies.

MORINVILLE.

This colony is situated about twenty miles to the north of Edmonton; it makes fresh progress every year. The colonists improve the roads, fence their fields and renew their outbuildings. The resident clergyman is the Rev. J. M. Jolicœur; he has almost completed his church and presbytery. The population consist of seventy-nine families; the mail only arrives there once a week, (this service is very insufficient). The usefulness of the new telephone line which connects the colony with Edmonton and with the railway station is very great and much appreciated.

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SAINT ALBERT.

See and residence of Mgr. Grandin, is situated on the Sturgeon river, about nine miles to the north of Edmonton. This colony is composed of a mixed population : French, Scotch, Irish and half-breeds. The French Canadians are largely in the majority. One sees at St. Albert large farms worked with talent and intelligence. The Seurs Grises of Montreal have a convent there, an industrial school, an orphanage and a hospital. There are three stores, a good hotel, two blacksmiths, two butchers, a carter, a painter, a shoemaker, a goldsmith, a post and telephone office. The aspect of the country, above all in the village, is simply superb.

EDMONTON.

This is the chief place of the district, the centre of all the colonies : French, English, German and Polish. The site of the town is magnificent, several hundred feet above the bed of the Saskatchewan. One sees here several churches, a hospital, a convent, good schools, two banks, lawyers, doctors, flour mills, elevators, saw mills, manufactories, numerous stores, good hotels, telegraphic and telephone offices. The Government has its public offices there, timber, lands and registry. Edmonton is the centre from which the treaty posts of the extreme North are supplied. There is considerable activity in commerce at Edmonton. When one goes to town, said a colonist to me, and sees the farmers bringing in their farm produce: grain, hay, vegetables, butter, cheese, pork, fruits, game, etc., our thoughts are carried back to our natal parish, to our public markets at home, and we cannot believe that we are about 2,500 miles from the province of Quebec. The French Canadian population of Edmonton consists of 61 families.

FORT SASKATCHEWAN.

This colony is about 18 miles to the north-west of Edmonton, on the great river. It is one of the oldest and most prosperous of the district. One sees there three schools, two flour mills, a saw mill and shingle mill, a cheese factory, several stores and tradesmen of every kind. The mounted police has its headquarters there for North Alberta. There is a bi-weekly postal service ; a new post office has been put up near the Catholic Church for the convenience of the colonists who live to the north of the river. The name of the office is Lamoureux, Alberta, N.W.T. Population 119 families. The curé of Notre Dame de Lourdes, of Fort Saskatchewan, is the Rev. S. Dourais.

BEAUMONT.

This colony is about 16 miles to the south of Edmonton, on the line of railway. It is settled by families that came from Minnesota and Dakota ; it has its church, its presbytery and its resident curé, the Rev. Father Beuparlant. It has a weekly mail service ; a school district has been made, and the school works regularly. The soil at Beaumont is remarkably rich. It has wood, water and prairie enough for all the requirements of the settler. This vicinity is admirably adapted for the raising of stock and for farming. The population consists of 48 families.

RIVIÈRE QUI BARRE.

A new centre founded about 12 miles from Morinville, in a westerly direction. The colonists come for the most part from the state of Kansas, U.S.; there is a chapel with a resident missionary, a school and a post office. A glance at the schedules which accompany this report will give an idea of the rapid development of these different colonies. Ten Scottish families from Glengarry, Ont., are settled at Rivière-qui-Barre. We are far from opposing this strange immigration into the midst of our people, we gain a good neighbourhood thereby. The colony has a population of 39 families.

SAINT PIERRE.

Saint Pierre is about 10 miles from St. Albert and about 20 miles from Edmonton. The population of this colony is exclusively French Canadian with the exception of some half-breeds who still possess their farms there. The Sturgeon river crosses the colony and offers several good water powers. The site of the future church has been selected, the wood has been brought to the spot, and the building will begin in the spring. A school opened this autumn is attended by 22 children. A Belgian colony has come to settle on the limits of this parish and occupies itself principally with the raising of sheep. This enterprise promises good results.

VEGREVILLE.

A colony recently founded about 12 miles to the east of Beaver lake. As in that of Rivière-qui-Barre, the colonists come from Kansas, U.S. The soil at Vegreville is excellent, there is wood in sufficient quantities for the needs of the settler. Two rivers flow through this colony and irrigate it. What beautiful pasturage! How many thousands of animals we could feed on these immense prairies! What harvest one could obtain by cultivating such a rich soil! There are still some of the finest homesteads to be taken up. From the county of Cloud, Kansas, about 50 families wished to come next spring to settle at Vegreville, but the costs of the journey, the difficulty of selling their lands, and other uncontrollable causes, put a stop to the project, the carrying out of which is deferred to next year. With some thousands of dollars to assist the colonists to pay the expense of transport, we could draw a most desirable population here.

STONY PLAIN.

A mixed colony composed of French Canadians and Germans, which rivals the other agricultural centres of the district. There as elsewhere the soil is of an excellent quality, and the colonist who arrives with a few hundreds of dollars can assure to himself and his children in a few years a successful future. The Canadian population counts 26 families.

At Lac la Biche, at Victoria, at Lake Ste. Anne, and in all the treaty posts on the Athabaska, Peace and other rivers, there is a good number of French Canadians employed by the Hudson's Bay Company. One can count the number at 300 or 400. Some of them are adventurers who have made it a second nature to traverse the prairie or the forests of the West in pursuit of game, but a good number come every year to Edmonton and manifest their intention of soon settling down on lands.

THANKS TO THE C. P. R.

I am happy to offer to the company of the Canadian Pacific Railway my sincere thanks for the kindness, I may say cordiality, with which the officers have always received my requests and granted the favours which I solicited for my clients. Through the intervention of this powerful company I have been able to render to some of my colonists and to the friends of colonization services from which I await the happiest results.

POPULATION OF VARIOUS COLONIES.

Here is the result of the census taken of my compatriots scattered among the nine Canadian colonies of the district of Edmonton.

Department of the Interior.

The table annexed here shows a population of 1,944 souls ; further divided into :

Families	483
Adults	1,270
Children	674
Masculine	1,106
Feminine	838
Of these 483 families, there came from the United States....	327
From the other provinces of Canada	135
From Europe	21

The colonies possess 11,780 head of stock divided into :

Horses	1,830
Cattle	4,313
Pigs	3,502
Sheep	2,135

This year (1896) 11,357 acres of land have been sown, and 5,553 acres of land broken.

The harvest has produced 244,865 bushels of grain and 37,405 bushels of vegetables.

I can affirm that these figures were taken at the different domiciles and that the given results are rather below than above the true figures.

PRICES OF DIFFERENT ARTICLES ON THE EDMONTON MARKET.

Pork, per 100 lbs	\$ 6 00 to \$ 8 00
Flour, do	2 25 to 3 00
Beef, do	5 00 to 6 00
Butter per lb	15 to 25
Cheese, do	10 to 12
Tea, do	20 to 50
Coffee, do	20 to 50
Sugar, do	8 to 10
Soap, do	8 to 10
Tobacco, do	25 to 1 00
Eggs, fresh, per doz	12 to 20
Oil per gal	45 to 55
Syrup,	50 to 60
Molasses, per gal	40 to 50
Salt per bag	70 to 90
A stove and its utensils	30 00 to 40 00
A wagon (buckboard)	45 00 to 50 00
A double wagon	80 00 to 85 00
A single buggy	100 00 to 125 00
A pair of sleighs	20 00 to 30 00
A single harness	15 00 to 20 00
A double harness	25 00 to 35 00
A mowing machine	70 00 to 75 00
A hay rake	25 00 to 30 00
A reaper	80 00 to 90 00
do (self-binder)	175 00 to 180 00
Plough (for breaking)	18 00 to 20 00
do (for old ground)	15 00 to 18 00
do combination	25 00 to 28 00
do brush	25 00 to 35 00
do on wheels	50 00 to 60 00
Harrow, iron, per section	5 00
Seeder, with drill	50 00 to 60 00

Disk harrow	\$ 38 00 to \$ 42 00
A pair of horses (1000 lbs)	100 00 to 125 00
do ponies	50 00 to 60 00
do oxen	80 00 to 100 00
A milch cow	25 00 to 30 00
A heifer, 6 mos. old	8 00 to 12 00
A pig, do	6 00 to 10 00
A sheep or ewe	4 00 to 6 00
A pair of fowls	75 to 1 00
do chickens	50 to 60
A pair of boots	2 50 to 4 00
do gloves	50 to 1 00
Trousers, workman's	50 to 1 00
Vest do	50 to 1 00
A hat	1 00 to 2 00
A servant, man, per month	20 00 to 30 00
A servant girl do	8 00 to 15 00
A servant, man, per day	1 00 to 1 25
A servant girl do	75 to 1 00

PRICE OF SAWN WOOD.

Boards, pine, tongued and grooved, per 1,000 feet.	\$11 00 to \$13 00
do not dressed	10 00 to 11 00
do culled	8 00 to 9 00
Wood for planking in pine	13 00 to 20 00
do do from British Columbia.	20 00 to 24 00
do ceilings	15 00 to 20 00
do finishing	15 00 to 20 00
do clapboarding	15 00 to 18 00
Shingles per 1,000 feet	2 00 to 2 75

The wood imported from British Columbia is very much appreciated; it is used in the building of town houses; the wood cut and prepared in the country answers for common use, covering houses, first timbers, first finishing, fences, palisades, etc. In the country this wood is generally used; it is cheaper and gives fair satisfaction.

PRICES OF GRAIN.

Here are the prices for the month of October last :

Wheat	40 cts. to 46 cts. per bushel.
Oats	15 do 20 do
Barley	18 do 23 do
Potatoes	15 do 18 do

Since my departure from the colony, I learn that the price of grain has gone up about 50 per cent. I cannot give more precise information.

Further, it is well understood that the market at Edmonton is not regularly established; the prices of articles given herewith may have varied, and in fact varied noticeably sometimes in the space of a few weeks.

I have thought it well to give you all the details concerning the population so as to draw your attention more to this part of the country, and that an efficacious measure of government interest and protection may be directed towards it.

The above humbly submitted.

J.-BTE MORIN, *Priest.*

Department of the Interior.

No 4.

REPORT OF THE OPERATIONS OF THE REV. FATHER CORBEIL.

(*Translation.*)

MONTREAL, 31st December, 1896.

A. M. BURGESS, Esq.,
Deputy Minister of Interior,
Ottawa.

SIR,—I have the honour to make you my report on the work which I have done during the year 1896 for colonization in Manitoba.

After having carried on a correspondence with several French journals in Montreal on the numerous advantages which Manitoba offers to farmers, I found myself in communication with a large number of people, more from the United States than Canada, asking me the most precise details in regard to this vast and rich province of Manitoba. I endeavoured in my letters to give the most complete information possible to all that had written to me. However, I must say that all my hopes have not been crowned by success. Not all the settlers that I had a right to hope would do so have established themselves in Manitoba; but this is due to different causes all of which I cannot give, but of which I submit to you some, the principal ones:—first, the unhappy school question has sterilized half our work, for it was feared that there would be a destructive agitation, which would last for a long time, or that the question might be settled in an unsatisfactory manner for the Catholics. Another reason which arrests the current of immigration towards Manitoba is the price of the journey on the railways. The settlers, it is true, are very well treated on the Canadian Pacific Railway; but though the tariff is relatively lower from Montreal to Winnipeg than from Montreal to other places in the province of Quebec, those who have a numerous family draw back on account of the large amount which they require to disburse to reach Manitoba. Others have complained because of the distinction made between those who have come from the province of Quebec and those who come from the United States. For the latter the cost of the journey between Montreal and Winnipeg is \$14; for the former \$22. However, after having sent several settlers singly to Manitoba during the course of the year, I left Ottawa at the end of March last with several families for Manitoba. Two settlers went to Lake Dauphin to take up free lands there (homesteads); two others to St. Jean Baptiste, etc.

The season began with a backward spring, and then occurred an unforeseen inundation. This was not likely to create a great deal of enthusiasm among the settlers. In one word, the year has been a bad one. Nevertheless, the Guenette family, composed of fourteen members, which is settled at St. Jean Baptiste, declares itself satisfied with the past year, and hopes for more success in the coming one. This will be an encouragement for the other settlers.

For about two months I have been at St. Adolphe, a new parish situated about 15 miles from Winnipeg, on the banks of the Red river. In all Manitoba these lands are perhaps those which offer most advantages from the point of view of colonization; they have wood, water, hay, and a soil which is suited to growing wheat, oats and barley. It is an excellent district in which to carry on mixed farming. The lands formerly belonged to the half-breeds, but have passed into the hands, for the most part, of speculators and loan societies. I am working to organize this parish, and am bringing there several families from the United States, offering them desirable terms to settle. I count on seeing this parish considerably larger by next spring.

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

O. CORBEIL,
Priest.

No. 5.

TRANSLATION OF ANNUAL REPORT OF THE GENERAL AGENT OF
"THE SOCIETY OF COLONIZATION AND REPATRIATION
OF THE PROVINCE OF QUEBEC.

MONTREAL, 2nd January, 1897.

To the Hon. CLIFFORD SIFTON,
Minister of the Interior,
Ottawa.

SIR,—I have the honour of addressing to you my annual report in the capacity of immigration agent specially attached to the work of the "General Society of Colonization and of Repatriation of the province of Quebec."

This society, founded during the first months of the year 1894, has its offices opposite the city hall of Montreal, and occupies itself, as its name indicates, with colonizing the vacant lands which are so numerous in this country; with repatriating the Canadians who have emigrated to the United States; and further with receiving and directing to the best of its ability all the strangers who apply to it with the object of settling in our vast domains.

The facts and figures being from their nature more likely to strike the attention of earnest people, I will endeavour to give here, year by year, a summary of the operations of the society, reserving to myself the addition of several observations on the amount of good accomplished up to this date, the possible developments of the work and the encouragement which the society merits from the public and the government.

Between the 11th April, 1894, the date of the opening of the society's offices, and the 31st December of the same year, 1,140 persons registered in the books with the object of obtaining reduced rates of passage to visit the regions to be colonized, and about 717 definitely settled in the regions north of Montreal, of lake St. John, of Saint Maurice, of lake Temiscaming, of Northern Ontario and in the great Canadian West.

During the year 1895 no less than 1,898 persons registered at the same offices, to visit the new lands, with a proportion of more than two-thirds remaining to settle.

Finally, during the 12 months terminating with the year 1896, more than 1,994 persons were registered, of whom 314 came from the United States and 171 from France and Belgium.

To sum up, during a period of less than three years, about 5,000 persons have obtained, at the offices of the society, special information in regard to the lands to be colonized, reduced rates of passage and for freight, in short, guidance and facilities for settlement in many different forms.

I will only mention for example the numerous excursions into the regions to be colonized, either organized or else patronized by the society. During the year which has just ended six of these excursions have met with remarkable success; two to lake St. John; two to the north of Montreal; and two to lake Temiscaming, a distance of 400 miles from the metropolis. We send to the Abbé Morin those who wish to take part in the excursions which he organizes to the west of Winnipeg. These excursions have largely contributed to the diffusion of the knowledge which is indispensable to the choice of a settlement in these regions and were all followed by the most noteworthy results. Our compatriots of the United States joined the other explorers in large numbers.

For the simple enumeration in detail of what has been done at our offices, I will merely refer to my former reports, which show that there is progress all along the line.

To demonstrate the work accomplished by the Colonization Society of Montreal, which is as yet only at its beginning, I am able to point to the fact that already its services, in proportion to the help from all sources which has been put at its disposal, may be advantageously compared with no matter what other organization of a similar kind.

Department of the Interior.

Thanks to the initiative of this society, the work of colonization becomes more and more a regular institution, perfectly organized, following certain settled and well tried methods.

Experience shows that the great difficulty is not precisely in finding colonists who are qualified, but in keeping them once they have arrived within our boundaries. In the same manner there is some merit in preventing those who are inclined to leave, to the number of several thousands yearly, from departing. The organization of the society is admirably adapted for the attainment of this double object.

The stranger who addresses himself to our society is met with kindness. He is taken possession of, so to speak, with the object of guiding him, encouraging him, and making him surmount the difficulties inevitable to every beginner. One should if possible, so it seems to me, increase the number and efficiency of institutions such as this.

The society accomplishes a great deal of good by demonstrating to the mass of our compatriots that there is more to be gained by remaining in the country than by leaving it, and in bringing them to exploit its inexhaustible resources.

It would be difficult enough to estimate in dollars and cents the value of such a work; but a single fact may give an idea. During the 15 days which preceded the departure of the steamer "Moravia," which carried to Brazil its cargo of emigrants torn from the Canadian soil under the falsest pretences, the Colonization Society of Montreal, by the efforts of its staff, its directors and friends, as well in the press as elsewhere, succeeded in preventing the departure, at the lowest computation, of a dozen families. If one calculates what the repatriation of those unfortunates will cost who were not thus dissuaded one has an approximate idea of the debt which the state thus owes to the Colonization Society.

Different statements have been made public in regard to the probable number of French Canadians who left for Brazil. Nevertheless, in accordance with the information which I have been able to obtain, there were not more than one hundred and fifty, perhaps a few less. A week before one could have counted several hundreds entered in the offices of the "Ligue Brazilliana."

Fearing to make this report too long I will hasten to formulate my conclusions as briefly as possible.

I am specially charged, sir, above all to express to you the appreciation of the society of the financial help you have already granted it, and, besides, to solicit the continuation of the favours which it has received from the government since its incorporation.

It is not that it would be difficult to further develop its sphere of action in multiplying the good which it accomplishes; but I will confine myself to respectfully submitting the idea to your consideration, while assuring you of the wish of the society to carefully carry out the least suggestions on your part. Circumstances are more and more favourable to the realization of the programme adopted by the society.

Merely to quote a recent occurrence, the restrictions enforced by the Americans against the entrance of Canadian labour into their territories will end by offering very serious obstacles to the emigration of our people to the United States. The task of those who combat this emigration will be much facilitated, and I believe that from this point of view it is allowable to rejoice. It is the place for repeating the aphorism—"Its an ill wind," &c.

Briefly, there is here a good and splendid work worthy of being favoured, a work quite worthy of the attention of your department. The harvest is abundant and ready to be gathered in: only, workmen are needed.

Permit me, sir, in terminating this report to offer you my best wishes for a joyous future, for health, for success in the accomplishment of the important functions which have devolved on you, and to express the confidence that your administration will be largely profitable to Canadian interests in general and at the same time to our modest association.

I have the honour to be, sir,

Your obedient servant,

DR. T. A. BRISSON,

General Agent Colonization Society, Montreal.

No. 6.

REPORT OF THE REV. FATHER PARADIS.

(Translation.)

DOMREMY, ONT., 4th January, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—In accordance with the request which has been made to me by your department, I have the honour to transmit to you to-day my second annual report on my colony of repatriated people at Domremy, district of Nipissing.

Permit me to say, in the first place, that it is to be regretted that the mis-statement which has been spread by the Canadian press, following that of the United States, with the object of ruining my work of repatriation, still finds credence among distinguished personages, who are thus under the quite wrong impression that all, or almost all, the settlers who came to me from Michigan have retraced their steps.

This falsehood, started, full-fledged, from the office of a small Marquette journal hostile to the return of our compatriots to their country, remains that which it has always been—a deliberate and audacious untruth. The real truth is that the clear result of my campaign in Michigan has been to bring here not only about two hundred families, who have settled here and remain quite satisfied, but to create as well a regular current of immigration which has not been interrupted and which seems to accelerate itself with time.

The impetus is given and will not stop itself. I could have, if I had wished it, returned to Michigan to give lectures and to rouse the masses in favour of an extensive movement towards this colony, but in my humble opinion this would not be entirely wise.

In the matter of colonization I have always held the principle that I would only take up a territory the advantages of which were indisputable, and provide therein all that the settler likes to find on arrival in such a manner that there is no question of his wishing to leave it again.

The colonist is a being that travels by instinct. Why does he travel? Because he is always seeking something better. He has his ideal, like all other seekers. A good soil under a good climate: here is the first point, and that is what we can give him here. Then at any price roads. Here is the great mistake made by the governments not giving enough roads to the settlers, and I declare without fear of contradiction that if the governments had taken up the question of roads more seriously the number of settlers in each province would be more than doubled—I do not hesitate to say that it would be tenfold.

Thus my first care, in carrying out my work of colonization, is to occupy myself before anything else with the roads, and if the governments do not act willingly, I do the best I can and make them myself, these indispensable roads. This is what I have done at Domremy. I have opened up thirty-six miles of roads, and the immediate result has been the settlement of 45 families about ten miles from the Canadian Pacific Railway where there were splendid lands which were inaccessible for want of roads. If I had the roads here that are required, the task of immigration would be much simplified. There would not be any necessity for so many expeditions to the United States, a single satisfied colonist would be a more efficacious apostle than ten missionary colonizers who cannot obtain roads to bring in their colonists by. To me colonization resolves itself into three words: *Roads, roads, roads.* And I know what I am talking about.

Department of the Interior.

Consequently, to-day, in rendering account of my administration to your department, I am prouder of saying, "I have made 36 miles of roads," than I would be of writing, "I have traversed all the west of the United States and entered thirty-six hundred families," for in doing as I have done I have carried out true and solid colonization.

But I have not limited myself to the construction of roads. I have dowered my colony with a saw and a flour mill, other indispensable elements to prosperity, I would rather say, to simple subsistence. These two establishments work to the general satisfaction. For there the settler can convert into sawn wood the innumerable trunks of trees which otherwise he would be obliged to burn on the spot; and there he can have his wheat made into flour, and the different cereals prepared for food; and from this moment the settler colonist ceases to be a traveller, he becomes a citizen. He loves his fields for there he has a comfortable house to live in, and food for his family and stock; he cultivates his lands; he is a king.

Give these to the colonist and you will see Canada grow.

In saying then that the aim and the result of my colonizing operations in the district of Nipissing have been during the present year to procure these advantages of which I have spoken for my colony, I can without presumption rest assured that I present to you an excellent report.

All this work, you will readily understand, has not been carried out without trouble and sacrifices. Money does not come to any one as water flows from the spring. It has cost me many steps and efforts. I have not given myself any rest, often supplying by my manual labour the want of other resources. At the present moment I look to the future with more assurance, for my colony is its own best advertisement; and if it be true that nothing succeeds like success, I can defy those who have from the beginning of my work of repatriation croaked that it would be a *fiacso*. To sum up, an average of one hundred families per annum, in the course of two years, is a result which should count for something in the annals of repatriation.

I hope that in a year from now I shall have still better results to show you.

Permit me, in conclusion, to express my thanks for the interest that has been manifested in my humble labours, and for the liberal encouragement which the Minister has been pleased to grant them. Praying that these favours may be continued.

I subscribe myself, with consideration,

Your obedient servant,

C. A. M. PARADIS,

Pt. M. C.

REPORTS OF CANADIAN AGENTS.

No. 1.

REPORT OF THE IMMIGRATION AGENT AT ST. JOHN, N.B.

(MR. S. GARDNER.)

ST. JOHN, N.B., 31st December, 1896.

To A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit a report showing the operations of this agency during fourteen months from October, 1895, to 31st December, 1896.

EMIGRANT ARRIVALS.

The emigrant arrivals are shown on three accompanying schedules.

SATISFIED SETTLERS.

All who bought farms and settled are very much pleased, so they write. The farm labourers are well pleased with their change. Some have applied for and taken up crown lands under the Labour Act.

PLENTY OF INQUIRERS.

As usual, I am in receipt of many applications from Europe, the United States, etc., for particulars of the country, soil, climate, farms for sale, and Crown lands. These receive my prompt attention.

FORMER NEW BRUNSWICKERS RETURNING HOME.

I am pleased to again report the return of many New Brunswickers to their old homes. This movement, referred to in my report for 1895, has continued during the period covered by the present report.

NOT MUCH WEALTH.

The immigrants passing through this agency during the past fourteen months brought in cash only \$1,350, and effects \$850.

The customs records at the port of St. John give a total of 278 entries, 829 persons, with effects valued at \$31,351, for fourteen months. This of course includes first class passengers.

STATISTICS OF TRAVEL.

The travel by the international line steamships between Boston and St. John, N.B., for fourteen months, was: ins 17,828; outs 8,892.

Department of the Interior.

REPORTS FROM THE COUNTIES.

During fourteen months there settled in :—

Albert County.....	18
Queen's do	27
King's do	75
Northumberland County.....	237
Charlotte do	150
York do	238
Carleton do	216
Victoria do	128
Madawaska do	53
Restigouche do	49
Gloucester do	75
Westmoreland do	392
Kent do	72
Sunbury do	17

Total number of persons 1,747

ALBERT COUNTY.

Those who came were repatriated Canadians from the United States, bringing all they possessed, and they report many more would come had they the means. Farmers here have done well ; crops abundant ; large numbers of cattle kept to consume the roots and hay. Lumbering is extensively done, and the lumber shipped to Europe. Rock plaster business slack, as the United States market is dull. Quarries of stone idle for want of men and capital. This is a good county, good climate, and emigration should be encouraged.

QUEEN'S COUNTY.

Our young men find their way to the United States in the winter, working in the woods. All return in the spring with money amounting to several thousand dollars. Our only drawback is the want of a railway between Welsford and Oromocto, by way of Gagetown. The farmers are shut out for several months. Have to haul produce 40 to 50 miles to St. John market, but they are not without hopes of improvement in this respect at no distant date.

KING'S COUNTY.

Those who came into this county during 1896 were all Canadians from United States, principally farmers, and all, with few exceptions, bought farms and paid for them. Fifteen took up Crown lands, a part paid, others under Labour Act. Springfield correspondent writes land owned by government in this parish is not very good for farming. In Scotch settlement good ; two new comers bought farms here. There are lots of good farms for sale, and cheap, within easy reach of market by land and water, very desirable lands for immigrants. I expect to give a better report next year as we are working up a scheme to bring out a lot of families from vicinity of Belfast, Ireland, and get them settled on unoccupied farms. There are about forty families, and they have from £200 to £1,000 each. So they are not paupers, just the kind we want.

Millstream.—Quite a number came in here, Canadians from United States, settled, bought farms. Good, persistent workmen here can get right along. Large number of our young men are returning from the United States this fall. Our farmers as a rule are doing very well ; saving money and laying it up. We want people of a good class. Many this year have grown over 1,000 bushels of grain.

Havelock.—There are only 2,000 acres of Crown lands here. There are 1,200 to 1,500 acres of wilderness land in the parish that can be purchased—all fit for cultivation—from \$1 to \$2 per acre. This land is at the head of Thorn brook. About 100 settlers could each have a farm. There are some lots with old clearing that could be bought for \$2 to \$3 per acre. A few farms with good buildings from \$1,000 to \$1,200.

CHARLOTTE COUNTY.

Among the immigrants who came during 1896 were 127 Canadians, 29 United States citizens, 2 English and 2 Scotch, bringing their families with them. Some bought farms and settled; the labourers got work at once, mechanics also—especially at St. George. Those who entered there were from the United States. Several stonemasons arrived, one from Minnesota, who brought \$2,000 in cash and other articles of value. They say they intend remaining in Canada.

WESTMORELAND COUNTY.

All who came here during 1896 are Canadians returning from United States. Among them were 28 English, 13 French, and former residents of the county. There has been no Crown land taken up. A good number bought farms that were unoccupied and settled on them. Agriculture on the increase. Crops have seldom been better. Soil very fertile.

NORTHUMBERLAND COUNTY.

My correspondent in this county says:—"I can say nothing of much importance, except that our returning countrymen declare they are better Canadians than when they went away, and better satisfied with our country. On the whole the business of the year has been prosperous. There has been no lack of work for willing workers. The immigrants were 210 Canadians from United States, 10 Hollanders (Dutch), 10 English, 7 Scotch."

KENT COUNTY.

During the year 72 Canadians returned from the United States to this county. Some returned to farms they left and others bought, and all are now settled. They report a large number of our people still in the United States who want to return but have not the funds to pay their way back. Crops good; wheat and other cereals above the average. Health, peace and quietness reign in all the new settlements. The big rush for the west has kept this locality at a stand still, but I think the time is near when there will be a change and our young men will find here as good as elsewhere.

RESTIGOUCHE COUNTY.

All the immigrants who came into this county during 1896 are Canadians returning from manufacturing towns in the United States, with their effects, amounting to \$3,500. The exodus of our young men is much less than in previous years.

YORK COUNTY.

The immigrants who came into this county during 1896 were principally Canadians returned from United States. Among them were 8 United States citizens. All settlers. Many going to their old farms and to stay; others finding work at once as they were agriculturists. In all 238 came in, bringing their effects. Some bought farms in new settlements. Those passing McAdam junction during the year had 5,992 packages of household goods.

Department of the Interior.

CARLETON COUNTY.

All the persons who came into this county during 1896 are Canadians from United States, bringing their effects; those from Maine bringing their teams and farming implements. The land is rough, but raises good crops. Centreville—Farms could be bought in this vicinity. One is offered at Tracy's Mills, good land, 75 acres cleared, good buildings, price \$2,000. The Centreville and Woodstock Railway is being surveyed.

GLOUCESTER COUNTY.

All who came here during 1896 are Canadians returned from United States, and now settled permanently in the county. All those owning farms are improving them, adding to their stock, &c. The grants to agricultural societies are a great help to farmers. A number of our people live mainly by fishing, and the fishery bounties stimulate exertion. The young men returned from United States are wiser, not richer. They say Canada is the best place to live in, and, that if they worked as hard at home as they had to while away, they would be much better off.

VICTORIA COUNTY.

The arrivals during 1896 are mixed nationalities. Canadians 85, Danes 21, English 5, United States citizens 12. Some have taken new farms, others have returned to the farms they left. At South Tilley several farms have been purchased by parties from the United States—ex-Canadians—who at once began work, having brought their effects, including farming implements, with them. Very little Crown land left in this vicinity and that poor. My correspondent adds:—"If the owners would send in settlers on the railway land, which starts at the rear of my land, a big settlement could be formed, for the land is very good. Our settlers are in a flourishing condition. Scotch colony few new additions. The people are contented and working away improving their places."

MADAWASKA COUNTY.

Only two correspondents replied. They report 53 immigrants reached the county and all have taken up Crown lands and settled on them,—all French Canadians, bringing their cattle, &c., with them.

CONCLUSION.

The foregoing are all of the counties as yet heard from. Those entering the province by other inlets than Halifax and Quebec so far reported as positively entered and settled were 1,747. Of these 1,600 were Canadians, 43 English, 9 Scotch, 10 Hollanders (Dutch), 49 United States citizens, 21 Danes and 13 French; bringing \$61,848 in cash and \$92,711 in effects. Total number of immigrants, including those entered at this agency, 3,099.

The reports above from the various counties are from highly reliable persons.

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

S. GARDNER,
Dominion Immigration Agent.

LIST of Retail Prices of the ordinary articles of Food required by the working classes.

	\$ cts.	\$ cts.
Bacon per lb	0 11	to 0 14
Bread best wheat 2 lb loaf	0 06	" 0 07
do brown	0 06	" 0 07
Butter salt per lb	0 16	" 0 18
do fresh per roll	0 20	" 0 25
Beef cut per lb	0 08	" 0 12
do per quarter per lb	0 04	" 0 07
Beer per quart	0 10	" 0 00
Candles per lb mould	0 12	" 0 00
Coal oil, gallon	0 20	" 0 28
Cheese per lb	0 12	" 0 14
Coffee ground	0 24	" 0 40
Cornmeal per 100 lbs	1 50	" 1 60
Eggs per dozen according to season	0 10	" 0 30
Flour per barrel best 196 lbs.	5 00	" 6 00
do do 2nd best	4 00	" 5 00
Firewood per cord cubic measure	4 50	" 6 00
Ham per lb	0 12	" 0 14
Shoulders per lb	0 10	" 0 12
Herrings per barrel 200 lbs.	3 00	" 4 00
Mustard per lb	0 25	" 0 35
Milk per quart	0 05	" 0 06
Mutton per lb cut	0 08	" 0 12
do per quarter	0 06	" 0 08
Oatmeal per 100 lbs rolled	3 50	" 4 50
Pepper ground per lb	0 15	" 0 20
Potatoes per bushel	0 25	" 0 60
Pork fresh per lb cut	0 09	" 0 12
do per quarter per lb	0 06	" 0 10
Rice and corn per lb	0 07	" 0 10
Soap yellow	0 05	" 0 06
Sugar per lb	0 05	" 0 06
Salt per lb		0 1½
Tea black per lb	0 25	" 0 40
do green per lb	0 40	" 0 50
Tobacco per lb	0 35	" 0 40
Veal per lb	0 06	" 0 10

S. GARDNER,

Dominion Government Immigration Agent.

ST. JOHN, N.B., December 31st, 1896.

Department of the Interior.

LIST of Retail Prices of Raiment required by the working classes.

Clothing.	PRICES.	
	From	To
	\$ cts.	\$ cts.
Coats, under, tweed	3 00	3 50
do over do	3 00	4 50
Trousers do	2 00	2 50
Vests do	1 50	2 00
Shirts, flannel, all wool	1 00	1 50
do cotton	0 50	0 75
do under, all wool	0 75	1 20
Hats, hard felt	0 60	0 75
Socks, woollen	0 25	0 30
do cotton	0 12	0 25
Blankets, all wool, per pair	2 00	3 50
Rugs do each	0 75	1 40
Flannel, all wool, per yard	0 20	0 30
Cotton shirting, per yard	0 12	0 20
do sheeting do	0 40	0 60
Canadian cloth, tweed	1 40	2 00
Shoes, men's, per pair	1 50	2 00
do women's do	0 75	1 00
Boots, men's do	2 00	3 00
do women's do	0 75	1 00
India rubber shoes, per pair, men's	0 60	0 70
do do women's	0 50	0 75

S. GARDNER,
Dominion Government Immigration Agent.

ST. JOHN, N.B., December 31st, 1896.

STATEMENT of Immigrant Arrivals at St. John, N.B.
STEEERAGE PASSENGERS FOR UNITED STATES.

Date.	SEXES.				Total number of Souls.	NATIONALITIES.								OCCUPATIONS.						
	Male Adults.	Female Adults.	Boys under 12.	Girls under 12.		English.	Scotch.	German.	Scandinavian.	French and Bel- gian.	United States Citizens.	Canadians.	Other Countries.	Farmers.	Farm Labourers.	General Labourers.	Mechanics.	Clerks, Traders, &c.	Female Domestics.	Not Classified.
1895.																				
December	18	1	1	3	23	1			3						19	1	4	12	1	5
1896.																				
January	73	22	7	7	109		4			1		104						65		43
February	1				1													1		
March	22	3			25		6		1			18	4					4	8	1
April	22	9	5	2	38		16			2		11	7					2	2	17
December	97	70	56	45	268		66		1	3	4	179	13					41	16	185
Total.....	215	104	68	54	441	19	92	1	4	7	4	313	24	1	26	113	26	113	26	246
December, 1895.....	18	1	1	3	23	1			3			19	1		4	12	1	12	1	5
Total.....	233	105	69	57	464	20	92	4	4	7	4	332	25	1	30	125	27	125	27	251

Department of the Interior.

STATEMENT of Immigrant Arrivals at St. John, N.B.—Continued. STORAGE PASSENGERS FOR CANADA.

Date.	SEXES.				Total number of Souls.	DECLARED DESTINATIONS.						NATIONALITIES.								OCCUPATIONS.								
	Male Adults.	Female Adults.	Boys under 12.	Girls under 12.		Lower Provinces.	Quebec.	Ontario.	Manitoba.	North-west Ter.	British Columbia.	English.	Irish.	Scotch.	German.	Scandinavian.	French and Belgian.	United States Citizens.	Canadians.	Other Countries.	Farmers.	Farm Labourers.	General Labourers.	Mechanics.	Clerks, Traders, &c.	Female Domestic.	Not Classified.	
1895.																												
November.....	2				2	2	10	9	2																			
December.....	29	6	6	4	45	24	10	9	2		2	34	2	1	6	2						2	8	17	3	2		13
Total.....	31	6	6	4	47	26	10	9	2		36	2	1	6	2						2	10	17	3	2		13	
1896.																												
January.....	21	9	5		35	13	7	10	5		20		1	4	2							4	1	3	5	7		15
February.....	25	4	1	3	33	2	10	4	17		18	3	2			3						1	1	4	10	5		9
March.....	22	4			26	1	5	12	7		16			4		1									4	2		7
April.....	88	31	11	13	143	48	7	14	64	2	76	9	6	18	3	12	1					31	32		14	3		58
May.....	13	7	5	2	27	27					24											4						20
June.....	16	7	24	10	57	57					57																	34
July.....	2				2	2					2																	
August.....	6	1			7	7					7																	
September.....	20				20	20					5			2	4													
October.....	8	5			13	1					7				1													
November.....	1				1	1					1																	
December.....	40	22	13	20	95	11	7	21	54	1	23	1	2	29														57
Total.....	262	90	59	48	459	197	41	61	147	3	256	13	11	57	10	16	3	33	60	66	48	34	63	23	19		206	
November and December, 1895.....	31	6	6	4	47	26	10	9	2		36	2	1	6	2						2	10	17	3	2		13	
Total.....	293	96	65	52	506	223	51	70	149	3	292	15	12	63	10	18	3	33	60	68	58	51	66	25	19		219	

STATEMENT of Immigrant Arrivals at St. John, N.B.—Concluded.
CABIN.

Date.	SEXES.				Total number of Souls.	NATIONALITIES.								OCCUPATIONS.					
	Male Adults.	Female Adults.	Boys under 12.	Girls under 12.		English.	Irish.	Scotch.	German.	French and Bel-gram.	United States Citizens.	Canadians.	Chinese and Japanese.	Other Countries.	Farmers.	Farm Labourers.	Mechanics.	Clerks, Traders, &c.	Female Domestics.	Not Classified.
1895.	7	1	1	1	9	7	1	1	1	1	1	1	1	2	2	2	5	2	2
1896.	23	5	3	2	33	22	1	3	1	1	10	4	4	4	4	3	19	11	11
January.	18	7	2	1	30	22	1	3	1	1	4	2	2	2	2	4	8	8	12
February.	34	8	2	1	48	32	1	3	1	3	10	9	2	9	6	6	12	16	16
March.	68	13	11	3	84	71	1	3	1	3	5	6	2	29	5	5	18	32	30
April.	19	15	2	1	38	40	1	1	1	1	6	4	1	1	6	6	12	11	24
May.	15	13	2	2	38	38	3	3	1	1	14	4	2	1	2	12	14	26	26
June.	28	17	6	3	54	31	5	1	1	1	1	1	1	1	1	1	6	7	7
July.	9	5	3	3	17	7	2	1	1	1	1	1	2	1	1	3	2	1	22
August.	3	16	2	2	55	24	1	1	2	4	21	9	2	9	3	21	5	5	5
September.	35	99	31	23	405	289	7	11	4	8	72	5	7	53	5	43	123	1	180
December.	7	1	1	1	9	7	1	1	2	4	1	2	5	2	2	5	5	5	2
Total.	252	100	32	23	414	296	7	12	4	8	73	5	7	55	5	43	128	1	182
December, 1895	7	1	1	1	9	7	1	1	1	1	1	1	1	2	2	5	2	2	2
Total.	259	100	32	23	414	296	7	12	4	8	73	5	7	55	5	43	128	1	182

Department of the Interior.

No. 2.

REPORT OF HALIFAX AGENT.

(MR. E. M. CLAY.)

DOMINION GOVERNMENT IMMIGRATION AGENCY,
HALIFAX, NOVA SCOTIA, December 31st, 1896.

To A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit herewith a report of the Immigration at this agency for the fourteen months, November 1, 1895, to December 31, 1896, as follows:

The total arrivals were:—

CABIN.

	Males.	Females.	Children.	Totals.
2 months 1895.....	521	210	46	777
12 do 1896.....	4,044	3,543	465	8,052
Totals.....	4,565	3,753	511	8,829

STEERAGE.

	Males.	Females.	Children.	Totals.
2 months 1895.....	474	357	196	1,027
12 do 1896.....	4,025	1,573	1,184	6,782
Totals.....	4,499	1,930	1,380	7,809

Making a grand total "Cabin and Steerage" of 16,638.

The total arrival of steerage passengers shows a small increase over the previous corresponding period, but the increase has been in those for the United States, while a slight decrease is shown in the arrivals for Canada,—note statement E.

CLASS OF IMMIGRANTS.

As a whole the arrivals have been a fair class of immigrants, comparing favourably with those of former years, and, with one or two exceptions, they were, so far as we could see, provided with sufficient means to carry them through. A few mechanics and clerks who had tickets only to Halifax had to seek assistance from the different benevolent societies to get further west, but other classes had no trouble in getting employment.

NEWFOUNDLANDERS.

Immigration from Newfoundland was not as large as during the previous year, but a number of promising Newfoundlanders have made Canada their home this year, quite a number having gone to British Columbia to engage in fishing and mining.

JUVENILES.

During the past season eight parties of children, from the various homes, besides a number of individuals from the different societies, numbering in all 713 souls, passed through this agency, being an increase of 226 over the previous season.

DEATHS.

I have to report four deaths, all children, three infants at sea and one little girl four years old, who died in our city hospital from the effects of typhoid fever some ten days after landing from steamer "Mongolian." The parents of but one of these children were for Canada.

ONE BIRTH.

I have also to report one birth at sea, SS. "Laurentian," December 17, parents German, going to Manitoba.

In other respects the health of the immigrants has been good.

ARRIVAL OF PASSENGER STEAMERS.

We have attended and received passengers lists from 228 steamers during the period reported on. Of this number 176 arrived between the hours of 6 p.m. and 6 a.m.

BRITISH SETTLERS IN NOVA SCOTIA.

A number of English, Irish, and Scotch farmers, have settled in this province and are doing well. Several young men of means and some knowledge of farming, making Nova Scotia their home, spent the year in the agricultural college at Truro, adding greatly to their chances of success in this country.

Reports from older settlers continued encouraging.

VISITORS TO THE OLD COUNTRY.

A larger number of western settlers than usual sailed from this port during November and December, to visit friends in the old country, indicating good results from the past season in the West, and good prospects for a large immigration during 1897.

The usual statements are attached as follows :

- Statement A.—Monthly arrival and departure of cabin passengers.
do B.—Monthly arrival and departure of steerage passengers.
do C.—Monthly arrival and departure of steerage passengers for States.
do D.—Sexes, occupations and destinations of nationalities for Canada.
do E.—Comparative statement of monthly arrivals 1895 and 1896.
do F.—Comparative statement of nationalities 1895 and 1896.
do G.—Comparative immigration since 1869.
do H.—Sexes, nationalities and destinations of steerage by Allan and Dominion lines.
do I.—Juvenile immigration.

I again beg to express my thanks for, and appreciation of the many courtesies extended by all the officials with whom we have come into contact in our work of receiving immigration.

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

EDWIN M. CLAY.

Department of the Interior.

STATEMENT A.

Showing monthly arrivals and departures of Cabin Passengers, November 1st, 1895, to December 31st, 1896.

MONTHS.	SEXES.						NATIONALITIES.							REMARKS.		
	Via Ocean Travel.		Adults.		Children.		Totals.	English.	Irish.	Scotch.	Germans.	Scandinavians.	French & Belgians.		Other countries.	Totals.
	Male.	Female.	Male.	Female.	Male.	Female.										
November	365	234	110	10	11	365	102	1	2	1	10	250	365			
December	412	287	100	13	12	412	150	2	4	1	6	249	412			
Totals	777	521	210	23	23	777	252	3	6	1	16	499	777			
January	226	162	56	6	2	226	86	1	2	1	12	123	226			
February	239	154	65	10	10	239	142	1	2	1	3	90	239			
March	340	208	116	7	9	340	171	5	11	5	5	143	340			
April	409	231	136	21	21	409	157	1	9	2	3	240	409			
May	367	158	166	22	21	367	93	2	2	2	2	269	367			
June	670	382	231	27	30	670	97	1	2	2	2	568	670			
July	2,283	923	1,286	62	62	2,283	111	1	3	1	1	2,167	2,283			
August	1,453	787	614	27	25	1,453	115	1	2	2	2	1,335	1,453			
September	848	449	374	13	12	848	164	1	1	1	6	674	848			
October	461	252	185	14	10	461	92	1	1	1	5	362	461			
November	349	214	107	12	16	349	151	1	1	1	3	195	349			
December	407	275	106	15	11	407	191	1	1	1	3	211	407			
Totals, 12 months...	8,052	4,044	3,543	236	229	8,052	1,576	10	35	13	4	43	6,377	8,052		
Add 2 months, 1895.	777	521	210	23	23	777	252	3	6	1	16	499	777			
Totals, 14 months...	8,829	4,565	3,753	259	252	8,829	1,822	13	41	14	4	59	6,876	8,829		

Ultimate destinations of cabin passengers not given on passenger lists.

EDWIN M. CLAY,
Division Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

STATEMENT B.

Showing monthly arrivals and departures of Steerage Passengers, November 1st, 1895, to December 31st, 1896.

Months.	SEXES.				Declared Destinations.						Nationalities, Canada.						Occupations, Canada.															
	Adults.		Children.		Lower Provinces.		Ontario.		Manitoba.		North-west Territories.		British Columbia.		United States.		Totals.		Irish.		Scotch.		Germans.		Scandinavians.		French and Belgians.		Other countries.		Totals.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
November.....	366	163	125	41	37	366	92	28	33	7	14	11	181	366	129	4	12	1	10	6	23	185	20	50	16	15	22	62	185			
December.....	661	311	232	64	54	661	111	60	69	48	7	30	336	661	201	18	26	24	12	11	33	325	14	107	33	28	56	86	325			
Totals.....	1027	474	357	105	91	1027	203	88	102	55	21	41	517	1027	330	22	38	25	22	17	56	510	34	157	49	43	78	148	510			
January.....	339	154	89	40	26	339	75	25	55	46	4	21	113	339	155	6	14	15	7	4	25	226	20	4	67	31	15	17	72	226		
February.....	662	383	133	87	59	662	91	133	133	60	20	16	209	662	346	33	19	11	3	6	35	453	52	2	139	23	49	32	156	453		
March.....	1150	807	224	75	44	1150	124	80	206	232	46	39	423	1150	534	34	27	24	44	21	44	75	727	100	7	317	58	43	48	154	727	
April.....	2034	1377	275	282	100	2034	408	76	539	362	49	26	574	2034	1097	26	191	3	56	12	75	1460	51	120	700	33	62	85	409	1460		
May.....	568	367	163	21	17	568	271	1	8	8	.....	2	279	568	263	1	20	1	.....	4	289	1	140	26	25	43	54	289		
June.....	375	157	69	98	51	375	265	1	.....	.....	.....	2	107	375	251	.....	.....	.....	.....	.....	17	208	1	87	8	7	15	150	308	
July.....	208	104	77	12	15	208	111	2	.....	.....	.....	5	90	208	69	2	14	2	3	.....	28	118	3	34	10	11	24	35	118	
August.....	210	108	70	20	12	210	99	.....	.....	.....	.....	.....	110	210	88	.....	.....	.....	.....	5	6	100	.....	4	6	7	15	31	100	
September.....	262	107	118	18	19	262	115	.....	.....	.....	.....	2	141	262	98	.....	.....	.....	.....	.....	21	121	.....	2	48	7	10	22	34	121
October.....	186	53	106	17	10	186	82	3	95	186	75	11	88	2	3	5	11	19	28	88	
November.....	405	179	150	42	35	405	159	26	13	38	6	10	154	405	188	5	2	1	8	13	35	252	9	2	87	18	12	29	95	252		
December.....	382	199	99	36	48	382	84	43	91	38	2	4	120	382	146	16	10	6	7	1	76	282	18	.....	93	21	11	29	90	282	
Totals 12 months	4782	4025	1573	748	436	4782	1884	389	1049	786	127	129	2418	4782	3310	123	300	65	228	62	376	4364	255	138	1776	246	263	378	1308	4364		
Add 2 months, 95.....	1027	474	357	105	91	1027	203	88	102	55	21	41	517	1027	330	22	38	25	22	17	56	510	34	157	49	43	78	148	510			
Totals 14 months	7809	4499	1930	853	527	7809	2087	477	1151	841	148	170	2935	7809	3640	145	338	90	150	79	432	4874	289	139	1933	295	306	456	1456	4874		

EDWIN M. CLAY,
Dom. Immigration Agent.

HALIFAX, N. S., 31st December, 1896.

Department of the Interior.

STATEMENT C.

Showing monthly arrivals and departures of Steerage Passengers, for United States, November 1st, 1895, to December 31st, 1896.

MONTHS.	SEXES.				NATIONALITIES.								OCCUPATIONS.						Totals.		
	Adults.		Children.		Totals	English.	Irish.	Scotch.	Germans.	Scandinavians.	French & Belgians.	Other countries.	Totals.	Farmers.	Farm labourers.	General labourers.	Mechanics.	Clerks, &c.		Domestics.	Not classed.
	Male.	Female.	Male.	Female.																	
November	62	75	22	22	181	79	2	1	25	38	5	31	181	8	8	31	19	4	39	80	181
December	128	134	39	35	336	74	3	1	48	61	1	148	336	10	1	97	16	4	94	114	336
Totals	190	209	61	57	517	153	5	2	73	99	6	179	517	18	1	128	35	8	133	194	517
January	47	40	16	10	113	19			25	13		56	113	6		29	10	2	21	45	113
February	118	49	21	21	209	36	2	2	50	46		73	209	6		92	7	13	24	67	209
March	423	103	22	16	423	98			11	207	3	102	423	29		215	32	6	61	80	423
April	574	411	106	29	574	128		1	5	257	11	172	574	3	17	348	35	8	61	102	574
May	175	87	6	11	279	279						7	279			143	26	6	47	5	279
June	107	51	35	7	107	98		1			1	4	107			45	8	1	21	29	107
July	90	45	35	5	90	86						4	90			26	14	5	17	28	90
August	110	54	39	11	110	98		1		2		9	110			43	7	4	21	35	110
September	141	42	74	13	141	137						4	141			25	9	7	36	63	141
October	98	12	65	9	98	96		1				1	98			6	3	3	36	50	98
November	154	51	78	15	154	109				33		12	154			41	6	3	33	70	154
December	120	56	34	16	120	21			10	72		17	120		2	45	5	2	20	44	120
Totals, 12 months.	1,347	745	173	153	2,418	1,205	3	6	102	630	15	457	2,418	48	19	1,058	162	60	401	670	2,418
Add 2 months, 1895.	190	209	61	57	517	153	5	2	73	99	6	179	517	18	1	128	35	8	133	194	517
Totals, 14 months.	1,537	954	234	210	2,935	1,358	8	8	175	729	21	636	2,935	66	20	1,186	197	68	534	864	2,935

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

STATEMENT D.—Showing Sexes, Occupations, and Destinations of the different nationalities remaining in Canada.

Nationalities.	SEXES.				OCCUPATIONS.								DESTINATIONS.						Totals.		
	Adults.		Children.		Farmers.	Farm Labourers.	General Labourers.	Mechanics.	Clerks, &c.	Domestics.	Not classed.	Totals.	Nova Scotia.	New Brunswick.	P. E. Island.	Quebec.	Ontario.	Manitoba.		N. W. Territories.	British Columbia.
	Male.	Female.	Male.	Female.																	
English.....	2251	729	421	239	3640	217	117	1462	230	225	359	1030	1591	165	33	344	757	518	111	121	3640
Irish.....	86	45	5	5	145	14	5	45	5	17	23	36	24	1	1	25	46	39	1	9	145
Scottish.....	170	37	112	19	388	31	12	86	20	21	14	154	52	13	14	19	177	39	6	18	388
German.....	33	31	11	13	90	6	28	2	4	14	41	90	8	8	7	10	16	55	1	90	
Scandinavians.....	107	21	16	6	150	4	5	92	5	1	9	34	156	8	7	46	69	17	3	150	
French and Belgians.....	45	21	12	1	79	5	35	5	5	6	28	79	24	2	17	8	28	8	8	2	79
Russians.....	27	19	18	16	80	1	16	8	2	6	47	80	4	2	14	8	52	2	2	80	
Russian Jews.....	1	3	1	1	5	1	1	1	1	1	4	5	4	1	5	5	5	5	5	5	5
Russian Poles.....	6	7	3	3	16	6	6	6	6	5	5	16	16	1	2	2	2	5	5	6	16
Russian Finns.....	62	19	5	4	90	2	60	15	13	15	13	90	2	1	2	2	59	16	11	90	
Austrians.....	5	5	2	2	10	1	3	1	2	6	10	10	5	1	1	4	2	1	1	5	10
Hungarians.....	2	6	2	1	16	11	2	11	5	16	10	16	10	1	6	4	6	1	2	16	
Italians.....	11	3	1	1	20	20	20	20	1	1	5	20	20	1	1	1	1	1	1	1	20
Greeks.....	1	1	1	1	5	5	5	5	5	5	10	11	5	1	5	5	20	11	1	5	11
Armenians.....	20	1	1	1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Turks.....	5	3	2	5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Galicians.....	1	1	1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Chinese.....	3	1	2	2	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Icelanders.....	117	18	3	2	140	8	66	19	24	3	20	140	92	7	6	16	17	1	1	140	
Canadians.....	7	13	5	2	27	1	1	1	6	6	20	27	23	4	4	4	4	4	4	4	27
United States Citizens.....	2962	976	619	317	4874	289	139	1933	295	306	456	1456	1841	189	57	477	1151	841	148	170	4874
Totals.....																					

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

Department of the Interior.

STATEMENT E.—Comparative Statement of monthly arrivals and departures.

MONTHS.	Canada.		Increase.	Decrease.	United States.		Increase.	Decrease.	Total Arrivals.		Increase.	Decrease.
	1894.	1895.			1894.	1895.			1894.	1895.		
	November	522	185	...	337	110	181	71	...	632	366	...	266
December	505	325	...	180	215	336	121	...	720	661	...	59
Totals	1,027	510	...	517	325	517	192	...	1,352	1,027	...	325
	1895.	1896.			1895.	1896.			1895.	1896.		
January	307	226	...	81	67	113	46	...	374	339	...	35
February	388	453	65	...	116	209	93	...	504	662	158	...
March	704	727	23	...	187	423	236	...	891	1,150	259	...
April	1,683	1,460	...	223	390	574	184	...	2,073	2,034	...	39
May	363	289	...	74	68	279	211	...	431	568	137	...
June	369	268	...	101	84	107	23	...	453	375	...	78
July	130	118	...	12	58	90	32	...	188	208	20	...
August	105	100	...	5	90	110	20	...	195	210	15	...
September	80	121	41	...	154	141	...	13	234	262	28	...
October	105	88	...	17	87	98	11	...	192	186	...	6
November	185	252	67	...	181	154	...	27	366	406	40	...
December	325	262	...	63	336	120	...	216	661	382	...	279
Totals	4,744	4,364	196	576	1,818	2,418	856	256	6,562	6,782	657	437

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

STATEMENT F.—Comparative Statement of Nationalities for Canada, 1895 and 1896.

Nationalities.	10 Months.	14 Months.	Increase.	Decrease.	Per Cent.
	1895.	1896.			
English	3,142	3,640	498	...	+16
Irish	174	145	...	29	-17
Scotch	333	338	5	...	+ 2
Germans	69	90	21	...	+30
Scandinavians	87	150	63	...	+72
French and Belgians	142	79	...	63	-44
Other countries	287	432	145	...	+51

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

STATEMENT G.—Comparative Immigration, 1869 to 1896, inclusive.

Year.	SEXES.				NATIONALITIES.					Remarks.
	Males.	Females.	Children.	Totals.	English.	Irish.	Scotch.	Others.	Totals.	
1869...	289	73	74	436					436	No record of nationalities.
1870...	258	101	78	437	214	93	102	28	437	
1871...	317	132	101	550	339	40	72	99	550	
1872...	689	396	347	1,432	1,187	88	137	20	1,432	
1873...	1,037	414	202	1,653	972	22	117	542	1,653	
1874...	781	321	423	1,525	889	78	167	391	1,525	
1875...	374	136	233	743	551	44	21	127	743	
1876...	320	90	106	516	409	18	21	68	516	
1877...	607	200	124	931	580	99	35	217	931	
1878...	1,256	429	366	2,051	1,280	329	133	309	2,051	
1879...	2,503	751	701	3,955	2,516	706	67	666	3,955	
1880...	1,921	626	548	3,095	1,754	681	165	495	3,095	11 months.
1881...	2,028	801	817	3,646	2,248	766	223	409	3,646	13 do
1882...	4,970	2,086	1,667	8,723	5,597	999	514	1,613	8,723	
1883...	4,589	2,029	1,857	8,475	5,435	1,178	237	1,625	8,475	
1884...	3,033	1,193	1,378	5,604	4,097	637	190	680	5,604	
1885...	2,440	958	1,029	4,427	2,906	539	262	720	4,427	
1886...	3,305	1,302	1,049	5,656	4,336	488	511	321	5,656	
1887...	6,305	2,532	1,837	10,674	7,261	839	694	1,880	10,674	This statement does not include cabin passengers.
1888...	9,030	3,410	2,613	15,053	9,785	750	1,327	3,191	15,053	
1889...	7,430	3,054	1,844	12,328	6,303	370	1,027	4,628	12,328	
1890...	5,817	2,180	1,440	9,437	5,952	259	588	2,638	9,437	
1891...	5,996	2,555	1,567	10,118	6,203	181	602	3,132	10,118	
1892...	7,256	2,635	1,958	11,849	6,357	190	431	4,871	11,849	
1893...	10,611	3,929	3,592	18,132	6,160	224	371	11,377	18,132	
1894...	3,854	1,571	1,721	7,146	4,159	142	275	2,570	7,146	
1895...	3,373	1,258	904	5,535	4,048	179	347	961	5,535	10 months.
1896...	4,499	1,930	1,380	7,809	4,998	153	346	2,312	7,809	14 do.

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

Department of the Interior.

STATEMENT H.—Showing Sexes, Nationalities and Destinations of Steerage Passengers by Allan and Dominion Lines.

LINE.	SEXES.				NATIONALITIES.								DESTINATIONS.										
	Adults.		Children		English.	Irish.	Scotch.	Germans.	Scandinavians.	French & Belgians	Other countries.	Totals.	Nova Scotia.	New Brunswick.	P. E. Island.	Quebec.	Ontario.	Manitoba.	N. W. Territories.	British Columbia.	States.	Totals.	
	Male.	Female.	Male.	Female.																			
Allan—Weekly	1,498	507	251	170	2,421	1,078	128	117	47	564	42	445	2,421	206	26	2	280	446	404	83	69	815	2,421
do Fortnightly	353	201	139	80	773	668	4	39	9	6	47	773	401	96	37	9	4	6	1	10	209	773	
do Extra	67	8	96	4	175	.....	175	.....	.....	.....	.....	175	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	175
Dominion	1,168	414	257	164	2,003	1,031	20	7	204	304	34	408	2,003	103	10	.....	171	538	329	61	60	731	2,003
Totals	3,081	1,130	743	418	5,372	2,777	152	338	260	874	76	895	5,372	717	132	39	403	1,198	837	148	142	1,756	5,372

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

STATEMENT I.—Showing Juvenile Immigration and Societies connected.

Steamers.	Date.	By whom sent.	SEXES.				Totals.	Destinations.
			Over 18.		Under 18.			
			M.	F.	M.	F.		
Vancouver.....	Feb. 3	Dr. Stephenson.....				10	10	Hamilton.
Labrador.....	do 16	Bristol Em. Society.....			2		2	St. John.
Laurentian.....	do 24	Mrs. Birt.....			47	21	68	Knowlton.
Scotsman.....	do 29	Bristol Em. Society.....			3		3	St. John.
Vancouver.....	Mar. 14	Dr. Stephenson.....			51		51	Hamilton.
Labrador.....	do 28	Church Em. Society.....			2		2	Walshingham.
do.....	do 28	East End Em. Fund.....	1		2		3	Woodstock.
Parisian.....	Apl. 5	Miss Macpherson.....	5	2	38	26	65	Stratford.
Scotsman.....	do 11	Rev. R. Wallace.....	11		136	26	173	Belleville.
do.....	do 11	Dr. Barnardo.....	43		18		61	Russell, Man.
State of Nebraska	do 14	Mr. Quarrier.....	2		130		132	Brockville.
Corean.....	June 27	Mr. Middlemore.....			98	41	139	Lower Provinces.
do.....	Sept. 16	Mrs. Birt.....				2	2	Halifax.
Labrador.....	Nov. 28	Self Help Em. Society.....			1		1	Balmoral.
do.....	do 28	Bristol Em. Society.....			1		1	Montreal.
		Totals.....	62	2	529	120	713	

EDWIN M. CLAY,
Dominion Immigration Agent.

HALIFAX, N.S., December 31st, 1896.

Department of the Interior.

No. 3.

REPORT OF QUEBEC AGENT.

(MR. P. DOYLE.)

DOMINION GOVERNMENT IMMIGRATION OFFICE,
QUEBEC, 31st December, 1896.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit herewith a report of the arrivals of immigrants at this port for the year ending 31st December, 1896, with tables showing the numbers and nationalities of the immigrants brought out by each line of steamers, and the general destinations of the steerage passengers.

The arrivals up to 31st December, compared with those of the same period in 1895, were as follows:—

	1895.		1896.		Increase	Decrease
	Cabin.	Steerage	Cabin.	Steerage		
England	3,756	12,615	3,593	12,404	.....	374
Ireland	83	592	80	473	.....	122
Scotland	51	649	68	725	93	.....
Germany .....	.....	1,551	1	1,440	.....	110
Belgium .....	.....	477	5	167	.....	305
France .....	.....	.....	11	193	.....	204
Egypt .....	.....	.....	.....	7	.....	7
	3,890	15,884	3,758	15,409	304	911
	.....	3,890	.....	3,758	.....	304
Totals .....	.....	19,774	.....	19,167	.....	607

showing a decrease of 607.

The total number of steamships arrived with passengers was 104; tonnage 295,435.

The average passage of the Allan line was: Weekly steamers from Liverpool, 9½ days; Londonderry, 8¾ days. Glasgow steamers, from Glasgow, 11 days. Dominion line, weekly steamers from Liverpool, 9 days; Londonderry, 8½ days. Beaver line, weekly steamers from Liverpool, 10½ days. Hansa line, steamers from Hamburg, 18 days; Antwerp, 13½ days.

The number of Cabin and Steerage by each line was as follows :—

	Cabin.	Steerage.	Total.
ALLAN LINE.			
Weekly steamers from Liverpool	1,731	5,377	7,108
do do Londonderry	58	353	411
Glasgow steamers from Glasgow	68	716	784
	1,857	6,446	8,303
DOMINION LINE.			
Weekly steamers from Liverpool	1,200	4,798	5,998
do do Londonderry	22	120	142
	1,222	4,918	6,140
BEAVER LINE.			
Weekly steamers from Liverpool	662	2,229	2,891
HANSA LINE.			
Steamers from Hamburg	1	1,440	1,441
do Antwerp	5	167	172
	6	1,607	1,613
FURNESS LINE.			
Steamers from Dunkerque	11	193	204
OTHER LINES.			
Steamers from Aberdeen		9	9
do Alexandria		7	7
.....		16	16
Totals	3,758	15,409	19,167

Department of the Interior.

THE Nationalities of the Passengers brought out by each Line were as follows:—

	English.	Irish.	Scotch.	Germans.	Scandinavians.	French & Belgians.	Icelanders.	RUSSIANS.				AUSTRIANS.		Swiss.	Hallanders.	Bohemians.	Hungarians.	Roumanians.	Arabs.	Turks.	Egyptians.	Silesians.	Greeks.	Armenians.	Hindoos.	Brazilians.	Bavarians.	Japanese.	Chinese.	Canadians.	Americans.	Totals.	
								Russians.	Jews.	Poles.	Fins.	Austrians.	Galicians.																				Italians.
<i>Allan Line.</i>																																	
Weekly Liverpool.....	4,439	86	155	98	1,179	76	18	124	38	18	647	24	50	23	7	3	14	2	1							5	2	1			79	19	7,108
do Londonderry.....	411																													2		411	
do Glasgow.....	6	4	769		2	1																										784	
<i>Dominion Line.</i>																																	
Weekly Liverpool.....	4,445	501	921	98	1,181	76	19	124	38	18	647	24	50	23	7	3	14	2	1							5	2	1			81	19	8,303
do Londonderry.....	3,857	19	10	223	1,118	77	145	76	38	307	18	30	8			2	22	11	1						17					3	8	5,998	
do Glasgow.....	16	126																														142	
<i>Reaver Line.</i>																																	
Weekly Liverpool.....	3,873	145	10	223	1,118	77	145	76	38	307	18	30	8			2	22	11	1						17					3	8	6,140	
<i>Hansa Line.</i>																																	
Weekly Liverpool.....	1,116	21	36	347	215	38	37	507	33	104	154	53	2				3	16							5					4	82	2,891	
<i>Furness Line.</i>																																	
From Hamburg.....				402			149	168	5		254	384				6	2	55	9													3	1,441
do Antwerp.....				38			67	9			9					1		7														172	
From Dunkerque.....				440			216	177	5		263	384				1	6	62	9													3	1,613
<i>Other Lines.</i>																																	
From Aberdeen.....			9																														9
do Alexandria.....																																	7
Totals.....	9,484	667	979	1,108	2,514	423	19	522	804	94	1,058	459	517	63	15	11	2	101	38	1	1	7	2	2	22	5	2	3	3	4	171	196	19,167

The following table gives the number of male and female adults and the sexes of children and infants of each nationality arrived in 1896.

	ADULTS.		CHILDREN.		INFANTS.	TOTAL.
	Male.	Female.	Male.	Female.		
English.....	4,788	3,098	793	632	173	9,484
Irish.....	334	266	25	33	9	667
Scotch.....	369	320	89	170	31	979
Germans.....	466	320	140	130	52	1,108
Scandinavians.....	1,303	807	195	167	42	2,514
French and Belgians.....	257	91	32	32	11	423
Icelanders.....	15	4				19
Russians.....	227	134	77	63	21	522
do Jews.....	252	249	162	116	25	804
do Poles.....	33	25	14	15	7	94
do Fins.....	586	297	70	77	28	1,058
Italians.....	20	10	2	1		33
Austrians.....	176	126	56	79	22	459
do Galicians.....	152	120	110	92	43	517
Swiss.....	4	6	3	2		15
Hollanders.....	4	4	3			11
Bohemians.....	1			1		2
Hungarians.....	27	33	20	17	4	101
Roumanians.....	17	6	7	6	2	38
Arabs.....	1					1
Turks.....	1					1
Egyptians.....	4		1			7
Greeks.....	2					2
Armenians.....	13	4	3	2		22
Hindoos.....	5					5
Brazilians.....	2					2
Japanese.....	1	1	1			3
Bavarians.....	2	1				3
Silesians.....		2				2
Chinese.....	4					4
Canadians.....	133	33	2	1	2	171
Americans.....	57	21	11	6	1	96
Totals.....	9,256	5,980	1,816	1,642	473	19,167

The trades and callings of the male steerage passengers, as per passenger lists, were as follows:—

Farmers.....	637
Farm labourers and labourers.....	6,070
Mechanics.....	610
Clerks, traders, &c.....	95
	7,412

Department of the Interior.

TABLE showing the number of Immigrants landed at Quebec, assisted to emigrate by various societies, during the Year 1896.

By whom sent.	Adults.		Children		Infants.		Total.	Destinations.
	Male.	Female.	Male.	Female.	Male.	Female.		
Self Help Emigration Society, London.....	73	7	3	2	.....	.....	85	General.
United British Women's Emigration Association, London, Hon. Mrs. Joyce.....	3	107	.....	2	2	2	116	do
Dr. Barnardo, London.....	127	86	151	101	.....	.....	465	Peterboro', Tor- onto & Man.
Orphans' Homes of Scotland, Mr. Quarrier.....	.....	42	10	72	.....	.....	124	Brockville, Ont.
Sheltering Homes, Liverpool, Mrs. Bart.....	6	19	8	17	.....	1	51	Knowlton, Que.
The Southwark Diocesan Education Council and Rescue Society, London, Father St. John.....	52	3	20	1	.....	.....	76	Montreal and Ottawa.
Church of England Waifs and Strays Association, London.....	30	3	.....	.....	.....	.....	33	Sherbrooke, Que.
Children's Aid Society, London.....	11	.....	.....	.....	.....	.....	11	Winnipeg.
Manchester and Salford Boys and Girls Refuge, Manchester.....	.....	20	.....	16	.....	.....	36	Belleville, Ont.
Boys' Home, 95 Southwark St., London, Mr. Fegan.....	40	.....	37	.....	.....	.....	77	Toronto.
Canadian Catholic Emigration Committee, London, Father Seddon.....	18	.....	20	4	.....	.....	42	Montreal.
Liverpool Catholic Children's Protective Society.....	8	7	34	33	.....	.....	82	do
Bristol Emigration Society.....	4	3	7	2	.....	.....	16	Montreal & New Brunswick.
Park Row Industrial School, Bristol.....	7	.....	.....	.....	.....	.....	7	New Brunswick.
Committee of Children's Home, Clifton, Bristol.....	.....	2	3	8	.....	.....	13	Belleville, Ont.
Working Boys' Home, Great George Square, Liver- pool.....	2	.....	.....	.....	.....	.....	2	Lennoxville, Que
The Liverpool Farm School.....	2	.....	.....	.....	.....	.....	2	Montreal.
Home of Industry School, Green Road, London.....	35	2	27	13	.....	.....	77	Stratford, Ont.
Peckham Home, London, Miss Rye.....	.....	6	.....	4	.....	.....	10	Niagara.
Philanthropic Society Farm School, Redhill, Surrey.....	8	.....	.....	.....	.....	.....	8	Wapella.
Church Emigration Society, London.....	1	.....	.....	.....	.....	.....	1	Melita, Man.
Wellington Farm School, Midlothian.....	3	.....	.....	.....	.....	.....	3	New Brunswick.
Cumberland Industrial School, Cockermouth.....	3	.....	.....	.....	.....	.....	3	Montreal.
	433	307	320	275	2	3	1,340	

STATEMENT of the number of Immigrants arrived at the Port of Quebec, distinguishing the countries from whence they sailed, up to 31st December, 1895 and 1896.

	1895.	1896.
England— Liverpool.....	16,371	15,997
Ireland— Londonderry.....	675	553
Scotland— Glasgow.....	700	784
Aberdeen.....	.....	9
Germany— Hamburg.....	1,551	1,441
Belgium— Antwerp.....	477	172
France— Dunkerque.....	.....	204
Egypt— Alexandria.....	.....	7
	19,774	19,167

The immigration of the past season may be characterized as of a highly satisfactory nature.

Among the arrivals were a number of families of the better class, wealthy farmers, gentlemen and young men, who besides their intelligence and industry brought with them a considerable amount of capital.

I received visits from several parties who had been deputed to visit Manitoba and the North-west Territories to collect information concerning these districts by a number of their friends, who, if the reports prove favourable, intend to emigrate during the ensuing season.

The demand for ploughmen, experienced farm labourers, and female domestic servants being practically unlimited, all of these classes arriving next season are certain to find immediate employment at high wages. Immigrants of these classes, particularly men with families, would find it to their interest to arrive here during the months of April, May and June, when labour is most required in the rural districts. By arriving early in the season they secure several months of steady employment, and are enabled from the savings of their summer's labour to secure suitable clothing and lodging for themselves and families in winter.

Wealthy farmers and men of means seeking homesteads or improved farms to purchase can form a truer estimate of the real value of the property by an inspection whilst the crops are standing.

The Galicians, French and Belgians who arrived were bound for the new settlements of their respective countrymen in Manitoba and the North-west. A considerable number had been sent for by relatives, who remitted the amounts necessary to provide their passages, a fact which speaks well for the prosperity of the senders. They were an intelligent enterprising people, who will, I have no doubt, by their industrious habits maintain the good name they have so justly earned in these districts.

There was also a fair influx of Scandinavians and Germans who form a very desirable class of settlers.

If the agriculturists of Great Britain could be convinced of how much it would be to their advantage to transfer their labour to this country I have no doubt much larger numbers would emigrate. On their arrival they would be sure of immediate employment at wages far beyond what they could hope to obtain in the old country, with the prospect that, if steady and industrious, they would in a few years become owners of farms and employers of labour themselves.

I have the honour to be, sir,

Your obedient servant,

P. DOYLE,

Dominion Government Immigration Agent.

STERAGE PASSENGERS REMAINING IN CANADA.

STATEMENT of Arrivals and Departures at Quebec Agency for the twelve months ending 31st December, 1896.

MONTHS.	SEXES.				DESTINATIONS.							NATIONALITIES.							OCCUPATIONS.					Total.				
	Adults.		Children.		Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	North-west Territories.	British Columbia.	English.	Irish.	Scotch.	Germans.	Scandinavians.	French and Belgians.	United States Citizens.	Canadians.	Other Countries.	Farmers.	Farm Labourers.	Labourers.		Mechanics.	Clerks and Traders.	Female Domestics.	Not Classified.
	Male.	Female.	Male.	Female.																								
January	1622	666	322	321	21	26	953	716	1016	118	81	1614	151	174	126	168	215	1	8	474	173	355	351	120	23	204	1101	2031
February	765	376	145	207	13	7	446	515	414	55	43	706	69	252	108	70	100	2	18	168	83	144	472	55	11	113	615	1493
March	525	287	181	128	13	8	343	380	313	31	36	599	56	117	47	67	22	23	193	58	188	307	60	12	70	559	1124	
April	732	419	196	144	12	9	543	535	228	116	48	934	98	44	87	56	26	51	195	87	135	424	75	11	162	597	1491	
May	496	388	196	101	7	11	522	324	152	68	37	642	76	147	16	68	20	53	97	65	77	270	59	16	132	493	1121	
June	388	334	166	145	6	6	291	403	211	41	50	679	55	98	12	46	10	8	100	32	55	234	36	4	121	524	1008	
July	363	334	166	145	6	6	291	403	211	41	50	679	55	98	12	46	10	8	100	32	55	234	36	4	121	524	1008	
August	185	144	59	63	1	1	133	91	182	15	34	189	17	29	13	9	8	8	184	36	32	87	22	8	30	242	457	
September	185	144	59	63	1	1	133	91	182	15	34	189	17	29	13	9	8	8	184	36	32	87	22	8	30	242	457	
October	185	144	59	63	1	1	133	91	182	15	34	189	17	29	13	9	8	8	184	36	32	87	22	8	30	242	457	
November	185	144	59	63	1	1	133	91	182	15	34	189	17	29	13	9	8	8	184	36	32	87	22	8	30	242	457	
December	185	144	59	63	1	1	133	91	182	15	34	189	17	29	13	9	8	8	184	36	32	87	22	8	30	242	457	
Total	4688	2614	1208	1115	73	68	3231	2964	2516	444	323	5363	522	861	409	494	401	3	171	1411	534	886	2754	429	85	836	4101	9625

P. DOYLE,
Dominion Government Immigration Agent.

QUEBEC, 31st December, 1896.

Department of the Interior.

STATEMENT OF ARRIVALS AND DEPARTURES AT QUEBEC IMMIGRATION AGENCY FOR THE TWELVE MONTHS ENDING DECEMBER 31ST, 1896.

	SEXES.				Arrivals via Ocean Travel.	NATIONALITIES.								OCCUPATIONS.						Total.		
	Adults.		Children.			English.	Irish.	Scotch.	Germans.	Scandinavians.	French and Belgians.	United States Citizens.	Canadians.	Other Countries.	Farmers.	Farm Labourers.	Labourers.	Mechanics.	Clerks.		Female Domestics.	Not Classified.
	Male.	Female.	Male.	Female.																			Total Number of Souls.
January.....						146	26	11	117	718	4	5	479	33	132	706	41	1	144	449	1506	
February.....						61	6	12	118	447	16	16	405	18	61	437	15	91	443	1065		
March.....						72	8	3	110	276	1	14	548	22	28	338	24	3	89	528	1032	
April.....						70	7	3	81	192	26	26	296	9	9	194	34	1	83	345	675	
May.....	913	386	99	108	1506	87	12	16	105	175	25	207	207	6	19	209	32	4	90	357	717	
June.....	531	320	118	96	1065	69	6	4	108	173	7	148	148	9	19	166	26	1	47	247	515	
July.....	415	339	154	124	1032	23	1	1	59	49	1	141	141	6	10	102	9	26	121	274	5784	
August.....	247	244	94	90	675																	
September.....	270	260	113	74	717	528	65	50	638	2030	6	93	2314	103	278	2152	181	10	570	2490	5784	
October.....	221	177	64	53	515																	
November.....	127	88	31	28	274																	
December.....																						
	2724	1814	673	573	5784																	

QUEBEC, 31st December, 1896.

P. DOYLE,
Dominion Government Immigration Agent.

CABIN PASSENGERS.

STATEMENT of Immigrant Arrivals and Departures at Quebec Immigration Agency for the twelve months ending 31st December, 1896.

MONTHS.	Arrived <i>via</i> Ocean travel.	SEXES.				Total numbers of Souls.	NATIONALITIES.					OCCUPATIONS.				For Canada not reported elsewhere.			
		Adults.		Children			English.	Irish.	Scotch.	Germans.	French & Belgians.	Farmers.	Mechanics.	Clerks.	Female Servants.		Not classified.		
		Male.	Female.	Male.	Female.														
January.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
February.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
March.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
April.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May.....	578	297	214	36	31	578	553	8	4	1	12	.....	.....	.....	.....	.....	.....	578	578
June.....	387	178	169	18	22	387	353	14	18	.....	2	.....	.....	.....	.....	.....	.....	387	387
July.....	375	181	168	16	10	375	359	8	8	.....	.....	.....	.....	.....	.....	.....	.....	375	375
August.....	892	495	324	40	33	892	851	24	15	.....	2	.....	.....	.....	.....	.....	.....	892	892
September.....	846	408	367	36	35	846	806	17	23	.....	.....	.....	.....	.....	.....	.....	.....	846	846
October.....	503	207	226	34	36	503	497	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	503	503
November.....	177	78	84	9	6	177	174	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	177	177
December.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	3,758	1,844	1,552	189	173	3,758	3,593	80	68	1	16	.....	.....	.....	.....	.....	.....	3,758	3,758

P. DOYLE,

Dominion Government Immigration Agent.

QUEBEC, 31st December, 1896.

Department of the Interior.

No. 4.

REPORT OF THE IMMIGRATION AGENT AT MONTREAL.

(MR. JOHN HOOLAHAN.)

DOMINION GOVERNMENT IMMIGRATION AGENCY,
MONTREAL, 31st December, 1896.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit herewith my annual report of the operations at this agency for the period of 14 months commencing on the 1st of November, 1895, and ending on the 31st of December, 1896, together with the customary tabular statements, to which your attention is respectfully invited.

STATEMENT A.

Shows the number of immigrant arrivals and departures via the United States and their destinations, nationalities, &c.

STATEMENT B.

Shows the number of juvenile immigrant arrivals and their destinations.

STATEMENT C.

Table showing the number of applications for help received at this agency.

STATEMENT D.

Gives the retail prices of food, fuel, and clothing in Montreal.

STATEMENT E.

Gives the average rates of wages for mechanics, labourers and female domestics.

IMMIGRANT STATISTICS.

There is a record kept at this agency of the number of the immigrant arrivals at Montreal via the United States. The statement A hereto annexed, gives the particulars. There is, however, no record kept of the European immigrants (steerage passengers) who are obliged to disembark at Quebec, Halifax or St. John, N.B., as all such immigrants are accounted for at those ports. The first and second class passengers are brought up to Montreal on the steamships during the season of St. Lawrence navigation and landed at this port.

A GOOD CLASS OF IMMIGRANTS.

While it is to be regretted that there has been a slight decrease in the total immigration during the period treated of in this report as compared with previous years, it is satisfactory to note that the new arrivals amply made up in quality for what they

lacked in numbers. They were of a superior class and were intelligent, healthy and self-reliant. They brought with them more or less capital to establish themselves in the land of their adoption, and there is good reason to believe that they will become good citizens of the Dominion and a valuable acquisition to its population. With the view of obtaining an expression of opinion on the subject of immigration I have had interviews with prominent officials connected with the local national benevolent societies and others.

MR. JOSEPH RICHARDS,

President of the St. George's Society said: That the total number of the immigrants admitted into the St. George's Society's Home during the term referred to was about 1,275, being an increase as compared with the preceding fourteen months.

That the society's expenditure on immigrants has been about the same as for the preceding period. The immigration was entirely satisfactory, the people being a desirable class for Canada. The majority of them were agriculturists for whom there was a good demand during the season, and they obtained employment without difficulty. A large number of them found employment with farmers in the Eastern Townships, whilst others got work in the surrounding municipalities, and the remainder went west to Ontario and Manitoba. Apart from the farming class there were others, such as clerks, mechanics, and the common labourers, all of whom remained in the city and procured employment here. The immigrants who resorted to the St. George's home remained there a day or two, afterwards going to their several destinations; showing that they were a respectable and industrious lot of people who were both willing and anxious to obtain employment. Mr. Richards added that a certain class of people should not be encouraged to come here, such as professional men, clerks, book-keepers and mechanics, for whose services he says there is no demand there being a superabundant supply of such people on the spot.

MRS. W. H. BLACK,

Matron of the St. Andrew's Home, Montreal, said that the total number of Scotch immigrants who were admitted into the home during the period above mentioned was 93, as against 92 for the corresponding period of 1895, and the total amount of money expended on immigration for the current year was about the same as the year previous. The immigrants remained in the home on an average about one week, for a rest and change of clothing; they then proceeded to their destinations. The majority being farmers and farm labourers went to Ontario and Manitoba, whilst others got work with farmers in this province, mostly in the Eastern Townships. Others again, such as clerks, mechanics and labourers settled in the city where work was provided for them. Mrs. Black stated that the immigrants were a superior class, being healthy, intelligent people, many among them being possessed of more or less means and considerable baggage, which facts bear ample evidence of their thrift and industry, qualities necessary to obtain success in this country.

MR. B. CAMPBELL,

Chairman of the Immigration and Charitable Committee of the St. Patrick's Society of this city, being interviewed, said that the St. Patrick's Society have had very little to do with assisting immigrants during the period mentioned, apart from paying the railway fares of a few of the new arrivals for short distances into the country, where work had been promised them; the payment of a few days' board and lodging, and the procuring of situations for others, which I think would cover the year's immigration work, as regards the society. The total amount of money disbursed on account of immigration is therefore insignificant, a good proof that the Irish Catholic immigrants were industrious, self-reliant and a suitable class for Canada, they being possessed of some personal funds with which to re-commence the struggle for life in the country of their adoption.

Department of the Interior.

MR. ROBERT J. EVANS,

Secretary of the Protestant House of Industry and Refuge, said: "We have had practically nothing to do with immigrants during the term you mention."

THE IRISH PROTESTANT BENEVOLENT SOCIETY.

Mr. James Hamilton Ferns, secretary-treasurer, reports that the immigrants with whom the society has had dealings during the term covered by this report were certainly a suitable class for Canada. They were principally mechanics, who came out here seeking employment, which was procured for them through the influence of the society. The disbursements on account of immigrants amounted to a very small sum.

MR. CHARLES HELMS,

Travelling Immigration Agent and Interpreter of the Allan Line Steamship Company, being interviewed, and asked to give an opinion as to the class of immigrant settlers for Canada carried by the Allan Line, said:—"I think the immigrant passengers brought out to Canada by the Allan Line, during the term referred to, were of a good class. They were in robust health, and mentally and physically sound, having sufficient capital to pay the expense of travel and living, and to establish themselves in their new homes. The majority of the immigrants being of the agricultural class went to Ontario, Manitoba, and the North-west Territories, where they will take up farming as a means of obtaining their livelihood."

MR. ROBERT J. DAWSON,

The Dominion Line Steamship Company's Travelling Immigrant Agent and Interpreter, was seen and asked to make a statement. In reply he said, "I think the immigrants carried by the Dominion Line during the period mentioned were of a superior class. They appeared to be healthy, industrious people having in their possession ample funds to pay their travelling and living expenses to their destination and to establish themselves in their new homes. They required no financial assistance."

THE LABOUR MARKET.

The labour market for unskilled labour was fairly active during the open season, all able-bodied general labourers willing to work finding employment at wages ranging from one dollar to one dollar and fifty cents per day according to the capacity of the workman.

The immigrants of this class who made applications for work at this agency had employment provided for them in the city or in the neighbouring municipalities.

The demand for mechanics was dull and inactive, the new arrivals having to compete with their confreres the mechanics of the city. It is to be noted that the local supply of this class of workmen is always sufficient to meet the demand.

The same remarks will apply with equal force to clerks and salesmen and all others following similar sedentary occupations. I pointed out in my last annual report that mechanics, clerks, book-keepers etc., should not come here unless to fill situations pre-arranged for them, unless they possess some capital or have friends and relatives here willing to interest themselves in their behalf. The government emigration agents in Britain discourage the emigration of these classes.

There was a good demand for farm hands of both sexes, and the immigrants of this class did not experience any difficulty in getting employment with farmers in the adjacent districts.

There was also a good demand during the season for gardeners, provided they were competent, sober and industrious.

There was a large demand for female domestic servants. Those coming had no difficulty in having situations provided for them. Women and girls of this class should bring with them their certificates of good character from their late employers in the old country, as this would facilitate their obtaining positions and give them the confidence of their employers here.

TRANSPORTATION.

The transportation of the immigrants by water and rail was eminently satisfactory. Exceptionally fast trips have been made by the ocean passenger steamships from Liverpool to Quebec and Montreal; and both the Canadian Pacific and Grand Trunk Railways have done their part, after receiving the debarked immigrant passengers, by sending them on to their respective destinations with no delay.

WARNING TO IMMIGRANTS.

The Dominion government issued a special warning to young men not to pay fees to any immigrant agency for the purpose of obtaining a knowledge of farming. It is to be desired that this warning shall be still further impressed on intending immigrants, and that they be thoroughly assured that all needed information can be obtained from government sources.

IMMIGRATION LITERATURE.

In the matter of immigration literature I have seen that the immigrants arriving in Montreal, whether remaining in Canada or passing through to the United States, have been supplied with the pamphlets and maps issued by the Dominion government, descriptive of lands open for settlement in the Dominion, and calling attention to the advantages of Manitoba and the North-west Territories for intending settlers. All persons applying for such pamphlets by post have been similarly supplied.

JUVENILE IMMIGRATION.

The juvenile immigrants passing through Montreal to the various homes in Ontario, as well as those remaining here, were of a desirable class. They appeared to be healthy and intelligent children. Reliable guardians accompanied each party of children from the homes in Britain to their destination in Canada.

INSPECTION OF JUVENILE IMMIGRANTS.

In accordance with the instructions of the department Mr. A. Regimbal of my staff paid an official visit of inspection to 75 immigrant children who had been brought into Canada under the auspices of the various philanthropic societies of Great Britain. Mr. Regimbal states that the work of inspection lasted about two months, the territory travelled over comprising several counties of eastern Ontario and the western counties of the province of Quebec. The inspection proved satisfactory, the large majority of the children being placed in the homes of respectable farmers who take a deep interest in their moral and physical welfare.

HEALTH OF IMMIGRANTS.

The general health of the immigrants arriving this season has been good, there having been no cases of infectious disease reported. This is no doubt owing to the excellent supervision maintained by the medical staff at Grosse Isle quarantine station. I have to report, however, two deaths and two cases of sickness. Following are the particulars:—

March 17th.—A young man named Wm. Shribsole, an immigrant, ex ss. "Vancouver," sent to Montreal general hospital suffering from rheumatism of left leg.

Department of the Interior.

March 24th.—A child named Alex. Tarrance, aged 7 months, whose parents were en route for Newbery, Mich., U.S., died on the Canadian Pacific Railway train. The body was brought to the Windsor station. The coroner did not think it necessary to investigate. The child died of infantile debility.

March 24th.—An immigrant named Louis Salo bound for Moose Lake, Manitoba sick and sent to the Royal Victoria hospital, ex ss. "Numidian."

October 4th.—Mrs. H. Wilson, a second class passenger of the steamship "Parisian, arriving here on the 4th of October last being sick was taken to the Montreal general hospital where she died a few days after being admitted. She was going to join her husband who resides at Toronto. Mr. Wilson having been notified of his wife's death came to Montreal and took charge of the body, which was interred in the Mount Royal cemetery here.

RETURNED IMMIGRANTS.

Statement of persons returned to England owing to insanity and physical debility :
February 20th.—C. E. Standrop, a Dane, was returned for cause of insanity, from Winnipeg bound for Denmark; was met at Montreal junction and put on board Halifax express in charge of the conductor of the train.

May 27th.—Bernard O'Toole, an insane immigrant, was returned from Winnipeg en route to Ireland; was delivered to my care by Mr. Cloutier who accompanied him from Winnipeg as guardian; was kept under surveillance here for a few days, and then put on board the steamship "Laurentian" sailing for Liverpool.

September 3rd.—Charles Baker, a returned pauper immigrant from Winnipeg, bound for Liverpool, was met at Windsor station, kept over night and then put on board steamship "Angloman" sailing for Liverpool.

November 18th.—Harry and Maggie Lindus, brother and sister, two young people unable to look after themselves, being returned from Winnipeg en route for England, were met at Windsor station and conducted on board the steamship "Lake Ontario" sailing for Liverpool same day.

CHINAMEN DEBARRED FROM LANDING.

The Beaver Line steamship "Lake Superior," which arrived at Montreal on the 20th of September last, brought to this port four Chinese steerage passengers who were debarred from landing at Quebec because they were paupers and could not pay the per capita tax of \$50. For the same reasons they were also debarred from landing here. The steamship authorities being communicated with on the subject, agreed to take them back to Liverpool on the return trip of the steamer.

THE CHINESE COLONY.

The resident Chinese population of the city of Montreal is estimated at 300 male, and three females; the general occupation being the carrying on of small laundry business. There are, however, several who conduct stores for the sale of Chinese silks, tea, &c., and there are also among the colony a few mechanics.

THE SYRIAN COLONY

The number of Syrians at present in Montreal is about 250. So far as can be ascertained about 600 have their headquarters here, but spend most of their time peddling small wares through the surrounding country. They only come back to get a new stock of goods. Of the existing colony only 24 are naturalized citizens of the Dominion. The majority are Roman Catholics, about one-third being attached to the ritual of the Greek Church. Rev. Peter Shamny, specially delegated by the Pope to look after the spiritual welfare of the colony, is doing good work among them, and his influence has educated them into a style of living more in touch with Canadian ideas. Those who come here are fairly well supplied with money, and never become public charges.

THE WOMEN'S PROTECTIVE IMMIGRATION SOCIETY OF MONTREAL.

The immigration work of this society during the term covered by this report has been entirely satisfactory. The officials and staff take a lively interest in promoting the work of female immigration, and also the comfort and welfare of those they have in charge. The society's home, which is situated at 84 Osborne street, this city, is admirably adapted for the purpose for which it is intended, having good accommodation for a considerable number of boarders. It is in close proximity to the principal stations of the Canadian Pacific and the Grand Trunk Railways. A cordial greeting and good treatment are assured the inmates of the home. The society knows no creed or race, and all respectable female immigrants are made welcome at its doors.

THE ANDREWS HOME.

The Andrews home is doing good work in giving shelter and finding employment for those immigrants who belong to the Church of England. These are always given advice and counsel until such time as they can secure positions to enable them to earn their own living and become acquainted with their new surroundings. The Rev. J. Frederick Renaud, the immigration chaplain in charge of the home, devotes a large portion of his time in this connection, and gives all his energies to carrying out the aims for which the institution was established. His entire sympathies are in the work. The staff of officers of the home are efficient and thoroughly capable.

EMIGRATION TO BRAZIL.

The steamship "Moravia" of the Hamburg American Packet Company, sailed from the port of Montreal on the 15th of September last, with about 450 passengers for Brazil. The majority were from the province of Quebec, and of various nationalities. After communication with the department, to which I submitted the fact that these poor people had been induced by the offer of free passage and the false representation of remunerative employment to leave their comfortable homes in Canada for the fever swamps and sugar plantations of Brazil, and in compliance with instructions received, this agency used every effort to dissuade these people from the course on which they were bent.

APPENDED REPORTS.

I append hereto for your information the following reports from:—

- (1.) Mr. E. Marquette, province of Quebec immigration agent.
- (2.) Mr. Alfred B. Owens, Dr. Barnardo's Canadian agent, Toronto.
- (3.) Mrs. Eva Vosburgh, Hon. Secretary-Treasurer of the Women's Protective Immigration Society.
- (4.) Miss Agnes Brennan, matron and superintendent of the local branch of the Salford Catholic Rescue and Protective Society.
- (5.) Mrs. Louise Birt, Knowlton Home, Quebec.
- (6.) Mr. James Burges, Mr. Quarrier's Canadian Agent, Brockville, Ont.
- (7.) A. Lentze, LL.D., German consul at Montreal.
- (8.) Mr. A. Robert, agent of the Canadian Catholic Emigration Committee of Westminster, England.

I have the honour to be, sir,

Your obedient servant,

JOHN HOOLAHAN,
Dominion Government Immigration Agent.

Department of the Interior.

STATEMENT A.—Showing the Immigrant Arrivals and Departures at the Montreal Immigration Agency for 14 months ending 31st December, 1896.

MONTHS.	Arrivals via United States.		SEXES.				DECLARED DESTINATIONS.				NATIONALITIES REMAINING IN CANADA.							OCCUPATIONS REMAINING IN CANADA.						For Canada not reported elsewhere.			
	Males.	Females.	Children under 12.	Quebec.	Ontario.	Manitoba.	N. W. Territories.	British Columbia.	English.	Irish.	Scotch.	Germans.	Scandinavians.	French and Belgians.	Other Countries.	Farmers.	Farm Labourers.	General Labourers.	Mechanics.	Clerks and Traders.	Female Domestics.	Not Classified.					
1895.																											
November.....	107	56	63	45	54	91	21	15	97	23	19	14	18	26	23	14	26	48	14	10	13	106	226				
December.....	80	49	45	34	48	61	19	12	91	19	13	6	11	12	22	9	21	32	13	5	5	89	174				
Totals.....	187	105	108	79	102	152	40	27	188	48	32	20	29	38	45	23	47	75	27	15	18	195	400				
1896.																											
January.....	72	32	38	18	39	52	21	12	76	17	11	4	11	11	12	10	18	31	8	5	5	65	142				
February.....	159	70	46	21	42	66	20	10	95	14	9	5	9	15	12	8	17	26	11	8	5	81	159				
March.....	174	90	44	10	15	99	30	20	84	21	16	6	21	16	16	22	32	17	10	9	8	76	174				
April.....	198	100	50	30	37	75	38	18	102	20	15	15	16	14	16	16	36	29	14	5	11	87	198				
May.....	311	165	84	20	60	146	52	24	161	28	23	17	27	23	32	37	58	44	14	12	9	137	311				
June.....	245	130	62	26	39	131	36	13	122	24	18	16	18	32	15	23	49	35	11	12	11	104	245				
July.....	221	119	49	16	48	113	32	12	109	22	16	11	15	30	23	23	40	35	10	11	6	96	221				
August.....	207	113	46	11	41	103	29	12	105	21	12	8	11	28	22	24	39	28	9	13	8	86	207				
September.....	198	98	43	16	28	104	28	12	104	13	9	7	12	34	19	20	31	27	8	12	6	94	198				
October.....	180	95	44	18	28	97	21	25	99	12	17	8	14	26	13	20	32	24	7	12	9	85	180				
November.....	174	89	46	16	24	76	18	40	93	20	11	6	9	23	13	11	24	33	8	13	7	78	174				
December.....	169	96	36	19	27	65	22	36	78	16	13	10	14	26	12	17	33	31	6	9	8	65	169				
Totals.....	1424	650	713	315	530	1284	387	271	1416	276	202	133	195	321	245	254	456	435	143	136	114	1249	2787				

JOHN HOOLAHAN,
Dominion Government Immigration Agent.

DOMINION IMMIGRATION AGENCY,
MONTREAL, 31st December, 1896.

STATEMENT B.—Showing the number of Children received at this Agency, whom in charge of, and destination, for the year ending 31st December, 1896.

Date. 1895-96.	Name of person in charge.	Number of Children.	Destination.	By whom sent.
Nov. 10..	Mr. A. B. Owen	36	Toronto, Ont.	Dr. Barnardo.
do 10..	Mr. E. A. Struthers.....	35	Russell, Man.	do
do 10..	Mr. Thorn	17	Grenfell, N.W.T.	Young Colonist Aid Society.
Feb. 4..	Miss Curnock	10	Hamilton, Ont.	Dr. Stephenson.
do 26..	Mrs. Birt	71	Knowlton, P. Q.	Mrs. Birt.
March 16..	Mr. W. W. Rhodes.....	51	Hamilton, Ont.	Dr. Stephenson.
April 6..	Mr. Merry	60	Stratford, Ont.	Miss McPherson.
do 15..	Rev. R. Wallace	152	Belleville, Ont.	Rev. R. Wallace.
do 13..	Mr. E. A. Struthers.....	59	Russell, Man.	Dr. Barnardo.
do 13..	Rev. R. Wallace	22	Grenfell, N.W.T.	Rev. R. Wallace.
do 15..	Mr. J. Burges	132	Brockville, Ont.	Mr. Quarrier.
do 15..	Mr. A. B. Owen.....	146	Portland, Me.	Dr. Barnardo.
May 25..	Mrs. Foster	14	St. John, N. B.	Mrs. Foster.
do 25..	Mr. R. Render	77	Toronto, Ont.	Mr. Feegan.
June 7..	Miss R. Yates	50	Montreal, Que.	Catholic Protection Society.
do 8..	Mr. J. Burges	122	Brockville, Ont.	Mr. Quarrier.
July 4..	Mrs. A. Tovey	10	Belleville, Ont.	Rev. R. Wallace.
do 25..	Mr. J. Merry	90	Stratford, Ont.	Miss McPherson.
Aug. 8..	Mr. A. B. Owen.....	254	Toronto, Ont.	Dr. Barnardo.
Sept. 12..	Rev. Thos. Seddon.....	42	Montreal, Que.	Rev. Thos. Seddon.
do 21..	Miss R. Yates	32	do	Catholic Protection Society.
Oct. 17..	Mr. A. B. Owen.....	180	Toronto, Ont.	Dr. Barnardo.
do 18..	Mr. E. A. Struthers.....	34	Russell, Man.	do

JOHN HOOLAHAN,

Dominion Government Immigration Agent.

DOMINION IMMIGRATION AGENCY,
MONTREAL, 31st December, 1896.

APPLICATIONS FOR HELP.

STATEMENT C.—Annual Report of Immigrants Wanted at the Montreal Agency, from November 1st, 1895, to December 31st, 1896.

	November	December	January	February	March	April	May	June	July	August	September	October	November	December	Total.	Remarks.
Blacksmiths.....	1			1	1	2	3	1	2	1					12	Local supply sufficient.
Butchers.....	1					1			1						3	do
Bricklayers.....															2	do
Bakers.....	2	1	1	4		3	5	2	2	1			2	4	4	do
Carpenters and joiners.....	1		1												26	Demand limited.
Cabinetmakers.....	1		1												2	Local supply sufficient.
Clerks.....	2	2	1	2	8	5	4	1	3	3			1	1	33	No demand.
Express drivers.....	9	7	6	7	10	12	10	7	8	7	6	4	5	4	102	Local supply sufficient
Female cooks.....	12	12	8	10	12	15	12	15	10	12	10	9	9	14	160	Large demand.
General servants.....	5	9	5	4	5	6	8	9	7	9	7	5	8	7	94	do
Housemaids.....	6	3	4	5	7	14	19	8	8	10	8	2	3	2	99	do
Farm hands, male.....	7	5	2	3	3	5	8	3	2	3	1	1	2	3	42	Good demand in season.
do female.....	9	5	3	2	3	5	5	50	8	4	3	14	2	3	111	do
Common labourers.....	9	5	3	2	3	3	5	50	8	4	3	14	2	3	111	Fair demand in season.
Night watchmen.....	2	1			2	1									6	Local supply sufficient.
Storemen.....															6	do
Tinsmiths and plumbers.....	2			1	1	2									6	do
Steamfitters.....															4	do
Painters.....	1						2	1							4	do
Printers.....															4	do
Waiters.....	1			1	6	4	2		1						14	Occasionally asked for.
Boys, messengers.....	1	1		1											4	Local supply sufficient.
do office.....	2	1		1		2	3	2	1		1	2	2	1	18	do
do bell.....	2	2	3	2	5	7	9	6	4	5	3	1	2	3	56	Fair demand in season.
do care of horses.....	4															

DOMINION IMMIGRATION AGENCY,
MONTREAL, 31st December, 1896.

JOHN HOULAHAN,
Dominion Government Immigration Agent.

STATEMENT D.—List of Retail Prices of the Ordinary Articles of Food and Raiment required by the Working Classes, at Montreal Agency for 1896.

Provisions.	PRICES.		Clothing, &c.	PRICES.	
	From	To		From	To
	\$ cts.	\$ cts.		\$ cts.	\$ cts.
Bacon, per lb	0 12	0 15	Coats, under, tweed.	2 00	3 00
Bread, best white, 14c., brown.		0 15	do over do	5 00	12 00
Butter, salt.	0 18	0 25	Trousers, tweed	0 75	3 00
do fresh	0 20	0 30	Vests do	1 00	1 50
Beef, 7c. to 12c., mutton, 10c. to 12c., veal, 10c., pork		0 10	Shirts, flannel	0 50	1 50
Beer, per quart		0 10	do cotton	0 25	0 75
Candles.		0 15	do under, "wove"	0 40	0 75
Cheese.	0 15	0 18	Drawers, woollen, "wove"	0 40	0 75
Coffee	0 20	0 40	Hats, felt	1 00	2 00
Corn meal, per 100 lbs.	2 00	3 00	Socks, worsted	0 15	0 25
Eggs.	0 15	0 25	do cotton.	0 10	0 25
Flour, per barrel, 1st quality.	4 50	5 50	Blankets.	2 00	4 00
do do 2nd quality.	4 00	4 50	Rugs	0 75	1 50
do buckwheat, per 100 lbs		2 00	Flannel	0 20	0 35
Fish, dry or green cod, per cwt.	2 50	2 75	Cotton shirting.	0 08	0 10
Firewood, per cord.	5 50	6 00	Sheeting.	0 08	0 15
Ham, per lb.	0 12	0 15	Canadian cloth.	0 40	0 75
do shoulders, per lb.	0 08	0 10	Shoes, men's, \$1, women's		1 00
Herrings, per barrel.	4 00	5 00	Boots, men's, \$2, women's.		2 00
Mustard, per lb.	0 20	0 30	India rubber overshoes, men's, \$1.25, women's.		2 00
Milk, per quart	0 05	0 08			
Oatmeal, per 100 lbs.	2 00	2 50			
Pepper, per lb.	0 15	0 20			
Potatoes, per bushel.	0 30	0 45			
Rice, per lb.		0 04			
Soap, yellow, per lb.	0 03	0 08			
Sugar, brown	0 03½	0 05			
Salt, per lb.		0 01			
Tea, black.	0 25	0 40			
do green.	0 30	0 50			
Tobacco.	0 30	0 50			
Coal, per ton	5 50	6 50			
Coal oil, per gallon.	0 18	0 25			

JOHN HOOLAHAN,

*Dominion Government Immigration Agent.*DOMINION IMMIGRATION AGENCY,
MONTREAL, 31st December, 1896.

Department of the Interior.

STATEMENT E—Average rate of Wages at the Montreal Agency, 1896.

Employment.	WAGES.		Remarks.
	From	To	
	\$ cts.	\$ cts.	
Farm labourers, per day	1 00	1 25	
do per month	10 00	15 00	
Female farm servants	7 00	9 00	The average cost of board and lodging for workingmen is \$3 to \$3.50 per week.
Masons, per day, without board	2 50	3 50	
Bricklayers, per day do	2 50	3 50	
Carpenters, do do	1 50	2 00	
Lumbermen, per month, with board	15 00	22 00	
Shipwrights, per day, with board	2 00	2 50	
Smiths do do	1 50	2 00	The rent of workingmen's dwellings, say three or four rooms, is from \$6 to \$8 per month; in the suburbs cheaper rents can be had.
Wheelwrights do do	2 00	2 50	
Gardeners, with board, per month	12 00	20 00	
do without board, per day	1 25	1 50	
Female cooks, per month and board	10 00	15 00	
Laundresses, per day	0 75	1 00	
Female domestics, per month	6 00	12 00	
General labourers, per day, without board	1 00	1 50	
Miners do do ..	1 00	1 50	
Mill hands do do ..	1 00	1 50	
Engine drivers do do ..	1 75	2 50	
Saddlers do do ..	1 25	2 00	
Bootmakers do do ..	1 00	1 25	
Tailors do do ..	1 50	2 00	
Tinsmiths and plumbers, without board ..	1 50	2 00	
Machinists, without board	1 75	2 25	
Electricians do	1 50	2 00	

JOHN HOOLAHAN,
 Dominion Government Immigration Agent.

DOMINION GOVERNMENT IMMIGRATION AGENCY,
MONTREAL, 31st December, 1896.

LETTER FROM MR. E. MARQUETTE, PROVINCIAL GOVERNMENT IMMIGRATION AGENT.

(Appended to Report of Montreal Agent.)

MONTREAL, 31st December, 1896.

DEAR SIR,—I am pleased to comply with your request for a few notes concerning immigration in this province during the past year.

Although there has been a slight decrease in the number of immigrants compared with the previous year, it is worthy of note that those who arrived and settled here were of a very desirable class, mostly all farmers and farm servants.

The demand for farm servants from the Eastern Townships was in excess of that of last year, and in almost every instance the servants sent to the country gave satisfaction.

The East End, The Self Help and the Bristol Emigration Societies have this year sent a very good class of people. Most of them were farm labourers and were placed on arrival with farmers in the Eastern Townships.

Altogether I can say that the province of Quebec received a fair share of this year's immigration; that the people were of a very good class and that there was no difficulty in finding employment for them on arrival here.

The increased interest taken in the dairy industry in this province has given rise to a greater demand for a good class of farm servants and agriculturists.

I am, sir, yours very truly,

JOHN HOOLAHAN, Esq.,
Dominion Immigration Agent,
Montreal.

E. MARQUETTE.

DR. BARNARDO'S HOMES.

LETTER FROM MR. ALFRED B. OWEN.

(Appended to Agent Hoolahan's Report.)

214 FARLEY AVENUE, TORONTO, 7th December, 1896.

JOHN HOOLAHAN, Esq.,
Dominion Immigration Agent,
Montreal.

SIR,—Since you last kindly afforded us the opportunity of submitting a report of Dr. Barnardo's work, our immigration operations have been proceeding actively on the same lines as in former years. During the period of fourteen months covered by your present report to the department Dr. Barnardo has sent out from his English homes a total of 751 young people, including 188 girls and 563 boys. Our fourth party for last season, not included in the returns embodied in your last report, consisted of 71 boys, and crossed in the last of the Allan Line ships to sail for the St. Lawrence before the close of navigation. During the present season we have had three parties only, the numbers, respectively, being 211, 255 and 214. These three parties have been conveyed by the Dominion Line steamship "Scotsman," a vessel we have found admirably well adapted for our purposes, on account of her immense deck space, roomy and well ventilated steerage compartments, excellent sanitary appliances, and, I cannot help adding, the unvarying attention and kindness shown by her officers and crew to our young voyagers and those in charge of them. The first party which left Liverpool on the 2nd of April was divided at Halifax, 61 destined for Manitoba, landing there, to take the Canadian Pacific, the remainder, who were destined for Ontario, remaining on board to continue their voyage to Portland. The other two parties, arriving in August

Department of the Interior.

and October respectively, landed at Quebec. The railroad facilities provided for the transportation of our parties during the past season have been most satisfactory, and the runs made over the Grand Trunk by special trains from Portland in April, and from Quebec in October, have been quite phenomenal in our experience. The distance from Montreal to Toronto on the last occasion was covered in slightly over nine hours, and the whole journey from Quebec was accomplished in little more than half the time frequently occupied in former years by what were known as "immigrant specials."

Despite the dullness of the times and the general depression, of which the farming community seems to have had more than its share, we have found no lack of applications for our trained boys and girls, and the demand has been far in excess of the supply. As I write, even now in the season of the year when farm help of all kinds is least in demand, I am correct in saying that not a day passes, scarcely in fact a post, without bringing us applications, and we have already on our books a considerable number of applications for our first arrivals next spring. We have not been able to make as good terms for our boys as in former years, wages being generally lower, but considering the much greater purchasing power of a dollar to-day, as compared with that of a few years ago, we do not consider that the newcomers are in the end much worse off than their predecessors. We never place a boy without an agreement being signed by the employer, safeguarding the interests of the employé, recognizing our own control and guardianship over him and providing for his receiving specified remuneration for his services, according to his age and capability. The majority of those we place out are quite young, and in these cases we enter into an engagement on their behalf, covering a term of from three to six years, during which the boy is fed, clothed and cared for by his employer, sent to school during a portion of the year, up to a specified age, and paid a cash sum (usually one hundred dollars) at the expiration of the engagement. This money we make ourselves responsible for collecting and depositing in the bank to the boy's credit, so that no boy is left to be victimised by an unprincipled employer. We have now in the country many hundreds of boys who have served these terms of apprenticeship, and who now, at 17 or 18 years of age, with the experience and knowledge they have acquired, and habits of industry in which they have been trained, and with their hundred dollars in the bank, are in the fairest possible position to achieve success in the future and make useful careers for themselves in the country. We flatter ourselves, indeed, that there are few boys in the country who receive a more favourable start in life than our young immigrants, and we gratefully record the fact that the great majority are making admirable use of their opportunities.

Within the last few weeks we have opened a branch distributing home in the city of Winnipeg, to be carried on in connection with the Toronto institution and under the same management. It is confidently anticipated that this newly established agency will prove a valuable adjunct to our work, and enable us to avail ourselves of the large and growing demand for young boys among farmers in Manitoba and the North-west. Dr. Barnardo's industrial farm at Russell, Manitoba, is intended for giving a practical training in farm work to youths from 16 to 20 years of age, who are drafted from his Youths' Labour House in London; but the Winnipeg Home will be a distributing centre for younger boys from ten to fourteen years of age. The premises engaged at 115 Pacific Avenue are proving very suitable for the purpose and everything up to the present time points to the success of this latest development of our immigration work.

We have maintained correspondence with the members of our large and increasing family as actively as ever during the year, and our travelling staff, male and female, has been at work unremittingly in making visits to the children in their homes all over the country. Five persons have been almost exclusively employed in the work of visitation during the year, and the results of their labours have been in the highest degree encouraging and satisfactory.

I fear that reference to any other features of our immigration, of which many could be mentioned, would involve an undue trespass upon the space of your report, and I will, therefore, only add that I am exceedingly glad to be able once again to bear grateful testimony to the kindness and courtesy, and at the same time the efficiency and

vigilance in discharge of duty, which has marked the conduct of the officials of the department with whom we have been brought into contact during the year. Assistance has been forthcoming wherever it could be rendered, and in Liverpool, Quebec, Halifax, Winnipeg, and last, but by no means least, at your own agency at Montreal, nothing could exceed the attention and consideration that has been shown us, and for which, on behalf of those I represent, I tender our sincere and grateful thanks.

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

ALFRED B. OWEN.

REPORT OF THE WOMEN'S PROTECTIVE IMMIGRATION SOCIETY.

(Appended to Agent Hoolahan's Report.)

MONTREAL, 31st December, 1896.

To JOHN HOOLAHAN, Esq.,
Dominion Immigration Agent,
Montreal.

DEAR SIR,—The past year has been one of anxiety to the Women's Protective Immigration Society, but the committee are glad to report that they have been able to continue their work steadily in spite of reduced means; and they confidently hope that their embarrassment, caused by the temporary reduction of grant, is now over.

It was with great pleasure the managers received the full grant of \$1,000 from the Dominion government, and they wish to express their gratitude to those gentlemen connected with the present ministry through whose influence and exertions the grant was restored to the society.

163 immigrants have passed through the home during the season. 126 English, 10 Irish, 18 Scotch, 1 Welsh, 2 French, 2 Germans, 3 Swedes, 1 Dane. 113 Church of England, 20 Roman Catholics, 19 Presbyterians, 3 Baptists, 2 Congregationalists, 4 Wesleyans, 2 Lutherans.

58 immigrants of previous years returned to the home to rest before taking new situations.

Seven parties under the charge of competent matrons were sent out through the United British Women's Emigration Association by the Hon. Mrs. Joyce. A few girls were sent out by Mrs. Foster from Bristol.

Seven girls went to the United States hearing reports of higher wages, but five returned dissatisfied.

Miss Proctor brought out four girls from the Southwark Roman Catholic Society, and had an interview with the committee with a view to co-operation in her work during the coming season.

The number of immigrants received into the home this year is not so large as before, in consequence of the increase in steamship steerage rates. This is greatly to be deplored. If it continues there is no doubt the country will in time suffer, especially in the thinly populated districts of the North-west, and a system of government assisted immigration conducted on strict principles is a thing greatly to be desired.

The difficulty of obtaining well trained, respectable domestic servants, in sufficient numbers to meet the requirements of the largely increasing well-to-do classes in this country is as great as ever; and it cannot be expected that good servants will leave good situations at home to emigrate to a colony with uncertain prospects, having to pay out so large a sum as £5 for their passage.

Those who have passed through the home during the present year have been of a superior class, and are doing well, not a single case of ill-behaviour having been reported to the board of management.

On Thursday, May 14, a successful conference on female immigration was held in connection with the National Council of Women, presided over by their Excellencies

Department of the Interior.

Lord and Lady Aberdeen, who seemed much interested in the work. Three resolutions were proposed as follows :—

1. That, in the opinion of this meeting, the time has come for a national system of immigration, and that the immigration of women, while under the control of women's committees, should form a part of this national system.

2. That this national system should include agencies abroad and in Great Britain sanctioned by the home governments, and receiving and distributing centres throughout the Dominion.

3. That this meeting desires most strongly to urge on the government the desirability of concentrating as far as possible the settlements of the North-west, in order to obviate the disheartening loneliness which is so great a drawback in the present system, such being the only method to secure for all settlers (1) the benefits of companionship, (2) facilities for the proper education of the children who are to be the future citizens of the Dominion, (3) cottage hospitals and the services of doctors and nurses, (4) the means of mental and moral improvements by the circulation of good literature, etc.

These resolutions produced an animated discussion on the question of female immigration, and the class that is brought out by the W. P. I. Society.

The committee of this society being encouraged by the interest taken in this meeting, and also by persons connected with immigration from abroad, decided to address the Minister of the Interior with regard to a scheme for extending the work which is now carried on, and a letter has been forwarded to the Hon. Mr. Sifton to that effect.

During the summer the home was visited by several friends interested in immigration, some of whom are the following : Mr. L. M. Fortier of Ottawa, who inspected the home and expressed his satisfaction in a letter.

Mrs. Firebrace, daughter of the president of the United British Woman's Immigration Association, and Miss Hope of the same society especially visited the home ; also Mr. Stuart, one of the three delegates who came out to report on immigration work in Canada.

Mrs. Cox, first vice-president of the society, went to Ottawa to meet the three delegates and consulted them about the prospects of immigration with regard to the extension of the work in the North-west.

The president, Mrs. Gillespie, spent some weeks in Edinburgh last spring, and had much pleasure in meeting Lady Victoria Campbell and other ladies connected with the Scotch branch of the United British Woman's Immigration Association ; she was glad to be able to encourage the immigration of Scotch girls, as these have mostly proved very satisfactory as domestic servants.

Mrs. Gillespie was also most kindly received by the ladies of the U. B. W. E. A. in London, and was present at a very interesting meeting held in the Imperial Institute in June, at which Lord Loch presided, and spoke in warm terms of the assistance given by the W. P. I. Society in Canadian immigration.

The president also had the pleasure of meeting Miss Macdonald from Aberdeen, who has been especially successful in her selection of the girls she has sent out to the society.

The Rev. J. Patterson has been unfailing in his visits to the home on the arrival of Scotch immigrants.

The committee acknowledge with thanks the assistance given to them by the officials of the Allan and Dominion steamship lines, as well as the services rendered to their matron by the officials of the railway companies.

They also wish to thank Mr. Hoolahan, Dominion immigration agent, and Mr. Marquette, Provincial immigration agent, for their co-operation and aid.

Many thanks are due to Dr. Kirkpatrick for his kindness in attending any cases of illness in the home during the past year.

The whole respectfully submitted,

EVA VOSBURG,
Honorary Secretary-Treasurer.

REPORT OF THE CATHOLIC CHILDREN PROTECTIVE SOCIETY.

(Appended to Agent Hoolahan's Report.)

ST. VINCENT RESCUE HOME,
11 ST. THOMAS STREET, MONTREAL,
MONTREAL, 31st December, 1896.

MR. JOHN HOOLAHAN,
Dominion Immigration Agent,
City.

DEAR SIR,—I beg to present to you a statement of the past year's work. I regret that there was a decrease in the total arrivals as compared with the previous year. The demand for girls far exceeded the supply. During the year 1896 I received eighty-four children. In the month of June I received fifty-two, of whom twenty-seven were males and twenty-five females, and in September another lot of thirty-two children, sixteen boys and sixteen girls, making a total of eighty-four. The whole of the children were from the Liverpool schools. They were good, healthy children. Miss Yates and her niece accompanied both lots of children from Liverpool to Montreal as guardians.

Apart from the work of providing situations for the children above referred to, I received back into the home about forty children, mostly girls, who, however, remained only a short time at the home when they were replaced in new situations.

I am pleased to inform you that there are several of my young people who are in good situations, earning from \$6 to \$12 per month, whilst others have been married and are doing well. Only last week one of my young women paid a visit to the home accompanied by her husband and a lovely baby boy about three months old. The mother wishes to take one of my little girls when I can procure her one, as nurse, and I shall not hesitate in complying with her request, being assured she will receive the best of treatment. There is another girl about whose case I wish to say a few words. She came out in 1894, and has been in good places, earning good wages, and went home to visit her parents at Manchester, England, and intends returning in the spring to resume her work here. I can say I am very well pleased with my work of last year. My only regret is that there was a decrease in the arrivals as compared with the past two years. I closing my report I desire to return my most sincere thanks to the kind friends of the home, but especially to the Rev. G. M. Godts who has rendered valuable aid in the promotion of the good work. The reverend gentleman's good counsel and advice are always at my disposal in matters connected with this work. Dr. Edward J. C. Kennedy, whose professional services are always rendered free of charge to the little ones when sick, is also a true friend of the institution. Also Mr. E. Marquette the Provincial immigration agent, who does all in his power to help along the work, in return for which I am always ready to assist him in sheltering those he may send to the home for protection. And now, dear Mr. Hoolahan, it only remains for me to add that to yourself and your able assistant I am indebted for valuable assistance during the past and previous years.

I remain

Yours respectfully,

AGNES BRENNAN,
Matron.

Department of the Interior.

LETTER FROM MRS. BIRT.

(Appended to Agent Hoolaha's Report.)

DISTRIBUTING HOME, KNOWLTON, P.Q., 14th Dec., 1896.

JOHN HOOLAHAN, Esq.,

DEAR SIR,—In reply to yours of 7th December would say since November, 1895, 124 juvenile emigrants have been received into this home from Liverpool. All have been placed in homes and situations, some have been returned for one cause or another, and been replaced again. Added to these 53 of the cases brought out in previous years have also returned and been replaced, making a total of 177. During the past year several of our young people have married and have settled down in comfortable homes of their own, and promise to become good law-abiding citizens of our Province and Dominion.

I remain, yours truly,

LOUISA BIRT.

THE FOLLOWING LETTER (ACCOMPANYING MRS. BIRT'S REPORT TO AGENT HOOLAHAN) WAS PUBLISHED IN THE MONTREAL *Daily Witness* IN JUNE LAST:—

SIR,—On leaving your shores, after having placed in good and reliable Canadian families our forty-ninth party of trained boys and girls from Liverpool, England, I desire to offer a few remarks on this work of child immigration.

I. With regard to the class of children we bring to Canada from the Liverpool Sheltering Home: They are mostly between the ages of four to sixteen: their histories are carefully inquired into and all essentials are known about them before they are admitted: they are not "waifs" with nobody belonging to them—the nearest relative has to appear and sign them over to our guardianship. The majority are orphans or the children of widows—some few the children of widowers, bereft of a mother's care, and the father unable to secure their being properly minded while he is at work. None of them have been guilty of theft, nor do I take any who prove themselves difficult to control to Canada. They are carefully trained in good habits, in elementary and domestic lessons, and religion. They are all carefully examined by a physician before sailing, and none but those in sound health are brought to Canada.

II. The demand on the part of Canadians for such children continues as great as ever. From January to June we received about five hundred applications at the Knowlton Home, and only brought to Canada about one hundred and thirty children.

III. A majority of these applications were from families who have previously had one or more of our children and have been so pleased with their conduct and helpfulness that they wanted another.

IV. The testimony of our inspectors is that ninety-eight per cent are doing well for themselves, and giving satisfaction to their employers.

In this connection I should like Canadians to ask themselves whether the two per cent unsatisfactory may not be due to some lack on the part of those Canadian families who have undertaken to carry on the guidance and training begun by us.

Mr. Drummond, our head master, has been visiting the children in their Canadian homes for several months. In addition we have secured other able and wise assistance in visiting the children during the winter months, so that we receive a detailed report on each child every year. Mr. Drummond writes:—"During the last week visited forty, all in Ontario; of these twenty-eight have remained in their first homes for periods ranging between seven and sixteen years—the balance of the forty have been emigrated since 1889 but have done equally well."

Our hearts have been cheered by the very honourable and useful careers some of our boys have worked up to.

E. T. has graduated at college, and also taken a post-graduate course with honours—he was engaged in mission work in Canada the past year, and hopes soon to enter the ministry.

A. B. has graduated as doctor of medicine. Both these lads have worked and paid for their own education, and others are doing the same. Then the girls have many of them married and settled into nice homes. Twenty-two were married last year, 1895. Some have trained as nurses, and others as teachers. Through my having held no meetings lately in Canada, many Canadians are ignorant of the success which has attended our work. If there is one bad case out of a thousand everybody hears and talks about it; but the vast majority of successful young emigrants are absorbed into the general population. Our distributing home at Knowlton is always open to receive back any child who is not liked and wanted by a Canadian family. Therefore, no one need keep a child they cannot get along with, or who is not happy in their house.

This home is kept up by voluntary contributions collected in England, therefore, we are actually bringing a large sum of money into the province every year. But if Canadian friends feel sympathy with our work in its two-fold aspect of benefiting orphans, and also benefiting hardworked Canadian wives and farmers by bringing them the help they need, we shall be very glad to receive marks of their good will, to be devoted to some needful repairs on the home at Knowlton to keep it water-tight, which will entail additional expense this year.

LOUISA BIRT.

Distributing Home, Knowlton, Que.

LETTER FROM THE AGENT IN CHARGE OF THE DISTRIBUTING HOME FOR SCOTCH CHILDREN, AND CANADIAN ORPHAN HOME, FAIRKNOWE, BROCKVILLE, ONT.

(Appended to Agent Hoolahan's Report.)

BROCKVILLE, 24th December, 1896.

J. HOOLAHAN, Esq.,
Montreal.

DEAR SIR,—From the orphan homes of Scotland at Bridge of Weir, for which this is the distributing branch, we got 142 boys, and 114 girls, or a total of 256 during the year. All these children, so far as it was possible for medical and other experts to judge, were of the healthiest possible type—mentally and physically—and selected from about 1,200, as in every sense adapted to the requirements of this country. Each was provided with a stock of clothes of an average value of \$25. We visit all our children regularly, and should we find any developing, from environment, undesirable traits of character, even after many years residence here, we return them to Scotland. For these and other reasons we consider our children a most desirable class of immigrants.

I am, yours truly

JAMES BURGESS.

A. Lentze, Esq., LL.D., German Consul at Montreal, sends the following statement:—
The German Protestant Minister informs us that the German immigration to Montreal during the year 1896 consisted only of about 12 to 15 single persons, five of whom came from the United States and the rest from Germany direct.

Of the Germans residing here, four families and a few single persons, a total of about 20, went back to either Germany or the United States. One family went to Brazil.

The German Society (Deutsche Gesellschaft) has rendered, as before, much assistance to Germans who remained here or who passed through this city.

Department of the Interior.

LETTER FROM MR. A. ROBERT, AGENT OF THE CANADIAN CATHOLIC
EMIGRATION COMMITTEE.

(Appended to Agent Hoolahan's Report.)

ARCHEVÊCHÉ, MONTREAL, 14th January, 1897.

J. HOOLAHAN, Esq.,
Immigration Agent, City.

DEAR SIR,—I have the honour to inform you that I have received, on the 12th September last, from the above committee, 42 children, whom I have placed chiefly in the parishes of St. Louis de Gonzague and St. Timothée in the county of Beauharnois. A good few of the above have been returned to me, but I immediately placed them with other people in other parishes. Nine of them, though, had to be returned to England.

As usual these children have given me and the people with whom they were placed good satisfaction. I have received no complaints.

With my respects, I remain

Yours very sincerely,

ANTOINE ROBERT.

P.S.—I forwarded a list of the children and their addresses to the government at Ottawa on the 2nd December last.—A. R.

No. 5.

REPORT OF MR. A. L. POMEROY, TRAVELLING IMMIGRATION AGENT.

COMPTON, QUE., 8th February, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior
Ottawa.

SIR,—I have the honour to submit to you my report for 1896. I beg to state that in accordance with instructions I met the mail steamers and other ships bringing immigrants to Quebec from 15th May to 1st November.

My duties were the same as in 1895, viz., travelling with the immigrants, giving general information, assisting with tickets and baggage, and looking out for the comfort of the immigrants while on the train. I placed 40 servant girls and four labourers throughout the townships, who have given good satisfaction with few exceptions.

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

A. L. POMEROY,
Travelling Immigration Agent.

Department of the Interior.

No. 6.

REPORT OF MR. J. M. McGOVERN, TRAVELLING IMMIGRATION AGENT.

PORT ARTHUR, 2nd November, 1896.

H. H. SMITH, Esq.,
Commissioner Dominion Lands,
Winnipeg, Man.

SIR,—I have the honour to submit the following report, giving some particulars of the duties performed, general immigration work, and other matters in connection with same, during the year ending 31st October, 1896.

DUTIES DURING THE EARLY PART OF THE YEAR.

From the date of my last report until the middle of March, 1896, I was principally employed in the usual duties of travelling with immigrants on the trains, making trips east of Port Arthur to meet incoming immigrants or settlers, and continuing with them until satisfied that they were receiving good attention, and also giving them all necessary assistance and advice.

INSPECTION OF IMMIGRANT CHILDREN AND DISTRIBUTING HOMES.

Instructions having been forwarded from Ottawa, I left here on 14th March to make an inspection of the immigrant, or as they are termed, pauper children, and the homes that place them out in different parts of this province. The instructions were very particular as to the information to be obtained regarding these children, viz., the terms on which they were taken by employers, their general character and habits, state of health and physical standard, how they were situated, and the statements of the employers as to the satisfaction they were giving or otherwise. The home inspections were also to be carefully made, and a full report obtained as to their assisting in placing out the children.

GENERAL WORK OF INSPECTION AND REPORTS MADE.

The widely separated places at which the children were placed made it necessary to visit many parts of the province, make long trips by rail, and frequently drive from 30 to 50 miles per day. I interviewed each child and the employer, and when necessary people in the vicinity, and made a full report of each case on the forms provided for that purpose.

I visited the different homes at Toronto, Peterborough, Hamilton, Stratford and Niagara-on-the-Lake, carefully inspected the institutions, made particular inquiries as to how the children were obtained before being brought to this country, the general system adopted in obtaining homes for them, the arrangements made regarding their earnings, and to what extent the homes assumed the responsibility for their welfare and general good conduct during the period of their contract with the employers. It was also considered advisable to ascertain the estimation in which the homes were held by people in their vicinity, which was done by interviewing some of the principal residents. Careful attention was given to all these matters and reports giving full particulars forwarded to the department.

OBSERVATIONS AND SUGGESTIONS.

During the trip of inspection I ascertained that there was a very considerable feeling against this class of immigrants, and frequently heard the homes severely criticized,

but on careful inquiry found it difficult to get any one who was willing to make a direct charge or complaint and allow their names to be used in connection with the same. Some of the homes are more particular than others in looking after the welfare of the children after they leave the institutions, and it is important that particular attention should be given to this part of the work, as the children are liable through bad advice and sometimes for good reasons to leave their places, and unless immediately looked after may become wanderers through the country. I beg to state that I believe it would be beneficial to both the government and the homes if strict regulations could be made for the homes to have inspectors visit every child they place out at least twice a year for the first three years, and make careful reports and forward certified copies of same to the department. This, with the yearly inspection by an official of the department, who could be authorized to visit any child in the district he travelled, would enable the government to obtain a full knowledge of the system, and make any necessary improvements, which should do away with the unreasonable prejudice against this class of immigration that the government are so frequently blamed for encouraging. The very general discussion about this matter and the resolutions passed last year by some of the county councils would appear to make it necessary that some action should be taken, and I may state that the officials of the homes invariably expressed their willingness for a full and impartial investigation of their work.

SOME DELAY IN COMPLETION OF INSPECTION WORK. .

On account of the inspection having been commenced at a later date than formerly, and the unusual amount of snow which made travelling very difficult, it was found impossible to complete the work until the last of April, although I was anxious to do so at an earlier date, as the season's immigration to the western provinces having fairly commenced necessitated my return to Port Arthur.

EXPLANATION OF GENERAL DUTIES.

Returning to Port Arthur on the 1st of May, I at once resumed the usual duties of attending to the wants of immigrant passengers en route to Manitoba, the Territories and British Columbia, which necessitated travelling by train fully 1,200 miles per week, making careful arrangements for obtaining supplies, provisions, &c., and arranging various other matters for the comfort and welfare of the people. West bound trains with large parties of immigrants were met some 200 miles east of Port Arthur, and when necessary I remained with them until they left Fort William, when they would be supplied with everything required until their arrival at Winnipeg. Numerous cases of lost tickets, delayed baggage and other inconveniences were satisfactorily arranged, and every effort made to let the people understand that the government desired that they should receive all possible attention.

INFORMATION REQUIRED AND SATISFACTION EXPRESSED.

The great majority of immigrant passengers having little, if any, practical knowledge of the western provinces were anxious to obtain information about the country and made numerous inquiries, all of which I endeavoured to satisfactorily answer, and they invariably expressed their satisfaction with the arrangement for having an official travel on the trains.

INSPECTION OF TRAINS AND PRECAUTION AGAINST DISEASE.

The trains were carefully inspected to see that they were kept in a cleanly condition, well ventilated, and a plentiful supply of good water provided. This is important, as disease is liable to break out among immigrants who travel long distances by train after having made a sea voyage, and I was careful to see that every precaution was taken, particularly with some of the foreign element who appear to take very little

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trouble to guard against the ill effects of an ocean voyage. The Canadian Pacific Railway officials fully realize the necessity of being particular in this matter and good attention is always given by the employees.

DESIRABLE SETTLERS.

The arrivals during the past year will compare very favourably with those of other years, the greater number being healthy, intelligent people, principally of the agricultural class, and undoubtedly well fitted to overcome the difficulties to be experienced in making a start in a new country. With very few exceptions they were able to pay the full expense of their journey, and I was credibly informed that a very considerable number of individuals and parties had sufficient money to purchase land and commence farming under favourable circumstances.

GENERAL HEALTH OF IMMIGRANTS.

It is satisfactory to report that the general health of the arrivals was good, a limited number of cases of measles being the only contagious disease. Efforts were made to separate these cases as much as possible from the other passengers, and they were reported by wire to Winnipeg, where they could be properly cared for.

NECESSITY FOR HOSPITAL ACCOMMODATION.

I have referred in previous reports to the necessity for some arrangement being made whereby cases of contagious disease could be removed from trains here, instead of having them go on to Winnipeg, which further endangers other passengers, and must make it difficult to keep the large immigration building there free from infection, as well as to prevent the spread of disease in the city and province. I may also state that if the matter was fully understood there is good reason to believe that the towns of Port Arthur and Fort William would join with the Canadian Pacific Railway and the provincial and federal governments in erecting and maintaining an isolation hospital here, to be used for local cases as well as those from trains and steamers. The cost of maintenance would be small as it would only be necessary to steadily employ a matron, or possibly a man and wife. To commence with, a small building might be erected, and the total expense if divided as before stated should not be a serious consideration.

If it was necessary to detain a carload of people, which in some cases should be done, those free from disease might by being carefully watched for the first sign of sickness be accommodated at the immigrant building here. This arrangement would allow the cars and any passengers that had been seriously endangered to be properly disinfected, and the result should be that there would be less trouble and expense to the department than is now experienced in Winnipeg, besides being a much greater safeguard to the health of the western communities to which the immigrants were going.

The reported past year's experience with measles in Manitoba, and the outbreak of small-pox on the trains in 1893, prove the necessity for some such arrangement as I have suggested. If it is desired I can forward more definite particulars as to the feasibility and probable cost of establishing a hospital here such as I have referred to.

NUMBER OF IMMIGRANT ARRIVALS.

The immigration to the western provinces during the past year cannot, as regards numbers, be considered fully satisfactory. I should judge, without having the exact figures, a careful record not having been kept here, that it was about the same as in 1895. Judging from reports received and conversations with the agents from Great Britain who visited this country during the past season, every effort was made with the means at their disposal to forward the right class of settlers. The expenditure in the United States having also necessarily been greatly reduced it must eventually be

realized that a much larger amount should be voted if the western provinces are to be rapidly settled with a good class of people.

FARMERS' AND LABOURERS' EXCURSIONS.

The farmers' excursions from the eastern provinces to Manitoba and the Territories organized at different times during the past season were well patronized, and must prove beneficial in making more generally known the great natural resources of that part of the Dominion. Personal observation will show the people of the older provinces the necessity for developing the West and undoubtedly induce those desiring to make a change to settle there.

A large number of men took advantage of the cheap rates offered by the farm labourers' excursions, which have a two-fold benefit, as they provide work for the surplus labour of the east and furnish the help so much required by the prairie farmers, besides giving the men a general knowledge of the country, where many of them remain with the intention of becoming permanent settlers. Mr. Scott, the provincial agent for Manitoba, usually accompanied these excursions, and the people had good reason to be fully satisfied with the attention they received.

IMMIGRANTS FOR PORT ARTHUR AND VICINITY.

Forty-six immigrants, including children, came to Port Arthur and this vicinity during the past year. There were three English families, the balance being Scandinavians, principally of the labouring class. These people received good attention and were assisted in locating friends, obtaining work, and in every way that was found to be necessary.

DEMAND FOR LABOUR.

The demand for labour, with the exception of an occasional demand for railway labourers and men for the lumber woods, has been very limited. The only want not supplied is for female domestics, a limited number of whom could find employment at any time. There are good prospects that mining in this vicinity will be carried on to a considerable extent next year, and this with the railway construction that is contemplated should provide work for a large number of the right class of men.

INDUCEMENT TO SETTLERS IN THE PORT ARTHUR DISTRICT.

Efforts were made in the early part of the year by organizing a branch of the Western Canada Immigration Association to induce immigration to this district, but numerous things have occurred that prevented much practical work being done. I am informed that the intention is to collect the necessary information for a small pamphlet showing the inducements offered, which can be well distributed this winter and all other arrangements made for active work during the coming summer. There are good free grant lands in this vicinity; in certain sections they can be easily cleared, repeated fires having disposed of the timber, and in other places the wood to be obtained can be disposed of to advantage and would materially assist in paying for improvements made. Partially improved farms can be obtained at reasonable figures, and the timber or lumber required for building purposes with little trouble and small expense. All kinds of coarse grains, roots and vegetables can be grown to good advantage, and the easy communications with Port Arthur and Fort William affords a profitable market for all kinds of farm produce. Gold has been discovered in different parts of the district, and there are good indications that a very considerable amount of mining will be done next summer. This with the construction of a railway that is fully expected to be commenced within the next six or eight months will provide an additional market of the most desirable kind for agricultural products, and with the numerous other advantages should make this one of the most attractive parts of the Dominion for energetic settlers.

Department of the Interior.

I have accepted the position of secretary-treasurer of the local association, it being considered that on account of my experience of fourteen years and general connections made in immigration work, I should be specially fitted for the position, which I can attend to without interfering with other duties. If the government desire to assist the western association, and the necessary arrangements are made, I can look after the interest of any of their parties en route to the west and wire the secretary at Winnipeg as to their number and destination.

CONCLUSION.

Prompt attention has been given to a very considerable correspondence, numerous letters of inquiry having been received, particularly since the discoveries of gold have attracted general attention to the district ; and I have endeavoured to carefully attend to all other duties in connection with immigration work.

In conclusion I desire to thank the Canadian Pacific Railway officials, particularly the general passenger agent, Mr. McNicol, for favourably considering all my requests, and the general disposition shown to do anything possible for the comfort and welfare of the immigrant passengers.

I have the honour to be, sir,

Your obedient servant,

J. M. McGOVERN.

No. 7.

REPORT OF MR. HUGO CARSTENS.

(GERMAN OFFICER.)

DOMINION GOVERNMENT IMMIGRATION OFFICE,
WINNIPEG, MAN., 31st October, 1896.H. H. SMITH, Esq.,
Commissioner of Dominion Lands,
Winnipeg.

SIR,—I have the honour to submit my report on German and Slavic immigration and colonization for the departmental year ending 31st October, 1896.

STATISTICS.

The total number of immigrants coming under the above heads, and under my special care, who arrived during the aforementioned period at Winnipeg, as shown by the detailed statement marked "A" appended hereto, was 1,745 souls, being of the following nationalities: 990 Germans, 630 Ruthenians, 38 Polanders, 57 Hungarians, 13 Bohemians and Roumanians, 6 Dutch, 3 Swiss, and 8 Jews, coming from the following countries: Germany 306, Russia 266, Austria 971, United States of America 139, and from South America 63.

There were distributed in Manitoba 1,186, Assiniboia 204, Alberta 346, and British Columbia 9; of these, 1,491 arrived in families and 254 were single; 1,248 settled directly on land, while 497 took employment or settled in this city.

A GOOD INCREASE.

Comparing these figures with those of the previous year an increase of about 80 per cent is noticed with satisfaction in view of the poor crops that were harvested last year in most of the new settlements in the west.

IMMIGRATION FROM GERMANY.

The number of Germans from Germany, properly speaking, compares favourably with those of last year, as a falling off might have been expected on account of the unfortunate location chosen last year by the settlement of East Prussians, and who, on this account, discouraged the coming of their friends so successfully that none of their class of people have arrived this season.

The steamship agents within Germany, and especially those located at Hamburg and Bremen, who are doing a good share of our continental immigration work, are restricted in their work, as the existing laws only allow them to disseminate information about this country, either by letter or pamphlet, on the written or verbal request of any person. It is therefore obvious that the work must be prosecuted from outside if the process of waiting for a casual inquiry becomes too slow.

I have therefore during the past season made a special effort to get into communication with the farming classes of Germany, who, I believe, are amongst the most desirable settlers we could obtain, for if you but look at the advancement of the different states across the line, and if you ask who make up the population, especially of the western and eastern states, you will find that it is largely made up of Germans. I think we would be most fortunate in getting this class of settlers, and I hope to see some results of my efforts during the coming season.

Department of the Interior.

A DELEGATE FROM GERMANY.

Through the kindness of the Allan line and the Canadian Pacific Railway officials in granting free transportation to Mr. Carl Engelland, of Husum, in Schleswig-Holstein, the latter was enabled to visit this country as a delegate of a number of farmers in his district.

Besides spending some time in southern Manitoba this gentleman visited several German settlements in Assiniboia and Alberta, and assured me that he returned with the conviction that he can honestly recommend this country as a desirable field for the settlement of the practical, hard-working farmer of Germany.

Mr. Engelland himself purchased before his return an improved and stocked farm in the Balgonie district, and he will return next spring with his family to settle on it.

I am confident that a number of farmers from his district will follow the example of Mr. Engelland, and that like results could be obtained in other districts if the right men could be selected to come and see with their own eyes the inducements offered by this country.

IMMIGRATION FROM RUSSIA.

Immigration of Germans from Russia has fallen off during the past season, which I think may partly be due to causes arising from the partial failure of crops last year in the new settlements in Alberta, but mainly from Russia herself having opened new large territories for settlement, to which she is anxious to direct her emigration, and the consequent relaxing of some of the oppressive laws which in the past chiefly induced the German colonists to leave Russia.

Should she continue to improve her attitude towards her German colonists we may not look for a large increase in immigration from Russia, although this year's favourable crop throughout the German settlements will no doubt be the means of bringing to us the friends of our good and numerous Russian-German settlers, who have in the past year been held back by unfavourable reports.

IMMIGRATION FROM AUSTRIA.

There has been, in comparison with last year's figures, a large increase in immigration of Germans and a still larger increase of Ruthenians from Austria, or more particularly from the crown land of Galicia.

Galicia with its seven million inhabitants, an average of 202 souls for every square (English) mile, including the mountainous portions, is one of the most over-populated districts in Europe, and offers one of the best fields for the promulgation of successful emigration work.

The population of Galicia is made up of about 51 per cent Poles, 42 per cent Ruthenians, and 6 per cent Germans, with a sprinkling of Armenians.

We have several colonies of Germans from Austria, but within the last few years this immigration had become almost nil, until this year witnessed somewhat of a revival; and as those who came are mostly from new districts and well located, it is hoped that the movement will again increase.

RUTHENIANS.

As already mentioned a large increase has been in the number of Ruthenians; in former years only a few of these people came here and there, and only one colony had been formed of them in Alberta.

This large increase is I think chiefly due to the efforts of Dr. Oleskôw, who visited this country in the interests of immigration during the months of August and September, 1895, when I had the pleasure of accompanying him on an extended tour through Manitoba, the North-west, and British Columbia.

On his return Dr. Oleskôw published in a pamphlet, issued by a society for the promotion of knowledge, a full report of his trip and impressions, recommending to his

people the Canadian North-west as a suitable country for Ruthenians to settle in, and also sought to turn the stream of emigration from its former course to Brazil, to Manitoba and the Canadian west.

In this effort he has been very successful as upwards of one hundred families, in all 630 persons, have settled, principally in Manitoba and Alberta during the past season.

The Ruthenians are throughout agriculturalists, very modest, thrifty and hard working, a primitive people and generally ignorant, about 80 per cent of them not being able to read or write; but they appear quick to adapt themselves to their new surroundings, and, although they come mostly with very small means, they all exhibit great eagerness to get a piece of land and own their home, preferring the country to the city, and I doubt not but that they will stay with it and be a success.

Of the arrivals this year about 42 families have joined their colony established in 1895 in township 56, range 18, W. 4th M. in Alberta. Some 10 families joined some of their compatriots north of Beausejour, in townships 14 and 15, ranges 7 and 8 east, where there are now some 15 Ruthenian families. The odd numbered sections in these townships have been thrown open for settlement, but as already a number of Germans had located there, and much of the land belongs to the Manitoba government, there is very little room left for any new settlers.

In the month of August last a new colony was located in township 2, ranges 6 and 7 east, east of Dominion City, where there are now 36 families located. The land is said to be well adapted for settlement and its situation, being near a market and close to the Mennonite reserves, where these people can always rely on getting work, makes it very desirable for a Ruthenian colony. But already the even numbered sections fit for settlement have been taken up, and I would, therefore, respectfully suggest that the government also throw open the unpatented odd numbered sections for homesteading, and so enable others to join and strengthen this colony.

The beginning of a Ruthenian settlement was also made in the Lake Dauphin district in township 26, range 21, west, where about 15 families have located on excellent land; others settled north of Grenfell in township 19, range 8, W. 2nd M.

Outside of the above who settled on homesteads, some 20 families purchased small holdings near St. Norbert, and others in the municipalities of St. Andrew's and Springfield.

HUNGARIANS.

The number of Hungarian arrivals has not been as large as expected, only 56 souls having come during the entire season; these have nearly all added strength to the "Otthon" colony, in township 24, ranges 4, 5 and 6, W. 2nd M. south of Yorkton, founded by the Rev. John Kovacs, who is indefatigable in his efforts to promote the immigration and the welfare of his people. From indications I believe a larger immigration of Hungarians may be looked for next season.

GERMANS FROM THE UNITED STATES.

The number of Germans from the United States registering at Winnipeg is somewhat less this year than last, but I understand a number of them have come in by team to different points in Manitoba, and others have come by the "Soo" line and via British Columbia, so that the decrease may be more apparent than real.

During the past summer several delegates from South Dakota, Nebraska, Kansas and Minnesota travelled over this country in quest of free land, and I believe next spring will witness quite a large influx of Germans from the United States. I have also received many inquiries by mail, especially from Globeville, Colorado, where there are about 50 families who have expressed a desire to come to Manitoba if they can get free land.

The building of a railway to the Lake Dauphin district, which opens for settlement some very fine lands hitherto almost inaccessible, will prove of great benefit to immigration, as conveniently situated free lands—the greatest attraction for immigrants—are almost all taken up in Manitoba.

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GERMANS FROM SOUTH AMERICA.

Statement "A" also shows 63 Germans having arrived during the season from Chili and Brazil; there are yet a number of families in both these countries anxious to come to Manitoba, but the great expense that must be incurred in coming, together with the depreciated value of their currency, are drawbacks that are difficult to overcome.

DESIRABLE KIND OF IMMIGRANTS.

It will be noticed that the majority of the arrivals were families, with comparatively few single men.

These families were mostly of a good, sturdy, healthy class, and of the right kind, being mostly agriculturalists with some means, so that they were nearly all in a position to settle at once on land.

Some of the families brought from \$2,000 to \$3,000 with them, and have made an excellent start, some starting out with one hundred cows; but on the whole not as much money was brought into the country by these immigrants this year as last year.

DISTRIBUTION.

Comparing this year's distribution of German and Slavic immigration with the distribution in former years it will be noticed that whereas formerly the bulk of this immigration went to the Territories, this year nearly two-thirds of all arrivals have remained in the province of Manitoba. The majority of the latter have been able to acquire suitable homesteads, while others have preferred to acquire improved farms through purchase.

PRODIGALS RETURNING.

Last spring about 16 German families left the Balgonie and Grenfell districts to better their fortunes in the United States, some going to North Dakota, Montana, Washington, Oregon and Texas, only to be disappointed; and, after one season's trial, those who could return have come back to their old homesteads, and others unable to do so on their own account are now asking for assistance to be brought back.

Also two or three Mennonite families from south Manitoba returned this season from Oregon.

No doubt these will hereafter be good satisfied Canadians and a warning to others not to wander abroad.

COLONIES.

German settlements and German farmers are spreading over all Manitoba and the Territories, even to British Columbia. Wherever railways have opened for settlement suitable lands there Germans have settled, some in distinct colonies, others in groups or singly here and there wherever good land offered itself to them.

It is, therefore, difficult to do justice to the number of German farmers within our western country in a statement of colonies.

A conservative estimate places the number of German and Slavonic families (including the Mennonites) settled on land in Manitoba and the North-west Territories, at about 6,000 families, with about 38,000 souls.

They have about 300,000 acres under cultivation, own 19,000 horses, 50,000 head of cattle and 9,000 sheep.

The statement marked "B" annexed hereto, shows the situation of the colonies with the approximate number of settlers, acres under cultivation, their stock, &c.

In addition to the Ruthenian settlements already referred to, the following new colonies of Germans were added during the past season: about 17 families settled north of Whitemouth on homesteads, some 25 families purchased land east of Emerson

and south-east of Dominion City, and from 25 to 30 families purchased lands in townships 6 and 7, range 1 west, on the Morris river. Also a colony of Westphalian Germans was established on the Pincher creek, west of Fort Macleod, Alberta.

Besides these a number of Germans purchased and settled upon vacant lands around Winnipeg; and the older settlements north of Beausejour and Gladstone in this province, and the settlements in Assiniboia and Alberta have gathered strength by addition to their population.

CROPS.

The reports received from the different colonies are all very favourable, good crops having been harvested this season and good progress made everywhere.

The majority of the German settlers in Alberta are getting more stock around them, and with the prospect of having creameries established in the near future the success of these settlers is assured.

In the colonies near Regina, Balgonie, Grenfell and Langenburg, where water is still scarce, some of the settlers have been forced to reduce their stock on this account, which is most unfortunate. Several attempts have been made by the territorial government to remedy this evil, but apparently with very little success. It would be a great benefit to the settlers and to immigration if the federal government were to remove, as soon as possible, this great drawback to the success of the settlers concerned.

On the whole the German colonies continue to prosper. During the past season several new school districts have been formed and new schools opened, so that there is no lack of educational training.

Several church edifices have also been erected and new clergymen have taken charge. At the present 22 German clergymen attend to the spiritual wants of the settlers.

These are signs that the colonies have passed the experimental stage.

LABOUR.

Throughout the past season, with the exception of the early part of the summer, there has been a good demand for farm and general labourers; but owing to the lightness of the crop the harvest season has been much shorter than in former years, and those who relied altogether on the harvest work have not earned as much money as in former seasons.

As usual the demand for domestic servants has been much in excess of the supply.

CORRESPONDENCE.

The correspondence of my branch of the immigration service during the past season has been 734 letters received and 784 letters sent. Amongst these were many inquiries about this country, and to these and others whose addresses were obtained pamphlets and maps were also mailed.

THE SEASON'S WORK.

Besides attending the arrival of trains, receiving and rendering all possible assistance to the new arrivals, attending to the correspondence as enumerated, and being generally of assistance to my country people, I also assisted the North-west mounted police officers in the inquiries into relief and seed grain applications and distribution in Alberta during the months of January, February, April and part of May last.

The whole respectfully submitted.

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

HUGO CARSTENS,
German Officer.

B.—SUMMARY STATEMENT showing location of German and Slavic colonies in Manitoba and the North-west Territories, with approximate number of settlers, acreage under cultivation, and number of stock owned by them, 31st October, 1896.

Number	Name of Colony.	Name of nearest		Location by Township and Range.	By whom settled	Number of		Average under			Number owned of		
		Railway Station.	Post Office.			Fami- lies.	Souls.	Cultivation.	Horses.	Cattle.	Sheep.		
1	Mennonite	Gretna, Altona, Rosenfeld, Plum Coula, Morris, Niverville.	do	Tp. 1, Rg. 1 E. and Rg. 1, 2, 3, 4 & 5 W. Tp. 2 and 3, Rg. 1, 2, 3, 4 and 5 W. Tp. 4, Rg. 6 E. and Tp. 5, Rg. 5, and 6 E. Tp. 6, Rg. 5 and 6 E. and Tp. 7, Rg. 4, 5 and 6 E.	(German and Russian Mennonites.	2,900	24,000	235,160	11,230	20,362	2,500		
2	Reserves and two villages, near Morris.												
3													
4	Holstein	Gladstone	Tenby	Tp. 5, Rg. 1 E. and Tp. 6, Rg. 1 W. Tp. 17, 18 and 19, Rg. 12 W.	Germans.	40	180	600	80	250	60		
5		Lake Dauphin.	Oak Nook	Tp. 26, Rg. 21 W.	Ruthemans	15	70	200	30	70			
6	Gilbert Plains.	do	Gilbert Plains.	Tp. 24 and 25, Rg. 23 W.	Germans	12	42						
7	Brokenhead	Beausejour	Brokenhead.	Tp. 14 and 15, Rg. 7 and 8 E.	(25 Ruthemans. 10 Polishers.)	50	320	500	75	300	50		
8	Oldenburg	Whitemouth.	Whitemouth	Tp. 12, Rg. 11 E.	Germans	20	63	20	18	50			
9		Morris.	Morris.	Tp. 6 and 7, Rg. 1 W.	do	30	110	500	80	250	80		
10		McGregor	McGregor	Tp. 11, Rg. 10 and 11 W.	do	9	22	600	35	70			
11		Holland	Holland	Tp. 8, Rg. 11 W.	do	5	18	100	15	40			
12	Ridgeville	Emerson	Ridgeville	Tp. 1 and 2, Rg. 3 and 4 E.	do	30	125	450	80	280			
13		Dom. City	Stuartburn	Tp. 2, Rg. 6 and 7 E.	Ruthemans	36	127	220	25	70			
14		Russell	Russell	Tp. 22, Rg. 28 and 29 W.	Germans	10	43	400	50	80			
15	Alester.	Boissevain	Alester.	Tp. 5, Rg. 19 W.	do	12	40	350	60	200			
16	Huns Valley.	Franklin.	Huns Valley	Tp. 16, Rg. 16 W.	Hungarians and Polishers.	25	100						
17	Hohenlohe	Langenburg	Langenburg	Tp. 21 and 22, Rg. 30 and 31 W. and Tp. 20, Rg. 31 W.	Germans.	60	320	1,800	200	800			
18	Landshut	do	do	Tp. 21, Rg. 32 W.	do	25	110	1,000	30	400			
19	Beresina	do	do	Tp. 22, 23 and 24, Rg. 31, 32 and 33 W.	do	40	220	1,200	80	450	400		
20		do	Redpath	Tp. 20, Rg. 32 and Tp. 21, Rg. 33 W.	do	10	48	450	6	180			
21	Lantestren.	do	Langenburg	Tp. 33, Rg. 30 W.	do	30	130	900	12	350			
22	Hoffenthal	do	do	Tp. 22, Rg. 30 W.	do	12	40	350	8	120			
23	Ebenezer	Yorkton.	Ebenezer	Tp. 27 and 28, Rg. 4 and 5, Tp. 29, Rg. 4, and Tp. 28, Rg. 3 W. 2nd M.	do	150	740	5,000	800	3,200	1,000		
24	Sheho Lake.	do	Sheho Lake.	Tp. 30, Rg. 9 and 10 W. 2nd M.	do	25	90	600	120	350			
25	Theodore.	do	Theodore.	Tp. 28, R. 7 W. 2nd M.	do	10	48	180	24	100			
26	Othton	do	Othton.	Tp. 24, Rg. 4, 5 and 6 W. 2nd M.	Hungarians	46	200	500	43	200			
27	Koposvar.	Whitewood.	Koposvar	Tp. 18a, 19, Rg. 1 and 2, and Tp. 20, Rg. 2 W. 2nd M.	Hungarians and Bohemians.	80	470	1,800	160	600	200		

No. 8.

REPORT OF MR. JOHN W. WENDELBO.

(SCANDINAVIAN OFFICER.)

DOMINION GOVERNMENT IMMIGRATION OFFICE,
WINNIPEG, 7th November, 1896.H. H. SMITH, Esq.,
Commissioner of Dominion Lands
and Immigration, Winnipeg.

SIR,—I have the honour herewith to submit my report on Scandinavian immigration to the Canadian North-west, through Winnipeg, for twelve months ending 31st October, 1896.

ARRIVALS.

The total number of Scandinavians from Scandinavia was 334 souls, and from the United States of America 159, exclusive of Finlanders; showing an increase of European Scandinavians of nearly 30 per cent over last year, but a very large decrease of those from the United States.

FALLING OFF FROM THE STATES, AND ITS POSSIBLE CAUSE.

The Scandinavian emigration from the United States (with few exceptions) all proceeded west to Alberta, the people anticipating a very bright future for that beautiful country, which I am sure will soon be realized; but the expense of moving their families and effects such long distances, and the amount of work and money necessary to make a family and their stock comfortable in such a new country, together with a number of other difficulties and adversities to be overcome by the first settlers, had the effect of leaving these people in straitened circumstances, and led a number of them hastily to complain of their adopted country. Accordingly, in my opinion, this had the effect of decreasing the Scandinavian emigration from the United States to Alberta in particular, and to the other portions of the North-west in general. After a fairly successful harvest this season immigration will no doubt again largely increase.

SETTLEMENT.

Two hundred and twenty-four persons, or about 45 per cent of the new arrivals, have settled upon land for themselves, and nearly 200 persons of the Scandinavian immigrants of former seasons have taken homesteads or purchased land this summer. Sixty-eight persons or about 14 per cent of the new arrivals have gone into employment with farmers, and about 200 have settled in towns and villages.

COLONIES.

I beg to submit a statement showing the location of a few of the most important Scandinavian settlements, and as near as possible an approximate estimate of the number of persons settled therein. This does not, however, give a fair estimate of the number of Scandinavians who are working their own land in this country. A large number of that class of people, far from being inclined to colonize, prefer to mingle with other

Department of the Interior.

nationalities, and we can, therefore, find Scandinavians settled in almost any likely district. In some cases small clusters of from three to ten families may be found; but, considering that less than ten families can hardly be rated a colony, I make no mention of these except in this way.

PROGRESS BY SETTLERS.

I am unable from personal observations to report upon the progress made in any of the settlements, especially with respect to acreage under cultivation and increase of stock. I am, however, informed that all their crops in settlements west of range 12 W 1st in general have been very good, and that the prices of wheat, cattle and other farm products have been very satisfactory this season, and that the settlers are more inclined to encourage others to settle in their district than has hitherto been the case.

EMPLOYMENT.

For the last three years work in general has been limited to a short season, being started late in the spring. Immigrants arriving in March or April must be found employment with farmers, and in some cases they are not well suited for that class of work; but, without much delay, I managed to find employment for all. Railroad work, saw-mill work and gold mining have been fairly good this season; but, owing to the depression in the United States, a large number of common labourers are constantly flowing in from that country. For artisans there has been no employment this season, except for the older residents.

CORRESPONDENCE.

During the year there have been received and handed to my care 603 letters, and in reply I have forwarded 656 letters, and a large number of maps and pamphlets.

OTHER THAN SCANDINAVIAN IMMIGRANTS.

During the season of 1896 I have assisted in directing English speaking and other immigrants, to the best of my ability, by finding them employment, or by giving information about land.

In one instance I had the pleasure, in accordance with your instructions, to take charge of a delegation of Routainers in search of new homes. As already reported I conducted six of them through the East Mennonite reserve and finally found a suitable location for them in township 2, ranges 6 and 7 east, and a few days later conducted the whole party of 25 families comprising 92 souls to their new colony, now named *Routainan Slavorda*, and by August 19th had each family located on a quarter section of fairly good land. On October 28th I conducted another party of eight families comprising 39 souls to the same colony or settlement.

In addition to the 33 families now settled there, four others not yet resident have made entry for land, and will make settlement early in the spring.

When I had the opportunity on the 28th of October last to visit this young colony I found a number of small but comfortable houses and some fairly good stables had been erected, in addition to which plenty of hay had been procured, and a number of the settlers were in possession of one or more cows. In all, these settlers have expended about \$850 in stock and implements, about \$100 in materials, and possibly \$150 to \$200 in provisions, during the two months they have been settled there.

The land these Routainers have been settled upon can not be considered first-class wheat land, but it is well suited for mixed farming, there being good grazing land and spendid hay for a large number of cattle, besides being fairly well sheltered by bush.

These settlers do not intend for the first few years to cultivate very large fields, but will endeavour to procure as much stock as possible, so that when the settlement

increases sufficiently in numbers and capital they may be able to arrange for enough cows to organize a creamery or cheese factory. It is expected that about 35 or 40 more families, friends of those already settled, will join them early next spring.

The Routainers being used to very small farms in their own country, averaging from 3 to 10 acres, are first-class gardeners and fairly industrious farmers or farm labourers, both sexes as a rule taking part in outdoor employments. I am, therefore, very confident that a few years time will wonderfully improve the appearance of this settlement. The capital they possessed when starting was certainly limited, but their frugal nature will assist them to weather the first season, that being the most difficult one for new settlers. Located as they are in close proximity to older settlements I am confident they will be able to find employment next season and thus be able to make a fair start.

The whole very respectfully submitted.

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

JOHN W. WENDELBO.

Department of the Interior.

STATEMENT of Scandinavian Immigration to the Canadian North-west, through Winnipeg, for twelve months ending 31st October, 1896.

	VIA OCEAN.			FROM UNITED STATES.			Grand Total.	Farmers.	Farm Labourers.	General Labourers.	Mechanics.	Clerks and Traders.	Domestic.	Not Classified.	Total.	Manitoba.	Assinboia.	Alberta.	British Columbia.	Total.	SETTLED ON LAND ON FARM.		SETTLED IN CITY.		Total.				
	Adults.		Children	Adults.		Children															Male.	Female.	Adults.	Children.		Male.	Female.	Adults.	Children.
	M.	F.	M.	F.	M.	F.																							
1895.																													
November	5	1	2	1	9	10	2	7	4	23	32	11	3	3	32	3	3	29	1	32	14	14	2	2	32				
December	3	4	1	1	8	13	7	7	7	36	44	17	1	26	44	4	1	38	1	44	23	15	2	2	44				
1896.																													
January	1	4	2	2	9	4	4	4	4	13	5	5	2	6	13	6	3	1	3	9	9	4	4	4	13				
February	1	1	1	1	2	3	4	1	1	8	2	2	2	4	10	1	1	2	5	10	6	2	2	3	10				
March	15	3	1	1	20	3	4	1	4	20	15	2	1	4	20	15	2	4	5	20	1	2	9	1	20				
April	38	10	5	2	55	18	14	12	12	56	11	15	3	8	111	52	2	44	13	111	36	24	16	2	111				
May	43	18	7	4	72	3	3	2	1	75	34	9	13	11	86	34	9	13	19	75	11	7	11	4	86				
June	23	6	1	1	30	3	2	1	6	36	6	3	17	5	41	19	1	13	3	36	7	1	2	24	41				
July	27	8	5	4	44	3	3	2	3	47	3	3	9	3	50	36	5	5	1	47	7	2	9	1	50				
August	14	6	2	4	26	8	2	2	2	32	4	4	2	2	36	16	4	17	6	36	5	1	2	12	36				
September	11	9	7	5	32	8	2	3	1	43	4	4	4	4	47	16	4	17	6	43	5	1	2	12	43				
October	4	10	10	3	27	3	2	3	1	36	5	5	1	5	41	11	15	8	2	41	11	14	7	7	41				
Totals	185	80	42	27	314	70	33	29	27	493	76	77	87	2	493	220	41	170	62	493	134	90	56	12	36	493			

JOHN W. WENDELBO,
Immigration Officer.

SCANDINAVIAN Colonies in Manitoba, the North-west Territories and British Columbia, with approximate estimate of number of Settlers and number of Souls, 31st October, 1896.

Name.	Location.	Post Office.	Railway Station.	Number of Settlers.	Number of Souls.	Acres Cultivated.	Number of Horses.	Number of Cattle.	Number of Sheep.
New Scandinavia	Tps. 17, 18, ranges 17, 18, west 1st.	Scandinavia, Denver-	Minnedosa	130	512				
Monrose	Tps. 11, 12, range 16, west 1st.	Monrose	Carberry	14	62				
Tyndall	Tp. 13, ranges 6, 7, east 1st.	Tyndall	Tyndall	14	54				
New Stockholm	Tps. 18, 19, range 3, west 2nd	Ohlen	Whitewood	66	280				
Fleming	Tp. 13, ranges 24, 30, west 1st	Fleming	Fleming	12	56				
New Denmark	Tps. 28, 29, ranges 6, 7, west 2nd	Theodora	Yorkton	40	145				
Estevan	Tp. 2, range 8, west 2nd	Estevan	Estevan	10	19				
New Finland	Tps. 17, 18, range 34, west 2nd	Forrest Farm, New Finland	Whitewood	50	214				
Olds	Tp. 33, range 1, west 5th	Olds	Olds	26	87				
Sweda	Tp. 38, range 1, west 5th	Red Deer	Red Deer	21	69				
New Sweden	Tp. 45, ranges 19 to 23, west 4th	Wetaskiwin							
do	Tp. 46, ranges 21 to 23, west 4th	Duhamed, Bear's Hill, Lavesville	Wetaskiwin	260	620	No recent statistics.	No recent statistics.	No recent statistics.	No recent statistics.
Beaver Lake	Tps. 50, 51, range 19, west 4th	Logan	Wetaskiwin	30	141				
Edna	Tps. 55, 56, range 19, west 4th	Edna	Edmonton	30	110				
Stoney Plains	Tp. 52, range 1, west 5th	Stoney Plains	do	10	29				
Bella Coola, B.C.	Bella Coola Valley	Bella Coola	Vancouver	59	212				

New Swedish Colony on Vancouver Island, B.C.

JOHN W. WENDELBO.
Immigration Officer.

Department of the Interior.

No 9.

REPORT OF MR. G. PH. CLOUTIER, FRENCH INTERPRETER.

(*Translation.*)

WINNIPEG, 24th November, 1896.

H. H. SMITH, Esq.,
Commissioner of Dominion Lands,
Winnipeg.

SIR,—I have the honour to submit to you my report on French, Belgian and French Canadian immigration into Manitoba and the North-west for the 12 months ending 31st October, 1896, and to add to this report a table showing the number of immigrants who came to settle there. From the information I have had of different colonies, in correspondence with the colonists, I am in a position to state that on the whole the colonists are content.

In the course of the last twelve months I have received 389 letters asking for information in regard to the general advantages of that part of Canada. I have written 349 letters in reply, and at the same time I have sent a good number of pamphlets and maps to those persons named to me by the new colonists on their arrival in Winnipeg.

I have the honour to be,
Mr. Commissioner,
Your humble servant,

G. PH. CLOUTIER.

FRENCH, BELGIANS and FRENCH CANADIANS, settled in Manitoba and North-west Territories during the Year ending on the 31st of October, 1896.

MONTHS.	ADULTS.		CHILDREN.		TOTAL.	NATIONALITY.				TOTAL.	DESTINATION.				TOTAL.	TRADES.				TOTAL.
	Males.	Females.	Males.	Females.		French.	Belgian.	Fr. Can.	Fr. U.S.A.		Manitoba.	Assiniboia.	Saskatchewan.	Alberta.		British Columbia.	Farmers.	Farm Labourers.	Domestics.		Not Classified.
1895.																				
November.....	9	5	9	7	30	20	3	7	0	21	2	7	0	0	9	8	0	21	30	
December.....	6	5	10	8	29	2	12	0	15	28	1	0	0	0	5	0	1	23	29	
1896.																				
January.....	6	2	2	2	12	11	0	0	1	7	0	5	0	0	4	1	0	7	12	
February.....	4	1	1	5	11	9	1	1	0	3	0	8	0	0	2	2	1	7	11	
March.....	37	10	7	6	60	31	8	16	5	32	0	15	13	0	34	2	1	23	60	
April.....	32	16	24	16	88	19	14	33	22	72	0	11	0	5	27	6	1	54	88	
May.....	54	21	25	33	133	95	36	0	2	116	4	8	5	0	51	3	2	77	133	
June.....	10	3	0	0	13	10	3	0	0	11	2	0	0	0	6	2	1	4	13	
July.....	29	14	7	11	61	38	2	11	10	55	1	2	3	0	27	5	1	28	61	
August.....	36	4	5	8	53	9	19	20	5	42	0	2	2	7	13	7	20	13	53	
September.....	8	3	5	7	23	9	1	13	0	21	0	2	0	0	7	0	1	13	23	
October.....	9	5	12	7	33	4	1	10	18	33	0	0	0	0	6	3	2	22	33	
TOTAL.....	240	89	107	110	546	257	100	111	78	441	10	60	23	12	188	33	31	294	546	

Department of the Interior.

No. 10.

REPORT OF MR. R. L. ALEXANDER,

(TRAVELLING IMMIGRATION AGENT ON CALGARY AND EDMONTON RAILWAY.)

CALGARY, 7th November, 1896.

H. H. SMITH, Esq.,
Commissioner of Dominion Lands,
Winnipeg.

SIR,—I have the honour to submit my report for the 12 months ending the 31st day of October, 1896.

During the year I made 80 round trips between Calgary and Edmonton as well as several to some of the intermediate points, having thus travelled 31,250 miles by train. I have driven into the settlements at all the leading points along the line of railway, covering in this way about 1,040 miles, and reaching many places which in previous years I had not been able to go to. While on these trips I called upon very many of the settlers, both old and new, more particularly the latter. During these drives I accomplished two objects: First, that of seeing the settlers, conversing with them as to their prospects, ascertaining how they were getting along, finding out if any grievances existed, and other matters that might affect their interests as settlers; and second, that of travelling into unsettled localities, ascertaining from personal observation and examination the natural facilities of these localities, what kind of homestead lands, where and how situated, quality of soil, distances from other settlers, schools, railroad, towns, &c. By this means I have added to the knowledge acquired in previous years much useful, accurate and reliable information, which I shall be able to impart to new comers in the future, whether homesteaders or others.

With regard to the crops I am glad to be able to report that, taken as a whole, they are good. The yield of straw was not so heavy as last year. The yield of grain, however, was much larger and of a very much better quality. In many localities the yield is a good average, but in others it is under the average. Taken on the whole, all over the country, a good fair crop has been realized.

In places where the crop is under the average the principal cause has been the drought in June and the early part of July, which affected grain on old lands early sown, and grain sown on spring breaking.

Very little grain was injured by frost, and where it was so injured it was, generally speaking, on late sowing or very low lying land.

The invariable reply to the question "How is your crop this year?" was "Good," where the land was well cultivated and early sown with good seed. There were a few instances where the oat crop was bad; this happened where last year's frozen seed was used.

I made it a point when travelling amongst the settlers to find out how the seed advanced by the government had done, and am pleased to report that without a single exception I found that the seed thus received had done well.

To say that the root crop was good would not be giving a fair idea, but to say that the root crop all over was immense would convey a more correct idea of the big crop of all kinds of roots all over the country.

In order to reach the outlying settlers and to see some of the available vacant homestead lands I had necessarily to drive through some of the older settled parts, and it was pleasing to see the very marked improvements and signs of progress throughout these localities. New and commodious dwellings, barns and outhouses have been erected; farms nicely fenced; old trails along which one used to drive without interruption are now closed and fenced across; roads have been made on the regular road allowances, giving the country a much more home-like appearance.

There is a marked increase all over the different localities in the number of cattle, sheep, pigs and poultry. A few years ago where the cattle were numbered by tens, they are now numbered by fifties and hundreds; pigs too are being largely raised, so that instead of the settler having, as in the past, to buy his bacon from the merchant, he is now supplying the merchant with this commodity. At Wetaskiwin last spring one of the enterprising merchants of that town took me into his store-house and pointing to a pile of nicely cured bacon, said: "See what the settlers about here are supplying us with."

"Mixed farming, mixed farming" is the watchword all over, and all who can are going into this kind of farming in real earnest.

The pork packing houses—one in Calgary and the other in Edmonton—have given a stimulus to the hog raising industry. Yet the supply is not at all equal to the demand, the Calgary establishment having to ship from the east many of the hogs they require.

At Lacombe a Mr. Storey tried fall wheat growing last year, which proved very satisfactory, yielding 40 bushels to the acre and of a first-class sample.

Instead of depending entirely upon prairie hay many of the settlers are cultivating and growing on their lands winter feed for their stock—spring rye, green oats and timothy being some of the kinds grown for that purpose, the latter doing very well wherever tried.

Every year becomes more and more apparent the great need of creameries and cheese factories, more particularly the former; and, just as soon as these most essential industries are established, so soon will those settlers who are now discontented and somewhat unsettled as to their prospects be in a position to materially improve their circumstances.

Too much praise cannot be given to the settlers for their energy in desiring to establish schools in the newer settlements, and it is a rare case to find a settlement without a school in which there are a sufficient number of children of school age. All throughout the older settlements commodious and comfortable school-houses are to be seen, many of which are open all the year, instead of only during the summer term as used to be the case.

At Fort Saskatchewan on the beautiful North Saskatchewan river there has been erected, and is now working, a flour mill with a capacity of 50 barrels a day. This mill will fill a long felt want amongst the settlers in and about that district, for all around that locality the country is well settled, and perhaps in no other place in Northern Alberta is there more good wheat grown than there is about that centre. This mill, together with the fine flour mill at Calgary and flour mill and oat meal mill in South Edmonton, and the demand for all kinds of farm produce in the Kootenay country, has already created a lively demand for grain of all kinds, flour, feed, &c., and the farmers are getting cash for their grain as fast as they are able to bring it to the towns all along the line, at which places buyers are established.

By reference to the accompanying schedules it will be seen that the number of settlers that came in this year is considerably less than last year, yet I am glad to be able to report that they are a much better class, being composed more of married men with families and possessed of more means. There have not been so many single men and men looking for employment as in past years, and there have been fewer "prairie schooner" settlers.

There is a greater amount of contentment and more general satisfaction prevailing throughout the country than hitherto, with a fair crop, cash for grain, no trouble to sell all kinds of cattle for cash and at good prices; so that the general opinion is that "the country is all right," and that what is required is the right kind of settlers, practical, with even limited means. As a man from Chicago who was up here "spying out the land" said "with such rich soil, abundance of prairie grass and hay, fine climate, plenty of wood, a bountiful supply of good water, an inexhaustible supply of coal and plenty of building timber, and enough gold in the Saskatchewan river to pay off the national debt, I cannot see why immigrants should not succeed here."

I think that the letters received by me, and forwarded to you, from some of the settlers, bearing testimony to the advantages of the country, would confirm the above.

Department of the Interior.

Holding as I do a commission of justice of the peace for the Territories, I have been of much service to the settlers in passing their effects through the customs, being in a position to take the necessary affidavits to their papers, and filling out the same, thereby saving the new comers a great deal of trouble and annoyance, as well as expense. During the year I passed about 55 consignments.

Complaints are still being made by the settlers that the Indians in many places during the spring are in the habit of destroying the eggs of the wild ducks and geese, and that in consequence of this these birds are becoming scarcer.

Prairie and forest fires have done an incalculable amount of damage this fall, many settlers losing all their season's crop, some of them their dwellings and other buildings, and thousands upon thousands of tons of hay. In a few instances some cattle and horses have been destroyed. These fires do more damage in the newer settlements and in the cattle ranging localities, as in the older settlements there are more fire guards made and the roads are ploughed and graded, thus preventing the fire from spreading as happens where these roads and fire guards are not made.

Accompanying this I send you four schedules. Schedule "A" shows the number of cars which came from the United States, and the various provinces of the Dominion of Canada, the number of horses, cattle, sheep and pigs, together with their values. Of the 70 cars, 54 came from the United States, Dakota contributing 23, Minnesota 15, Kansas 7, Michigan 2, Nebraska 5 and Washington 2. The remaining 16 came from the provinces of the Dominion.

Schedule "B" gives the number of cars of live stock and effects which arrived during each month with their values, where from, and destination.

Schedule "C" gives the number of individuals arriving each month, and from where they came, the number of adults, males and females, and those under the age of 12, males and females.

Schedule "D" shows the number coming from each state, the number from the British Isles, Europe and the provinces of the Dominion.

I am continuously receiving letters of inquiry from the residents of the United States, asking for information, particularly about Alberta, all of which I have answered giving the information asked.

I have the honour to be, sir,

Your obedient servant,

R. L. ALEXANDER,

Dom. Govt. Travelling Immigration Agent.

SCHEDULE A.

STATEMENT showing number of Cars of Stock and Settlers' Effects arriving between Calgary and Edmonton, for the year ending 31st October, 1896.

WHERE FROM.	No. Cars.	LIVE STOCK.				Value of Car Loads.	Value of Lots less than Car Loads from the United States.	Total Value.	Remarks.
		Horses.	Cattle.	Sheep.	Pigs.				
Dakota.....	23	113	89		2	19,950 00	1,950 00	21,900 00	
Kansas.....	7	36	35		5	5,550 00		5,550 00	
Michigan.....	2	12				2,000 00		2,000 00	
Minnesota.....	15	33	111		1	13,300 00	2,600 00	15,900 00	
Nebraska.....	5	26	8		3	4,850 00	750 00	5,600 00	
Oregon.....		7					700 00	700 00	
Washington.....	2	23			2	1,800 00	1,500 00	3,300 00	These drove in.
Other States.....							19,750 00	19,750 00	Part of these drove in.
Total United States.....	54	250	243		13	47,450 00	27,250 00	74,700 00	
Ontario.....	11	25	52		1	10,200 00		10,200 00	
Manitoba.....	5	2	20		1	4,100 00		4,100 00	
Total Dominion of Canada.....	16	27	72		2	14,300 00		14,300 00	
United States total.....	54	250	243		13	47,450 00	27,250 00	74,700 00	
Dominion of Canada total.....	16	27	72		2	14,300 00		14,300 00	
Grand total.....	70	277	315		15	61,750 00	27,250 00	89,000 00	

R. L. ALEXANDER,
Dominion Government Travelling Immigration Agent.

CALGARY, 7th November, 1896.

Department of the Interior.

SCHEDULE B.

STATEMENT of number of Cars Live Stock and Settlers' Effects arrived during the twelve months ending 31st October, 1896, between Calgary and Edmonton.

MONTH.	No. of Cars.	LIVE STOCK.				VALUE.			WHERE FROM.			DESTINATION.											
		Horses.	Cattle.	Sheep.	Pigs.	Car Lots.	Lots less than Car loads from U.S.	Total Value.	Ontario.	Manitoba.	United States.	Total.	Edmonton.	Leduc.	Wetaskwin.	Lacombe.	Red Deer.	Olds.	Bowden.	Penhold.	Total.		
						\$ cts.	\$ cts.	\$ cts.															
1895-96.																							
November.	13	63	79			11,150 00	3,550 00	14,700 00	1	11	13	5	1	3	3	1	1	1	1			13	
December.	6	11	6			5,400 00	2,800 00	8,200 00	2	3	6	6	1	3	1		1			1		6	
January.	3	4	9			2,400 00		2,400 00		3	3	1		3	1							3	
February.																							
March.	8	25	21	4		7,100 00	3,350 00	10,450 00	2	5	8	5		1	1	1	1				8		
April.	14	51	79	6		13,550 00	5,750 00	19,300 00	3	10	14	3		5	6	1					14		
May.	6	23	3			5,800 00	2,100 00	7,900 00	1	4	6	2		2	2	2					6		
June.	2	12	10	3		1,900 00	2,450 00	4,350 00		2	2			3		2					2		
July.	4	7	43			3,100 00	1,950 00	5,050 00		4	4	4		1		2					4		
August.	5	25	23			3,400 00	850 00	4,250 00		5	5	4		1		2					5		
September.	2	20	8			1,900 00	2,300 00	4,200 00	2	7	7	2		2	2	2					2		
October.	7	27	34	2		6,050 00	2,250 00	8,300 00		7	7	4		3	1						7		
Total.	70	277	315	15		61,750 00	27,250 00	89,000 00	11	54	70	25	7	16	14	5	1	1	1		70		

R. L. ALEXANDER,
Dominion Government Travelling Immigration Agent.

CALGARY, 7th, November 1896.

Department of the Interior.

SCHEDULE D.

STATEMENT showing number of Settlers between Calgary and Edmonton from each State and Province or Country during 12 months ending 31st October, 1896

State.	Number	Province or Country.	Number	Destination.	Number
Connecticut.....	2	Ontario.....	164	Edmonton.....	
California.....	18	Quebec.....	42	Leduc.....	116
Dakota.....	148	Nova Scotia.....	11	Wetaskiwin.....	230
Idaho.....	7	Prince Edward Island..	3	Lacombe.....	127
Iowa.....	11	Manitoba.....	62	Black Falls.....	3
Illinois.....	5	British Columbia.....	21	Red Deer.....	77
Indiana.....	1	Total, Dom. of Can.	303	Penhold.....	9
Kansas.....	63	England.....	82	Innisfail.....	74
Michigan.....	56	Ireland.....	4	Bowden.....	19
Minnesota.....	145	Scotland.....	12	Olds.....	26
Montana.....	20	Wales.....	1	Didsbury.....	7
Massachusetts.....	1	Total, British Isles..	99	<i>Synopsis.</i>	
Maine.....	1	Austria.....	139	Dominion of Canada....	303
Nebraska.....	25	Denmark.....	3	British Isles.....	99
New Hampshire.....	3	France.....	1	Europe.....	325
New York.....	11	Germany.....	32	United States.....	652
Oregon.....	42	Hungary.....	1	New Zealand.....	2
Pennsylvania.....	5	Norway and Sweden....	7	Grand total.....	1,381
Vermont.....	8	Prussia.....	4		
Washington.....	68	Russia.....	135		
Wisconsin.....	12	Switzerland.....	3		
Total.....	652	Total, Europe..	325		
		New Zealand.....	2		

R. L. ALEXANDER,
Dominion Government Travelling Immigration Agent.

CALGARY, 7th November, 1896.

No. 11.

REPORT OF THE MINNEDOSA AGENT.

(MR. JOHN FLESHER.)

MINNEDOSA, 7th November, 1896.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to inclose you statement showing work performed in this office during the departmental year ending on the 31st ultimo, from which it will be seen that the number of homestead entries granted in this district during such year is slightly less than those granted the previous year ; but this, considering the low price of products, the general depression in business and the reduced number of immigrants, is, I think, a satisfactory showing.

I am pleased to report that the settlers have again been favoured with a bountiful harvest, the abundant rainfall having caused all crops to grow luxuriantly ; and should the recent increase in the price of farm products be maintained, which seems probable, the present season will be regarded as a very satisfactory one.

As you are probably aware, a railway is in course of construction from Gladstone northerly up to and through the Lake Dauphin district, and this will prove a boon to the settlers along its route, not only furnishing them a near market, but also enabling them to bring in their supplies more cheaply ; indeed it is difficult to estimate all the advantages that follow railway construction, and in how many ways such construction promotes the welfare and comfort of the settlers.

Consequent on the abundant rainfall the growth of grass was exceptionally good, and furnished excellent pasturage for stock, as is evidenced by the large number of cattle which have been shipped from the several stations in this district. During the year ending 31st ultimo 6,869 head of cattle were so shipped. It is claimed by some of the dealers, however, that the quality of such cattle was not up to the average, partly on account of the late spring and partly on account of the unusual number of flies.

The creameries in the district are increasing in numbers, and are apparently flourishing, having manufactured and shipped during the same period upwards of half a million pounds of butter, some of which was shipped to British Columbia and some to Japan. Less attention is given to the manufacture of cheese, although nearly 95,000 pounds was manufactured and shipped.

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

JOHN FLESHER,
Agent of Dominion Lands.

Department of the Interior.

No. 12.

REPORT OF THE BRANDON AGENT.

(MR. W. H. HIAM.)

BRANDON, MANITOBA, 20th January, 1897.

A. M. BURGESS, Esq.,
Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the following report of immigration affairs at this agency for the fourteen months ended on the 31st ultimo.

The summarized statement of work performed which I inclose herewith shows a total of 318 homestead entries granted during that period, and the number of homesteads cancelled is 207, showing a decrease of 67 as compared with the fourteen months prior to November, 1895. It is gratifying to note this diminution of cancelled entries, because it indicates a more prosperous and contented condition of the settlers generally.

The wheat crop of last year, although not equal in bulk to that of 1895, was a fairly good one, and it is estimated that owing to the advanced price the farmers made as much profit, or perhaps more, than they did in the previous year; consequently business has flourished and money has been plentiful.

Favourable weather prevailed last fall after harvest work was finished and it is rumoured that a much larger area of land than usual was ploughed and made ready for seeding in the spring.

The hay crop of last season was an abundant one, and live stock is doing well. This branch of farming continues to increase very satisfactorily, as mixed farming is now acknowledged to be the most profitable and safe system to follow.

The low price of dairy products which has lately prevailed tends to check any great expansion of this industry, although the business is by no means neglected. I learn that creameries have been established at the following named places in this district, viz. :—Carberry, Douglas, Austin, Hamiota, Boissevain and Oak Lake; also cheese factories at Alexander, Brandon Mills, Baldur, Deloraine, Killarney and at a point south of Oak lake.

Preparations are now in progress for establishing a felt manufactory in this city by Messrs. Senkbeil & Merner, who expect to employ almost constantly some 25 or 30 hands; the necessary machinery for the purpose is being imported from Germany, which country Mr. Senkbeil recently visited for the purpose of obtaining machinery of the best kind, and it is expected that the factory will be in operation in February or March next. The wool required in this manufactory will be bought from farmers in the province, who will thus have a home market for their fleeces.

A cigar manufactory was also started here last year, employing fifteen hands, and it is reported that the business done by the firm has proved satisfactory.

The number of transatlantic immigrants registered at the immigration buildings since my last annual report is much smaller than was anticipated, and it is admitted by all who have given the subject thoughtful consideration that the Dominion, and more especially the north-western portion, needs a steady and constant influx of immigrants who have been brought up to farming pursuits in Great Britain and other European countries that are over-populated. I believe there are many hundreds of families of this class in the United Kingdom who would be glad to come over here if they had the means necessary for passage and outfit to begin farming in Canada; and if some plan could be devised to assist a limited number of families possessing the necessary qualifications, such as experience in farm work, sound health, industrious habits, verified

by testimonials from former employers, showing their fitness to be aided by the government during the first year or two in their new homes, the experiment might be worthy of trial. The assistance to be given should consist in the erection of buildings, or the purchase of necessary implements, or both, according to the circumstances of each family; and the money expended for such purpose should be regarded as a loan for a specified period, bearing interest at 6 per cent, until the settler be able to discharge the debt, and obtain a patent for his homestead. Homestead inspectors should visit these settlers periodically and report their condition and prospects.

I have the honour to be, sir,

Your obedient servant,

W. H. HIAM,
Agent Dominion Lands.

Department of the Interior.

No. 13.

REPORT OF AGENT AT LAKE DAUPHIN. ,

(MR. ROBERT GUNNE.)

LAKE DAUPHIN, 2nd January, 1897.

The Commissioner of Dominion Lands,
Winnipeg, Manitoba.

SIR,—I have the honour to submit my annual report for the period ending the 31st December ultimo.

There has been a noticeable increase in all branches of the work of the office, the greatest being in the correspondence and the number of entries granted, which exceed by a considerable extent those of the previous year.

Four hundred and twenty-nine homestead entries have been granted, representing an area of 58,900 acres, one interchange from a homestead to a pre-emption, and one 80 acre homestead, making a total area granted as homesteads, exclusive of the interchange, of 59,980 acres. 2,301 letters have been received and 1,752 have been sent.

The spring of the season was very wet and the roads in very bad condition, and as at that time there was no railway to bring settlers in, it deterred a great many people who advised they were coming, and who then intended selecting lands, from doing so. The late fall season acted in a similar manner; but notwithstanding these obstacles a very considerable number, as may be seen above, have come and taken up homesteads.

Although there have been a sprinkling from Ontario and the other provinces, and a few from the United States, the great majority of immigrants here this season have come from other parts of the province.

The district has been on the whole prosperous. The late harvest of the previous year prevented a great many farmers from doing much fall ploughing or breaking, and, particularly as at that time there did not appear to be much probability of the railway being built into the settlement, they did not care to cultivate more than enough land to meet their own requirements. There seemed at that time to be a pause in the growth and development of the district. Previous to this the incoming settlers had made a market for any overplus at good prices, but last year there was a very limited market indeed, many of the farmers having to hold the large bulk of the season's crop over to this year. A universal feeling of financial stringency prevailed throughout the district, and a general restlessness and uncertainty as to the future, many thinking of leaving the country where they could no longer make anything but in trade, and sometimes not even that, out of the products of their labour.

The building of the railway has changed this despondent tendency to one of buoyancy and faith in the future. Farmers wherever possible have been increasing the acreages of their fields by additional breaking; the construction of the railway has been the means of distributing a large amount of ready money for supplies of hay and oats, vegetables, butter, eggs, &c., and there is everywhere a better feeling evinced and a readiness to take advantage and make the best of every opportunity the new order affords.

The new town of Dauphin established by the railway people, although hardly three months old, can already boast a much larger number of buildings than the old villages of Dauphin and Gartmore put together, it being situated nearly midway between them, and it has the promise of being one of the best country towns in the province.

The cattle trade has not come up to the figures realized last year. Between \$12,000 and \$15,000 would probably cover the exports from this source this season. The reason for the falling off is that last year the cattle buyers purchased nearly everything in that

line it was possible to. Stock that had better for the community have been held over for another season was to a certain extent sacrificed, it being with many a pressing necessity to realize on their young stock so as to meet their obligations to merchants and others. From the effects of this drain the country has not this year recovered, but by next year it is very probable that a fair average for the district will again be shipped out.

The fishing industry on lake Winnipegosis, from which a very superior quality of whitefish is obtained, has been carried on, as in the past, until very recently, by individual enterprise, a few parties buying the catch from Indians and others and hauling them in the winter time to points on the Manitoba and North-western Railway and Canadian Pacific Railway line and there disposing of them. With the advent of the railway a greater number have signified their intention of prosecuting this business, contemplating its development in a more systematic and comprehensive manner, such as the building of fishing fleets, the erection of freezers, &c. At the present time all the large fish companies have representatives here buying up this year's catch.

Between four and five tons of salt have been manufactured by Mr. Paul Woods at the south end of lake Winnipegosis, which has been disposed of to the surrounding settlers. With the increased local demand from the fishing industry, and the improved transportation facilities, it is highly probable that Mr. Woods will enlarge his works, as, with an increased capacity, there is no reason why his works should not supply the requirements of the district with that article.

The lumbering industry might only now be said to have commenced. Previously the only market was that of the settlement. Now that there is the possibility of shipping out the manufacture, the limits on the mountains will be fully opened up, and a large export trade spring therefrom. About one million five hundred thousand feet have been manufactured by the different concerns operating in that line this season.

As yet no co-operative creameries have been established here, but this has not deterred individual enterprise in that direction, Mr. Andrew Malcolm of this point having manufactured six thousand pounds of cheese from the produce of his own stock, while Mr. Dow of Oaknook has put out seven hundred and twenty pounds.

A colony of Polish settlers, the first foreign settlement in these parts, was commenced this fall by the arrival of eight families from Galicia, Austria, who immediately on their arrival, after a location had been decided upon, commenced building their houses and putting up hay for their stock. The colony has recently been augmented by seven families who arrived on the 23rd of last month. Several of the original settlers have been at the office on different occasions and have declared themselves well satisfied with their locations. They have settled along the township line between ranges 20 and 21, township 26.

Notwithstanding the very wet and unpromising spring the crop yields throughout the district have been very satisfactory this season, the average running for wheat at 25 bushels to the acre, while in some localities it has run to 36; oats have run between 50 and 60, and barley, which has been grown to a very limited extent, at about 30 bushels to the acre.

With regard to surveys I would urge that all the unsurveyed land in the district be subdivided as soon as possible. Immigration seems to be turning in this direction, and in the interests of such it would be well to have the lands laid out in such a way that a settler could be certain of any particular location he might select.

In conclusion it might be said that with the construction of the railway which has just been built, which places it now in communication with the business centres of the country, the district starts on a new era, and the future must decide as to the high opinions entertained of its capabilities. Everything points to the probability of their being justified, and the district can, without hesitation, be commended to the intending settler.

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

ROBERT GUNNE,
Agent of Dominion Lands.

Department of the Interior.

No. 14.

REPORT OF THE AGENT AT YORKTON.

(MR. F. K. HERCHMER.)

YORKTON, 4th November, 1897.

The Commissioner of Dominion Lands,
Winnipeg.

SIR,—I have the honour to acknowledge the receipt of your circular, dated 21st ultimo, *re* the result of the past year's business in this office, and to report as follows :

There has been a slight falling off in the number of new entries granted from last year, and of those made a large proportion were by people who had been residing in the country for some time ; those from Europe being very few, and in most instances being people having friends here who had induced them to settle here.

It is to be hoped that the results of the past season will induce more people to locate next year.

All the entrants who presented themselves at the office were well-to-do people. The year has been a favourable one, and crops generally through the district were good, the sample of grain being very fine.

Threshing is well advanced, and will be completed before the severe weather sets in. Large quantities of wheat are being offered in Yorkton market, and oats are commanding better prices than last year, though so far but few are being offered.

Roots and vegetables were a splendid crop, some specimens exhibited at the fall fairs being very fine.

Large quantities of hay have been secured, and the bulk saved in good condition, though at the first part of the cutting season frequent storms caused some damage.

The cattle trade has been flourishing, though a large number of those offered for sale were not considered by the shippers as fit for the English market ; this is said to be due to the rank growth of grass, caused by the wet spring, which has not the same fattening qualities as in a dryer season, and the quantity of mosquitoes which prevailed during the early summer and prevented the cattle feeding as well as usual.

Still some 2,200 head of beef cattle were shipped from Yorkton alone, and a number from other points within the district, prices varying as high as three cents per pound for the best quality—this is considered a fair price.

The large quantity of feed obtainable has drawn the attention of Messrs. Gordon & Ironsides, cattle exporters, who last winter shipped in a number of stockers which were distributed among ranchers and farmers tributary to Yorkton, and who were paid on an average \$5 per head for the winter keep, some having taken as many as 100 head each. The result is the distribution of a large amount of cash through the country for straw and damaged grain that would otherwise have been of no profit to the producers. This year the firm mentioned have brought in some 1,500 head, which have been disposed of in like manner, and it is expected that the next year will see this business carried out on an even larger scale. For the settler without means to buy the number of cattle he could provide fodder for, this is a good way of earning wages during winter.

Two creameries have been in operation—one here, the other at Saltcoats. The former worked some four and a half months, churning cream from 600 cows, and the output was some 53,400 pounds of butter ; the latter, 50,000 pounds. The bad roads in spring somewhat retarded operations, or the results would have been larger. These industries are of marked benefit to the district and distribute a large amount of cash that otherwise would not be forthcoming, as the ruling price offered for the average farm dairy butter is very low.

Prairie fires have caused a great deal of damage in certain localities, some people having lost heavily in hay, grain and buildings, while there are cases where cattle and horses have been burnt ; still there is ample fodder saved to winter all stock carried. It is much to be deplored that prompt steps cannot be taken to stop the spread of these fires which are rapidly denuding the country of timber. The settlement in this district is too scattered to permit of concerted action on the part of individuals, and each year brings a repetition of the damage.

I have driven through a large part of the district this autumn, and everywhere have found the people prosperous and evidently contented. I have not met with a single case of destitution. Business men tell me that payments are being met with more promptness than usual, which in itself is a good sign.

The health of the district has been good.

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

F. K. HERCHMER,
Agent of Dominion Lands.

Department of the Interior.

No. 15.

REPORT OF THE AGENT AT ESTEVAN.

(MR. A. E. HETHERINGTON.)

ESTEVAN, ASSA., 3rd Nov., 1896.

The Commissioner of Dominion Lands,
Winnipeg, Man.

SIR,—I am much pleased to be able to report that the crops throughout this whole district for the past season have been good, and in some portions of it remarkably so.

The French and Belgian settlement at Percy, in the northern townships, is in a flourishing condition; and from present prospects the immigration from the vicinity of Bathgate, in North Dakota, to that colony for the coming season will be quite large, and will consist of a good industrious class of people, well acquainted with the ways of western life, and capable of carving out for themselves good comfortable homes in this part of the country. There have been a number of these people through the district this season looking over the land, and the assurances I have from them leads me to believe that there will be a goodly number come here for the purpose of homesteading next season. George St. Germain and his son Leonard, from the above named place in Dakota, who have already taken land near Percy, have informed me that a great many French families will come with them, or shortly after follow them, when they return next spring.

This district is only just beginning to attract the attention of immigrants, and the magnificent crops grown and harvested by Dunbar brothers, and others, along the line of railway between here and north Portal, have been the theme of conversation for every visitor to this part from the United States during the past summer. Although the immigration has been light during the season there have been more inquiries for vacant lands in the last two or three months than any time for two or three years past.

There is a decided change for the better, and, now that farm produce is a better price, a more hopeful sentiment prevails among the settlers, and those whom I have met, from all over the district, are very well satisfied with their prospects and the ultimate prosperity of themselves and the country at large.

The Baron Hirsch colony, situated principally in township 3, range 5, west of the 2nd meridian, which was at one time considered an entire failure, has now attained to a state of prosperity that is very encouraging, and the settlers that are left there are very well satisfied with their prospects, and are doing all that could be desired of them, while I am told that those who left the colony are sorry for it and wish very much to get back again. The crops in the colony have been good for the past two seasons, and I have every reason to believe that all the vacant lands will be again taken, and the colony eventually become a success. I have been given to understand by Mr. Mendels, vice-president of the Young Men's Hebrew Benevolent Society, of Montreal, who has charge of the colony, that it is the intention of the society to place a large number of settlers on lands in the vicinity of Hirsch next year, and I look for a good showing in that direction when the spring of 1897 opens.

The Swedish settlers throughout the district are a thrifty, industrious people, and make remarkably good citizens. A number of them settled in the vicinity of Estevan in the early days of the town when the country was suffering from the drouth that discouraged so many at that time. But they were not so easily discouraged and remained here to become, as they are to-day, prosperous well-to-do settlers. They inform me that, previous to this, they did not feel justified in advising their friends in Sweden and

the United States to come to this part of the country, but now they have every confidence in its success, and will do all they can to bring their people here, feeling confident they can do as well, or better, than anywhere else in America.

The cattle ranches in the western portion of the district are in a flourishing condition, and everything shows indications of a period of greater prosperity for the district of Coteau than it has never known before, and I look forward with confidence for a good immigration next spring, and a more encouraging amount of business for this office than it has known for some years. With the prices for farm produce at anything like the present standard there is no reason why the farming industry should not come to the front again, and the demand for farming lands become greater; while those people living in the eastern provinces and in the old country who are looking for a more extended field to labour in, will, eventually, look to this, the greatest of all farming countries, as the most desirable place to come to for the purpose of making good homes for themselves.

There are no creameries or other industries receiving government aid in this district, but such an institution would, I am sure, be of great benefit to the farmers who would be in close enough proximity to it to utilize its benefits, for, as a rule, they all keep a number of cattle and very often have difficulty in disposing of their home-made butter, while creamery butter is always in demand.

There is a cheese factory at Arcola, owned and operated by Hopper brothers, that does them the greatest credit. They produce a quality of cheese that cannot be beaten in any country, and they find a ready sale for all they can produce at good paying prices.

The pork packing industry established and maintained by Mr. James Humphries, of Cannington Manor, is an institution that is bound to flourish, and I understand Mr. Humphries is increasing his business very materially every year, and Humphries' "hams and bacon" are becoming well known and highly appreciated throughout the country.

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

A. E. HETHERINGTON,
Agent of Dominion Lands.

Department of the Interior.

No. 16.

REPORT OF THE ACTING AGENT AT REGINA,

(MR. A. J. FRASER.)

REGINA, 6th November, 1896.

The Commissioner of Dominion Lands,
Winnipeg, Man.

SIR,—The number of immigrants who arrived in this district during the year ending the 31st October, 1896, has decreased in comparison with that of other years, owing, no doubt, to the general depression affecting all countries.

In the agricultural portions of the district this year's harvest has proved to be an abundant one. The grain in general is of exceptional quality, and commands the highest prices.

All kinds of horticultural products have been a success, and the demand is proportionate.

The dairying interest has also received a forward impetus, the prices realized for butter and cheese being greatly in advance of last year.

In the different settlements, as well as in the colonies at Strassburg, Grenfell and Balgonie, I find that the settlers are reaping the reward of their industry. Their stock is increasing, the harvest is bountiful, and the prices of all kinds of produce are greatly in excess of those obtained during the last few years.

The increased shipments of cattle to European markets are, in a marked degree, making this industry one of the most lucrative in the Territories.

I need only add that there is every prospect that the encouragement thus afforded to the settler will greatly increase the tide of immigration to this district during the coming year.

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

A. J. FRASER,
Acting Dominion Lands Agent.

No. 17.

REPORT OF AGENT AT PRINCE ALBERT,

(MR. J. McTAGGART.)

PRINCE ALBERT, 6th November, 1896.

The Commissioner of Dominion Lands,
Winnipeg.

SIR,—The immigration during the past year has been almost nil. The few settlers who came in were from Great Britain, France and the United States. A certain number of Russian Mennonites came also last fall from Manitoba, thus keeping this colony steadily increasing and prosperous. The condition of our settlements is most encouraging. The hay and grain crops have been abundant all over the district. I hear of many places where forty bushels for one sown had been reaped. Some rare localities have, it is true, rather suffered from the effect of drought and hot winds during the month of June, but from nowhere is any complete failure reported. The potato crop has given an extraordinary yield.

The cattle trade has not been carried on largely during the past year. Some 700 to 800 head only have been exported. The condition of the animals, however, is excellent.

Our industries, besides the lumber saw-mills, consist principally of two powerful grist mills in this town, one of similar capacity at Duck Lake, and another at St. Louis de Langevin, all worked by steam; one creamery, doing good business; two breweries; and the fishing industry. This last is carried on successfully only in winter time, and in the numerous lakes lying north of the North Saskatchewan river. 350,000 pounds were shipped from here last winter to the American markets.

Prairie fires did considerable damage in the Stony Creek and Shellbrook settlements, but happily no bush fires have prevailed to any considerable extent, owing mainly to greater vigilance on the part of the North-west mounted police.

I have the honour to be, sir,

Your obedient servant,

JOHN McTAGGART,

Agent of Dominion Lands.

Department of the Interior.

No. 18.

REPORT OF BATTLEFORD AGENT.

(MR. E. BROKOVSKI.)

BATTLEFORD, 31st October, 1896.

The Commissioner of Dominion Lands,
Winnipeg, Man.

SIR,—I have again to report that there has been no increase of settlement in this district during the year ended 31st October, 1896. I am not sanguine that there will be much future addition in this respect until a railway reaches this point, or some other means are afforded intending settlers of reaching this vicinity than travel by trails.

Owing to a favourable season and better tillage by those settlers who had sown grain I have this year to report excellent results in the growth of cereals, both as to yield and quality.

In three instances taken for example, one settler cropped 100 acres (excellently tilled), yield 4,000 bushels of grain of all classes; a second 125 (fairly tilled), yield 3,000 bushels; a third 40 (well tilled) yield 1,300 bushels, in addition to root crops. The quality of the grain is fully equal to the product of any locality in the Territories, and local contracts for oats can this season be supplied from the home product without having to resort to importation.

The export trade of beef cattle has not been so large as last season, only 535 head having been purchased and exported to eastern and European markets, at an average of \$30 per head; 1,005 have been slaughtered for local consumption, Indian reserves and government contracts.

The pasturage and fodder crop was more than ordinarily abundant, and will suffice to feed the large number of stock owned by settlers and ranchers in this district until next spring without appreciable deterioration of their present excellent condition. By inquiry, affidavits of hay permittees, and from other sources of information, it has been ascertained that the following stock are owned and fed in this district: horses, 2,106; cattle, 10,028; sheep, 1,545; pigs, 230; or 13,909 of all classes, including cattle owned on Indian reserves.

The importation of thoroughbred stock has been: stallions, 1; bulls, 20; heifers, 5. During last summer it was reported that some of the cattle on ranches north of the Saskatchewan river were suffering from foot disease. On examination this was found not to be the case, but a temporary lameness caused by the animals grazing where the prairie fires of last year had burnt the willow brush, leaving short sharp stumps hidden amongst the grass. These stumps had penetrated the foot between the clefts of the hoof, causing festering sores and consequent lameness. The cleaning out of these wounds and liberal applications of pine tar effected a cure.

The ranchers state that they have been much troubled by the depredations of timber wolves this season. One herd suffered a loss of forty calves.

There are two creameries in this district, the output from which has been: Lakeside creamery (co-operative), 9,500 pounds; Roundhill creamery (private), 4,000 pounds; total, 13,500 pounds, which was sold at an average of 25 cents per pound, making the value of product \$3,375, in addition to the output and value of butter made by settlers. At the Roundhill creamery the quantity manufactured was the result of an average number of 25 cows milked. These animals are not dairy-fed or sheltered. This year's exportation of wool has taught sheep-owners a lesson as to the value of baling their wool in a clean and marketable condition. For the 3,110 pounds purchased by the resident merchants, only an average of six cents per pound was obtained, whilst 7,600

pounds exported direct by owners, properly baled, realized 18 cents per pound. Total value of wool exported, \$1,554.60.

The fur trade has resulted in purchases and exportation to the value of \$16,503.75; and that of seneca root, 33,163 pounds, at the average price of 12½c. per pound, \$4,145.58. As these two industries are usually engaged in by half-breeds and Indians, the results are given in this report to show that these classes of the population have had fair results from the work done by them, and have not suffered for want of the necessaries of life when willing to work.

Prairie fires have again visited this district and burnt over a very large extent of country, destroying the pasturage and some haystacks; but, owing to the fact that a large quantity of hay was put up this fall, I am of the opinion that the settlers will be enabled to winter their stock under fairly favourable circumstances.

As this district, not more than ten years ago was wholly non-productive, owing to the ravages and losses during the rebellion of 1885, and is even now but sparsely populated, it is some satisfaction to be able to say of it that, although remote from a railway, and notwithstanding the drawbacks it has had, it is not now altogether an unproductive portion of the Territories, or an idle factor in the Dominion of Canada, and that its settlers during the past year have been able to realize the sum of over \$41,628 from its merchantable products, above-mentioned, and that the office of district bailiff has been almost a sinecure.

I have the honour to be, sir,

Your obedient servant,

E. BROKOVSKI,

Agent of Dominion Lands.

Department of the Interior.

No. 19.

REPORT OF THE LETHBRIDGE AGENT.

(MR. W. H. COTTINGHAM.)

LETHBRIDGE, 31st October, 1896,

The Commissioner of Dominion Lands,
Winnipeg.

SIR,—I have the honour to submit my annual report for the departmental year ending the 31st of October, 1896.

Last winter was on the whole mild and favourable for stock, but owing to an early frost the grass did not cure as well as usual, consequently the range cattle did not come through in as good condition as the preceding year, nor was the calf crop as large; notwithstanding this, the export of cattle has increased during the past year, and will continue to do so. There has already been shipped from Lethbridge alone 142 horses, and 4,570 horned cattle, and there are about 1,750 head of horned cattle being held for shipment when the necessary cars can be secured. I may say the want of transport facilities has been the cause of much trouble and considerable loss to the cattlemen this season. Cattle for shipment have to be rounded up over a wide stretch of country and when gathered must be held until loaded on the cars, and every day they are held adds to the expense of the shipper and detracts from the value of the animals, as range cattle will not thrive while being close herded. It is sincerely to be hoped that when the shipping season comes around again this very serious cause of complaint will have been removed through an adequate supply of stock cars being available. The cattle shipped from here this season were of a superior quality, and in prime condition, as buyers refused to accept any but the choicest animals. The number of young cattle imported from Ontario and Manitoba has increased materially during the past season.

Sheep raising is steadily on the increase, and at the present time over thirty-three thousand are ranged in the district. A number were shipped to England during the past season. Mr. Grant, manager of the Sarnia Rancho Company, went to England, taking with him 1,700, and the same gentleman disposed of 1,000 in Winnipeg. The Mormons have about 10,000 sheep in the southern part of the district, the remainder being ranged in the eastern part, in the vicinity of Medicine Hat.

Although there is a slight falling off in the number of homestead entries recorded during the past, as compared with the previous year, the progress made in the district in general is gratifying. This is essentially a stock-raising district, and when the fact is taken into consideration that a large portion is fit only for grazing purposes, the advance made in agricultural pursuits is very satisfactory.

A great deal has been done in the way of irrigation during the past season, and the advantages to be derived therefrom were fully demonstrated by the Macleod Agricultural Society's show, held at Macleod in September, where grain, roots and vegetables of all descriptions were exhibited, which for quality and size could not be surpassed. This as a result of the seven irrigation ditches mentioned in my last report as having been recorded is very encouraging. Since that report applications for forty-one irrigation ditches have been recorded in this office. These applications are from private individuals, which indicates the hold the subject of irrigation is taking on the settlers.

No new creameries have been established since my last report, but the three therein mentioned have been working during the past season. The one established at Etna has shipped 20,000 pounds of butter and 18,000 pounds of cheese, and has now on hand a considerable quantity of both these commodities ready for shipment.

Prairie fires have been of rare occurrence during the past season, and very little damage, if any, was caused thereby.

The trend of settlement has principally been westerly, along the foot hills of the Rocky mountains. In the Mormon settlement marked signs of improvement are everywhere observable, and this most industrious and enterprising colony is very hopeful and contented.

The construction of the Crow's Nest Pass Railway is anxiously looked for in this district, and will undoubtedly, when constructed, be a great boon to the country at large, and will especially benefit this portion of the North-west Territories.

I am, sir,

Your obedient servant,

W. H. COTTINGHAM,
Agent of Dominion Lands.

Department of the Interior.

No. 20.

REPORT OF THE AGENT AT RED DEER.

(MR. J. E. JESSUP.)

RED DEER, 31st December, 1896.

The Commissioner of Dominion Lands,
Winnipeg.

SIR,—I regret to have to state that the immigration into this district during the fourteen months ending to-day has been very small, much smaller even than that of the corresponding period embraced in my last annual report. Its general direction was towards the northern and north-eastern portions of the district. The crops this season were slightly below the average, but the quality of the grain is good. Better returns would probably have been realized had it not been for severe frosts which occurred in the early part of September. The hay crop was abundant, but considerable difficulty was experienced, owing to continued rains, in curing and stacking it. Prairie fires again did great damage to the district, particularly in its western and south-eastern portions, destroying much winter grazing, and, in some cases, entire crops of hay which had been reserved for winter use. Live stock, too, were in some places so injured as to necessitate their slaughter. However, I am glad to report that these losses, in the matter of hay at least, were in a great measure repaired before the season closed, and that the settlers generally have entered on the winter season with an ample supply of fodder to carry them through to next spring.

In regard to prairie fires I would offer a suggestion which, however, by some may be considered wild and chimerical. In the first place it appears to me that Arbor Day might safely be abolished, because no one plants trees in the North-west, and the day is practically nugatory in its results; and in lieu of it a fire day (no doubt a better appellation could be devised) might be set apart, in which the settlers in a district would be expected to turn out and act in concert in the execution of the following plan: Along the entire lines of each township, partially if not wholly settled, firebreaks of the usual normal width might be ploughed by the settlers inhabiting the township (the means to induce or compel them to do this being for a higher consideration than mine). This, in addition to the voluntary work of a similar character done along the boundary lines of each inhabited homestead, would, I am convinced, go far towards arresting the progress of prairie fires and, as districts become more settled, the area covered by this preventive work would increase proportionately, so that in time the risk in connection with these fires would be reduced to a minimum. Of course I do not mean that this should constitute the sole plan of campaign against this terrible and sleepless enemy of the settlers, but it might be one of the measures taken to effect the object in view.

The Icelandic colony, apart from natural increase, has received few additions to its members, and, I regret to have to add, it has again suffered from frost, which injured to a very serious extent the settlers' grain and potato crops. Prairie fires also swept over a large area of the settlement. Yet, despite their reverses, these hardy colonists maintain their ground, and, in their small farming way, assisted as it is by careful and temperate habits, they seem to experience no difficulty in making a comfortable living.

In conclusion, I have to report that very few immigrants were accommodated in the building provided for that purpose, and it was in consequence dispensed with at an earlier date than usual.

I have the honour to be, sir,

Your obedient servant,

J. G. JESSUP,

Agent of Dominion Lands.

No. 21.

REPORT OF THE ACTING AGENT AT WETASKIWIN.

(MR. H. S. SHERWOOD.)

WETASKIWIN, 1st January, 1897.

The Commissioner of Dominion Lands,
Winnipeg.

SIR,—I regret to have to report that, so far as this district is concerned, there has been no considerable influx of settlers during the year just past. The majority of homestead entries made at this agency have been procured by persons already residents in the district.

The season has been a most favourable one, as regards crops, which I am pleased to state has caused a much more contented feeling throughout the district than prevailed during the early part of the year.

The majority of the settlers have considerable herds of cattle, and are looking forward with hopes that the government will locate and operate a creamery.

There has been a number of cattle shipped from this district in the past year, and from information I have received I am of the opinion that the increase in this line will be very large this coming season.

I have the honour to be, sir,

Your obedient servant,

H. S. SHERWOOD,

Acting Agent of Dominion Lands.

Department of the Interior.

No. 22.

REPORT OF THE EDMONTON AGENT.

(MR. R. A. RUTTAN.)

EDMONTON, 31st October, 1896.

The Commissioner of Dominion Lands,
Winnipeg.

SIR,—I have the honour to submit my report for the year ending this date.

During this period 137 homestead entries have been granted, chiefly to new arrivals in the country, being 48 less than in 1895.

A number of persons have "squatted" in the Beaver hills, also in the neighbourhood of Victoria, as well as south of the Saskatchewan river, along Conjuring creek. The lands occupied are in some cases open for entry, but, for whatever reason, the squatters seem to prefer the present unauthorized occupation to legal possession which an entry confers. They will no doubt in time appreciate the advantage of being able to exercise full rights of ownership, and will then come forward and obtain entries in the regular way.

As it is likely that there will be a considerable demand for lands in this district in the near future, I would recommend that in addition to surveying and opening the Beaver hills to settlement the subdivision survey be also extended in a westerly direction to embrace the tract of country lying east of the western boundary of range 5, west of the 5th meridian and extending to the northern boundary of township 56.

I regret to report that owing to the lack of a profitable cash market for coarse grain a number of the poorer settlers have during the past year been obliged to leave the district and seek means of livelihood elsewhere. It is hoped, however, that as industrial conditions improve here many of them may return.

The cause which has chiefly operated to compel people to leave the country is lack of means to enable them to prosecute farming operations on a profitable basis. Not possessing sufficient herds of cattle to support them as ranchers, and failing remunerative prices for the coarse grains which they have been able to raise, as well as for the products of the home dairy and poultry yard, they have not realized the amount of cash essential to even a frugal subsistence. I have encountered no one who is dissatisfied with the natural conditions. They esteem the soil and climate eminently favourable to either the agricultural or pastoral industry; whilst the abundance of water, coal, timber and hay, generally available, make the operations of the farmer comparatively easy and congenial. He has no difficulty in establishing a comfortable home; it is a simple matter to provide himself with the requisite buildings, and with a sufficiency of fuel, hay and water; taxes are light, being levied only for school, and, occasionally, statute labour or fire district purposes. The most frugal mode of living requires, however, a moderate cash outlay for groceries, clothing and schooling. A settler possessing sufficient cattle or hogs to enable him to sell for meat purposes can provide for this necessary outlay. He may sell steers or hogs in number to yield revenue for his indispensable requirements. If, however, he possesses only two or three cows, and lacks the capital to purchase more cattle, his earning capacity is very limited. Hitherto the market for coarse grains has been almost restricted to the oats and wheat required for home manufacture and home consumption. It is true that a considerable quantity of oats was last year exported to the Kootenay country, but at a price, it is said, which realized to the farmer here (for feed oats) about 12 or 13 cents per bushel. This is reckoned to be about the cost of production and leaves very little profit to the farmer. Of his butter, the product of his home dairy, he has been unable to sell more than a

limited quantity, and that at an unremunerative price. The average price is about 10 cents per pound, usually in trade. Such price affords no profit and no encouragement to develop the home dairy industry. One creamery is in operation, but, owing to the sparse settlement from which its supplies are drawn, working expenses are necessarily high; and as the concern is a private one it cannot afford to give the farmer a remunerative price for his cream. If the creamery could pay, for example, at the rate of 16 or 17 cents per pound cash, I do not doubt that within a year this price would induce the farmers to increase their dairy herds, to improve their quality, and to patronize the creamery more largely. This price might, however, involve a small loss in early operations, which a private concern could not well submit to.

I am glad to observe that the government proposes to promote the dairy industry by granting assistance to creameries, cheese factories and cold storage warehouses.

Pending the development of the "factory" process, as applied to the dairy industry, it is obvious that the establishment of cold storage facilities would be of great and immediate benefit to this community. It would secure to the farmer a sale of all the butter his home dairy can produce, and at a fair price. At present this butter is held in the local store when brought in by the farmer, until enough is accumulated for shipment. While in the merchants' hands it may be subject to great alternations of temperature and very often to a variety of odours which do not improve its flavour. The supply of even this sort of butter, handled in this unsatisfactory manner, is irregular and uncertain. Were it possible to store the products of the home dairy in a properly constructed cold warehouse, these advantages to the farmer would attend the operation: 1. He could sell for cash: 2. The price would be improved: 3. The quantity would be unlimited.

On leaving the home dairy the butter is in good condition. If placed at once in a cold warehouse it could be kept in that condition. Transported in a refrigerator car to a second cold warehouse at the consuming point, the butter would reach the ultimate consumer in as good a condition as when it left the farmer. The supply being large and constant it could be shipped at the best advantage and sold at the best prices.

The advantage of cold storage, also, in handling poultry and eggs is too obvious to require explanation. At present we have no market for these things. Cold storage would give us a market and a profitable one. Cold storage established at Edmonton would at once put the small farmer, possessed of but a few head of dairy stock, in a moderately good earning position. His home dairy butter, turned out in the sort of packages which the market requires, would, if handled through a cold storage system, realize probably 14 cents or 15 cents cash the year round—perhaps a higher price if the buyer at the warehouse paid the farmers according to the quality and thus gradually brought the entire product to a satisfactory grade. He would in due time establish a good reputation and good prices for Edmonton dairy butter, possibly only a few cents below the quotation for the best creamery product. All this however would depend largely of course on the farmers themselves.

With a good market established for butter, poultry and eggs, and available to the farmers of this district—results which, we may feel confident, must attend the establishment of cold storage and transport facilities—the settlers now in the district would make rapid progress; their contentment, and the satisfactory state of the pastoral and dairy industries, would lead to an early accession to the agricultural population. The resulting consolidation of settlement would ensure the most favourable conditions for the successful operation of the creameries and cheese factories which we may look for as a consequence of the movement which the government proposes to initiate; and I am confident that in the sequence of events above outlined would be discovered a solution of the difficulties which have, up to the present time, seriously burdened the settlers of this district and retarded their prosperity.

It must be borne in mind that not only do we, by virtue of our situation, adjacent to the rich mining fields of British Columbia, enjoy an exceptionally advantageous market with regard to that part of our commodities for which a sale may be found so near at hand, but that the surplus product of the beef and dairy industries is not debarred from the common British market to which these classes of Canadian products are chiefly exported. The freight rates from Edmonton to Liverpool on these com-

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modities do not greatly exceed the rates on the same commodities when shipped from central Ontario. The excess freight paid by the Edmonton farmer still leaves the latter in an enviable position as regards the British export trade, for which his cheaper land, light taxation, &c., enable him to compete on advantageous terms with the farmers of either central Ontario or the middle western states of the Union.

The export of meat and dairy products will stand a very large development. I do not, therefore, apprehend that the great impetus to these industries which must necessarily follow a large influx of population in the Canadian North-west is likely to lead to a production in excess of the demand, or to a serious depreciation in values.

The area of land sown to crop this year is less than in 1895, but, as far as the results of the threshing are known, the grain, wheat especially, proves to be very superior to last year's crop. I am unable to give a reliable estimate as to quantities, but it is generally believed that the yield of the several kinds of grain will be about:—

Wheat.....	150,000 bushels.
Oats.....	200,000 do
Barley.....	50,000 do

Potatoes are an excellent crop, both as to quantity and quality. It is estimated that there are about 24,000 head of cattle in the district, 12,000 hogs, 3,000 sheep, and 16,000 horses. The cattle have done well and show a normal increase. The district is improving the quality of its hogs, and by the time the dairy business is well established will be in a position to produce a large quantity of pork for home consumption and shipment. The local pork-packing establishments have turned out about 600,000 pounds of cured meat.

The gold produced from placer mining operations on the Saskatchewan river is estimated at about \$50,000.

The coal mined here and consumed locally is estimated at between 4,000 and 5,000 tons. The price is 75 cents to \$1.25 at the mine, and \$1.65 to \$2 delivered.

On page 11 of the report of Captain Palliser (Journal) is the following statement, the truth of which it seems to be of importance to verify: "In the upper part of the Saskatchewan country coal of fair quality occurs abundantly, and may hereafter be found very useful. It is quite fit to be employed in the smelting of iron from the ores of that metal, which also occur in large quantities in the same strata." The iron ores thus referred to are supposed to crop out in exposed strata on the Saskatchewan river east of Rocky Mountain House.

Apart from the industrial situation, one of the most important subjects which the settlers of this district have to consider is the prevention and checking of prairie and forest fires. It does not appear to be possible to wholly prevent these fires; but I am confident that it is practicable to so control them that their recurrence will in future be free from the exceedingly disastrous results with which they are now attended. I am aware that during the last ten or twelve years you have given this subject a great deal of consideration, and that it has received a large measure of attention from other officers of the outside service, notably the superintendent of mines and the Crown timber agent at Winnipeg. In January last I submitted to the department an official report, suggesting that the general adoption of firebreaks upon existing road allowances would prove an effective check. The results which have so far followed the adoption of this plan, wherever applied, demonstrate its efficacy. It is already to some extent in operation in this Edmonton district, and is regarded by persons whose experience gives value to their opinions as providing at least a practicable, effective check upon an evil which it is impossible to wholly prevent. The extent to which fires in the past have overrun the district is indicated by the gradually disappearing spruce forest which is supposed to have at one time occupied the whole of the territory as far south as the Red Deer. Its presence to-day in the central parts of the district is confined chiefly to localities in which natural fire guards exist. Forty years ago the spruce areas lying between what is now the fifth meridian and Rocky Mountain House to the west were of great extent. The best merchantable timber of this class appears to have at that time existed south of the Saskatchewan river, between the boundaries above mentioned, and north of the river,

as far west as Jasper House. It was to be found at lac Ste. Anne, lac la Nonne, the Macleod river, &c., in very extensive areas.

Fire has since then overrun most of the country, and has spared but little of the valuable original forest of spruce, the greater part of the country being now covered with the usual second growth of poplar. This timber, while less valuable in a mercantile sense, is of equal value in its climatic effect, and almost as useful for all domestic purposes—notwithstanding a rather widespread impression to the contrary. It makes serviceable house logs, for example, especially if the bark is removed to prevent rotting. A building constructed of poplar logs peeled—if placed upon a stone foundation—is thought to possess a durability almost, if not quite, equal to spruce. It is, therefore, of importance that this timber shall be preserved as far as possible; and it can be shown that the development of a system of fire guards offers probably the most effective means of protecting it against fire.

This system can be developed very rapidly so soon as the settlers generally become alive to its importance. Prairie fires running unchecked over the country rapidly gain force and intensity. If, however, they are met at every mile by a barrier of ploughed land, or land that has been already denuded of its inflammable material, it will be a comparatively simple matter to hold them under control. In timbered, or partially timbered, localities, if it has gained too much force to be extinguished by the appliances at the settlers' command, its devastation can be at least confined to the square mile. This result can be accomplished by burning back from the fire guards (road allowances), and, as has been already pointed out in my former report on this special subject, any improvements to the efficiency of a road as such must necessarily be an improvement to its efficiency as a fire break.

The untaxable railway lands and school lands in this district make the burden of the work done in fire districts fall very heavily upon the resident settler, and it occurs to me that since all the work which he may do towards fire prevention, or road improvement, benefits all lands equally, the government and the railway companies may perhaps be disposed to render voluntarily the assistance which the municipalities are unable to demand as a right.

If as settlement extends north, east and west of this point its progress is followed by an application of this system of fire breaks to the road allowances, the effect will be not only to afford protection to the resident settlers and their property, but to protect also the valuable timber on the unoccupied public lands. In the past, as is very well known, most fires have originated on the occupied lands, extending thence into the timbered country where their recurrence speedily brings about an enormous destruction of valuable material. If these fires should be largely brought under control and checked at or near the points of inception, it will be admitted that public as well as individual property will be thereby protected and benefited.

The expenditure of public moneys which was found necessary in the construction of colonization roads in eastern and central Canada and in British Columbia is popularly supposed to be wholly unnecessary in the prairie regions of the west. As to the true prairie regions this supposition may be correct, but in such a district as that of Edmonton the theory does not hold good. In the timbered portions of this district colonization roads are required upon the same assumption of their necessity as a provincial work which prevails in Ontario, for example. Here, however, the timber being generally softer and of small dimensions, the labour and expense involved in opening such roads are much less than in Ontario. The expense is, however, beyond the ability of our sparsely settled communities to meet; and I have good reason to believe that, so soon as the industrial condition of the district improves, and the flow of traffic increases, the lack of such roads in certain localities will place the settlers under appreciable disadvantages.

It is doubted if the funds at the disposal of the North-west council, and intended for local improvements, can be applied in such manner as to do justice to the timbered localities, where road work is necessarily very much more expensive than in the prairie regions. The fund is probably appropriated upon a basis of area, or population, a method which obviously in either case must fail seriously in its results where applied

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indifferently to the several districts, in some of which road work costs four and five times as much as it does in others. Apart from the great advantage of providing direct roads to railway points, the construction of colonization roads through the timbered portions of this district would secure the valuable purpose of providing a base of operations against the progress of timber fires. For example, a road cut out along the base line between townships 52 and 53, and extending from Edmonton to the north end of Beaver lake, would do much to prevent the spread of fire and its encroachment upon the more heavily timbered lands of the Beaver hills. A second road, equally useful both for colonization and fire check purposes, might be cut out extending in a south-westerly direction from Edmonton to the south end of Beaver lake. A third along the base line between townships 56 and 57, extending from Manawan lake in range 25 to the Saskatchewan river in range 20, would, in addition to its value as a fire break, serve a present useful purpose in opening up the lands in township 57 in the intermediate ranges, which are at present difficult of access.

The location of these roads is suggested tentatively. Their final satisfactory location could be arrived at only upon careful survey.

I am, sir,

Your obedient servant,

R. A. RUTTAN,

Agent Dominion Lands.

No. 23.

REPORT OF THE AGENT AT KAMLOOPS, B.C.

(MR. E. A. NASH.)

KAMLOOPS, 4th November, 1896.

The Commissioner of Dominion Lands,
Winnipeg, Man.

SIR,—I have the honour to submit the following report for departmental year ended 31st ultimo:—

	Acres.
No. of homestead entries, 55.....	7,964·75
do do sales, 27.....	4,056·19
do general do 15.....	14,153·87
do town do 2.....	.....
<hr/>	
Applications for patent (recommended).....	39
Hay permits issued.....	13
Mining records.....	2
Letters received.....	1,224
do sent.....	1,273

A comparison with the report for last year will show that, with the one exception of town sales, the business of the agency has very considerably increased, and there are still a number of settlers in advance of survey prepared to make entry so soon as the township plans are confirmed.

The city of Kamloops is progressing in a very satisfactory manner, carpenters in particular having plenty of work. A large number of mining locations have recently been recorded about four miles in a south-westerly direction from this point, and the indications are that this may yet be an important mining centre.

There is no volume of direct immigration from the old country, but the district is filling up steadily, chiefly through the more easterly provinces and the north-western states.

South Kootenay is naturally attracting attention; it, however, lies outside the 40 mile belt.

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

E. A. NASH,
Agent of Dominion Lands.

Department of the Interior.

No. 24.

REPORT OF THE AGENT AT NEW WESTMINSTER, B.C.

(MR. JOHN MCKENZIE.)

NEW WESTMINSTER, B. C., 5th November, 1896.

H. H. SMITH, Esq.,
Commissioner Dominion Lands,
Winnipeg.

SIR,—I beg to submit a report on the subject of immigration. Many letters of inquiry in regard to the province have been received and answered. A small number arrived from time to time, and a few purchased desirable parcels of land from the older settlers. Others rented lands on easy terms, while they would be studying the character and resources of the country. Farmers and others arriving at any of the points where the agents of the department are located should be urgently cautioned to consult parties who can give reliable information before purchasing. Those who act on that suggestion generally succeed, and acknowledge the plan to be good in all districts. It takes a little time for strangers to study the different phases of a new country, and every settler who is contented becomes a tower of strength to others arriving.

Partly improved lands in good parts of the district can be purchased from private parties at very reasonable prices, while small areas in the foothills, suitable for fruit-growing, may be entered at this agency at \$1 per acre. The cost of clearing should be carefully considered by every person going into fruit-growing.

I have the honour to be, sir,

Your obedient servant,

JOHN MCKENZIE,
Agent Dominion Lands.

No. 25.

REPORT BY HON. T. M. DALY OF HIS VISIT TO GREAT BRITAIN.

OTTAWA, 10th August, 1896.

To the Honourable R. W. SCOTT,
Acting Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the report of my recent visit to Great Britain and Ireland in the interests of emigration to Canada.

I sailed from Montreal on the 16th of May by the steamship *Labrador*, of the Dominion Line, arriving in Liverpool on the evening of Monday, the 25th May, and proceeded next day to London. I called upon the High Commissioner, Sir Donald Smith, at his office, Victoria Street, on the morning of the 27th, and saw him several times afterwards, and discussed with him the objects of my mission. During my stay in London I also had several discussions with Mr. J. G. Colmer, C.M.G., whose long experience in office has given him a knowledge of matters affecting emigration which is exceptional. I also held conferences with Mr. Archer Baker, European Traffic Agent for the Canadian Pacific Railway, at the Company's offices in London, meeting at these conferences Mr. Haslett, the officer in charge of the Company's Immigration Bureau in Europe. Both Messrs. Baker and Haslett were fully conversant with the subject, and afforded me a great deal of useful and valuable information.

While in London I had the honour of attending, as a delegate from the Winnipeg Board of Trade, the meeting of the Congress of Chambers of Commerce of the Empire, and of moving the following resolution upon the subject of emigration :—

“That this Congress views with regret the movement of the surplus population of Great Britain to foreign lands, thus drawing from the strength of the Empire.

“That this Congress looks upon such a tendency as not only wasteful to the vitality of the Empire, but altogether unnecessary, seeing that the British colonies and dependencies offer fields for emigration as attractive, if not more attractive, than can be found in any foreign country.

“That within the bounds of the British Empire the emigrant can find any variety of climate and reach success in any pursuit, and yet retain all the privileges of a British subject.

“Therefore, this Congress deems it the duty of the Imperial and Colonial Governments, as well as of all patriotic citizens of the Empire, to use every means available to encourage emigration to the colonies.”

Owing to the resolution being placed near the end of the programme, I was not afforded as much time as I would have liked for the discussion of the important question involved, but I was gratified to find that the remarks I did make were received most cordially and enthusiastically by the delegates assembled. Composed, as this assemblage was, of representative business and professional men from all the principal centres of population in England, Scotland and Ireland, and the colonies, I am satisfied that the discussion which followed the introduction of the resolution, and the information imparted by myself and other delegates from Canada, who ably supported me in capital speeches, cannot but have a good and lasting effect. It is unnecessary to add that the resolution passed unanimously, and its adoption was hailed with acclaim by all the colonial delegates present. I made the most of my time in London, meeting and dis-

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cussing the question of emigration with a large number of gentlemen who were interested in it, not only from the standpoint of trying to solve the problem of relieving the motherland of its overcrowded population, and seeing to the transplanting of its good citizens in a British Colony, but also with a view to assisting to fill up and people Canada, and thus add to its wealth and material prosperity.

From London I proceeded to Liverpool, where I inspected the offices of Mr. John Dyke, the government agent, whom I regret to say I did not see, as he was absent from Liverpool on sick leave. Mr. Mitchell, Mr. Dyke's assistant, I found to be a very capable young man, fully conversant with the affairs of the office, and is recognized by steamship, booking and railway agents, and others interested in the work of emigration, as being well fitted in every way for the performance of the onerous duties which devolve upon him. Mr. Mitchell has been over sixteen years in Mr. Dyke's office, and consequently has, by his long experience and attention to duty, acquired a great deal of most useful and practical knowledge, which is invaluable to the government of Canada in the carrying on of the work done in the Liverpool agency. The Canadian Government office in Liverpool is next in importance to the High Commissioner's office in London. Liverpool, being the largest shipping port in Great Britain, is the point of departure for nearly all the emigrants to Canada and the United States. It is also a port of call for vessels from continental Europe on the way to America, and a centre that justifies not only the establishment and continuation of the present office by the Canadian Government, but suggests to me from my inquiries and observation while there, that if possible the premises at present occupied by Mr. Dyke and his staff should be enlarged, and another officer in the person of a travelling agent added to the staff. Of this new officer I will speak later on.

The district served by the Liverpool agency comprises the counties of Lancashire, Cheshire, Shropshire, Staffordshire, Derbyshire, Yorkshire, Westmoreland, Cumberland, Northumberland, and Durham, and the whole of the Principality of Wales, with a combined population of 13,000,000.

It is also from and through the Liverpool office, under the supervision of the High Commissioner, that business is carried on with France, Belgium, Holland, Germany, Switzerland, Austria, Denmark, Norway, Sweden, Finland, and parts of Russia. The correspondence carried on by this office is a very large one, and is conducted in the English, French, Dutch, Flemish, German, Norwegian, Swedish, Finnish, Bohemian, Hungarian and Polish languages. This recital alone will convey some idea to the uninitiated of the work which devolves upon Mr. Dyke and his assistants. I was informed by Mr. Mitchell that for the first four months of the present year 2,523 answers were written to inquiries made by intending emigrants in Great Britain, Ireland, and continental Europe. A great many people call at the office to make personal inquiry, and a large volume of literature is distributed in this way, besides that which is transmitted through the post.

The head offices of nearly all the shipping companies engaged in the emigration trade are situated in Liverpool, and I found that close communication was kept up between the government office and these agencies; a good feeling prevailed amongst all the officials concerned, and hearty co-operation and mutual confidence and respect existed, which cannot but prove of great benefit in carrying on the work in which they are all so much interested. Through the good offices of Mr. Mitchell I met and had conferences with the chief officers and heads of the various steamship companies doing business with Canada.

I had a particularly interesting and valuable discussion on the subject of emigration with Mr. John Ennis, the much respected and genial representative of Messrs. Allan Bros. & Co. Mr. Ennis had frequently been quoted to me as an authority upon all matters pertaining to emigration, and is recognized by his confreres to be the best posted man upon the subject in Great Britain and Ireland. I was not disappointed in all I had heard of him, and found him most courteous and obliging, and ready in every way to facilitate the object of my mission, and to impart all the information at his command. As he has been thirty-six years continuously in close touch with and principally concerned in the business of transporting settlers from all the European countries to

Canada, it is easy to understand that his knowledge and experience on the subject are of great value.

Mr. Ennis informed me that he had never known emigration to be so slack as during the past two years, and that there was little or no movement from Great Britain and Ireland as compared with former years. Particularly was this the case with the agricultural classes. He was of opinion, and I found the same impression prevalent amongst all those with whom I discussed the question, that the government of Canada would have to make a larger expenditure of money, and offer inducements, such, for instance, as are offered by the Queensland Government, before we could expect any movement to Canada in large numbers. He assured me, and gave me evidence of the fact, that the Allan Line were doing all they could in the way of advertising, and printing, and distributing literature, to encourage emigration to Canada. By way of example I may mention the "Allan Line Hand-book" for 1896; also their issue of printed sheets, containing extracts from the *Canadian Gazette* of October, 1895, giving in detail reports of Manitoba and North-west harvests in 1895; extracts from the *Toronto Mail* and other Canadian newspapers on the same subject; articles on fruit growing in Nova Scotia and British Columbia; an extract from Sir Charles Tupper's address on Canada, delivered at Newcastle on 21st November, 1895; letters of Mr. Claude Lisle, from Wataskiwin, Alberta, published originally in the *Canadian Gazette*; articles on gold mining in British Columbia, and extracts from the article of Mr. S. A. Thompson, in the *New England Magazine*—with other useful and pertinent information about Canada. These sheets, Mr. Ennis informed me, were distributed by Allan Bros. & Co. from their Liverpool office to no less than 150,000 farmers, market gardeners and others in England, the names and addresses of the people to whom these pamphlets were sent being obtained from Kelly's County Directories, purchased by the Allans expressly for this purpose. This is only one instance among many I might cite where Canada is being advertised, and kept constantly before the British public.

I saw the representatives of the Dominion and Beaver Lines, and these companies are likewise doing all they can to make Canada well known, and to secure a large emigration. The Dominion Line, being most energetic and progressive under its new proprietorship and management, is particularly aggressive in its work to secure passengers from intending settlers in Canada. I can truthfully say, therefore, that so far as my inquiries and observation went, all the steamship companies are doing their fair share of the work of keeping Canada prominently before those who intend to leave the old land. I may add that on the steamships upon which I crossed the Atlantic I found every comfort and convenience for steerage passengers, and every attention and consideration shown to these passengers by the surgeon and other officers of the ships.

Returning to the Liverpool Agency, I found that amongst the other work performed by Mr. Dyke's staff is that of looking after the correspondence of the Rev. J. Bridger, Organizing Secretary of the Emigration Committee of the Society for the Promotion of Christian Knowledge. Through this Mr. Dyke is brought constantly in communication with the whole of the clergy of the Church of England, and with intending emigrants all over England, in whom these clergy are particularly interested. This society, every spring and summer, sends a chaplain on one and sometimes two Canadian steamers each week. This fact being largely advertised, encourages many to come out to Canada who would otherwise be timid about undertaking the journey.

I found that in connection with this agency three sets of magic lantern slides were in constant use from October to April in each year. These slides were lent by Mr. Dyke to school teachers and to gentlemen who have visited Canada, amongst whom were a number of clergymen, whose lectures were largely attended and highly appreciated, the views attracting particular attention. The lantern slides in use in the other agencies, of which I will speak later, along with those used by Mr. Dyke, are of valuable service, and the lectures so illustrated are doing a great deal to enlighten people in England and Scotland as to Canada and its resources. Mr. Dyke prepared and supervised the printing of pamphlets in German, Flemish, Dutch, Norwegian, Danish, Swedish, Finnish, Bohemian, Hungarian and Polish, and has distributed these through the continental steamship agencies, and directly from his own office. He states that in

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the aggregate, since 1883, foreign publications to the number of 1,922,550 have been issued from his office. In sending out this literature, attending to callers at the office, visiting incoming and outgoing ships, inspecting emigrant children, receiving and forwarding advice of lists of continental bonus passengers, and the payment of the bonuses to continental agents, visiting English and foreign emigrant boarding houses, and in many other ways, Mr. Dyke and his staff are fully and constantly engaged. I may add that in addition to the work done by them relating to emigration, a great deal of time is devoted by Mr. Dyke and his assistant, Mr. Mitchell, to questions of trade affecting Canada. Constant inquiries are being made and answered about agricultural produce and other Canadian exports, and every information is afforded to those inquiring. Mr. Dyke has some files of Canadian newspapers which are eagerly read by visitors, and a lot of information is obtained by people from a perusal of them, but the number should be increased, so that all who are desirous of knowing fully about Canada, from the Atlantic to the Pacific, can obtain such knowledge by a perusal of the leading journals published in the different provinces.

SCOTLAND.

I went to Glasgow from Liverpool, and was met there by Mr. Thomas Grahame, who has been in charge of the agency at this point for over sixteen years. Glasgow, being the second largest city of the Kingdom, and a large shipping and commercial centre, it is essential that the Dominion of Canada should have an office there, not only in the interest of emigration, but of trade. I found Mr. Grahame was *en rapport* with the leading men in Glasgow, highly respected, and in every way from long residence and experience well able to fill the duties of his office. He is also thoroughly alive to the necessity of constantly keeping Canada before the people, and takes advantage of every opportunity which is afforded him at meetings of making reference to the attractions and resources of the Dominion. He also distributes literature in large quantities direct from his office, and through the steamship and booking agents, at the various agricultural shows, and to people calling at his office. Mr. Grahame's offices are well situated in St. Enoch's Square, in a new building fitted with an elevator and all modern improvements, so that he is easy of access to all inquirers. I found the Exchange in Glasgow to be the great *rendezvous* for all commercial, professional and business men. Mr. Grahame is a member of the Exchange, is there every day, and in this way keeps himself and Canada prominently to the fore, and comes in contact with all those interested in Canada. As a large number of Canadian cattle, horses and sheep, with other Canadian produce, is shipped to Glasgow, a great deal of Mr. Grahame's time is taken up with trade matters—as he is constantly being called upon for information as to Canadian products, and to discuss such matters with people who are interested in Canadian trade. He finds that the low prices for grain which have of late obtained in Canada have had a deterrent effect upon emigration for the last few seasons, especially with agriculturists who have a fair amount of means, and hesitate to embark in agriculture in Canada while these low prices prevail. Although the same conditions as to low prices for grain obtain in Scotland, yet people naturally are loth to leave their old homes, and have little inducement to do so when they find a similar state of things existing in Canada. I look upon the Glasgow Agency as a very important one both for emigration and trade purposes, and I think an allowance for travelling expenses should be made to this office, so that either Mr. Grahame or his assistant could constantly be on the move in the southern counties of Scotland.

While in Glasgow I took occasion to call upon and discuss emigration with booking agents and others, and get their views, and in company with Mr. Grahame I visited the offices of the Messrs. Allan Bros., who are more largely interested in Canadian trade than any of the steamship lines running to America from Glasgow. They gave me evidence, by their advertisements and otherwise, of their constant efforts to direct emigration to Canada, but like all others who are so interested they remark a large falling off in emigration from Scotland during the past few years.

From Glasgow I went to Crieff, in the county of Perthshire, then to the city of Perth. At both these places I met a large number of people of all classes, and discussed Canada and its resources, meeting many who had friends and relatives in Ontario and other provinces. I found evidences here of the work being done by Messrs. Stuart and Fleming; but while people were willing to admit that Canada presented great advantages to those who might choose to make it their home, they hesitated to leave the old land while the prices of agricultural produce, particularly grain, were so low. Here, as elsewhere in Scotland, I found people ready to acknowledge that farming was not paying them, yet while things could not be much worse with them they had the old home and its associations, and did not feel inclined to leave these and friends if they saw no better prospects beyond the seas. Still we might hold out inducements to these people and secure them for Canada, as I will explain further on.

I heard the same story all over Scotland, viz.: that farm labourers were deserting the farms for the cities, the effect being to increase the wages of those who remained on the farms, and to fill the already overcrowded cities with idle men. From this class we should and can draw many good settlers for Canada, but they cannot come without assistance. In the northern and middle counties of Scotland the small farmers are the men we want. They can only make a bare living where they are, yet they have not the means with which to make a start in a new country. If they could be afforded assistance by the Canadian Government paying their passages to Manitoba and the North-west, on their contributing something towards the expense from the proceeds of the sale of their chattels, they would have a small capital to begin on, and with their national push and thrift would soon be in fair circumstances. The Scotchman is proverbially successful wherever he goes, in all walks of life, and given a fair chance in Canada, like many others of their countrymen who have made Canada their home, the class of small farmers now eking out a living in Scotland, and the farm labourer—both those now on the farms and those who have gone into the cities—with the assistance I have mentioned, would soon establish themselves in comfortable homes.

The next place I visited was Dundee. I found Mr. Peter Fleming's office in charge of his daughter, a very bright and estimable young lady, who revealed to me a splendid knowledge of things Canadian, and exhibited a perfect conversance with all the work of the office and methods being adopted by her father in the good work he is doing. I had seen Mr. Fleming at Liverpool the week previous, on the occasion of his sailing for Canada by the Beaver Line, and discussed the question of emigration fully with him, and got his views. Mr. Fleming, having for many years been in the employ of the Queensland and other Australian governments, and for the past three years of the Canadian Government, has had large experience in emigration. He informed me that "the object he invariably kept before him was to direct in the best way he could think of the attention of the agricultural population in his district to the facilities which Canada offered to those whose enterprise and ambition led them to aspire to become owners of their own homes, instead of, as in Scotland, continuing to be mere wage earners, subject to the fluctuations and uncertainties which attend such conditions."

He has adopted the method of sending circulars to farmers, farm servants and female domestic servants. In these circulars he describes the general features of Canada, the demand for farm and female servants, the current rate of wages, conditions upon which land can be obtained, etc., etc. He has mailed these and similar circulars to every farm and female servant on every farm in his district. Accompanying this circular was a small bill naming the places in the immediate neighbourhood where he would hold meetings, to which they and their friends were invited. As Mr. Fleming in his reports has already informed the department, these meetings on the whole were well attended. In this way I found Mr. Fleming, in each year, had visited every important agricultural district in the counties assigned to him. He also had his circulars printed on adhesive paper, and mailed to the county blacksmiths, wrights and meal millers, along with a letter asking them to kindly post up these bills in their premises, and accompanying them were bills giving the places he was to visit and hold meetings in, and dates of such meetings. These adhesive bills were invariably posted up by the people

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who received them, and thus the dates and places of his meetings were prominently brought before the agricultural classes.

Miss Fleming showed me the valuation rolls of the leading agricultural counties in Mr. Fleming's district, from which she took the names of the small farmers, crofters and farm servants. The work of folding, addressing and sending out these circulars and emigration literature takes up nearly all Miss Fleming's time, and her work is neatly and methodically done.

At his meetings Mr. Fleming distributes the official hand-book and other publications issued from the department. Although the offices of Mr. Fleming are centrally situated, they are upstairs. I would highly recommend his being allowed to rent suitable premises on the ground floor in the same locality, which I understand can easily be done.

Mr. Fleming informed me that he found a feeling of unrest among the crofters and small farmers, caused by the high rents they had to pay for their holdings, and the unsatisfactory prices realized for their crops. Coming in close contact with these people in the course of his travels, he has been able to induce a number of families to come out to Canada. These families he hopes to visit during his sojourn in Canada, and he will, no doubt, be able to take home to their friends in Scotland good reports as to their success and future prospects, and thus induce others to follow the example of those who have so wisely taken up their abode in Canada. I inclose specimen copies of the different circulars and handbills sent out by Mr. Fleming from time to time.

Mr. Fleming is most energetic and enthusiastic in his work, and seems to me to fill most admirably the position he holds. If hard, constant and persistent advocacy of the advantages Canada offers to the intending settler can do anything the results shown by Mr. Fleming's efforts cannot fail to be seen in the near future; but the department is well aware what has already been accomplished by that gentleman.

I cannot forget the kindness and attention shown to me while in Dundee by the Messrs. Thomson, who are the proprietors and managers of the *Dundee Courier*. It will be remembered that the Messrs. Thomson exhibited most commendable enterprise, and at the same time great interest in Canada, in 1893. In that year they sent out to the World's Fair, at Chicago, delegates representing the different trades and also agriculture, in order that these delegates (who were chosen by the votes of their co-labourers in the respective spheres represented by them) might read, mark, learn, and inwardly digest, not only all that they saw and heard at the Chicago exhibition, but also in their travels through Canada. The letters which subsequently appeared in the *Courier* as the result of the visit of Mr. Osler and the other *Courier* delegates, who travelled through Canada from ocean to ocean, were models of explicitness, and detailed the resources and physical features of Canada and conditions of Canadian life in a manner highly creditable to the writers, and of infinite benefit to Canada.

As the Messrs. Thomson are also members of the well-known shipping firm of William Thomson & Son, whose splendid fleet of steamships are amongst the best and most regular sailing to Montreal during each year's season of navigation, it can readily be understood that they take more than an ordinary interest in Canada and the development of its resources. The *Dundee Courier* has the largest circulation of any weekly paper in Scotland, and in consequence is a most valuable advertising medium. As Canada and its advancement are kept constantly before the Messrs. Thomson, our country gets many a free advertisement in the columns of their valuable paper, and will always have in them staunch friends and fair advocates.

After spending some days in Dundee and meeting a number of leading people there, and getting such information as I could from conversation and observation, I proceeded to Inverness, stopping off for a few hours at Dunkeld. Here I met a good friend of Canada in the person of the genial station agent of the Highland Railway. The name of Canada is well known to the good people of this particular neighbourhood, since a few miles beyond Dunkeld was born one of Canada's foremost statesmen, the late Hon. Alexander Mackenzie, whose name is enshrined in the memory of those who were his acquaintances in his youth. I found the same kind mention made of him and the same respect shown to his memory amongst his old friends in Scotland as one finds

in Canada to-day, irrespective of politics. The good people of Inverness are deservedly proud of having extended to Mr. Mackenzie the freedom of their borough as an appreciation of the high and honourable position he had attained in Canada.

I was kindly given the opportunity, in Inverness, of attending the closing exercises of some of the schools, and enjoyed the privilege very much, being particularly struck with the ruddy cheeks and bright eyes of the children, and the precision with which they carried out their programme. At the High School closing, the Rev. Gavin Lang, an old resident of Montreal, and a warm friend of Canada, presided. I was called upon to address the young men and women comprising the classes in the school, and took occasion to say a good word for Canada. By way of illustrating what they might rise to, should they at any time cast in their lot with us, I pointed to the positions attained by Sir John Macdonald, Alexander Mackenzie, Sir David Macpherson and Sir Oliver Mowat—all to the Scotch manner born—men whose lives and careers all point to the advantages they enjoyed in being cast in the same mould as so many eminent men throughout the world who claimed the heather-clad hills of Scotland as their birthplace.

I renewed my acquaintance with Mr. W. G. Stuart (ex-Baillie and agent for the Canadian Government at Inverness for the past few years) at Liverpool, Mr. Stuart having arrived there en route for Canada by the "Vancouver" of the Dominion line. I had the advantage of a talk with him about the work he had been doing, the results of his labours and his suggestions for future action. Mr. Stuart being an English and Gaelic scholar, and being an old and well known resident in Inverness and the north of Scotland, and having travelled extensively through Canada, and again renewed his travels this year from Cape Breton to British Columbia, is particularly well fitted for the position he holds, and the government have been fortunate in securing his services. I found every one speak well of Mr. Stuart and of his zeal and particular adaptability for the work he is engaged upon, although many I spoke to about him had no idea who I was or why I inquired. The methods adopted by Mr. Stuart, and by which he has succeeded in making Canada known to the people of the Highlands are:—

1. Lectures in English and Gaelic, illustrated by lantern views.
2. Distribution of hand-books and pamphlets; personal visitation and correspondence.
3. Attendance at markets, fairs, stock sales, cattle and flower shows, &c.
4. Keeping Canada constantly before the public in the press, by means of articles and letters.
5. Utilizing the presence of Canadian tourists and visitors to advertise the country by means of newspaper paragraphs and interviews, and, when practicable, inducing them to relate publicly their experience and success.
6. Keeping in touch with settlers from the north of Scotland who are successful in Canada, and making their success known to their friends and acquaintances.

During the past year Mr. Stuart has been paying special attention to the emigration of experienced domestic servants, and has been fairly successful. He has put a large number of girls in communication, this spring, with families in Montreal, Ottawa, Toronto, and other places in Canada. Some of these young women were to join Mr. Stuart on the "Vancouver," and accept his escort to Canada by that ship on the 18th June.

The fact that, as stated to me by Mr. Stuart, and corroborated by information furnished to me by others, a number of prominent public men have come out to Canada of late years from the north of Scotland with a view to seeing the country for themselves and examining its resources, establishes that a practical interest is being taken by these men in Canada, and the reports of their visits are bound to do great good. The fact is, I found more men who were posted on Canadian affairs in the north of Scotland than in any other part of Great Britain and Ireland that I visited. The ignorance exhibited by men of position and intelligence whom I came in contact with about Canada, its position, resources, capabilities and future, was really lamentable. The only way to overcome this ignorance is to stimulate interest and inquiries in and about our Dominion, and educate the younger people in the British Isles upon lines that will give them a fuller and better knowledge of Canada than at present is enjoyed by

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their parents. The lectures, illustrated by lantern views, which of late years have been so extensively delivered by our agents throughout the old land, are effective in removing prejudices and enlightening the minds of old and young.

Canada has a good and constant friend in Mr. Kenneth McDonald, the estimable and popular town clerk of Inverness, who visited this country in 1882, going as far west as Portage la Prairie. Mr. McDonald has not forgotten his visit, and is never weary of putting in a good word for the Dominion, whose beauties of scenery charmed him so much, and whose good citizens were so kind to him. The wonderful progress Canada had made and was making, and her great natural resources and future possibilities, awakened a keen interest in his breast which the years that have elapsed since 1882 have not diminished. His great desire is to visit us again, which he proposes to do in the near future. A name which is well known to Highlanders in Canada is that of Alexander Mackenzie, the proprietor and editor of the *Highlander*, and the author of those most valuable and interesting histories of the Clans of Scotland. Mr. Mackenzie has the liveliest and most pleasant recollections of his visit to Canada some years ago, when he personally saw all the Highland settlements in the older provinces, from Cape Breton to Kincardine on the shores of Lake Huron. The letters which Mr. Mackenzie sent home to the leading papers of Scotland, highly descriptive of his journey through Canada, awakened a great interest amongst his countrymen in our fair Dominion. By their wide circulation these letters, and Mr. Mackenzie's interviews on his return to his Highland home, were the means of making many a now prosperous settler in Canada resolve to emigrate thither. Mr. Mackenzie is hale and hearty, and, with his good wife, who is as keenly interested in literary pursuits as her husband, is doing a great deal to enlighten and entertain his countrymen by the preparation and publication of the many volumes they are from time to time respectively contributing to the already splendid literature of Scotland. Like Mr. McDonald, he is eagerness itself to see Canada again, and to note the great progress and changes that have been brought about since their former visit.

When in Inverness I met and renewed my acquaintance with Mr. Alexander Fraser, of Balloch Farm, who was one of the agricultural delegates from Scotland to Canada in 1893. Like his brother delegates in other parts of Great Britain and Ireland, Mr. Fraser has not forgotten his visit, but keeps up his interest in our country, and is willing at all times to afford information to those who seek it, and to encourage in every way those of a desirable class who are anxious to select Canada as their future home. Mr. Fraser's farm is one of the largest on the Culloden estates, and if the condition of his crops, as I saw them, speaks for anything, he seems to be a good and a successful farmer. Like many others who are interested in the question of emigration to Canada, he is of opinion that the best class of people we can encourage to come out to Manitoba and the North-west are the small tenant farmers. Their intelligence, thrift and industry will ensure them success anywhere. While so many agree on this subject, and I concur in this opinion, the idea universally expressed, and which my own observation and inquiry confirmed, was that these people will have to be assisted in order that they may have a fair start in their new homes.

Through the kindness of Mr. McDonald I was driven through the country in the neighborhood of Inverness, and was thus given an opportunity of seeing the farms and homes of those who make their livelihood by farming.

I returned to the south of Scotland by way of the Caledonia canal to Oban, and then by train to Edinburgh. In observing the small houses and farms of the crofters in the course of this journey, one cannot but contrast the present miserable condition of these people with what their circumstances might be could they be induced and assisted to come out to our prairie lands. The young men and women of their families would be capital in themselves, and in a few years they would realize what independence is, and appreciate its attendant comforts. The route from Inverness to Oban, and Oban to Edinburgh, gives one a splendid opportunity of observing and contrasting the condition of the farmer in the north of Scotland and the farmer in Canada. It strengthens one's belief in the necessity of offering further and greater inducements than we are now doing for emigration, so as to transplant these industrious and frugal people to Canadian

soil and prosperity. From Edinburgh I returned to Glasgow, and again conferred with Mr. Grahame.

I went over to Ireland from Glasgow by way of Androssan, landing at Belfast. I took advantage of my stay in Belfast to talk emigration with the steamship agents there, and with others. Messrs. Thomson Bros., the leading steamship agents in Belfast, exhibited much interest, and spoke with enthusiasm as to the good work that could be done in Ireland by offering inducements to emigrants to Canada. From Belfast I journeyed by rail into the counties of Monaghan and Cavan, spending some days there going from place to place. I came in contact with clergymen, farmers, merchants and others, and elicited all the information I could on the subject of emigration. I did not find much disposition to encourage emigration from these parts. While it was readily admitted that the average farmer was making a bare living on his holding, that the rents were high and dissatisfaction general, yet too many had already left Ireland for America and Canada, and the people I met wanted those who were still in the country to stay. It is hard to impress these people with the great benefits which are sure to accrue to those leaving for Canada and making their home there, and the good which would result to those left behind by giving them a chance to increase their holdings and enlarge their farming operations. This becomes more apparent when one sees people trying to make a living by farming five, ten and fifteen acres. They cling even more tenaciously to their small holdings in Ireland than they do in Scotland.

Upon my return to Belfast I proceeded to Dublin, and occupied most of my time there in talking to steamship agents and others whom I found were conversant with the subject.

The general impression I formed as to Ireland being a field for emigration is that it presents a splendid opportunity for good work to be done. With an agent at Belfast and another at Dublin, I am satisfied success will follow the efforts of those who should be appointed to such positions,

On my return to London I again reported at the High Commissioner's office, renewed the discussion of the subject of emigration with Mr. Colmer, and exchanged views with him based on the observations I had made.

I went to Liverpool purposely to see the agent at Birmingham, Mr. E. J. Wood, on his leaving by the "Parisian" for Quebec. Mr. Wood is capable and most energetic, and is doing the best he can to send a desirable class to Canada. Birmingham, being a large centre, is well adapted for his headquarters. In imparting his views to me, Mr. Wood informed me that his efforts towards inducing people to go to Canada from the Midland Counties of England have been on the following lines, viz. :

1. Illustrated lectures dealing with Canada. He has delivered these lectures before public schools, grammar schools, elementary schools, chambers of agriculture, institutes, literary societies, and at library courses of lectures, county council series of lectures, steamship courses of lectures, etc., etc. Since his appointment in January, 1893, Mr. Wood says he has delivered 215 lectures, the approximate attendance of which was 69,000 persons. The total expense of these lectures was £270 8s. 3d., being an average of £1 5s. 2d. per lecture. Mr. Wood is convinced, from his experience, that the lectures delivered in the schools have had a most beneficial effect. They educate the young in the geography and history of Canada, and with the use of the lantern slides impress ideas on the young mind not easily eradicated.

2. Visits to fairs, agricultural shows, stock sales, etc.

3. Correspondence, interviews, distribution of literature.

Owing to Mr. Wood's long residence in Manitoba, and his personal experience there as a farmer, he is particularly well equipped and fitted for his work. The fact of Mr. Wood having gone out to Manitoba with his brother and engaged in farming, and being conversant with all that is incident to pioneering in a new country, gives him the advantage of speaking from personal experience in appealing to those who are anxious to go abroad and commence life in a new country. It is gratifying to know that Mr. Wood's efforts have been crowned with success, and that many families are now living in Manitoba and the Territories who emigrated thither through his exertions.

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I have thought it well to enumerate at some length what is being done in each agency, and have left to the last the most important office of all, since it is the headquarters of all that means good for Canada in the British Isles, namely, the office of the High Commissioner. In his official capacity the High Commissioner is the head or chief officer of the Immigration Department of the Canadian Government in Europe, and all the work of the agencies is under his control and supervision. It goes without saying, as shown in his yearly reports, and evidenced by his active work and public utterances, that the late High Commissioner, Sir Charles Tupper, exerted every effort on behalf of Canada, and was unceasing in his endeavours to promote immigration to this country. I can only say that Canada will find in Sir Donald Smith an officer equally anxious and untiring in his efforts to carry on this work.

The conclusions which I draw from the inquiries and observations made by me during my trip, based upon my interviews with Government agents, officers of railway companies, officers of steamship companies, and steamship and railway agents, clergymen, public men and others, are:—

1. That Canada offers the very best field for immigration. Its close proximity to England, the short sea voyage, the climate, the soil, the resources, and last but not least, the free lands of Manitoba and the North-west Territories, and the cheap agricultural land in British Columbia and other provinces, all stand out and present peculiar attractions to intending emigrants.

2. That the efforts now being put forth by the Canadian Government to secure to Canada its fair share of those who are leaving the British Isles and Continental Europe for other lands, are well directed and good as far as they go, and that every use is being made of the means placed at the disposal of the department.

3. That the Canadian Government officials with whom I came in contact, and whose offices I visited, all appeared to be very capable men, well fitted for the work they are engaged in. They are one and all most enthusiastic in their work, loyal to Canada, and ever zealous to promote her best interests.

4. That the efforts of the High Commissioner and different agents to stimulate inquiry about Canada and promote emigration thereto, while being all that can be done as matters are at present, are very much weakened, and do not produce the results which one would like to see because there is not sufficient money available to apply to the best advantage and up to their full capability the methods now in use, but on the contrary the work is hindered, and is not of the same force and effect as it would be if adequate means were available.

What then can be done, and what suggestions have I to make based upon my experience in office and my recent visit across the Atlantic, towards invigorating, increasing, and encouraging the efforts of the Department of the Interior and its officers in Great Britain in securing a greater movement of emigration to Canada? In the first place we have to remember that emigration, generally, from Great Britain and Ireland has decreased very materially during the past few years, and the following statement in this relation, taken by me from one of the leading newspapers of England, will give an idea of how the matter stands:—

“The emigration returns for the six months ended June 30th (says the London correspondent of the *Manchester Courier*) show a falling off of nearly six thousand in the number of persons who have left our shores as compared with the corresponding six months of 1895. The total number of emigrants was 114,110, of whom 76,258 were of British origin and 36,514 of foreign origin. During the six months of 1895 the number was 120,235, of whom 85,488 were British and 33,469 foreign. The decrease is therefore to be found in British emigrants, and is especially noticeable among Irish, who numbered 31,622 last year as against 25,304. Scotch emigration is almost stationary, the figures being 6,495 and 6,868 in 1896 and 1895 respectively. English emigrants are returned at 44,459 in 1896 and 46,998 during the six months of the preceeding year. This diminution is regarded as another evidence of our increasing commercial and industrial prosperity, as well as a sign of the improved conditions of life in Ireland.”

So far as my inquiries went, they established that of those who are leaving the old land, Canada is getting more than her share as compared with the other British colonies,

i.e. of the agricultural classes, the very people we are desirous of securing. But the consensus of opinion amongst those who are conversant with the subject is that by special efforts and further encouragements Canada can do much better than she is doing. The résumé I have given of the efforts of the different agencies indicates the present methods adopted; these I would continue as far as they go; but there is much more to be done, and I submit the following suggestions and recommendations:—

(a.) There should be more extensive and continuous newspaper advertising. At present efforts in this direction are restricted owing to the cost of this work. The press is a great agency through which to draw the attention of people to Canada and awaken an interest in the country. From judicious advertising on a much larger scale than is done at present I am satisfied good results would flow; not only would Canada be kept well before the people of England, Ireland and Scotland, but by judiciously patronizing the metropolitan, provincial and agricultural papers, we would secure friends to Canada in the proprietors and editors of these newspapers. In using the press as a medium of advertising it has occurred to me that if it could be arranged to secure a delegation of representatives of the leading newspapers in Great Britain and Ireland to visit Canada and make an extensive tour throughout its whole length and breadth, and to have these delegates correspond with the papers they respectively represent, giving their unbiased views of what they see and the impressions our country and its magnificent resources make upon them, such correspondence would be of incalculable benefit to Canada. Such a scheme could easily be carried out in its details by mutual arrangements between the Canadian Pacific Railway, the Grand Trunk Railway, the Steamship Companies, and the Department of the Interior; and in my opinion no better means could be adopted for bringing Canada prominently before the mother country and creating a renewed interest in her welfare. When the British public are daily consuming our Nova Scotia fish and apples, Prince Edward Island and New Brunswick butter, cheese and beef, and the same products from Quebec and Ontario, flour ground out of our Manitoba and Assiniboia wheat, and beef from Saskatchewan and Alberta; and when the capital of Englishmen is now seeking investment in the gold, silver, copper and lead mines of British Columbia, I am satisfied a description of the great provinces which produce all that I have enumerated, written in the graphic and trenchant style known to the correspondents of the British press, cannot fail to excite a deep interest in Canada, and assist materially in bringing to our shores many good settlers, and at the same time secure the investment of large sums of money in our different enterprises. The press of the old country is an all powerful agent, and we should not fail to cultivate its friendly interest in Canada.

(b.) More advertising should be done by posters and metallic signs. I am glad to say I found in nearly every post office I visited a poster about Canada exhibited in a conspicuous place. This concession is also allowed the other British colonies through the courtesy of the Postmaster General. Canada and Queensland alone seem to avail themselves of the privilege. While this is very helpful so far as it goes, yet much more can be done in this direction. As all visitors have no doubt noticed, advertising is carried to a great length in Great Britain and Ireland—indeed one might say it is almost reduced to a science. Canada should not fail to take advantage of this opportunity of making herself known, and, what is of greater importance, keeping herself continuously before the eyes of the people in the motherland. One suggestion I must offer in this relation, and that is, that all advertisements should be headed with the word “Canada” *in large letters*. Too much prominence, in my opinion, cannot be given to the continuous display of the name of our country, the name we all love so well, “Canada”—not with the prefix “Dominion,” which is all very well for official use—but let the one word “Canada” be our talisman. I do not suggest that the names of the different provinces should not appear in all advertisements, and that prominently, but nothing creates more confusion in the mind of a stranger to our country, whose geography has been neglected, than to read the names of several provinces strung out together. “Canada” is sufficient for all purposes; the average inquirer and reader knows where Canada is, and when people come out here they will soon learn the position and condition of the different provinces.

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(c.) All of our Government officers should be supplied with full and complete files of the leading Canadian newspapers. Inquirers about and friends of Canada, by having access to the files of these papers, will be able to get the latest market, mining, and crop reports, and all information of a local and general character pertaining to the different provinces. Now that Canadian produce is being so extensively exported to Great Britain and Ireland, the inquiries at the different agencies are very much on the increase. In this relation I may say that the *Canadian Gazette* is doing a good work, and is highly useful in promoting Canadian interests and giving the latest Canadian news to its readers. The *Gazette* fills a unique place in journalism; being well conducted and containing excellent matter, its mission cannot be too highly commended. As copies of the *Gazette* are sent weekly by the High Commissioner to the leading public libraries, workmen's and other clubs and institutions, chambers of commerce, etc., the latest and most reliable news relating to Canadian affairs is thus kept prominently before the reading public.

(d.) Sir Charles Tupper inaugurated a work a few seasons ago that cannot be too highly commended, and that is the opening up and continuance of corresponding with schoolmasters throughout the country. These schools have been supplied with maps, the Official Hand-book, and other pamphlets. This work in my opinion could be very much extended. A map of Canada on a large scale should be placed in every school-house in Great Britain and Ireland. If possible, correspondence should be opened with, and efforts made, to induce the educational authorities there to use our Hand-book or some other similar and reliable book of information on Canada. I have great hope in, and look for good results from this work amongst the school teachers and the school children. If the British parents of to-day had been taught Canadian history and geography in their day, the necessity would not obtain for the Government of Canada making the effort it is now doing, and the increased efforts I suggest, towards educating the British public about matters Canadian. But we should be taught a lesson by the marked ignorance of old country people about Canada, and take the earliest and best opportunities which are afforded of remedying this sort of thing, and I know of no way in which we can secure better and more lasting results than by trying to educate the children in the old land in Canadian history and geography.

(e.) I have spoken of the lectures that have been delivered by our agents and others, illustrated by lantern views. These lectures have been well attended, so I am informed, wherever delivered. The lantern views excite curiosity and inquiry, and create an enthusiasm otherwise unobtainable. A photograph does not lie, it gives the best and truest illustration that can be afforded of the physical features, conditions and life of our colony. There is a demand for more slides than can be furnished; the supply of these views should be increased, new photos of new scenes, exemplifying varied phases of the country, should be supplied from time to time, and photographs of old views renewed. As the admission to these lectures is free, and, generally, the halls granted rent free, the cost is not great, and very small compared with the value received.

(f.) In times past Canada has always been represented at the leading agricultural shows in England, Ireland and Scotland, but this year nothing has been done in this line owing to the scarcity of funds. It is generally conceded that there is no better way of reaching the farming classes, and attracting their attention, than by having a large and varied display of Canada's products at the agricultural shows. Wherever made these exhibitions have been most creditable to Canada, and have created very great interest. In this connection the office of the High Commissioner should be supplied with fresh samples of grain and other products. Each and every government office should have additions made to their present exhibits, and the same should be renewed and freshened up from time to time. It would be well to supply steamship agents and leading booking offices with these samples. Immediate steps should be taken to gather together and ship to the High Commissioner at the proper time an exhibit for the leading agricultural shows to be held in 1897. If a series of photographs of Canadian scenery, depicting home life in Canada, similar to those so widely distributed by the Canadian Pacific Railway were sent over and put up in leading hotels, stations, booking offices, and other public places, I am sure they would prove a good medium of

advertising. Everything of this nature, like all literature, should bear the government stamp. The fact of the pamphlets, leaflets, photographs and other publications printed in advertising Canada being issued under the authority of, and proclaimed by the Government of Canada goes a very long way towards convincing the sceptical as to the genuineness and truthfulness of the publications. People in the old land have naturally a great reverence and respect for authority. They appreciate the value of good government and free institutions, and anything which emanates from Canada in the way of advertising its resources that bears the "Hall mark" of government authority, is sure to command attention and carry weight.

(g.) The attention of the governments of the different provinces should be called to the necessity of at once augmenting the exhibits now on exhibition in the Imperial Institute. The collection of Canada's products in this institute is far from perfect; it is lamentably defective, and stands out as such when one sees the exhibits made by the Australasian and other colonies of the Empire. I would suggest that the attention of the premiers of the different provinces be called to this very important matter. Mr. Watson, the curator, I believe, visited the various local governments in Canada last year with a view to stimulating them to greater effort. I do not wish to express myself too strongly, but need only say that I think some of the local governments have been most neglectful in this matter. Thousands of people visit the Institute every week, and it is a constant source of profit and delight to people coming to London from the rural districts of England, Scotland and Ireland. No better object lesson of Canada's greatness can be afforded to the inquiring public than the products of her different provinces splendidly exhibited in this great institution.

Literature.

(h.) It would seem to be in the interests of economy that more of the literature issued by the department should be printed in England. I am assured that the work can be done more cheaply and expeditiously there than here. This was apparent from the inquiries I made on the subject, and I hope any suggestion which may be made in this direction by the High Commissioner from time to time will be readily acquiesced in. With the excellent county directories which are issued in England, and the large staffs which are kept by establishments for the handling, addressing and mailing of such material, I am sure too much cannot be said in favour of following out the wishes of the High Commissioner in this regard.

Exhibition Cars.

(i.) The Canadian Pacific Railway Company, a few years ago built an exhibition car. This car is about fourteen feet long by five feet wide, and eight feet high, and is fitted with glass sides. The car contains samples of grain, grasses, minerals, fruits, pictures, &c. These were all displayed with plenty of lettering, showing at a glance the nature and object of the exhibit. The cost of the car was £300; this included horses, harness, &c. I understand this car can be duplicated at much less cost, and improvements made in it which experience has suggested. If the bill now before the British Parliament permitting the use of motor carriages should become law, it will make a great saving in the cost of construction and running of these cars, as they can then be propelled by motor, thus doing away with the expense entailed in purchasing and feeding horses, &c. More ground can be covered in less time if motor power is used. In the seasons of 1891, 1892, 1893 and 1894, a large section of the country was gone over by this car—so Mr. Haslett (who was in charge) has informed me. All the towns and villages in the counties through which it passed, were visited and particular pains were taken to reach all places lying off the regular line of travel, and where the railways did not run. The leading agricultural shows were attended, and a great deal of good and lasting advertising of Canada was done by this means. In the years mentioned, Mr. Haslett says, they visited 1,511 different places. At these places thousands of books and

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pamphlets were distributed, and the approximate number of people who visited the car in these years was fully two millions. I am certainly of opinion that it would be money well invested if the department were to purchase, as a beginning, say three cars similar to the one used by the Canadian Pacific Railway. One of these cars and the Canadian Pacific Railway car could be made use of in England and Wales, one in Scotland, and the remaining one in Ireland. Judging from the miles travelled and the places visited by Mr. Haslett with the Canadian Pacific Railway car, these four cars would be able to cover a large area of country, and be seen by thousands of people in the course of a year. I would therefore recommend that such cars should be purchased and put in operation under the care of experienced men.

Work to be done by the Churches.

(j.) While a great interest is being taken in emigration by the different societies connected with the Church of England, and the Roman Catholic Church in England is putting forth some efforts to systematize their work in this connection, I do not find that other great religious bodies like the Presbyterians, Methodists, Baptists, or Congregationalists have ever taken hold of this question as the Church of England has. I am sure that there is a splendid field here for the able and energetic governing bodies of these churches to labour in. When one considers how numerous the Presbyterians and Methodists are in Canada, and particularly in Manitoba and the Territories, one is surprised that co-operative methods between these churches in Canada and Great Britain have not been adopted towards encouraging emigration. What a great help it could be if these churches had a committee in Great Britain whose duty it would be to look after the welfare of those intending to emigrate. Each clergyman could send to the central body the names and occupations of those in his parish or congregation who proposed emigrating to Canada, together with particulars as to each man's trade or calling, means, &c. All this information could be sent out to a similar committee of the Canadian churches, and through this agency these intending emigrants might all be placed and located before leaving their homes. The details of such a scheme could readily be worked out, and I do not know any better agency through which Canada can obtain a good class of settlers than through the influence and systematic work of the churches. I hope the suggestion I have made will bear fruit, and that our Canadian brethren belonging to the denominations mentioned will follow the example so nobly set by the Church of England in this great work.

Co-operative Work in Municipalities.

(k.) The idea in calling the Immigration convention held last winter in Winnipeg was an excellent one. In order to people our great western provinces we must have assistance from those who are already living in the country. The work of inducing people to come to Canada and remain there and making them welcome after they arrive, should not be left entirely to the government, and the railway and steamship companies. Every Canadian, of whatever degree or calling, has an interest in the question of immigration, and a great deal can be done by individual effort, but more still by the mutual exertions and co-operation of residents in small communities. Each municipality in Manitoba and the Territories having an immigration committee, or some authoritative body charged with the duty of advertising the advantages of the municipality, ascertaining and imparting to the central committee in Winnipeg information as to lands available for settlement, price of such lands, &c., and being on hand to receive and look after the new settler on his arrival in their midst, is bound to be of great benefit and render inestimable service in the cause. "What is everybody's business is nobody's business," and in order to assist the government and the railway, and steamship agents in their work, it is essential that there should be some one in each locality charged with the business of looking after immigration. I trust that the enthusiasm and interest which was aroused by this convention will not be allowed to abate or die out, but that all

classes and communities in Manitoba and the North-west Territories will feel it to be their duty and in their interests to keep up the organizations which were formed at this great gathering.

Mutual Co-operation of Agencies.

(l.) While much impressed with the good feeling and kindly co-operation which exists between the Dominion Government agents and the Provincial Government, and the railway and steamship agents in Great Britain, I cannot but feel that a great deal of money, time and energy can be saved by their being a further and closer co-operation between these different agencies. Without systematic and concerted action on the part of those interested in emigration to Canada, duplication and overlapping of work must necessarily occur. It seems to me, therefore, and I make the suggestion, that at a convenient time in the fall of each year the High Commissioner should call together the representatives of the provincial governments of Canada resident in England, of the Canadian Pacific and Grand Trunk railways, the Allan, Dominion, and Beaver Lines Steamship Companies, and other agencies which are interested in emigration to Canada. At such meetings the Dominion Government agents should be present. A full discussion of the subject could be had, the work laid out for the coming season, and some portion of it be taken up by one agency and some by another, so that the work could be equitably distributed. I am sure such a meeting and such co-operation and mutual understanding would effect a saving to all concerned, and increase the efficiency of the work. A sub-committee of one person representing each interest could be formed, with the High Commissioner as chairman, and this committee could meet from time to time during the year as an advisory body, and review and discuss all matters of mutual interest. I sincerely trust that my recommendation in this respect will be carried out at an early date, as I am convinced that great good will arise from such action.

Personally Conducted Parties.

(m.) This mode of assisting the work of emigration has been under discussion in the department for some time, and was inaugurated this season. There is no doubt that the establishment and continuance of this plan will stimulate immigration very considerably. Many people are deterred from undertaking a long sea and land voyage to a new and strange country from the fact of their being ignorant of travel, at a loss how to reach their destination by relying on their own knowledge, and timid about embarking on an expedition of the details of which they are utterly ignorant. To be made aware that an agent, and a government agent at that, will be on hand to meet them at Liverpool or Glasgow, to look after their baggage, accompany them on the voyage out, assist and counsel them from time to time, and be with them when they land at Quebec or Halifax, is certainly a great incentive to many. I cannot too highly recommend the continuance of this plan. The announcements of the departure of these parties should be made many weeks before the day of sailing, the extensive advertising of them being a necessity.

Assisted and Prepaid Passages.

(n.) This opens up a large question, and one which has engaged the serious and thoughtful consideration of every one who takes an interest in emigration and immigration. I have stated elsewhere, briefly, the condition of the small farmers, the farm labourers—both those who are still on the farms and those who have moved into the city—and other classes from whose ranks can be selected first class settlers. There is a natural disinclination upon the part of people to leave their own homes. They only do so in most cases through force of circumstances. With some it is compulsory owing to misfortune in business; with others, while not in a sense compulsory it is essential to

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the welfare of their families that they should seek a wider sphere where the energies of the family may be extended and proper results obtained from their united efforts in the field of labour. Others again are doing fairly well where they are, but are ambitious to extend their operations, and so on. One and all of these people are affected in the same way; the spectre that rises before them is the thought of leaving the old home and old associations, and it takes a great deal of thought and study, with a lot of talking and consultation in the family circle, before this feeling is overcome and the final movement decided upon.

The next and most vital consideration with all intending emigrants is the one of pounds, shillings and pence—how much can they realize from the sale of the goods and chattels which they care to part with, and when realized will the proceeds be sufficient to pay their passages to Canada and put by enough with which to make a start in the new home? I have no doubt there are many people in England, Scotland and Ireland to-day who would only be too glad to come out to Canada had they the means of doing so. While some could arrange to pay the passages of themselves and their families, say to Winnipeg or Calgary, they are met with the difficulty of not having sufficient money to go and come on after their arrival there, and to purchase the necessaries for making a start. Now one of the questions to solve in this matter of emigration is how to reach, and how best to assist, this class of people to come to Canada. In the first place should the government extend any such assistance? I say unhesitatingly, yes, by all means assist properly selected people to settle in Manitoba, the North-west Territories and British Columbia.

It is admitted on every hand by people of both political parties that the future welfare and prosperity of Canada is, in a very large measure, bound up in the peopling and development of our great West, from Port Arthur, in Ontario, to Vancouver Island on the Pacific. We have everything to offer the intending settler, and feel justified in encouraging the right class of people to come and make their home amongst us. It has been calculated by American statesmen that each settler who takes up land in the United States is worth \$1,000 to the state. I agree with this estimate. Well then, what better can be done for the future of our country than to bring out from the motherland good, strong, healthy, sturdy agriculturists, and settle them on the magnificent prairies of the west or on the fertile valleys of British Columbia. Every settler becomes in turn a producer and consumer; the greater production we have from the soil and the more consumers we can have for our manufacturers the greater the wealth of our country becomes. We have splendid examples in old Canada to-day, and also in Manitoba and the Territories, of what the sturdy sons of England, Scotland and Ireland can do in Canada with nothing to rely upon for their success but their pluck, their sobriety, their industry and determination to succeed.

There are not only hundreds and thousands but millions of just such men whom we could bring out to follow in the footsteps of their countrymen, who have made Canada what it is to-day, if we could only make up our minds to extend a little assistance to them. There is every inducement for these people to come to Canada. It is Britain's nearest and greatest colony, and the intending emigrant has but to learn of the success which has attended those who have already come out to Canada, to feel that the same success awaits him. But some additional effort will have to be put forth by the Government to secure these desirable people for Canada, and the best thought I have been able to give to the subject, based upon my own experience and observation, and information obtained during my recent visit, leads me to the conclusion that the most feasible plan which can be adopted for settling our western provinces, and the freest from objection, is for the Government of Canada to make advances to intending settlers on the security of their holdings, *i.e.*, by taking a lien for such advances on the land which they make homestead entry for after their arrival in the west. These advances can be of three kinds. (1.) Sufficient to pay passage money and railway fares of emigrant and family only. This pre-supposes that this class have sufficient means to make a start without further aid. (2.) In addition to the advance of passage money a further sum sufficient to enable the settler to purchase his oxen and necessary implements, and the materials for his house and stable. (3.) Advances made under the system known as "prepaid passages."

The initial consideration and first and most important step to be taken in the matter of these advances is to make proper selection of the persons to be assisted. It is an indispensable, absolute first principle, that the person who is to be assisted shall be found to be worthy in every respect of such assistance. In laying down this proposition I am only expressing the views of those who have interested themselves in and studied this phase of the question. Personal observation and inquiry in Manitoba and the North-west Territories about, and amongst, the people who have been assisted out there by philanthropic and other agencies, clearly demonstrates to one who has investigated the subject that all who have been so assisted and have proved failures were failures before they left their old homes, and should never have received the aid which brought them away from there. If indiscriminate choice is made, and haphazard methods adopted, in the selection of people who are to be brought out to Canada or any other British colony, then all such people are sure to prove failures, and only reflect discredit upon those who sent them out and upon the country of their adoption. Wise and independent men, who are entirely disinterested and have local knowledge and understanding, associated with our experienced Canadian Government agents, should alone have to do with choosing those to whom assistance is to be given, the former to afford full information as to the antecedents and general character of the applicant, and the latter, from observation, inquiry and personal communication and otherwise, to judge whether such applicant is physically and mentally fit to cope with the conditions of the new life he and his family are to enter on. I think that only men up to a certain age should be assisted, but the age limit should not be too arbitrarily fixed in case it might exclude any one a little over the limit who had a family of grown up sons and daughters. This latter consideration should offset most other conditions, as there is no better capital that a man can start with in a new country than a large and growing family, the older members of which are wage earners. An agreement could be made with the people so assisted by which they would undertake to return the advances made, such repayment to be made in yearly instalments commencing say three years after location upon the land, and to bear interest from the date of their sailing, both principal and interest being secured by a lien upon their lands. I would recommend that a commencement of this system of assisted passages or advances to intending settlers be made at as early a date as the necessary legislation can be obtained to authorize the expenditure, if it is thought such legislation is required. The numbers so assisted could be limited for the first year or two, one-half of the amount appropriated for such purpose being used in England and Wales, and the other half equally distributed between Scotland and Ireland. With a yearly inspection of the homesteads of these people, and a careful and constant supervision over their operations and interests, I have no doubt as to the success of such a scheme. The fact of these advances being made by way of a loan on the security of their lands, and reduced to a business basis, relieves these people from any idea of being looked at as objects of charity, and what is of more importance it would not create that feeling of dependence which has obtained amongst many of those who have been so assisted by philanthropic societies in times gone by. To create a feeling of self-reliance and perfect independence should be one of the objects underlying this movement.

Prepaid Passages.

(o.) A system has been in vogue in the Western States for some years back known as "Prepaid Passages." It means that through the assistance of local banks, railway corporations, and other agencies, settlers in the Western States have been enabled to send money or tickets to their friends in the old land whom they were desirous of bringing to America. It is surprising the thousands of people that have been brought out to the Western States by this means. Unfortunately, little has been done in this way in Western Canada. It seems to me that this is a matter which the Canadian Government would be fully justified in taking up and carrying out to a successful conclusion. There are many men now living in Manitoba, the Territories and British Columbia who have

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relatives or friends in the old land whom they would like to have out here, but who though anxious to come out, have not the means wherewith to pay their passage or that of their families. Advances in such cases would be made on the faith and personal, or other security, of the settler who is desirous of bringing out his friends. There are two good reasons why this system should be inaugurated, and why it is likely to prove successful. The first is that the person who applies to have his friend in the old land assisted out here, in giving his personal security for such advances, is not likely to enter into a contract of this kind without knowing that the party whom he is thus willing to help is worthy of his assistance—thus indicating that the person or persons so assisted would make good citizens ; but it further indicates that the applicant is a satisfied settler, and one who is so well pleased with his condition and life in the new land that he not only recommends his friend to come out here, but goes further, and is willing to furnish the necessary security for advances to be made to that friend. One contented and satisfied settler who thus evidences his faith in the country is as good an advertisement as one could wish for. In the matter of these prepaid passages the details could be readily arranged. For instance, the applicant could apply to the nearest Dominion Lands agent, and on a form provided for the purpose of setting out his name, location, length of residence in the country, nature and value of his improvements, and other details, make application for the necessary money to be advanced for bringing out to Manitoba, the North-west Territories, or British Columbia his relative or friend, naming him, his residence, occupation, and other particulars for the purpose of identification, the applicant undertaking to give security by a lien upon his land, or otherwise, for the repayment of such advances. This application could be transmitted through the head office of the department to the government agent residing in the district in which the person to be assisted lives. This government agent, in turn, would make full and exhaustive inquiries as to the occupation, character, and general standing of the person to be assisted, and his suitability for residence in our western country. If the agent is satisfied from this investigation that the intending settler is suitable in every way, he could then arrange for his passage to Canada ; and the Government, being secured against any loss of the money so advanced, and being assured of its early repayment, would not be out of pocket by the transaction, while Canada would be enriched by the emigration of many a worthy man and many a worthy family. In this question of emigration the Government will have to make up its mind to take hold of the matter from a business point of view, and with a clear understanding, based upon past experience, that it is only by putting forth such efforts as I have endeavoured to describe, that people can be induced to emigrate from the European countries in larger numbers.

From the way in which some people discuss the question of emigration, and the tone adopted in criticizing the efforts put forth by the Government in the past, one would conclude that the people in Great Britain and Ireland, and Continental Europe, were simply waiting with their trunks packed ready to set sail for Canada. This is all moonshine. The people who have got to come will come anyway, and the question arises are these persons always desirable settlers, and are they the class we want to fill up our great West with or not ? Judging from experience in the United States, and the action of the government there in the past few years, one must conclude that many of the people who have come to the United States are not desirable citizens. So far Canada has been comparatively free from the immigration of objectionable people. What we want, and the only class of people our agents are authorized to encourage, are agriculturists, farmers and farm servants of both sexes, or others having experience in, or who are desirous of engaging in agricultural pursuits. We are getting our share of this class of emigrants at present ; if we desire them in larger numbers we will have to offer the inducements I have enumerated. It is in the interests of the emigrant and his family, and of the country to which he emigrates, that he should have the necessary means of starting himself on his farm, so that by granting the assistance I have indicated a double benefit is being extended ; Canada will be recouped all the money she thus expends, and will have to her credit many hundreds of good, thrifty, and loyal citizens.

I have spoken entirely of this system being carried out in Great Britain and Ireland. There is no reason why it should not, under the same supervision, be extended to Continental Europe—in such countries as the government officials would be permitted to carry on their propaganda.

Agencies.

(p.) In my opinion no time should be lost in the appointment of an agent at Belfast, and another at Dublin, to be paid the same salary as Mr. Grahame in Glasgow, with a liberal allowance for travelling expenses. Travelling is more expensive in Great Britain and Ireland than in Canada. These agents should have good offices, centrally situated, and should be men well fitted by experience and knowledge of Canadian life to impart full information as to our Dominion. They should also be men capable of meeting any and all classes. At least one travelling agent or inspector should be attached to the High Commissioner's office, with residence at Liverpool. This gentleman's time could be well and profitably employed in going about inspecting the different agencies from time to time, and keeping the agents up to their work. He could also be at the call of the High Commissioner for special duties. Having his residence in Liverpool he would be within ready reach of Scotland and Ireland, and at the same time within five hours' ride of London. I think the appointment of such an officer indispensable to the proper working of the agencies we have now established, and the results a good man could obtain would soon repay the outlay of his salary and travelling expenses.

Local Governments.

(q.) I would like to see greater interest taken in the subject of immigration by our local governments. If the local governments did nothing more than furnish the department of the Interior from time to time with literature for distribution in Great Britain and Ireland and the continent, a certain advance would be made in the way I indicate. While the Dominion Government, as in the past, should assume the greater and general control of emigration, yet by the active interest and co-operation of the local governments much good could be done. For instance, why could not the government of Ontario and other governments obtain and furnish the Dominion Government agents in Great Britain and Ireland with a list of farms for sale in Ontario or their respective provinces, with full particulars as to the situation, improvements, prices and terms of sale of such farms? By a small expenditure in advertising for such information, to be sent to the Provincial Secretaries, and the compilation of this information in lists to be sent to the Dominion Government agents from time to time, and the correction monthly of such lists, I am satisfied many sales could be made of these farms in the older provinces.

While of necessity the greatest attractions that are offered to intending emigrants are the free farms of Manitoba, Assiniboia, Alberta and Saskatchewan, there is no doubt that many of the larger tenant farmers in England, Scotland and Ireland might be induced to buy farms and settle in the older provinces. I hope some movement in this direction will be made. The energies of the Dominion Government emigration agents are directed to the encouragement of people to settle in Canada without giving precedence to any province. It rests with the governments of these provinces to do what is necessary to assist in furthering emigration to their particular provinces by assisting the Dominion Government in the work they are doing.

The question of immigration should be considered entirely aside from politics. Both political parties should approach the subject from the standpoint of nationalism only, and do all they can to assist in strengthening the Government of the day in carrying on this, in my humble opinion, greatest work that presents itself to the Government of the country.

I might further enlarge on the subject, and go more into details, but feel I have already made my remarks as long as they should be, perhaps too long.

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I have endeavoured to give my views and impressions as broadly as I could, and with an earnest desire to further a work in which I am much interested. I hope I may be successful, Sir, in encouraging yourself and the members of your Government in the belief that while the work now being done by the Department of the Interior with the money at its disposal is giving all the return one could expect in view of the great falling off in emigration from the older countries, yet it is in the interests of our great Dominion that further effort should be put forth to secure more settlers for Canada, and that that can only be done by the appropriation and expenditure of more money than is now available for the purpose.

I think, with the efficient staff you have in the Department at Ottawa, and the experienced officers you have in Great Britain and Ireland, good results can be obtained if these men are encouraged with the assurance that there will be enough money at their command to do the work as it should be done, and that whatever increased vote is given for immigration will not be subject to reduction from year to year. What is done in one year by your agents may not produce results for years to come, but as it is the constant dropping of the water that wears the stone, so it is the constant labour of the emigration agent that bears fruit in the end. This work, and the efforts put forth by your officers at home and abroad, should not be hampered by cutting down the immigration appropriation.

I would also suggest that further facilities be extended to the agents in looking after trade matters. Trade and emigration go hand in hand, and every effort should be made through the different agencies to stimulate and encourage our trade. The work of our agents might be much enlarged in this respect by communication with the Department of Trade and Commerce.

In conclusion I desire to bear testimony to the zeal and capacity of all the agents of the Government, the Canadian Pacific Railway, and the steamship companies, whom I came in contact with. Their uniform courtesy and kindness have enabled me to obtain an insight into the work they are doing, which has proved of great service to me.

I returned to Quebec on the steamship "Parisian," of the Allan Line, on the 25th July, after a very pleasant passage.

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

T. MAYNE DALY.

Department of the Interior.

PART V.

NORTH-WEST TERRITORIES.

Department of the Interior.

THE CANADIAN NORTH-WEST TERRITORIES.

REPORT CONCERNING THE ADMINISTRATION OF AFFAIRS FOR THE YEAR 1896.

LIEUTENANT-GOVERNOR'S OFFICE,
REGINA, N.W.T., 31st December, 1896.

To the Hon. CLIFFORD SIFTON,
Minister of the Interior, Ottawa.

SIR,—I have the honour to submit the following report concerning the administration of affairs in the Canadian North-west Territories, during the year 1896.

FARMING OPERATIONS.

A bountiful harvest of wheat, barley, oats and root crops, together with enhanced prices of cereals, and increased demand for cattle at remunerative figures, inspired noticeable hope and contentment throughout the Territories during the latter portion of the year. As near as can be estimated, 241,700 acres comprised the wheat area, the average yield per acre being $19\frac{1}{2}$ bushels, making a total output of 4,755,500 bushels. Of oats, about 57,550 acres were sown, the average yield per acre being about $36\frac{1}{2}$ bushels, or a total yield of 2,100,300 bushels. In barley, 11,300 acres produced an average yield of about 25 bushels an acre, or a total of 285,500 bushels. The northern crops to some extent redeemed the partial failure, consequent upon frost, reported last year. The wheat crop in the Calgary district was above the average, but, consequent upon failure of crops in former years, the acreage sown was reported from 40 to 50 per cent less than usual; the root crop, however, was noticeably fine; and the cattle and dairying industries rendered good returns. The same may be said of the Edmonton and Fort Saskatchewan districts, where, consequent upon advantageous transport rates being agreed to by the Canadian Pacific Railway, producers were enabled to supply a large portion of the Kootenay district in British Columbia with farm products. It was estimated that Moosomin district in east Assiniboia yielded over 750,000 bushels of wheat; Whitewood district, also, an average of 20 bushels per acre. In Prince Albert district an average crop of superior quality wheat was harvested. In the Innisfail district (Alberta) butter and cheese were largely produced. In Fort Qu'Appelle district the wheat crop throughout proved in quantity and quality more favourable than for many preceding years, the yield being from 20 to 30 bushels per acre, and on summer fallow about 40 bushels per acre. In the Saltcoats district (North-east Assiniboia) on the Manitoba and North-western Railway, wheat samples were excellent, though somewhat short compared with the year 1895. Altogether, agricultural interests throughout the Canadian North-west were reasonably remunerative; for, although the cereal crops were not as large as in some seasons, increased prices more than compensated for shortage.

DIVERSIFIED FARMING.

Discussion of the subject of diversified farming has, within two or three years, proved exceedingly advantageous. From every district throughout the Territories agricultural communities seem anxious to enlarge the scope of operations; and one factor necessary to ensure continuous progress will doubtless soon be supplied, namely, the creation and maintenance of a home or local market, as well as connection with foreign business centres, and cheaper freight rates.

DAIRYING.

Visits made to the North-west by Professor Robertson, Dominion agriculturist and dairy commissioner, during which conferences were held with the leading agricultural associations, have given an impetus to the more complicated branches of scientific farming. As a result of his efforts a number of creameries have been established in the Territories; noticeably at Moosejaw, Indian Head, Prince Albert and Regina. That at Moosejaw afforded an excellent opportunity of ascertaining results, it having been in operation from the middle of May until the latter part of November, 1895, and since then. The total quantity of butter made between the months specified from milk and cream supplied by sixty customers was in the vicinity of 70,000 pounds, and the value at Moosejaw railway station was \$19.31 per 100 pounds, with a rebate of 12½ cents per 100 pounds if and when the butter is shipped from Montreal. Producers are gradually learning by experience that a creamery can only be managed successfully by men possessed of technical training sufficient for the requirements of the business.

HORSE RANCHING.

Depression in horse ranching has been experienced for several seasons, and has not been an unmixed evil, concentrating labour and capital upon the more prosperous and remunerative cattle trade. For some time those engaged in horse ranching anticipated the establishment of a remount or military horse depot at Calgary or some central point, by the imperial government, but, expectations not being realized, many have turned their attention in other directions. A number still continue the business, raising such stock as there is a demand for.

CATTLE TRADE.

From every district where it was possible to find fodder for cattle results are reported to have been satisfactory. While crops in the Lethbridge district sustained damage by an unsuspected snowstorm, the loss was fully compensated by the large number of cattle shipped from that point. In June about 1,700 cattle and 142 horses were sent forward; and later in the year over 3,000 head of cattle followed, which, bringing good prices, made up for the shortage of herds as compared with 1895. Over 457 yearling steers were brought from Ontario, and about 300 from Manitoba, and these are found to readily mature on western grasses. Fully \$30,000 worth of cattle were shipped from Moosomin (Assiniboia), and between \$30,000 and \$40,000 from the Whitewood district (Assiniboia.) 50 or 60 carloads of cattle were shipped from Prince Albert (Saskatchewan), and about 2,000 head from the Innisfail district (Alberta). A large number of cattle were also shipped from Wolseley district (Assiniboia), and about 1,000 head from Qu'Appelle station; while from Macleod district and other points in Alberta ready markets were found in British Columbia for surplus stocks. The herds in North and South Regina were in prime condition, commanding good prices.

INCLEMENT WEATHER.

The unexpected snowstorms in the west, more particularly affecting Pincher Creek, and between Macleod and Crow's Nest Pass, as well as some of the northern districts, occasioned a great deal of anxiety. During the latter part of November the snow was three feet deep for several weeks and the cattle fell off in weight and general appearance.

The report of Superintendent Steele, of the mounted police force, commanding in the Fort Macleod district, furnished to me by Commissioner Herchmer, and dated the 15th December, stated that in Pincher Creek section stock had suffered from exposure, and it was feared that "fall calves" had perished in large numbers, and serious results had been experienced by the stock south of the Belly river. The Cochrane ranch was reported to have met with a severe loss, consequent upon the stock being scattered and

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it being found impossible to round them up. The Mormon Church ranch had lost seventeen head, frozen in the St. Mary's river. At Lethbridge, Macleod and High river, ranchmen were obliged to find and supply hay to save their cattle, many prophesying disaster to stock interests. At Medicine Hat and Maple Creek, while the cattle on the prairie, removed from hay, suffered to some extent, there was very little loss reported. At Wood Mountain the deep snow and the prairie fires which had burnt over the country earlier in the year would have left the cattle in a wretched condition had it not been that the herds were small and considerable hay in stack, so that little damage was done. This state of affairs continued until the last week of this month (December), when a warm wind continuing for some days throughout the ranching country, renewed hope was given, and the latest reports received state that the cattle are progressing admirably, and the weather for the past three weeks being exceptionally fine, no further danger was feared. The loss too during the bad season was extremely small.

THE OUTLOOK.

The outlook for the cattle trade of 1897 is certainly cheering, as such of the stock as cannot be transported east will be in ready demand throughout British Columbia. A great many ranchers are anxious that United States cattle should be kept off the circumscribed unburnt prairie; this being done, cattle could winter fairly, unless extremely snowy and cold weather was continuously encountered. Naturally enough the hay crop will be short this winter, as those ranchers who have their cattle convenient to it were obliged to use a much larger proportion, consequent upon the storms.

IRRIGATION.

The general enactment dealing with the question of irrigation passed by the Dominion Parliament in 1894 has proved extremely beneficial to various portions of Alberta and parts of Western Assiniboia.

Mr. J. S. Dennis, of the survey and irrigation branch of the Department, reports that practically in all the districts the efforts to grow crops or to obtain hay under ordinary conditions, after much experience, owing to insufficient rainfall, have been abandoned, and it recognized that only by the aid of the process of irrigation can a sure and certain grain, fodder or root crop be obtained. After four years, including the very unfavourable season of 1895, it was found that irrigation areas compared favourably with crops raised anywhere in the Dominion.

STATUTE LABOUR AND FIRE DISTRICTS.

The following statute labour and fire districts under the territorial ordinance have been erected in the different provisional districts:—

Assiniboia	17
Alberta	35
Saskatchewan	0
	—
Total	52

Coroners.

The following coroners were appointed:—

Name.	Address.	
E. M. Sharpe	Wetaskiwin	Alberta.
W. Elliott	Wolseley	Assiniboia.
H. J. Richardson	Lacombe	Alberta.
H. J. Denovan	Canmore	do
R. D. Sanson	Calgary	do
E. A. Braithwaite	Edmonton	do
William Laurie	Regina	Assiniboia.

Advocates.

The following advocates were enrolled :—

Name.	Address.	
Michael Charles Bernard	Calgary	Alberta.
Charles Edward Dudley Wood	Macleod	do
Harry Havelock Robertson	Edmonton	do
Abraham Richard Colles	Calgary	do
Giffard Elliott	Yorkton	Assiniboia.
Henry William Howard Knott	Calgary	Alberta.

Issuers of Marriage Licenses.

The following issuers of marriage licenses were appointed :—

St. George Jellett	Edmonton	Alberta.
M. C. Bernard	Calgary	do
E. F. Grover	Regina	Assiniboia.
J. K. Walsh	Indian Head	do
J. Doolittle	Qu' Appelle Station	do
M. Begg	Gleichen	Alberta.
H. W. Silverthorn	Olds	do

Commissioners for Taking Affidavits.

The following appointments were made during the year :—

W. Wilkie	South Edmonton	Alberta.
A. Fleming	Adair	Assiniboia.
R. W. Huimers	Grenfell	do
W. D. Dunlop	Yorkton	do
R. J. Richard	Canmore	Alberta.
R. F. C. C. Hoyer	Edenwold	Assiniboia.
A. Downey	Toronto	Ontario.
George B. Batho	Olds	Alberta.
C. Draper	Moosomin	Assiniboia.
E. Cave	London	England.
J. Johnson	Cochrane	Alberta.
C. E. Rigden	Moosejaw	Assiniboia.
D. W. Banks	Moosomin	do
George B. Murphy	do	do
F. Bain, sr.	Crescent Lake	do
W. F. Robinson	Montreal	P. Q.
H. J. Langstaff	Wallace	Assiniboia.
T. McCloy	Colleston	Saskatchewan.
F. J. Peacock	Banff	Alberta.
J. Emmerson	Logberg	Assiniboia.
P. Plisson	Lebret	do
J. Brannon	Broadview	do
G. Balfour	Wolseley	do
J. A. O. Hayes	Wetaskiwin	Alberta.
F. H. Robinson	Moosomin	Assiniboia.
J. Bird	Brancepeth	Saskatchewan.
P. W. King	Calgary	Alberta.
J. A. Carley	Winnipeg	Manitoba.
W. S. Walker	Montreal	P. Q.
J. F. C. Haldane	Windsor	Ontario.
A. Dunlop	Moosejaw	Assiniboia.
W. F. Mackenzie	Whitewood	do

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Name.	Address.	
C. M. Delmage	Lacombe	Alberta.
H. L. McInnis	Calgary	do
J. A. Nolan	Calgary	do
J. Burns	Beaver Hills	do
C. O. Clemens	Melfort	Saskatchewan
W. Flett	Flett's Springs	do
C. Ritchie, sr	Saltcoats	Assiniboia.
A. R. Dickson	Wetaskiwin	Alberta.
A. T. Morrison	Wapella	Assiniboia.
W. Moffat	Winnipeg	Manitoba.
A. T. Abbey	Regina	Assiniboia.
Alexander Taylor	Edmonton	Alberta.
J. H. S. Coyne	Moosomin	Assiniboia.
W. A. Lamont	Whitewood	do
S. H. Field	Broadview	do
R. MacNutt	Edmonton	Alberta.
W. Able	Hazelcliff	Assiniboia.
G. W. Harper	Saddle Lake	Alberta.
D. A. McEwan	Carlyle	Assiniboia.
S. Webster	Mountain View	do
P. Neufelt	Rosthern	Saskatchewan.
A. T. Fotheringham	Grenfell	Assiniboia.
M. McAuley	Edmonton	do
W. Cousins	Medicine Hat	do
J. G. Calder	Medicine Hat	do
R. H. Lithgow	Maple Creek	do
C. D. Algar	Ponoka	Alberta.
E. J. Mitchell	Pincher Creek	do
T. Spence	Edmonton	do
W. T. Finlay	Medicine Hat	Assiniboia.

INSANE PATIENTS.

The total number of insane patients at present confined in the Selkirk and Brandon asylums, (Manitoba), under arrangements with the Manitoba government, by Dominion Order in Council, is 74. The number committed in 1895 reached 20, and the number discharged, 21. During the present year warrants were issued for the commitment of 40 patients, and orders for discharge during the same period for 28. The arrangement now existing between the Dominion and Manitoba governments with reference to the care of patients will expire in January, 1898.

DEAF MUTES.

Upon several occasions the advisability of something definite being done to provide for the care of the deaf mutes of the North-west Territories has been impressed upon the Dominion government. An amount was some time ago put in the estimates for such service, but a misunderstanding having arisen between the federal authorities and the provincial government of Manitoba as to the length of time of the proposed contract, delay followed, although the executive committee of the North-west Territories strongly urged that provision should be made for the deaf mutes, there being between 26 and 30 in various portions of the Territories. The system of teaching these unfortunates at the Manitoba asylum in Winnipeg is highly commendable.

SALTCOATS COTTAGE HOSPITAL.

Owing to the efforts of the Reverend T. A. Teitlebaum and a number of ladies and gentlemen, another hospital has been established at Saltcoats in the north-eastern

portion of the Territories. The Medicine Hat hospital, together with the maternity cottage and institutions at Calgary, Lethbridge and Edmonton, have undoubtedly proved of great service in alleviating the suffering of the afflicted, and reflect the highest credit upon those who promoted their establishment and contributed towards the fund for their erection. I had the honour of opening the Saltcoats hospital on the 23rd of September last, and was greatly impressed by the harmony and public spirit characterising the proceedings.

PRAIRIE FIRES.

The greatest loss sustained by farmers, as well as ranchers, during the autumn months of the year, was from prairie fires, the luxuriant growth of hay and grass proving in reality disastrous in many districts, increasing the fires and thus greatly reducing the fodder depended upon to supply live stock during the winter, as well as destroying a large amount of property and buildings. In order that some estimate might be arrived at as to the extent of these fires and the disasters occasioned by them, I deemed it advisable to ask the co-operation of Commissioner Herchmer and his officials in order to be able to present as full a report as possible dealing with the various fires during 1895 and 1896. Although there may be omissions in the reports, still they are worthy of every credence, and are as full as could be obtained under the circumstances.

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PRAIRIE FIRES, 1895 AND 1896.

Date.	Location.	Damage done.	Action taken to put fire out. To discover origin.	Remarks.
1895.				
April 13..	12 M. N. W. Maple Creek.	Very slight; 3 square miles burnt.	Extinguished on 14th; from shepherd's camp	A. Wallace tried and fined \$50 and costs or 2 mos.
do 24..	Wapella	Nil; 800 acres burnt.....	.....	Geo. Barkemann fined \$5 and costs.
do 11..	Fishing Lake and s. side Foam Lake.	2 stacks hay, 2 deserted stables, 1 occupied stable, school house, S. D. 247.	Not known	No convictions; 100 sq. miles burnt.
do 19..	Crescent	J. J. Peck burned on hands and face, stable and thoroughbred Clyde stallion, value \$1,200.	Police taking census and put out fire.	Extent unknown.
do 8..	Sec. 6, tp. 19, rge. 8. Hyde.	2 horses, 2 stables, stallion burnt, man badly burned.	Put out by police and settlers; John Wenhard sentenced to 1 mo. h. l.	Set by Wenhard's boy burning rubbish; high wind.
do 15..	Glenarven, 18-3-33.	2 stacks hay, 15 sq. miles burnt.	Const. Rudd and settlers put fire out; smouldering straw piles.	J. Robinson convicted; fined \$1 and costs.
June 5..	Cannington Manor.	2 sections burnt over; no damage.	Put out by Const. Leigh and settlers; started burning scrub.	E. L. Neish fined \$10 and costs.
Aug. 27..	Wolseley	800 acres burnt, 9 tons hay.	15 men and settlers under Const. Hockin; C.P.R. engine.	No fire guards.
Oct. 11..	Milk River Ridge..	Large country, 3 hay stacks, 2 wagons.	Sgt. Higginbotham and 4 men worked hard. R. Farrer, camp fire.	Farrer pleaded guilty; fined \$100.
do 20..	Milk River to Pendant d'Oreille.	Nil; 60 miles.....	Patrols out; locomotive.	
do 1..	Big Gully, Bresaylor	Several stacks hay	All reserves saved by action of police; carelessness.	T. S. Lake was fined \$25 and made good damage to settlers effects.
do 21..	Graburn	Owner lost house and 12 tons hay; only country grass, &c.	Spark from chimney of house close to hay stack	Information laid; A. Trent, owner, fined \$50 and costs or 3 mos.
do 1..	Maple Creek	Spark from C. P. R. engine; barracks party out; information laid against C.P.R. and case adjourned.	A great deal of property burned; settlers' property saved with great difficulty.	
do 23..	Boscurvis.....	Horse, barn, oats, wheat, hay, value \$375.	Settlers were turned out. Const. Hayles found started on Evan's farm.	T. Evans charged; fined \$5 only.
do 26..	Alameda	2 houses, 9 stacks grain, 12 townships, very fierce	Const. Suell and all settlers turned out. Unknown.	
do 17..	Saltcoats	14 head cattle, 1 horse, 10 sheep, 80 tons hay.	Settlers turned out by Corp. Davis; unknown, started at Crofter Lake	Investigated.
do 3..	Yorkton.....	Supposed 20 miles, 3 shacks.	Supposed to be started by J. Patterson lighting his pipe.	Const. Jones arrested Patterson.
do 12..	Earlswood.....	1 separator, 1 house, 1 stable, 30 sheep and grain.	Efforts made to put fire out aided by settlers; from thresher.	Legal requirements as to No. of persons and proper appliances used.
do 15..	Fleming	100 acres; nil.....	Farmer burning straw...	W. Cockerell fined \$10 and costs.
do 28..	Hillburn	Nil.....	2 fires	J. G. Montgomery and R. Leverton, \$1 and costs each.
1896.				
April	Saltcoats district..	2 stables, 2 stacks hay, 100 bushels oats.	24 fires	2 convictions; fines \$6 and cost in both cases
May.....	Saltcoats, Yorkton.	\$35 worth of clothes. . . .	6 fires	1 conviction; fine \$1 and costs.

PRAIRIES FIRES, 1895 AND 1896—Continued.

Date.	Location.	Damage done.	Action taken to put fire out. To discover origin.	Remarks.
1896.				
June.....	Moosomin	Nil	6 fires	6 convictions; fines \$23 and costs.
July.....	Gainsboro', Fleming	3 loads hay	3 fires	1 conviction; fine \$1 and costs.
.....	Saskatoon	Burning shack	Sgt. Will put fire out	X. Gougeon fined \$10 and costs.
August...	Moose Jaw, N. Portal	Nil	6 fires	1 conviction; \$5 and costs.
Sept.....	Kipp	Nil	Lighting pipe	Thos. Crane fined \$20 and costs.
do 2..	Gainsboro	5 square miles, 6 stacks wheat.	Settlers turned out and investigated.	Supposed started by C.P.R. engine.
do 8..	File Hills, Pheasant Forks, Lorlie and Abernethy Districts.	Quantity of hay	Settlers turned out and investigated.	Cause unknown.
do 17..	Moosomin	Half acre; nil	A. Dalgliesh caught burning straw.	Fined \$3 and costs.
do 19..	Broadview	4 miles x 2 miles, 100 tons hay on Crooked Lakes Reserve.	Settlers turned out; investigated.	Supposed started by C. P. R. engine No. 78 Engineer Jackson.
do 22..	Saltcoats	4 square miles	Few stacks of wheat; settlers turned out; investigated.	J. Underwood fined \$5
do 22..	Gainsboro	24 square miles; 1 stable, 1 stack hay.	Settlers turned out; investigated.	W. Sandercock fined \$15 and costs.
do 25..	Carlyle	Very large area; 2 stacks hay, quantity of oats.	Settlers turned out; investigated.	
Sept. 27..	Calgary	None; small area burned.	Put out by police and settlers. Two boys named Butland started fire accidentally.	
do 28..	Sturgeon River... Ft. Saskatchewan	Large brush and bush burned.	Police worked very hard.	Fire too severe to control.
do 28..	Grenfell	Millions of acres; many settlers burned out; impossible to estimate damage.	All townspeople and settlers turned out; supposed started by engine on Soo Line, near Deloraine.	Very high wind.
do 29..	Touchwood Hills...	Very large area; 100 tons hay, stabling, houses, and few cattle.	Settlers turned out.....	Came from Long Lake
do 28..	Redberry Lake....	Very large area; 150 tons hay.	Seven police worked.....	
do 28..	Battleford District.	1,500 tons hay	do do	
do 28..	Parkland, Haywood Settlement.	Great damage; settlers burned out.		F. & J. Spaurier fined \$100 and \$50 respectively, and \$12.50 costs each.
Oct. 1..	Carnduff	14 sq. miles; 1,300 bush. wheat.	Burning straw	W. Elliott charged case dismissed.
do 1..	Cannington Manor.	None	Boys herding let fire out. Police extinguished it.	Boys too young; dismissed with caution.
do 1..	Calgary			
do 2..	N. Portal	200 sq. miles; 400 bush. wheat, 4 stacks wheat, 1,500 bush. oats, 80 tons hay.	Settlers turned out; very high wind; could only endeavour to protect property.	Came from North Dakota at 50 miles an hour.
do 2..	Wolseley, Hill Farm and Chickney Districts.	10,000 bush. of wheat, 5,000 of oats; hay, buildings, &c.	Settlers turned out; started by threshing engine.	Owners (J. Fletcher, J. Mason, W. Jolly and E. Estelle) fined \$50 and costs each.
do 2..	Parkbeg	80 sq. miles; 200 tons hay	Settlers turned out	J. Bradshaw Spicer fined \$25 and costs.
do 2..	Yorkton	Very large area; 150 tons hay, stables, &c.	do do	Probably continuation of Parkland's fire. (Sept. 28.)

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PRAIRIE FIRES 1895 AND 1896—Concluded.

Date.	Location.	Damage Done.	Action taken to put fire out—To discover origin.	Remarks.
1895.				
Oct. 2..	Indian Head. (See 2, 19, 12.)	1,000 bush. wheat.	Settlers turned out; started by threshing engine.	J. L. Harrop and J. Baldwick fined \$10.
do 2..	Balgonie.	Not great; a crop of wheat.	Settlers turned out; started by 3 year old child playing with matches.	No prosecution.
do 2..	Estevan.	Very large area; 1,000 tons hay, 500 bush. wheat, 1,000 bush. oats.	Settlers turned out to protect property.	Came from North Dakota; high wind.
do 2..	Carnduff.	300 sq. miles; 100 bush. wheat, 200 bu. barley, 150 bu. oats, 10 tons hay, 1 horse, 3 stables, 1 granary.	Settlers turned out. . . .	Fined \$10 and costs.
do 2..	Qu'Appelle.	Burned through German colony; much hay.	Settlers and Indians turned out.	Origin unknown.
do 3..	Moosomin.	Nil; 50 acres burned.	Left to protect property from larger fire.	Fined \$10 and costs. . . .
do 4..	Whitewood.	Large area; great damage.	Settlers turned out. . . .	Came from West before a very high wind. Could only save town.
do 4..	Percy.	Very great area; 700 tons hay, 5,000 bush. wheat, 3,000 bush. oats.	Settlers turned out.	Swept the country from Moose Mountain to Souris.
do 4..	Moosomin.	100 sq. miles; very great.	do do.	High wind; came from Moose Mountain.
do 4..	Carlyle.	Unknown area; \$1,000..	do do.	Fined, \$10 and costs.
do 12..	Fleming.	3 acres; nil.	do do.	Corp. Vaudreuil also looked into this but could get no proof; suspected sec'n men.
do 13..	Goose Lake.	Large tract; nil.	Investigated by Insp. Moodie.	
do 16..	Oxbow.	200 sq. miles; hay, &c. . .	Settlers turned out.	Fine, \$10 and costs.
do 21..	Prosperity.	2 acres; nil.	do do.	Fine, \$5 and costs.
do 23..	Morley.	No damage of consequence.	Extinguished by Const's Harris & McDonald.	Section foreman fined \$10 and costs.
do 23..	Rocanville.	5 acres; nil.	Settlers turned out.	Fine, \$10 and costs.
do 25..	Battleford.	Large tract, all from and over south country; 300 tons hay; horses injured.	Police worked; wind too high.	Nothing could save the land.
do 26..	Swift Current.	50 tons hay.	Police kept fire from doing further damage.	Origin unknown.
do 27..	Qu'Appelle.	Sec. 4, 18, 14 burnt; 2 tons hay.	Settlers turned out.	Green and Hooper fined \$5 each.
do 23..	Fleming.	1/2 acre; nil.	Lit to burn slough.	Fine, \$3 and costs.
do 23..	do.	1/2 acre; nil.	Lit to burn straw.	Fine, \$5 and costs.
do 27..	Oxbow.	144 sq. miles.	Settlers turned out; burning guard on railway.	Section foreman fined \$50 and costs.
do 30	Poundmaker's and Sweet Grass Reserves.	Tent and camp, outfits; horses and harness scorched; 7 stacks, 100 loads, and 45 tons hay.	Corporal Allegar and party worked hard; rain and snow finally extinguished fire.	

ORGANIZED TERRITORIAL SCHOOLS.

During the past year a number of additions have been made to the public schools throughout the organized territories of Alberta, Saskatchewan and Assiniboia. The following statement shows the total up to the 31st of December :—

Public schools	431
Protestant separate	3
Roman Catholic public	44
Roman Catholic separate	11
Total	<u>489</u>

The average attendance of pupils was 12,000, as compared with an average of 10,750 in 1895.

SCHOOL DEBENTURES.

The total amount of debentures registered up to the 31st of December, 1896, was \$240,100; the total amount of debentures authorized, but not registered is \$5,700, making a total of \$245,800. The amount of debentures redeemed up to 31st December, 1896, reached \$14,695, leaving an actual debenture indebtedness to that date of \$231,105. The debentures mature during various periods up to A.D. 1916.

JUSTICES OF THE PEACE APPOINTED UNDER THE NORTH-WEST TERRITORIES ACT.

By section 7, chap 17, 57-58 Vic., section 64 of the North-west Territories Act was amended making a property qualification necessary for justices of the peace to the value of \$300 over and above all encumbrances, with three years, residence in the territories, and prescribing the necessary oaths of qualification and office. It was deemed advisable in the public interest that a thorough re-organization of the magistracy should take place under this Act. The new appointments have been made, as far as possible, upon the recommendation of the judges of the Supreme Court. In this connection I have caused to be prepared a magisterial hand-book, being a ready reference manual for justices of the peace in the Canadian North-west Territories. This has been revised by legal authorities, and with each commission issued the new appointee has been furnished with a copy. After a thorough investigation it was found that large numbers of those hitherto holding office had failed to make the quarterly returns, and a circular has been issued to each magistrate stating that hereafter the rule in this matter will be strictly enforced, and all returns duly published.

The magisterial list, which it was found proper to revise, numbered as follows :—

Assiniboia	210
Alberta	133
Saskatchewan	62
	<u>405</u>

The new commissions will be as follows :—

For Assiniboia	113
For Alberta	40
For Saskatchewan	23
	<u>176</u>

From some of the outlying districts and a few other points returns have not as yet been received with reference to qualification, and it will be found necessary to make a few additions to the present list, which will then be about one-half the number hitherto

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holding office. To avoid any inconvenience consequent upon any district being deprived of an official qualified to take affidavits and declarations an additional number of commissioners have been appointed. A police magistrate having been appointed, a reduction of magistrates in Calgary became possible. Similar reduction is deemed advisable in the case of the town of Regina, where it is probable a police magistrate will shortly be appointed.

In cancelling commissions of justices of the peace, exception has been made in the case of those residing within the territories and outside the several local electoral districts, and the inspectors of the North-west mounted police force.

Commissions have been issued to the following persons:—

Name.	Post Office Address.	
T. Bawden	Cotham	Assiniboia.
A. H. R. Bastien	Rocanville	do
J. H. Boyce	Qu'Appelle Station	do
W. Braithwaite	Indian Head	do
E. Bolton	Saltcoats	do
W. T. Blythe	Wapella	do
J. A. Brown	Spy Hill	do
William Brownlee	Glen Adelaide	do
F. W. Bull	Yorkton	do
D. J. Cantelon	Lorlie	do
W. M. Carment	Kamsack	do
R. Chappelle	Fleming	do
J. W. Connell	Carnduff	do
Thomas Cope	Oxbow	do
T. S. Cornell	Pheasant Forks	do
George Campbell	Ellisboro	do
W. C. Coade	Workman	do
W. R. Carson	Forest Farm	do
Richard Cailmount	Cailmount	do
J. Daniel	Moosomin	do
G. F. Dunn	Moosomin	do
H. C. Disney	Oxbow	do
W. J. Dawson	Crescent Lake	do
T. E. Donnelly	Indian Head	do
P. Dayman	Kenlis	do
S. C. Elkington	Fort Qu'Appelle	do
William Findlay	Moffatt	do
Edward Fitzgerald	Grenfell	do
S. Fleming	Summerberry	do
James Franks	Pheasant Forks	do
J. H. Fraser	Qu'Appelle Station	do
E. Field	Sheho	do
J. B. Gibson	Alameda	do
H. Gisborne	Qu'Appelle Station	do
B. B. Gilbert	Fleming	do
G. F. Guernsey	Fort Qu'Appelle	do
G. W. Gadd	Oxbow	do
J. Hollis	Kutawa	do
W. P. Hopkins	Yorkton	do
J. Humphrys	Cannington Manor	do
R. H. Henderson	Winlaw	do
H. Hill	Sumner	do
W. Hodgson	Broadview	do
J. J. Heaslip	Alameda	do
A. E. Hart	Moosomin	do

Name.		Post Office Address.
G. A. E. Hyde	Hyde	Assiniboia.
J. G. Hardy	Cannington Manor	do
T. J. Irwin	Fitzmaurice	do
W. E. Jones	Cote	do
John Kidd	Fairmede	do
Alexander Kindred	Moffatt	do
R. S. Lake	Grenfell	do
W. Logan	Wapella	do
W. H. Minhinnick	Kinbrae	do
William Moran	Hillburn	do
Thomas Moore	Dongola	do
J. Montgomery	Lippentott	Manitoba.
W. R. Motherwell	Abernethy	Assiniboia.
E. H. Meadows	Langenburg	do
M. V. Morrison	Percy	do
Charles Millham	Hazelcliffe	do
W. W. McDonald	Fleming	do
A. M. McLane	Indian Head	do
T. McNutt	Saltcoats	do
Alexander McArthur	Welwyn	do
S. McGurk	Arcola	do
W. McCorkell	Fleming	do
A. T. McLellan	Katepwe	do
J. R. S. North	Edgeley	do
N. H. Neilson	Yorkton	do
F. S. Proctor	Fort Qu'Appelle	do
H. O. Partridge	Summerberry	do
R. J. Phin	Moosomin	do
A. B. Potter	Montgomery	do
H. Roberts	Churchbridge	do
James Sumner	Sumner	do
E. Salisbury	Crescent Lake	do
R. Stewart	Welwyn	do
W. Staples	Oxbow	do
C. H. Sahlmark	Ohlen	do
H. Sayer	Grenfell	do
W. A. W. Smith	Carnduff	do
J. J. Saddler	Gainsboro	do
J. Starling	Hill Farm	do
E. H. Scott	Estevan	do
D. Strachan	Arcola	do
George Thompson	Indian Head	do
C. Troyer	Oxbow	do
Onesime Tourigny	Wolseley	do
C. S. Willis	Theodore	do
W. T. Warner	Montgomery	do
Arthur Mackenzie	North Portal	do
W. A. H. a'Court	Dundurn	do
Thomas Barton	Hednesford	do
H. Dorrell	Moose Jaw	Assiniboia.
J. Dixon	Maple Creek	do
Robert Elliott	Davin	do
M. Menderson	Wascana	do
J. B. Hawkes	Balgonie	do
S. Marling	Pense	do
J. W. Cafferata	do	do

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Name.		Post Office Address.
G. SpringRice	Pense	Assiniboia.
W. McKillop	Pengarth	do
A. Neville	Cottonwood	do
D. A. Purdy	Lumsden	do
W. C. Sanders	Moose Jaw	do
Jas. Slemmons	Pasqua	do
W. Trant	Regina	do
T. D. Watson	Moose Jaw	do
E. Carss	Lumsden	do
Thos. Baxter	Loon Creek	do
F. T. Low	Wapella	do
T. A. Skilliter	Grenfell	do
Thomas Copland	Saskatoon	Saskatchewan.
J. Courtney	Prince Albert	do
W. Craig	Wingard	do
A. Cameron	Willoughby	do
A. R. Chisholm	Bresaylor	do
Jas. Grant	Osler	do
A. Garault	Batoche	do
Hilton Keith	Mistawis	do
J. Leslie	Saskatoon	do
Wm. Millar	Prince Albert	do
L. Marion	Batoche	do
W. F. Meyers	Kinistino	do
C. W. May	Saskatoon	do
Thos. McKay	Prince Albert	do
R. S. McKenzie	Duck Lake	do
William Plaxton	Prince Albert	do
G. S. Reid	Colleston	do
L. Schmidt	Prince Albert	do
J. E. Sinclair	do	do
J. E. Spence	Melfort	do
P. Tourond	Batoche	do
Geo. Taylor, jr.	Brancepeth	do
Alex. McNabb	Prince Albert	do
G. P. Ashe	Colles	Alberta.
A. E. Banister	Davisburg	do
V. Beaupre	Bleichen	do
J. W. Costello	Calgary	do
F. Champness	Lethbridge	do
Jno. Carswell	Penhold	do
John Cowdry	Macleod	do
Robt. Evans	Lethbridge	do
W. S. Edmiston	Edmonton	do
F. Fane	Beaver Lake	do
G. Fletcher	Lacombe	do
J. C. Gordon	Manawan	do
E. T. Galt	Lethbridge	do
W. Graham	Morely	do
Jas. Grier	Macleod	do
C. N. Garson	Onion Lake	Saskatchewan.
H. L. Hinman	Cardston	Alberta.
E. Hagell	do	do
J. Lamoureux	Ft. Saskatchewan	do
W. T. Livoek	Edmonton	do
A. M. Morden	Pincher Creek	do

Name.	Post Office Address.	
Alex. McRae.....	Sheep Creek	Alberta.
D. McDougall.....	Morley	do
H. W. McKenny.....	St. Albert	do
C. Schantz.....	Wetaskiwin	do
P. Talbot.....	Lacombe	do
Dieudonne Tellier.....	Morinville	do
R. T. Telford.....	Leduc	do
James Walker.....	Calgary	do
Frank White.....	Mitford	do
R. A. Wallace.....	High River	do
R. A. McKenzie.....	Logan	do
Chas. Taylor.....	Olds	do
A. Andreason.....	Lewisville	do
G. B. Batho.....	Olds	do
J. F. Forbes.....	Fort Saskatchewan	do
G. W. Gairdner.....	St. Albert	do
Jas. Mowat.....	do	do
W. Springbett.....	Red Deer	do
A. P. Welsh.....	Sheep Creek	do

TERRITORIAL LEGISLATION.

The Assembly was called together on the 29th of September, and prorogued 30th October, 1896. The following ordinances were assented to:—

1. An ordinance for granting to the Lieutenant-Governor certain sums of money to defray the expenses of the public service of the Territories for the twelve months ending 31st August, 1896, and for other purposes relating thereto.
2. An ordinance to amend and consolidate as amended the ordinance respecting schools.
3. An ordinance to amend and consolidate as amended the law respecting hides.
4. An ordinance to further amend the North-west Territories medical ordinance, 1888.
5. An ordinance to amend ordinance No. 9 of 1895, intituled: An ordinance to amend and consolidate as amended the law respecting the legal profession.
6. An ordinance to further amend the marriage ordinance.
7. An ordinance to exempt certain property from distress for rent.
8. An ordinance to amend ordinance No. 18 of 1892, intituled: The hospitals ordinance.
9. An ordinance respecting factors and agents.
10. An ordinance respecting the sale of goods.
11. An ordinance to amend ordinance No. 12 of 1895, intituled: An ordinance respecting veterinary surgeons.
12. An ordinance to further amend the prairie fires ordinance, 1893.
13. An ordinance to amend ordinance No. 10 of 1895, intituled: An ordinance to amend and consolidate as amended the ordinance respecting deputy clerks and deputy sheriffs.
14. An ordinance to repeal ordinance No. 10 of 1893, intituled: An ordinance respecting infectious diseases of animals.
15. An ordinance to further amend ordinance No. 6 of 1892, intituled: An ordinance to amend and consolidate as amended the ordinance respecting the practice of dentistry in the North-west Territories.
16. An ordinance to amend ordinance No. 11 of 1895, intituled: An ordinance respecting the Legislative Assembly.
17. An ordinance respecting weed districts.
18. An ordinance respecting the use of tobacco by minors.

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19. An ordinance to amend ordinance No. 8 of 1893, intituled : The game ordinance.
20. An ordinance to further amend the liquor license ordinance, 1891-92.
21. An ordinance to further amend the judicature ordinance, and the ordinance amending the same.
22. An ordinance to amend ordinance No. 22 of 1895, intituled : An ordinance to amend and consolidate as amended the ordinances respecting bulls.
23. An ordinance to amend chapter 24 of the revised ordinances, 1888, intituled : The cemetery ordinance.
24. An ordinance to amend ordinance No. 8 of 1895, intituled : The bill of sales ordinance.
25. An ordinance to further amend ordinance No. 8 of 1889, intituled : An ordinance concerning receipt notes, hire receipts, and orders for chattels.
26. An ordinance to amend and consolidate as amended the statute labour and fire district ordinance.
27. An ordinance to amend the municipal ordinance.
28. An ordinance to amend ordinance No. 17 of 1895, intituled : The village ordinance.
29. An ordinance to amend the irrigation district ordinance.
30. An ordinance to disorganize the municipalities of Wolseley and Qu'Appelle.
31. An ordinance to incorporate the Western Stock Growers' Association.

LIQUOR TRAFFIC IN ATHABASCA.

In August last complaint was made by prominent residents of the provisional district of Athabasca, and even farther north, that whisky traders were plying their nefarious business by smuggling intoxicants, as well as manufacturing them, contrary to the spirit of the North-west Territories Act, many of the Indians being supplied with spirituous liquors. Assisted by the Hudson's Bay Company, commissioner Herchmer, superintendent Greisbach of Fort Saskatchewan, and others, the following notice, being published, was freely circulated in portions of the territories above referred to:—

“PUBLIC NOTICE.

“Certain intoxicants having been introduced, sold, exchanged, traded and bartered in various portions of the unorganized territories, in violation of the “North-west Territories Act,” which requires a special permit, His Honour the Lieutenant-Governor deems advisable, in the public interest, to call attention to the following provisions of the said Act, chapter 50, 49 Victoria:—

“92. No intoxicating liquor or intoxicant shall be manufactured, compounded or made in the Territories, except by special permission of the Governor in Council; nor shall any intoxicating liquor or intoxicant be imported or brought into the Territories from any province of Canada, or elsewhere, or be sold, exchanged, traded or bartered, or had in possession therein, EXCEPT BY SPECIAL PERMISSION, IN WRITING, OF THE LIEUTENANT-GOVERNOR.

“94. If any such intoxicating liquor or intoxicant is manufactured or made in the Territories, or is imported or brought into the Territories, or is sold, exchanged, traded or bartered, in violation of the provisions of this Act, such liquor or intoxicant shall be forfeited, and may be seized by any officer of the customs or excise, or by any constable, or other duly qualified person, wheresoever found; and any judge of the Supreme court, or justice of the peace, on complaint made before him, may, on the evidence of one credible witness that the provisions of this Act have been violated in respect thereof, order such intoxicating liquor or intoxicant so seized forthwith to be destroyed; or, if such liquor or intoxicant has not been seized, such judge or justice of

the peace, on complaint as aforesaid, may issue a search warrant as in case of stolen goods, and, upon the same being found, may cause them to be forthwith destroyed; and the still, machinery, keg, barrel, case, box, package or receptacle whence or in which any intoxicating liquor or intoxicant has been manufactured, imported or made, sold, exchanged, traded or bartered, and as well that in which the original supply was contained as the vessel wherein any portion of such original supply was supplied as aforesaid, and the remainder of the contents thereof, if such still, machinery, barrel, keg, case, box, package, receptacle or vessel aforesaid, respectively, can be identified, may be seized by any officer of the customs or excise, or by any constable or other duly qualified person, wheresoever found within the Territories; and any judge of the Supreme Court, or justice of the peace may, on complaint before him, and on the evidence of one credible witness that the provisions of this Act have been violated in respect thereof, declare such intoxicating liquor or intoxicant, still, machinery, vessel or receptacle forfeited, and cause the same to be forthwith destroyed; and the person in whose possession any of them are found shall incur a penalty not exceeding two hundred dollars, and not less than fifty dollars, with costs; and a moiety of such penalty shall belong to the informer, and the other moiety thereof shall belong to Her Majesty for the public uses of Canada.

"95. Every person who manufactures, makes, compounds, imports, sells, exchanges, trades or barthers any intoxicating liquor or intoxicant, except by special permission as aforesaid, or in whose possession or on whose premises such intoxicating liquor or intoxicant of any kind is or has been, shall incur a penalty not exceeding two hundred dollars, and not less than fifty dollars—a moiety of which penalty shall belong to the informer.

"Be it known, that instructions have been given to Her Majesty's officers, inspectors and constables of the mounted police force to exercise due vigilance for the carrying out and maintenance of the provisions of the above statute, and all interested in the welfare of the said unorganized territories are requested to co-operate with the said authorities.

"By command,

"R. B. GORDON, *Secretary.*

"Dated at Regina, N.W.T., this 18th day of August, A.D., 1896."

In this connection it would be simple justice to acknowledge that, without the assistance of the North-west mounted police, the administration of the laws in the unorganized districts would be both difficult and costly; and there is truth in the comments made by Superintendent Greisbach, commenting upon illicit traffic in spirituous liquors. He wrote under date 4th September, 1896:

"Owing to the reduced state of the force at present, instead of having detachments of men stationed at the mouth of Little Slave river, at the Grand rapids on the Athabasca river, as in former years, my command in that portion of the district is represented by a sergeant, two constables, and an interpreter, stationed at Athabasca landing. My own opinion upon the subject is this, that until strong detachments of police are stationed at two or three of the more important posts in the north, say at Slave lake, Fort Vermillion, Chipewyan or Fort MacMurray, nothing more can be done towards lessening the evil for which traders and others taking liquor into the various portions of the unorganized territories are responsible."

During a visit to the North last June I enjoyed the advantage of meeting a number of people—traders and others—who had visited points in the provisional district of Athabasca, and travelled as well through portions of Yukon, and realized fully the force of Superintendent Greisbach's suggestions, as well as those of Mr. C. C. Chipman, Hudson's Bay Company commissioner, who strongly urged that North-west mounted police be stationed at a convenient point, where all importations could be examined, and liquor, if wrongly imported, seized and confiscated, suggesting the mouth of the Lesser Slave river and Lesser Slave lake posts as probably the most suitable places.

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LIQUOR PERMITS.

The following liquor permits were issued during the year, exclusive of special permits for Yukon, granted by requisition from the Department of the Interior: Whisky, 127 gallons; brandy, 49 gallons; wine, 20½ gallons; rum, 9 gallons; gin, 9 gallons. Total, 207½ gallons.

ALLEGED CANNIBALISM AT TROUT LAKE.

Early in the summer information was received that a crime had been perpetrated by the Indians at Trout lake in the vicinity of Fort Chipewyan on lake Athabasca, it being represented that the natives took upon themselves the responsibility of murdering an Indian or half-breed said to have been infected with so-called cannibalistic propensities. The particulars of the crime, so far as ascertainable, were at once communicated to the Department of Justice. Meanwhile the following notice was issued and largely circulated in the vicinity where the offence was perpetrated, the Hudson's Bay Company's officials and mounted police authorities, as well as clergy, exerting themselves to give it publicity:

"NOTICE.

"Whereas information has been received at the office of His Honour the Lieutenant-Governor of the North-west Territories that certain natives, resident at Trout lake in the vicinity of Fort Chipewyan, had foully murdered an unoffending person:

"Be it known, that the perpetrators of this crime are amenable to the laws of the Dominion and will be held responsible for such action.

"Information has also been received that this deed was executed by certain misguided natives under belief that the Indian or half-breed had been infected by insanity, and alleged cannibalistic propensities.

"The government of the country does not recognize the right of any man or men to commit murder and call it a process of law. It has therefore been deemed advisable to lay the whole matter before the Department of Justice in order that the criminals may be punished.

"Take notice that all who desire to maintain law and order should at once forward to this office the names of the perpetrators of the crime and the evidence against them. Any one discovered protecting or shielding the offenders will be punished according to law, and will be considered participators in the aforesaid murder.

"By order,

"R. B. GORDON,

"Secretary to the Lieut-Governor of the North-west Territories."

Up to the date of this report no further particulars have been received in connection with this subject.

PROTECTION OF FUR IN ATHABASCA.

During the latter part of September complaints were received by the Department of the Interior, and forwarded to this office, regarding the dissatisfaction expressed by the Indians and half-breed trappers, resident in the region through which the Athabasca river flows, as to the indiscriminate setting out of poison by irresponsible white trappers, thus causing a rapid diminution in the number of fur-bearing animals, as well as the loss of very many valuable train-dogs, hunters depending wholly upon the latter to do the work performed by horses in more civilized districts. This being a question outside the jurisdiction of either the executive committee or the territorial assembly, the prompt action taken by the federal authorities in directing Commissioner Herchmer to institute an investigation into this wholesale destruction of fur-bearing animals, as well

as into the cause of disastrous prairie fires in that district, was highly gratifying to those interested in that portion of the country. Inspector Routledge was commissioned to start with a police patrol, travelling by means of train-dogs, to Lac la Biche, Grand Rapids and Fort Chipewyan. Consequent upon the illness of Inspector Routledge, the command of the patrol was transferred to Inspector Jarvis of the "Stand Off" detachment. The party is now en route to the points above referred to, and will probably proceed to Fort Resolution in the far north, to report upon the protection of the wood buffalo. They will return, if possible, *via* Peace river, but should an early spring set in, will be obliged to await the opening of navigation.

UNORGANIZED SCHOOLS.

An annual grant is made towards the support of schools in those portions of the territories not represented in the Legislative Assembly. The payments are either quarterly, half-yearly or yearly, on the basis of \$100 per quarter, on receipt of returns, the register for each school to be sent to the Lieutenant-Governor's office. The reception of these returns depends very much on postal facilities. Up to the date of last statements received the following institutions were in active operation :—

PROTESTANT SCHOOLS.

Fort Norman.
do Macpherson.
do Simpson.
Hay River, (St. James' Mission, Fort Resolution.)
St. Peter's Mission, Lesser Slave lake.
St. Paul's school, Chipewyan.
Irene Training school, Fort Vermillion.
Episcopal Christ Church Mission, Peace river.

ROMAN CATHOLIC SCHOOLS.

St. Paschal, Green lake.
Sacred Heart convent, Fort Providence.
St. Henri's Mission, Vermillion.
Sacred Heart school, Isle a la Crosse.
Heart river, Lesser Slave lake.
School of Holy Angels, Fort Chipewyan.
St. Joseph's Mission, Great Slave lake.
St. Bernard's Mission, Lesser Slave lake.

Acting upon instructions from the Department of the Interior during the year a thorough revision of the system prevailing was instituted. In dealing with the Protestant schools I had the assistance of their Lordships Bishop Reeve of Mackenzie river and Bishop Young of Athabasca, and was thus enabled to institute certain changes, and to estimate the great difficulties encountered by them in conducting educational institutions at these far-off points. With reference to the Catholic schools I had the advice of Bishop Grouard of Ibora, Vicar Apostolic of Athabasca-Mackenzie, his Lordship Bishop Grandin, the Reverend Father Lacombe, and the Reverend Father Lestanc, and fully realized the onerous work involved. Hitherto the system had prevailed of entrusting quarterly returns to travellers or to an uncertain mail system, thereby causing great delay, not only in the reception of documents, but also in the payment of grants to which the various schools were entitled. Taking advantage of the mounted police patrol force going north, I caused circulars to be sent to the various districts, with prepaid envelopes, addressed to the Lieutenant-Governor's office here, forms sufficient for the year being inclosed to the authorities representing each school, with directions that replies and statements should be made every three months. The following is the form referred to :

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A.

QUARTERLY REPORT.

SCHOOLS IN UNORGANIZED TERRITORIES.

Name of school.....
Name of teacher.....
Post office address (if any).....
Quarter ending..... 18

NAMES OF PUPILS.

Total days present.....
Average daily attendance.....
Opening and closing hours of school.....
What subjects taught.....
.....
Is any grant made by Indian Department? If so, amount?.....
Has school been kept every day except usual holidays?.....
.....
Any suggestions, if deemed necessary.....
.....
.....

CERTIFICATE.

(To be signed by teacher, and resident or visiting minister of any denomination.)

The undersigned certify and declare that this report contains a true record as set forth above.

..... teacher.
..... resident or visiting minister.

TAKE NOTICE:—This report should be forwarded promptly to his Honour the Lieutenant-Governor, Regina N.W.T., mailed in the official envelope supplied for that purpose.

It might be added that those in authority naturally feel that they should not be held responsible for irregularities in the reception of reports, as these are sent when—

ever the opportunity is offered. They further explain that there are no mails in some parts of the country, except one in winter and one or two in summer and at no very precise date, although the Hudson's Bay Company does everything in its power to assist in this particular. Altogether, I was greatly impressed by the earnestness of the missionaries, clergy and teachers, in their efforts to educate the children living in these scattered communities.

BRITISH OUTPOSTS IN YUKON.

The action of the Dominion government in designating as Yukon, by Order in Council, all that region defined by the northern boundary of British Columbia, the eastern boundary of Alaska, the Arctic Ocean, and a line drawn from the westerly mouth of the Mackenzie river to the range of mountains, striking them at the intersection of the 136th meridian, thence south along the range to the Liard river at the British Columbia boundary, containing approximately 192,000 square miles, afforded much satisfaction to those who desired the adoption of some distinctive name for that vast section of country. The establishment, in October, 1895, at Fort Cudahy, on the Upper Yukon river, of a mounted police headquarters, and the raising of the Union Jack over that far northern post of the British Empire, added to the expressions of gratification conveyed in various letters received at Regina. I deemed it advisable to send forward, early in the spring of 1896, a series of questions with reference to the state of the country, its products, its requirements and general progress, and was much impressed by answers received. At the present time the Canadian territory is virtually occupied and controlled commercially by foreign traders, namely, the Alaska Commercial Company, of San Francisco, and the North American Transportation Company, of Chicago, a condition of affairs universally regretted by those Canadians who aspire to assist in developing Dominion interests in the northern portion of the continent. It must be admitted, however, that hitherto the companies above mentioned, while reaping rich harvests from the privileges resulting from trading operations, have assisted in developing portions of the country, although making no sacrifices in order to convey Canadian goods on American bottoms—if such seemed likely to interfere with foreign operations. During the summer it was estimated that over 2,000 miners went by way of St. Michael's by water, and by the Lynn canal overland route, into Yukon, in both cases having to utilize what is claimed as United States territory. In establishing law and order in the Yukon district, Dominion authority is maintained by a mounted police force, under Inspector Constantine, in number quite insufficient, comprising twenty men, the consequence being that the prevention of illicit manufacture, as well as smuggling of spirituous liquors, is almost an impossibility. The subjects appertaining to the Yukon district are so numerous and comprise so many branches that only bare details can be dealt with in this report; suffice to say, that the Yukon country and its requirements are well worthy the matured consideration of any government, and any people. It is estimated that the route of the American steamships from Seattle to St. Michael's island in the Behring sea, and from there, by way of the Yukon river to Cudahy, is fully two thousand miles longer than would be an all-through Canadian route from Fort Wrangell to Telegraph creek via the Stikine river, by stern wheel boat; thence by rail or tramway from Telegraph creek to Teslin lake, the Hootalinqua river, and the junction of the Lewes and Pelly at Fort Selkirk, and the Yukon proper to Fort Cudahy. Travellers and explorers represent that the building of a light railway from 120 to 140 miles in length would connect the entire country, north and south; others claim that the distance over a partially used trail would not exceed 112 miles. Should that portion of the boundary now in dispute between the United States and Canada become the property of the Dominion, a still shorter route by Tiaya, (sometimes called Dyea), to Lake Lindeman, thence through the lakes to the Yukon river, could be found.

It is satisfactory to know that, although the police force in the Yukon country is quite inadequate, law and order have been maintained at points where the largest population is concentrated. The following latest magisterial returns sent forward by

Department of the Interior.

Inspector Constantine, and supplied by Assistant Commissioner McIllree, fully establish the validity of the above statement :—

Date of Summons or Arrest.	Prosecutor.	Offence.	By whom tried.	Remarks.
1895.				
Aug. 25...	D.W. Walker.	Bringing stolen goods into Canada.	Strickland and Wills.	Case dismissed.
Dec. 27...	N.W.M.P.	Selling liquor to Indians...	C. Constantine.....	Fined \$100 and costs.
1896.				
Mar. 27...	Rose Phillips.	Theft.....	D. E. Strickland....	Dismissed.
April 24..	N.W.M.P.	Assault.....	C. Constantine.....	Sentence suspended.

From early in August last up to the 31st of December instant no official communication passed between Fort Cudahy and this office or the mounted police headquarters at Regina, except a brief letter from Inspector Constantine, brought to me by Mr. William McPhee, who was accompanied by Mr. John Macleod, both being traders in and about the Yukon district. Mails are expected to arrive out, via the "Summit" and Juneau, early in January, 1897. Messrs. McPhee and Macleod are warm advocates of an overland route through Canadian territory; they complain that it is exceedingly difficult to ship goods even by the American route to Yukon, owing to obstacles placed in the way by companies who own and operate steamers on the waters leading thereto, they controlling the trade. However, both give glowing accounts of the country, and of the order prevailing there, as well as the marvellous placer mining properties, extending for hundreds of miles throughout the Yukon, more particularly the Stewart, the Clondyke, near Fort Reliance, the Hootalinqua river and various other streams emptying into the Yukon. Over \$700,000 in gold is estimated to have been taken out during this year from the Canadian side, *i.e.*, the Yukon proper.

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

C. H. MACKINTOSH,
Lieutenant-Governor of the North-west Territories.

Department of the Interior.

PART VI.

REPORT OF THE LIEUTENANT-GOVERNOR OF KEEWATIN.

Department of the Interior.

PART VI.

ANNUAL REPORT OF THE LIEUTENANT-GOVERNOR OF KEEWATIN.

GOVERNMENT HOUSE,
WINNIPEG, 30th December, 1896.

The Honourable CLIFFORD SIFTON,
Minister of the Interior,
Ottawa,

SIR,—I have the honour to submit to you herewith a report upon the affairs of the district of Keewatin.

The district is but sparsely inhabited, the comparatively small population of Crees, Saulteaux, Chipewyans and Esquimaux being scattered over the whole of its large area. Means of communication throughout the district are very limited, being almost entirely confined to the Hudson's Bay Company's packets which are regularly sent some three or four times a year.

The only settlements which can be properly so designated are at the various stations or posts of the Hudson's Bay Company, near to which are generally also located other traders, known as free traders, as well as, in a few cases, Mission Stations with, in most instances, resident missionaries and teachers.

A beneficent work is carried on among those distant and scattered people by missionaries of the English, Roman Catholic and Methodist churches; and I desire to add my testimony as to the zeal of these devoted missionaries, whose influence and example so largely contribute to the promotion of that peaceful state of affairs which exists through the district, and which enables me to report an almost entire absence of crime.

To the officers of the Hudson's Bay Company in the district, who are in most instances justices of the peace, is also due a share of praise for this observance and maintenance of law and order throughout this vast territory.

During the past twelve months, with the single exception of a suspected case of infanticide, upon which I have already reported, no alleged cases of crime have been brought to my notice, save one of robbery by an Indian, when an article of little value was taken. On account of the difficulty of procuring witnesses, and of the uncertainty of being able to attach the offence to the suspected Indian, and of the very heavy expenses which would be incurred in bringing the suspect to trial before the proper judicial authorities, it was deemed advisable not to proceed further with the case.

This absence of crime and respect for authority which is somewhat remarkable among a people so widely scattered, and whose lives in most cases depend upon the success of their hunting, and who are constantly exposed to privation and poverty, and are almost entirely uneducated, is to a very great extent due to the restraint which is placed upon the admission of intoxicating liquors into the district.

The regulations do not admit of the importation of liquors into the district of Keewatin except upon specially issued permits granted, almost solely, for medicinal purposes. These permits, issued to responsible men only, upon the recommendation of men of standing in the community, are given for a limited quantity, and thus any traffic in intoxicants, in so far as the Indian population is concerned, is absolutely prohibited. I visited the northern part of lake Winnipeg during the month of July last at the time that the treaty Indians were receiving their annuities and had an opportunity then, from inquiry and personal observation, of satisfying myself that the traders were respecting the law, and that there was no attempt at illicit introduction of

intoxicants into the district. The Indian women and children whom I saw appeared cleanly and comfortably clad, and the men, who were reported as fairly industrious, were employed in large numbers on the fisheries which are being carried on in that neighbourhood.

I am informed that in past years a considerable traffic in intoxicating liquors was indulged in by American whaling vessels which wintered on the shores of the northern part of Hudson's Bay. These vessels, not being under the British flag, have for some time carried on a considerable trade in these Canadian waters, and their crews, it is stated, have shown but little respect for our Canadian laws or the regulations regarding the aborigines of the country, while they were not contributors in any way to the revenues of the Dominion. Whether there has been any recurrence of this traffic in that remote portion of the district during the past season I am, as yet, without information.

In the southern part of the district some of the Indians are under treaty, and receive the benefit of the occasional attendance of the medical superintendent of the Indian Department. Throughout the rest of this large area there is, as far as I can learn, but one medical man—the Hudson's Bay Company's officer stationed at York factory.

It is gratifying to be able to inform you that the reports received all point to the absence of any epidemics among the Indians during the past season, and to their general good health. This no doubt to a considerable extent is attributable to the comparative plenitude of deer, fish and fur-bearing animals throughout the year. The deer in the north-western part of the district are, I am informed, migratory, and cannot always be depended upon as a sure supply of food; while fur-bearing animals are subject to periods of increase and diminution. When scarcity arises from either of these causes cases of privation and hardship, and even of starvation, have been known to result, and a grave responsibility is thrown upon the authorities.

I am in communication with the resident missionaries at various points throughout the district, and should I learn from them anything of public interest I shall have pleasure in communicating it to you later on.

I am indebted to the kindness and co-operation of C. C. Chipman, Esq., Commissioner of the Hudson's Bay Company, and to the various officers of that company, for valuable information from time to time with regard to the district, and as to the health and welfare of the inhabitants; and I have also to acknowledge their co-operation in assisting me in enforcing the laws restraining the use of intoxicants among the white population, and absolutely prohibiting its introduction among the Indians.

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

J. C. PATTERSON,
Lieutenant-Governor of Keewatin.

Department of the Interior.

PART VII.

ROCKY MOUNTAINS PARK.

Department of the Interior.

ROCKY MOUNTAINS PARK

BANFF, 15th December, 1896.

The Hon. CLIFFORD SIFTON,
Minister of the Interior, Ottawa.

SIR,—I have the honour to report on the works and other particulars connected with the Rocky Mountains Park, from the beginning of October, 1895, to the end of October, 1896.

ROADS.

No new roads were laid out this year, nor were the present ones extended, the work under this head being confined to repairs.

Most of these roads have been in use for ten years, and each year calls for additional repairs. The culverts and smaller bridges built of such timber as this section of the mountains affords cannot be expected to last more than ten years, consequently the annual repairs are becoming more necessary, with frequent and careful inspections to prevent accidents.

Quantities of small brushwood have sprung up along the sides of the roads, encroaching gradually on the travelled part, and interfering with the traffic, besides being a disfigurement of the appearance of the highway. The removal of this brush, &c., constitutes part of the work of repairs.

The bridge over the Cascade river at the "Canyon," and also the bridge beyond it, over the Minniwanka river, have been carefully watched and repaired; but owing to the danger attending any defect in these bridges it is proposed to give them additional strengthening early the coming spring before the summer traffic begins.

The planking of the Bow bridge will have to be renewed at once. This planking has had nearly ten years service, and is worn thin, and cannot be trusted for another season. I have made arrangements for new planking early this coming spring.

THE FLOODS.

There was no damage done last spring by floods in the rivers of the park, the water not rising beyond its usual limits.

FIRES.

Although the whole surrounding country was deluged in smoke for several months no fires of any consequence reached the limits of the park, and no local fires having occurred the park has been free for another year from this devastating element.

HAY CROP.

Tenders were called for, as usual, for the hay crop on the meadows of the park, and the highest tender accepted. The crop was about the usual average.

VISITORS.

There is a visible falling off in the number of visitors during the past season. The cause of this falling off is well understood as being the result of financial depression, particularly in the United States. The Americans who come here do not hesitate to attribute it to this cause, but very few anticipated that the hard times would last so long.

The Americans form a large proportion of the visitors to the park, and usually patronize the Canadian Pacific Hotel. I understand that the business of that hotel was better than usual this year, notwithstanding there were fewer guests. This would indicate that these guests remained longer than usual this year.

The Rocky Mountains Park as a health resort has heretofore laboured under one great disadvantage, namely: its distance from large centres of population. In this respect it stands much in the same position as the celebrated Yellowstone Park in the United States. Yet, notwithstanding this similarity of position, the number of visitors to the latter park is little more than one-half the number visiting annually the Rocky Mountains Park.

It is hoped and expected that this isolation of the Rocky Mountains Park will soon be remedied, and that it will then assume its proper position as a resort for health and recreation.

The great prospective development of the mineral wealth of British Columbia just on the outskirts of the park on one side, and the consequent development of Alberta as an agricultural and ranching country on the other side, will bring the advantages and attractions of the park into such marked prominence as few can anticipate, and we may reasonably expect a very much greater influx of visitors here in the future.

MUSEUM.

The museum continues to be a source of attraction to visitors, over eleven hundred persons having resorted there during the season—the summer months almost exclusively.

Many articles are still necessary to make the exhibit complete, which it is hoped may be secured at an early day.

Some painting was done on this and other government buildings, which will be completed as soon as the weather will permit.

The surrounding grounds of the museum were also laid out with gravel walks and shrubbery.

TOURISTS.

Many tourists and sportsmen made Banff their starting point during the summer, returning here in the autumn after their excursions and explorations in the mountains.

The anticipated excitement in the coming spring, consequent on the mineral discoveries in the mountains, will, no doubt, bring many tourists to Banff during the following summer, who will combine the search for minerals with their other avocations.

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

GEORGE A. STEWART,
Superintendent.

Department of the Interior.

ROCKY MOUNTAINS PARK.

MAXIMUM and Minimum Temperatures and the general state of the Weather between
14th October, 1895, and 30th November, 1896.

Date.	Thermometer Readings.				Weather.	Date.	Thermometer Readings.				Weather.
	Maximum.		Minimum.				Maximum.		Minimum.		
	6 a.m.	6 p.m.	6 a.m.	6 p.m.			6 a.m.	6 p.m.	6 a.m.	6 p.m.	
1895.						1895.					
Oct. 14.	36.8	57.0	22.8	22.8	Fair.	Nov. 20.	38.8	40.5	37.0	31.8	Cloudy, lt. rain and snowstr'm
" 15.	53.0	60.8	32.5	32.5	"	" 21.	32.5	14.2	12.2	-3.0	Fair, lt. snow, River frozen over again.
" 16.	53.0	63.7	25.0	25.0	"	" 22.	3.8	20.2	-6.5	-6.5	Fair.
" 17.	55.0	59.2	23.8	23.8	" light rain.	" 23.	11.8	30.0	2.2	2.2	Cloudy.
" 18.	51.2	49.5	25.8	25.8	"	" 24.	24.8	26.8	18.0	18.0	" lt. snow.
" 19.	45.2	55.7	24.5	24.5	"	" 25.	25.1	29.0	8.8	8.8	" "
" 20.	42.0	57.2	22.0	22.0	" squally.	" 26.	28.0	31.8	25.0	25.0	Cloudy, lt. snow strong wind.
" 21.	47.0	46.2	17.5	17.5	"	" 27.	28.8	22.0	22.0	11.0	Cloudy, lt. snow
" 22.	33.0	49.2	19.0	19.0	"	" 28.	11.8	25.2	-2.0	-2.0	" "
" 23.	42.0	52.2	22.2	22.2	"	" 29.	30.5	31.0	15.0	15.0	Fair.
" 24.	46.0	55.0	22.8	22.8	Cloudy, gusty south wind.	" 30.	24.1	3.0	-0.5	-0.5	Cloudy, lt. snow
" 25.	51.2	48.0	44.0	38.2	Cloudy, light rain, sleet and snow.	Dec. 1.	-0.4	6.8	-5.5	-5.5	Fair.
" 26.	39.2	39.8	22.8	22.8	Fair.	" 2.	2.0	18.8	9.2	-9.2	"
" 27.	37.5	42.2	19.0	19.0	"	" 3.	12.6	19.0	-5.0	-5.0	"
" 28.	33.0	44.8	16.0	16.0	"	" 4.	14.6	20.5	4.8	4.8	" squally, S. W. wind.
" 29.	41.0	40.0	24.5	24.5	" light snow.	" 5.	23.0	33.8	14.8	14.8	Fair, squally, W. wind.
" 30.	29.4	44.5	20.5	20.5	"	" 6.	30.6	33.2	25.8	25.8	Cloudy.
" 31.	41.7	45.0	29.0	29.0	Cloudy, light rain.	" 7.	30.6	34.0	20.8	20.8	Cloudy, lt. snow
Nov. 1.	40.0	41.0	32.0	32.0	Cloudy, light snow.	" 8.	32.2	33.2	26.2	26.2	Cloudy, strong s.w. wind.
" 2.	33.8	32.0	20.0	20.0	Fair.	" 9.	35.0	35.8	30.0	30.0	Cloudy, snow.
" 3.	27.6	26.8	3.0	3.0	" Bow River frozen over.	" 10.	36.0	36.8	31.2	31.2	Fair.
" 4.	24.6	25.2	15.0	15.0	Cloudy, light snow.	" 11.	35.0	42.2	21.8	21.8	Cloudy, lt. rain.
" 5.	23.6	26.5	14.8	14.8	Cloudy, light snow.	" 12.	43.0	41.2	34.2	31.8	Cloudy, rain, and snow.
" 6.	23.6	25.2	-2.2	-2.2	Cloudy, light snow.	" 13.	32.2	27.8	23.8	22.5	Cloudy, snow, 1st sleighing.
" 7.	23.0	30.8	21.2	21.2	Cloudy, squally, S. W. wind.	" 14.	23.0	25.2	19.0	19.0	Cloudy, snow.
" 8.	30.8	36.8	24.5	24.0	Cloudy, gusty N. W. wind.	" 15.	24.1	12.2	16.8	6.8	do
" 9.	36.5	43.2	31.0	31.0	Cloudy.	" 16.	7.4	3.2	-2.5	-2.5	do
" 10.	41.9	41.0	31.2	31.2	" lt. snow and rain.	" 17.	2.2	10.5	-9.2	-9.2	Fair, squally wind.
" 11.	37.0	33.2	21.8	21.8	Fair.	" 18.	10.2	12.5	5.8	5.8	Fair.
" 12.	29.6	27.2	9.5	9.5	"	" 19.	10.8	7.8	-8.8	-8.8	Cloudy, snow.
" 13.	25.8	31.5	15.8	15.8	Cloudy, lt. rain.	" 20.	15.0	23.5	6.8	6.8	Fair, lt. snow.
" 14.	29.8	39.2	29.0	29.0	" "	" 21.	16.8	15.0	-2.0	-2.0	Fair.
" 15.	43.0	48.0	38.0	38.0	" "	" 22.	11.8	18.2	-1.5	-1.5	do
					Bow River free of ice, very squally wind.	" 23.	22.0	25.2	16.8	16.8	Cloudy, snow.
" 16.	47.2	53.2	38.5	38.5	Cloudy.	" 24.	21.0	20.5	13.5	13.5	Fair.
" 17.	51.2	46.5	39.0	39.0	Cloudy, lt. rain, very squally wind.	" 25.	19.4	29.8	15.0	15.0	do
" 18.	40.8	30.8	27.2	24.5	Fair, hail and rain.	" 26.	29.0	29.5	26.8	26.8	Cloudy, snow- storm.
" 19.	29.8	40.2	23.5	23.5	Cloudy, lt. snow and rain.	" 27.	28.8	21.5	25.5	18.0	Cloudy, snow drifting.
						" 28.	18.4	16.0	11.5	11.5	Cloudy.
						" 29.	14.8	20.5	8.5	8.5	Cloudy, lt. snow
						" 30.	17.4	17.2	9.8	9.8	Fair.
						" 31.	16.6	20.2	14.0	14.0	Cloudy, snow.
						Jan. 1.	16.8	4.2	-4.5	-12.0	Cloudy, snow.
						" 2.	11.8	20.2	-26.8	-29.8	Fair, lt. snow.

MAXIMUM and Minimum Temperatures, &c.—Continued.

Date.	Thermometer Readings.				Weather.	Date.	Thermometer Readings.				Weather.
	Maximum.		Minimum.				Maximum.		Minimum.		
	6 a.m.	6 p.m.	6 a.m.	6 p.m.			6 a.m.	6 p.m.	6 a.m.	6 p.m.	
1896.	°	°	°	°		1896.	°	°	°	°	
Jan. 3.	-28.2	1.2	-32.0	-32.0	Cloudy, snow.	Feb. 24.	39.0	41.0	35.5	35.5	Cloudy, light rain.
" 4.	15.2	26.8	.....	.....	"	" 25.	41.5	43.5	37.8	37.8	Cloudy, rain.
" 5.	30.8	35.8	21.8	21.8	"	" 26.	40.0	38.8	35.5	31.5	Cloudy, rain and snow.
" 6.	34.5	36.2	27.8	27.8	Fair.	" 27.	31.5	24.0	13.5	13.5	Cloudy, snow.
" 7.	36.2	38.2	32.8	32.8	Cloudy, rain.	" 28.	20.0	6.5	3.8	1.5	Fair.
" 8.	36.0	41.5	33.0	33.0	Cloudy.	" 29.	2.0	-1.5	-6.0	-6.0	Fair.
" 9.	40.2	39.2	35.2	35.2	Fair, lt. snow.	Mar. 1.	-4.0	-5.0	-10.2	-10.2	Cloudy, snow.
" 10.	36.2	2.8	21.2	21.2	Cloudy, lt. snow	" 2.	-7.0	-7.8	-15.0	-15.0	Fair.
" 11.	22.6	15.2	-2.8	-2.8	Fair.	" 3.	-10.0	12.0	-27.0	-27.0	"
" 12.	14.5	16.0	-3.2	-3.2	"	" 4.	3.5	22.0	-19.0	-19.0	"
" 13.	14.8	5.8	-5.2	-5.2	Cloudy, snow.	" 5.	21.8	20.2	-11.5	-11.5	Fair, snow.
" 14.	1.0	17.0	-17.2	-19.8	Cloudy.	" 6.	14.8	14.0	-12.2	-12.2	Fair.
" 15.	-19.8	-23.5	-30.2	-30.2	Fair, snow.	" 7.	8.0	25.5	-14.0	-14.0	"
" 16.	-24.8	-20.2	-26.5	-26.5	"	" 8.	23.5	35.0	19.5	19.5	Cloudy, light snow.
" 17.	-19.5	3.5	-22.0	-22.0	Cloudy, snow, strong s. w. wind.	" 9.	30.5	37.2	19.0	19.0	Fair.
" 18.	12.0	31.5	4.0	4.0	Cloudy, snow.	" 10.	33.0	42.5	28.0	28.0	Cloudy, chinook wind, light rain.
" 19.	31.0	26.5	25.5	25.5	" lt. snow.	" 11.	40.2	43.0	33.0	33.0	Fair. Sleighing ended.
" 20.	22.4	28.0	16.0	16.0	" snow.	" 12.	38.0	37.5	16.0	16.0	Cloudy, snow and soft hail.
" 21.	27.6	-2.0	-12.0	-12.0	"	" 13.	27.5	32.0	20.0	20.0	Cloudy, snow.
" 22.	20.0	28.2	-11.2	-11.2	Fair.	" 14.	26.5	34.8	.....	.....	Fair.
" 23.	26.6	24.0	3.8	3.8	" snow.	" 15.	33.0	39.2	4.0	4.0	Cloudy. Willows budding.
" 24.	6.2	-10.0	-24.2	-24.2	" lt. snow.	" 16.	35.2	31.2	24.8	24.8	Fair, snow furies.
" 25.	-15.8	5.2	-21.8	-21.8	Cloudy, snow.	" 17.	28.5	42.2	12.5	12.5	Fair.
" 26.	30.8	41.2	-13.0	-13.0	Cloudy.	" 18.	40.0	45.0	10.0	10.0	"
" 27.	39.0	41.8	33.0	33.0	" rain.	" 19.	42.2	47.2	29.5	29.5	Cloudy, light rain.
" 28.	38.0	35.0	23.0	23.0	Fair.	" 20.	45.2	37.2	33.2	18.5	Cloudy, rain and snow.
" 29.	27.8	24.8	5.8	5.8	"	" 21.	18.5	33.5	-2.5	-2.5	Fair.
" 30.	23.8	30.2	4.0	4.0	"	" 22.	31.8	39.0	9.8	9.8	Fair. Mountain bluebirds seen.
" 31.	28.1	35.0	7.2	7.2	Cloudy.	" 23.	36.5	43.2	20.0	20.0	Cloudy, snow flurries and rain.
Feb. 1.	35.0	39.5	32.5	32.5	Fair, light snow, strong south wind.	" 24.	41.2	41.2	35.2	23.0	Cloudy, rain and snow.
" 2.	34.0	32.5	26.0	26.0	Cloudy, snow.	" 25.	23.0	38.8	11.2	11.2	Fair. Robins seen.
" 3.	27.0	19.0	2.5	2.5	Cloudy.	" 26.	37.0	43.0	30.0	30.0	Fair.
" 4.	18.0	27.8	14.8	14.8	Fair, light snow.	" 27.	40.8	40.0	24.8	24.8	Cloudy, light snow.
" 5.	22.8	28.0	16.0	16.0	Cloudy.	" 28.	38.5	32.2	18.0	18.0	Fair, squally.
" 6.	28.0	25.4	3.6	3.6	Fair.	" 29.	28.8	35.0	16.5	16.5	Fair, light snow, squally.
" 7.	23.5	28.2	18.0	18.0	Cloudy, squally south wind.	" 30.	28.8	27.8	16.5	16.5	Fair.
" 8.	23.8	33.0	5.0	5.0	Cloudy, light snow, very squally wind.	" 31.	24.8	29.2	-1.5	-1.5	"
" 9.	35.8	28.8	22.5	15.0	Cloudy, light snow.	Apr. 1.	28.0	36.0	4.0	4.0	"
" 10.	16.8	20.0	13.0	13.0	Fair.	" 2.	34.5	37.2	25.2	25.2	Cloudy, light snow.
" 11.	15.5	25.0	1.0	1.0	"	" 3.	34.0	35.2	19.8	19.8	Fair, snow.
" 12.	24.5	-4.8	-6.0	-6.0	Cloudy, snow.	" 4.	31.8	41.8	4.5	4.5	Fair.
" 13.	-3.0	35.0	-12.0	-12.0	"	" 5.	38.2	49.0	15.5	15.5	Cloudy, light rain.
" 14.	35.0	35.0	29.0	29.0	Cloudy.						
" 15.	32.5	36.5	29.0	29.0	"						
" 16.	34.8	44.2	30.0	30.0	Cloudy, snow and hail.						
" 17.	35.0	36.2	25.0	25.0	Cloudy.						
" 18.	35.8	41.2	21.5	21.5	Fair.						
" 19.	39.5	41.2	20.0	20.0	"						
" 20.	39.5	40.5	13.0	13.0	"						
" 21.	37.2	41.0	14.0	14.0	Fair, light snow.						
" 22.	37.2	38.5	26.5	26.5	Fair.						
" 23.	37.0	41.2	29.8	29.8	Cloudy.						

Department of the Interior.

MAXIMUM and Minimum Temperatures, &c.—Continued.

Date.	Thermometer Readings.				Weather.	Date.	Thermometer Readings.				Weather.
	Maximum.		Minimum.				Maximum.		Minimum.		
	6 a.m.	6 p.m.	6 a.m.	6 p.m.			6 a.m.	6 p.m.	6 a.m.	6 p.m.	
1896.	°	°	°	°		1896.	°	°	°	°	
Apr. 6.	44·9	44·0	27·0	27·0	Cloudy, snow flurries.	May 17.	40·0	48·8	28·0	28·0	Cloudy, hazy, light rain and snow.
" 7.	42·2	43·8	32·5	32·5	Cloudy, snow.	" 18.	46·8	45·5	32·8	32·8	Cloudy, light rain.
" 8.	40·2	36·8	27·2	27·2	Cloudy, snow flurries.	" 19.	43·2	58·0	28·0	28·0	Fair, hazy.
" 9.	35·2	38·8	16·8	16·8	Fair.	" 20.	55·0	52·2	36·8	36·8	Cloudy, hazy, rain, squally.
" 10.	35·0	35·5	22·8	22·8	Cloudy, light snow.	" 21.	49·2	57·9	29·5	29·5	Fair, light rain.
" 11.	33·0	43·0	23·5	23·5	Cloudy, squally.	" 22.	52·9	62·4	26·5	26·5	Fair. River rising.
" 12.	41·2	46·2	35·5	35·5	Fair, light snow and rain.	" 23.	60·7	56·9	35·5	35·5	Cloudy, rain.
" 13.	41·7	34·2	28·5	27·5	Cloudy, light snow.	" 24.	48·0	57·3	35·8	35·8	Fair, light rain.
" 14.	29·0	26·5	13·0	13·0	Cloudy, light snow; anemones in bloom.	" 25.	54·0	53·3	39·8	39·8	Cloudy, light snow and rain.
" 15.	25·2	29·0	13·0	13·0	Cloudy.	" 26.	47·6	49·9	32·8	32·8	Cloudy, rain and snow.
" 16.	25·4	37·2	9·8	9·8	Fair.	" 27.	47·0	56·9	28·0	28·0	Fair.
" 17.	36·8	41·2	10·0	10·0	"	" 28.	54·9	55·3	35·0	35·0	Cloudy, rain and light snow, squally.
" 18.	40·8	42·0	18·2	18·2	Cloudy.	" 29.	47·2	65·0	26·2	26·2	Fair.
" 19.	38·0	46·2	22·8	22·8	Fair.	" 30.	64·4	71·0	35·2	35·2	"
" 20.	45·5	51·2	19·5	19·5	"	" 31.	69·6	64·7	47·5	47·5	Fair, rain.
" 21.	50·0	52·3	24·0	24·0	Fair. Bow river clear of ice.	June 1.	58·4	64·4	30·8	30·8	Fair, light rain.
" 22.	47·8	49·5	29·0	29·0	Fair, light rain.	" 2.	60·7	64·7	30·5	30·5	Cloudy, squally, thunder and lightning.
" 23.	46·8	41·8	24·8	24·8	Cloudy.	" 3.	59·7	60·0	39·2	39·2	Fair, light rain.
" 24.	40·2	54·8	23·0	23·0	Fair.	" 4.	56·6	59·0	32·8	32·8	Cloudy.
" 25.	54·0	58·0	23·8	23·8	Fair, squally.	" 5.	57·6	60·7	40·2	40·2	Cloudy, rain.
" 26.	55·8	51·2	40·6	40·5	Fair, light rain.	" 6.	54·9	56·9	42·0	42·0	Fair, light rain and soft hail.
" 27.	50·8	45·5	26·2	26·2	Cloudy, snow.	" 7.	53·9	60·0	28·0	28·0	Cloudy, rain.
" 28.	44·0	46·5	30·8	30·8	Cloudy, light snow and hail storm.	" 8.	49·9	57·3	38·0	38·0	Cloudy, light rain and snow.
" 29.	36·5	49·5	28·8	28·8	Fair, light snow.	" 9.	50·9	56·3	35·0	35·0	Cloudy, light rain and soft hail.
" 30.	43·8	46·5	27·8	27·8	Cloudy, snow and hail storm.	" 10.	52·9	49·1	38·2	38·2	Cloudy, rain.
May 1.	36·0	49·8	27·2	27·2	Fair.	" 11.	49·1	59·7	30·5	30·5	Cloudy, strong S.W. wind.
" 2.	46·8	42·2	31·0	31·0	Cloudy, snow.	" 12.	56·1	65·4	30·0	30·0	Fair, light rain.
" 3.	38·5	49·2	25·5	25·5	Cloudy, light snow flurries.	" 13.	60·0	64·4	31·5	31·5	Fair, strong S.W. wind.
" 4.	48·5	53·5	30·8	30·8	Cloudy, rain and snow.	" 14.	60·4	63·7	32·5	32·5	"
" 5.	45·2	48·0	32·2	32·2	Cloudy, snow and rain.	" 15.	60·0	67·7	35·0	35·0	"
" 6.	41·2	43·2	31·5	31·5	Cloudy, light rain.	" 16.	62·4	73·0	37·5	37·5	Fair.
" 7.	41·2	49·0	27·5	27·5	Cloudy, light rain and snow.	" 17.	70·7	70·0	36·2	36·2	Fair, light rain, squally west wind.
" 8.	47·0	44·2	32·5	32·5	Cloudy, light rain.	" 18.	65·2	71·0	35·0	35·0	Fair.
" 9.	41·8	48·2	32·5	32·5	Cloudy, light rain.	" 19.	67·0	70·0	32·2	32·2	Fair, squally, S.W. wind.
" 10.	44·8	52·6	27·8	27·8	Fair, light rain.	" 20.	67·0	72·2	39·8	39·8	Fair, moderate gale, bush fires west.
" 11.	48·5	49·2	30·0	30·0	Fair, snow flurries.	" 21.	69·7	74·2	32·2	32·2	Fair.
" 12.	46·8	48·0	33·2	33·2	Fair.	" 22.	70·7	72·7	32·8	32·8	Fair, rain.
" 13.	37·2	43·0	29·0	29·0	Fair, hazy.	" 23.	64·4	55·3	34·2	34·2	Cloudy, light rain and snow.
" 14.	40·0	45·0	33·0	33·0	"	" 24.	54·6	66·2	28·0	28·0	Fair.
" 15.	41·2	47·0	29·8	29·8	Fair, hazy, light rain.						
" 16.	44·2	44·8	28·8	28·8	Cloudy, hazy, snow.						

MAXIMUM and Minimum Temperatures, &c.—Continued.

Date.	Thermometer Readings.				Weather.	Date.	Thermometer Readings.				Weather.
	Maximum.		Minimum.				Maximum.		Minimum.		
	6 a.m.	6 p.m.	6 a.m.	6 p.m.			6 a.m.	6 p.m.	6 a.m.	6 p.m.	
1896.						1896.					
June 25.	63.0	75.4	40.2	40.2	Fair.	Aug. 2.	60.4	64.0	46.5	46.5	Cloudy, rain.
" 26.	71.0	80.0	37.8	37.8	Fair, forest fires east.	" 3.	61.7	64.0	35.5	35.5	Cloudy.
" 27.	77.4	82.4	36.2	36.2	Fair.	" 4.	63.7	54.9	46.2	46.2	Cloudy, rain.
" 28.	77.7	85.2	38.8	38.8	"	" 5.	54.1	64.2	43.5	43.5	Fair, light rain.
" 29.	79.0	87.7	40.8	40.8	Fair, sheet lightning.	" 6.	61.7	66.7	36.0	36.0	Fair, rain.
" 30.	79.7	80.7	51.5	51.5	"	" 7.	64.2	64.2	43.5	43.5	Fair, light rain.
July 1.	78.4	77.7	49.2	49.2	Fair, smoke from forest fires.	" 8.	61.2	65.4	49.8	49.8	Cloudy, light rain, sheet lightning.
" 2.	70.7	79.4	39.5	39.5	Fair.	" 9.	62.0	60.4	47.8	46.0	Cloudy, rain, squally, S.W. wind.
" 3.	74.0	81.4	40.2	40.2	Fair, smoky.	" 10.	46.8	63.0	34.0	34.0	Cloudy, light rain.
" 4.	76.7	85.7	41.5	41.5	"	" 11.	61.7	67.4	33.0	33.0	Fair.
" 5.	80.4	88.4	46.8	46.8	Cloudy, smoky, thunderstorm.	" 12.	66.4	72.2	31.0	31.0	"
" 6.	74.7	83.4	46.0	46.0	Fair, smoky, lightning.	" 13.	69.4	67.7	38.2	38.2	Cloudy, thunder storm.
" 7.	82.2	78.4	58.0	58.0	Cloudy, light rain.	" 14.	63.4	62.4	45.0	45.0	Fair, rain.
" 8.	75.2	82.2	49.5	49.5	Fair.	" 15.	60.0	63.7	47.8	47.8	Cloudy, light rain, lightning.
" 9.	79.4	83.2	48.5	48.5	Fair, very smoky.	" 16.	60.7	61.0	48.8	48.8	Cloudy, rain.
" 10.	77.7	78.4	47.8	47.8	Fair, smoky.	" 17.	55.6	61.4	46.0	46.0	Cloudy, thunder storm.
" 11.	77.0	81.7	40.5	40.5	"	" 18.	57.7	72.2	42.8	42.8	Fair, hazy.
" 12.	78.0	83.0	46.0	46.0	Fair, very much smoke.	" 19.	69.4	73.4	37.0	37.0	Fair.
" 13.	62.0	85.7	47.5	47.5	"	" 20.	72.0	61.4	37.5	37.5	Cloudy, rain.
" 14.	82.4	78.7	46.5	46.5	"	" 21.	54.9	64.4	40.8	40.8	Fair; forest fires west.
" 15.	69.2	84.2	43.5	43.5	Fair, smoky.	" 22.	62.4	75.4	34.5	34.5	Fair, smoky; eclipse of moon visible.
" 16.	83.2	79.2	48.2	48.2	Fair, smoky, squally, S.W. wind.	" 23.	73.0	75.4	37.5	37.5	Fair, smoky.
" 17.	76.7	79.7	40.0	40.0	Fair, very much smoke.	" 24.	71.7	75.0	42.0	42.0	"
" 18.	78.0	80.0	39.5	39.5	"	" 25.	70.7	73.4	38.5	38.5	"
" 19.	74.7	77.4	46.5	46.5	"	" 26.	67.7	79.2	36.2	36.2	"
" 20.	74.4	46.7	44.0	44.0	Cloudy, rain, gusty wind.	" 27.	75.0	74.4	41.0	41.0	"
" 21.	46.2	47.5	38.8	38.8	Cloudy, light rain.	" 28.	70.4	79.4	36.0	36.0	"
" 22.	47.0	56.9	40.8	40.8	Cloudy.	" 29.	77.4	79.2	36.5	36.5	"
" 23.	54.1	74.2	30.0	30.0	Fair.	" 30.	74.2	77.4	36.2	36.2	"
" 24.	72.7	64.2	38.8	38.8	Fair, light rain, very much smoke.	" 31.	72.4	72.7	54.2	54.2	Cloudy, very much smoke.
" 25.	61.0	63.0	46.0	46.0	Cloudy, smoky.	Sept. 1.	67.7	65.7	40.8	40.8	Cloudy, smoky, lightning.
" 26.	61.7	69.2	37.0	37.0	Fair, very much smoke.	" 2.	61.4	71.2	35.0	35.0	Fair, smoky.
" 27.	65.4	72.4	40.0	40.0	Fair, very much smoke, thunder and lightning.	" 3.	68.7	65.7	47.2	47.2	Cloudy, smoky, rain.
" 28.	69.7	51.1	46.2	46.2	Cloudy, thunder storm and hail.	" 4.	63.0	71.7	32.8	32.8	Fair, slight smoke.
" 29.	49.6	63.0	40.5	40.5	Fair, slightly smoky.	" 5.	61.7	75.4	36.0	36.0	Fair, slight smoke, squally.
" 30.	61.0	72.0	44.2	44.2	Fair, smoke from forest fires west.	" 6.	71.7	71.4	49.5	49.5	Cloudy, very much smoke, S. W. wind, lightning.
" 31.	68.0	72.0	40.2	40.2	Fair, smoky, light rain.	" 7.	66.0	50.3	39.5	39.5	Cloudy, smoky, light rain and snow.
Aug. 1.	64.7	71.4	42.8	42.8	Cloudy, rain, squally.	" 8.	45.2	42.0	28.2	28.2	Cloudy, snow flurries.
						" 9.	39.2	42.2	29.5	29.5	Fair, snow.

Department of the Interior.

MAXIMUM and Minimum Temperatures, &c.—*Concluded.*

Thermometer Readings.					Weather.	Thermometer Readings.					Weather.
Date.	Maximum.		Minimum.			Date.	Maximum.		Minimum.		
	6 a.m.	6 p.m.	6 a.m.	6 p.m.			6 a.m.	6 p.m.	6 a.m.	6 p.m.	
1896.						1896.					
Sept. 10.	40.2	40.2	25.0	25.0	Cloudy, snow flurries & rain.	Oct. 22.	38.2	52.8	27.0	27.0	Fair.
" 11.	37.8	41.0	33.8	33.8	Cloudy, rain & snow storm.	" 23.	39.8	54.1	26.2	26.2	"
" 12.	37.2	36.0	31.2	31.2	Cloudy, snow.	" 24.	46.8	48.9	28.2	28.2	Cloudy.
" 13.	34.8	38.2	32.0	32.0	"	" 25.	44.5	42.5	22.8	22.8	Fair.
" 14.	35.5	44.8	31.2	31.2	Fair.	" 26.	33.8	35.2	11.5	11.5	Cloudy.
" 15.	40.0	42.0	35.0	35.0	Cloudy, lt. rain.	" 27.	29.5	37.2	26.0	26.0	Cloudy, snow flurries.
" 16.	40.8	51.3	35.5	35.5	Cloudy, rain.	" 28.	33.5	42.2	17.2	17.2	Fair, squally S. W. wind.
" 17.	44.8	56.3	34.2	34.2	Fair.	" 29.	40.2	43.8	35.5	35.5	Cloudy, lt. snow
" 18.	54.3	60.0	28.8	28.8	"	" 30.	38.0	41.8	26.2	26.2	Cloudy, squally, S.W. wind.
" 19.	53.6	64.2	28.2	28.2	"	" 31.	39.0	39.8	36.8	33.8	Cloudy, snow.
" 20.	61.7	63.4	28.0	28.0	Fair.	Nov. 1.	35.2	35.8	14.8	14.8	Fair.
" 21.	57.6	66.4	28.2	28.2	"	" 2.	32.8	36.2	22.5	22.5	Cloudy.
" 22.	60.4	69.7	28.5	28.5	"	" 3.	34.8	40.2	24.5	24.5	Fair, snow flurries.
" 23.	58.7	70.2	28.8	28.8	Fair, light rain.	" 4.	36.8	37.2	27.5	27.5	Cloudy, snow.
" 24.	59.0	56.9	34.5	34.5	Fair.	" 5.	35.5	27.2	18.5	18.5	Fair, snow.
" 25.	49.6	42.5	32.2	32.2	Cloudy, snow and rain.	" 6.	22.8	28.5	7.2	7.2	Fair; Bow River frozen over.
" 26.	41.5	53.9	22.5	22.5	Fair.	" 7.	27.0	28.8	8.2	8.2	Fair, squally, S.W. wind.
" 27.	52.1	63.4	27.2	27.2	Fair, squally, S.W. wind.	" 8.	27.8	33.8	24.5	23.5	Cloudy, snow, gusty north- west wind.
" 28.	58.0	61.0	41.5	41.5	"	" 9.	23.5	13.2	9.0	9.0	Cloudy, snow.
" 29.	56.3	61.2	29.8	29.8	Fair.	" 10.	9.8	15.8	6.3	6.3	Cloudy, snow flurries.
" 30.	57.6	56.7	31.8	31.8	Cloudy, light rain, gusty S.W. wind.	" 11.	8.5	12.8	5.6	5.6	Cloudy, snow.
Oct. 1.	49.6	58.0	48.2	48.2	Fair, gusty S.W. wind.	" 12.	5.5	18.0	9.4	9.4	Cloudy, snow- storm.
" 2.	55.1	62.4	48.8	44.5	Cloudy, rain, thunder, squally S.W. wind.	" 13.	12.5	3.8	0.8	0.8	"
" 3.	44.8	44.2	33.2	33.2	Cloudy, strong west wind.	" 14.	2.2	2.2	5.1	5.1	"
" 4.	41.2	45.8	24.2	24.2	Cloudy, snow flurries.	" 15.	2.2	2.0	5.3	5.3	"
" 5.	41.8	44.5	30.5	30.5	Fair, snow.	" 16.	2.5	12.8	26.5	26.5	Fair; 3 ft. 8 in. snow on ground
" 6.	39.2	49.9	18.8	18.8	Fair.	" 17.	16.5	1.2	20.4	20.4	Cloudy, light snow, drifting.
" 7.	47.2	46.8	29.8	29.8	Fair, light rain and snow.	" 18.	5.2	10.0	31.4	31.4	Fair, hazy, light snow.
" 8.	42.2	44.8	27.2	27.2	Cloudy, snow- storm.	" 19.	19.5	9.5	32.6	32.6	Fair.
" 9.	34.0	44.8	24.5	24.5	Fair, squally, west wind.	" 20.	12.0	13.0	35.7	35.7	"
" 10.	42.5	54.3	31.5	31.5	Fair.	" 21.	21.5	7.8	34.1	34.1	Cloudy, snow.
" 11.	49.6	46.8	27.5	27.5	Cloudy, lt. rain.	" 22.	6.5	5.5	1.0	1.0	"
" 12.	43.8	50.9	34.8	34.8	Fair.	" 23.	0.5	14.0	10.7	10.7	Cloudy, light snow.
" 13.	48.1	59.7	32.2	32.2	Fair, squally S. W. wind.	" 24.	1.0	0.5	3.5	5.3	Cloudy, snow flurries.
" 14.	51.9	58.0	33.8	33.8	Fair.	" 25.	4.2	5.2	20.4	20.4	Fair, hazy, light snow.
" 15.	51.3	56.3	27.8	27.8	"	" 26.	10.2	21.8	40.8	40.8	Fair.
" 16.	44.8	58.4	25.5	25.5	"	" 27.	25.8	4.8	40.3	40.3	Fair, hazy.
" 17.	47.9	56.9	26.8	26.8	"	" 28.	11.2	1.8	30.1	30.1	Fair.
" 18.	42.8	58.7	23.5	23.5	"	" 29.	6.2	2.2	23.9	23.9	Fair, hazy, squally.
" 19.	47.9	52.9	26.0	26.0	Fair.	" 30.	2.5	1.8	10.7	10.7	Cloudy, light snow.
" 20.	38.8	55.3	23.5	23.5	"						
" 21.	48.6	49.3	33.5	33.5	Cloudy.						

NORMAN B. SANSON,

Observer.

CANADIAN PACIFIC HOTEL, BANFF.

VISITORS from the 15th of May to 1st October, 1896.

From where.	Number.
United States	800
Canada	350
England	233
Scotland	33
Ireland	9
France	5
Russia	3
Italy	1
Australia	9
New South Wales	10
Germany	12
India	19
Hawaiian Islands	21
Japan	12
New Zealand	6
Borneo	2
Egypt	1
Ceylon	1
China	79
	1,606

SANITARIUM.

VISITORS from 31st October, 1895, to 31st October, 1896.

From where.	Number.
Canada	1,401
United States	190
England	69
Ireland	15
Scotland	8
Germany	5
Italy	1
Japan	15
China	13
New South Wales	10
New Zealand	5
Switzerland	3
Borneo	1
Australia	12
	1,748

Department of the Interior.

GRAND VIEW HOTEL.

VISITORS from 31st October, 1895, to 31st October, 1896.

From where.	Number.
Canada	291
United States	38
England	5
Australia	4
China	2
Hawaiian Islands	1
	341

BEATTIE'S HOTEL.

VISITORS from 31st October, 1895, to 31st October, 1896.

From where.	Number.
Canada	271
United States	17
England	7
Ireland	4
Scotland	2
	301

CAVE AND BASIN.

NUMBER of persons registered from the 14th October, 1895, to 31st October, 1896.

From where.	Number.
Canada	1,419
United States	643
England	214
Scotland	27
Ireland	24
India	3
Australia	20
China	30
France	5
Japan	6
Germany	4
Belgium	4
Ceylon	2
	2,410

MUSEUM.

NUMBER of Visitors from 31st October, 1895, to 31st October, 1896.

From where.	Number.
Canada.....	581
United States.....	299
England.....	105
China.....	31
Australia.....	19
Scotland.....	17
India.....	14
New Zealand.....	11
Hawaii.....	10
France.....	7
Japan.....	5
Ireland.....	4
Germany.....	3
Switzerland.....	2
Italy.....	2
Egypt.....	1
	1,111

EXPENDITURE on Works from 1st October, 1895, to 31st October, 1896.

On what expended.	Amount.
	\$ cts.
Roads.....	715 54
Waterworks.....	195 00
Museum.....	305 97
Sprinkling roads.....	262 00
Cemetery.....	35 00
Clearing land.....	44 00
Contingencies.....	363 45
	1,920 96

60 Victoria.

Sessional Papers (No. 13A.)

A. 1897

SUMMARY REPORT

OF THE

GEOLOGICAL SURVEY DEPARTMENT

FOR THE YEAR

1896

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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

1897

No. 13a—1897.]

Geological Survey Department.

*To His Excellency the Right Honourable the Earl of Aberdeen, Governor General of
Canada, &c., &c., &c.*

MAY IT PLEASE YOUR EXCELLENCY :—

The undersigned has the honour to lay before Your Excellency, in compliance with 53 Vic., Chap. 2, Section 6, the Summary Report of the Proceedings of the Geological Survey Department for the year ending 31st December, 1896.

Respectfully submitted,

CLIFFORD SIFTON,

Minister of the Interior.

JANUARY, 1897.

Geological Survey Department.

SUMMARY REPORT

OF THE

GEOLOGICAL SURVEY DEPARTMENT

FOR THE YEAR 1896.

OTTAWA, 1st January, 1897.

The Honourable CLIFFORD SIFTON, M.P.,
Minister of the Interior.

SIR,—I have the honour to submit herewith the Summary Report on the operations of the Geological Survey for the year 1896, which Report it is directed in the Act relating to the Department shall be presented as soon as may be after the close of each calendar year. In this Report, as is customary, special prominence is given to facts ascertained in the course of the work which are of immediate economic importance, as well as to original observations or deductions and to the exploration of new ground in the field. Promptitude in publication is often particularly important in such cases, while in the detailed reports and maps which form the greater part of the annual volumes and are of more permanent value for the districts they cover, thoroughness of elaboration, both in the field and office is more essential.

Volume VII. of the new series of Annual Reports was completed in September last. Unlike previous volumes, which were issued in paper covers, this has been bound in cloth, and it is proposed, if possible, that succeeding volumes of the series shall be similarly bound. The additional expense is not great, and it is believed that a much larger proportion of the issue will thus be preserved for use and future reference. Volume VII. consists of 1239 pages and contains, or is accompanied by, eleven maps and numerous plates and illustrations. In addition to the reprint of the Summary Report of 1894, it comprises the following reports on special districts and subjects:—

Report on the area of the Kamloops map-sheet, British Columbia. Contents of
Report on an exploration of the Finlay and Omenica Rivers, B.C. Vol. VII.

Report on the country in the vicinity of Red Lake and part of Berens River, Keewatin.

Report on a portion of the province of Quebec comprised in the south-west sheet of the "Eastern Townships."

Report on the Surface Geology of eastern New Brunswick north-western Nova Scotia and a portion of Prince Edward Island.

Report of the Section of Chemistry and Mineralogy.

Report of the Section of Mineral Statistics and Mines.

The edition of volume VII. in French, has also been prepared and printed, and is nearly ready for issue.

The printing of volume VIII. is now well advanced, and it is anticipated that this volume will be ready at a date much earlier than the last.

Separate reports.

It may here be explained that each of the reports contained in the Annual Volumes is also issued separately, and in this form is made available to the public as soon as received from the press, at a nominal charge. The volumes combining the separate issues and furnished with general indexes, serve as continuous records of the work of the Survey, and the reports are sent out in this form to scientific exchanges, libraries and institutions.

Maps in preparation.

The number of maps actually printed during the past year is considerably less than in 1895, owing to circumstances elsewhere explained by the Chief Draughtsman, and also to the fact that a number of maps printed previous to 1895 were issued together in that year. There are, however, at the present time no less than 26 map-sheets of various parts of the Dominion in process of engraving or of reproduction by different lithographic processes.

New editions required.

As a result of the important mining development in progress in the western part of Ontario, all separate copies of two of the maps relating to that country have been exhausted. These are the maps of the northern part of the Lake of the Woods and of Rainy Lake, published respectively in 1885 and 1888. Corrections and additions to the engraved stones of the first-named map are now in hand, and a new edition of it will be printed at the earliest possible moment, in order that it may be available to prospectors and miners in the spring. The Rainy Lake sheet will also eventually require to be reprinted, but as it has in large part been reproduced in a map printed by the Ontario Bureau of Mines, it is not so urgently required.

Paleontological publication.

Part 3 of volume III. of the series of publications entitled *Paleozoic Fossils*, by Mr. J. F. Whiteaves, will shortly be published. This part

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deals with the Cambro-Silurian fossils of the Winnipeg basin, and is based upon the study of extensive and interesting collections made in that region, by several members of the staff.

Work on the general classified index of reports of the Survey subsequent to the *Geology of Canada* (1863) has been continued by Mr. D. B. Dowling during the year, and is now completed to the beginning of the new series of reports in 1885. It includes 25,813 references. The indexing of the *Geology of Canada* (1863) is now in hand, and will add about 6000 additional references. As this volume constitutes a summary of all the Reports of Progress of still earlier years, and as the volumes subsequent to 1885 have separate indexes, the completion of the work now in progress will, with these, practically afford easy reference to the entire work of the Survey since its inception in 1843. It is intended to print the general index as a separate publication as soon as possible.

General
index.

The preparation and distribution to educational institutions of small collections illustrative of Canadian ores, rocks and minerals has been continued during the past year, fifty-four such collections having been sent out, aggregating over 5000 specimens in all. It is endeavoured as far as possible to confine the supply of these collections to institutions in which some elementary natural science is actually taught, but even as thus restricted, the labour and time involved in obtaining material, making up, labelling and cataloguing the collections is very considerable.

Educational
collections.

Some duplicate mineral specimens of particular interest or rarity, brought in from various parts of the Dominion, have been sent to the museums of several Canadian universities, and a few specimens of the same kind specially requested by foreign institutions have been furnished.

Further samples of economic minerals have been supplied from time to time, with all necessary particulars, to the Canadian section of the Imperial Institute in London, which now affords an excellent medium of making known in Great Britain products likely to find a market there. Through correspondence with Mr. Harrison Watson, the efficient curator of the Canadian section, and by means of the recently established Research Department of the Institute, producers and consumers have already in a number of instances been brought into relation with each other. The Geological Survey Department will be happy to forward to the Imperial Institute, from time to time, any approved specimens of mineral products. Such samples should in all cases be accompanied by particulars as to price, place of shipment, freight charges, etc.

Contributions
to Imperial
Institute.

Correspondence.

The correspondence of the department has greatly increased in late years and while much of this is of a routine character, a large proportion of the letters written are in reply to specific questions of various kinds, or of the nature of reports upon specimens sent in for determination or examination. Work of this character consumes a good deal of the time of several members of the staff, not otherwise accounted for, but is of direct importance, being one of the modes in which the knowledge of the mineral resources and geology of the country can most profitably be employed.

New museum building urgently required.

The number of visitors to the museum again shows a notable increase, having risen to 31,595 in 1896, and every year the necessity for a modern and safe building of greater size, becomes more urgent. A computation shows that, for the museum, such a building should have about double the floor-space of the present one, with provision in the plan for further enlargement in future years. Considerable additions to the space now employed for offices, library and for purposes of storage, etc., are also required. The situation and construction of the present building render the danger from fire excessive, a fact particularly evidenced during the past summer by the occurrence of a conflagration in lots adjacent and to the rear, which under slightly different conditions might easily have involved this building. The collections, embracing as they do more than 2000 unique "type" specimens, with the entire supply of reports and maps, and the manuscripts and notes representing over fifty years of work, would constitute an irremediable loss to the country if destroyed.

Field-work of the Director.

The session of Parliament occurring during the past summer, with difficulties arising from the want, during some part of the season, of any appropriation to cover the work in progress in the field, rendered my continued presence in Ottawa necessary and prevented me from undertaking any considerable amount of work in the field, of any kind. A few days were, however, spent in Pictou county, Nova Scotia, in company with Mr. H. Fletcher and Dr. Ami in examining some critical and interesting points connected with the geological structure of that region, of which the map-sheets by Mr. Fletcher are now in process of engraving. To Mr. H. S. Poole, who accompanied us on several occasions, acknowledgments are particularly due for information which his accurate local knowledge of the Pictou coal-field enabled him to afford.

Notable progress in mining development.

During the past year, very notable progress has been made in the development of the mineral resources of Canada, both in the way of actual work and in attracting the attention and interest of capital. British

Geological Survey Department.

Columbia has begun to evidence its value as a permanent producer of the precious metals, in a manner long foreseen by those who have paid attention to its geological structure and position. In Ontario, wherever the Huronian system is developed and has been examined, valuable mines—more particularly those of gold—are being discovered and opened up. In Nova Scotia, renewed interest has been shown in gold mining, and with improved machinery and methods, the output is likely soon to be greatly increased. Other mineral industries throughout the country, whether already established or in course of development, share in a general appreciation.

The fundamental work of the Geological Survey is that of providing geological maps and reports of the several parts of the country, such as to be of value to the explorer, the miner and others, and in consequence of the activity above alluded to, the demand for information of the kind has been greater than ever before. This has been largely met by the results of surveys previously planned and completed, with such foresight as a study of the geological conditions existing in different parts of the Dominion has rendered possible. Detailed surveys have been made in some districts, while in others it has so far been possible only to carry out general explorations and preliminary reconnaissances. Thus, when an increased interest is simultaneously shown concerning all parts of the vast area of Canada, it is not possible to provide, in every case, information of the kind and on the scale that may be asked for. With the available force of properly trained men and the money actually at the disposal of the Geological Survey, all that can be done is to continue the work steadily, in those which appear to be the most important fields, with a due recognition of the fact that this work must be carried out in such a manner as to have a permanent value to those actually interested in employing it upon the ground, while at the same time commanding the respect and confidence of the scientific world.

With the partial exception of the Topographical Surveys Branch of the Department of the Interior, by which a great portion of the Northwest Territory, Manitoba and the Railway Belt of British Columbia have been or are being mapped in varying degrees of detail, the Geological Survey is the only organization under the Dominion Government occupied with anything of the character of a general mapping of the country as a whole. From the very inception of this Survey, the want of even reasonably accurate maps of any of the provinces, has constituted the principal difficulty in connection with the geological work. Wherever the operations of the Geological Survey have extended, it is universally admitted that the maps published by it are the best

Resulting demand for geological information.

Efforts to meet this.

Want of trustworthy maps.

The chief cause of delay in Geological Surveys.

that exist; but in producing these maps a vast amount of time and labour is involved which should not properly be thrown upon the Geological Survey. With two very limited exceptions, in the cases of Nova Scotia and British Columbia respectively, the surveys conducted by the provincial governments have been limited to the running of lines of a cadastral nature, or to the partial measurement of rivers and lakes, without any attempt at exact geodetical work or the delineation of the relief of the land.

Provincial assistance desirable in mapping.

The production of good topographical maps and the construction of roads or other means of communication in the several mining districts, are, it is believed, the most important means by which the provincial authorities may readily afford additional legitimate aid to the development of the mineral wealth of the several provinces. The work of the Mining Bureaus, or Departments of Mines, of Ontario, Quebec, Nova Scotia and British Columbia, besides its function in the inspection and regulation of the mines, is assisting materially in making known the opportunities for investment and in reporting the progress actually made, in detail. The Geological Survey is conducting its operations in complete accord with these organizations, but as the provincial revenues are those actually benefited by the sale of mining lands and royalties on output, it is surely not too much to ask for some further action on the part of the provinces in the matter of topographical surveys.

Death of Mr. Giroux.

I have to record, with great regret, the death of Mr. N. J. Giroux, who had been connected with the Geological Survey since 1883. This occurred November 30th, shortly after the completion of his field-work of the season. Mr. Giroux was a most careful and conscientious observer, and although he had not contributed any detailed reports to the volumes of the Survey, he had aided materially in the collection of facts which have found a place in these volumes. His loss is sincerely deplored by all the members of the staff.

Apart from the vacancy caused by Mr. Giroux's death, there have been no changes in the permanent staff of the Survey during the year 1896.

Parties in the field.

Fifteen field-parties have been at work during the greater part of the past season, distributed as follows:—

British Columbia	2
North-west Territories	3
Ontario	3
Ontario and Quebec	2
Quebec	1
Labrador	1
Nova Scotia	3
Total	15

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Besides the above, special investigations were carried on for shorter periods by various members of the staff. Dr. H. M. Ami, spent some time in palæontological work connected with the mapping of formations in Nova Scotia. Mr. W. F. Ferrier, was instructed to endeavour to ascertain the locality in Hastings county, Ontario, from which specimens of corundum had reached him. This he successfully accomplished, with results which may prove to be of considerable economic importance. Mr. J. White, continued and extended the survey of measured lines in Central Ontario, necessary for the purpose of ascertaining the geographical position of the map-sheets already blocked out there. Mr. Willimott spent some time in collecting minerals and rocks at several localities, and Messrs. E. D. Ingall and L. L. Brophy made short excursions in Ontario and Quebec for the purpose of completing information for mineral and mining statistics.

Briefly reviewing the field-work accomplished during the year, in regard to which fuller statements are made in the sequel by the several gentlemen engaged in it, the following points may be referred to :—

In British Columbia, the supplementary work necessary to complete the topographical and geological information for the Shuswap map-sheet, was completed by Mr. J. McEvoy. A small area of rugged mountainous country in the north-east corner of this sheet was left unsurveyed, as it was thought to be more important for Mr. McEvoy to join Mr. McConnell in the mapping of the West Kootanie district. In West Kootanie, Mr. R. G. McConnell geologically investigated a tract of country to the south of Slocan and Ainsworth, including the Nelson or Toad Mountain, Rossland and Trail mining centres. As already stated, the region generally is divided between highly altered stratified rocks, chiefly of volcanic origin, and granitic rocks, largely of later date than these, which have broken up through them. Fossils believed to be of Carboniferous age were found in some parts of the stratified series. The Rossland ores occur in association with an eruptive mass of gabbro, about four miles long by one in width, and the definition of this is of great importance, as the principal ore-bodies appear on or about its periphery. A close study of the conditions of occurrence of the ores here promises to be most instructive. It is proposed to prepare, as soon as possible, a preliminary geological map of that part of the West Kootanie district which has already been covered.

Synopsis of
field-work.

To the north of Lake Winnipeg, Mr. J. B. Tyrrell's explorations were of the character of a reconnaissance, by means of which a considerable area of country hitherto unknown geologically can now be

Synopsis of
field-work—
Cont.

approximately mapped. He succeeded in defining the area of considerable bodies of the metalliferous Huronian series of rocks, and also found an unexpectedly large region characterized by good soil and presumably susceptible of ultimate agricultural occupation.

By Mr. W. McInnes, the work of mapping the mining regions of Rainy Lake district in western Ontario was continued, his time being devoted in the first place to the revision of some parts of the Seine River sheet, of which a preliminary edition had been issued, and afterwards to the Manitou country, to the north of Rainy Lake. A report on the areas covered by the Seine River and Shebandowan sheets is now approaching completion, but a considerable amount of further field-work is required for the Manitou sheet, before this can be sent to the engraver. Much general information respecting the progress of mining in the region is given in Mr. McInnes's report in the sequel, and, as in the case of the work last referred to, the knowledge being gained respecting the associates and mode of occurrence of the auriferous veins is likely to be of great practical utility.

Investigation
of Archæan
rocks.

Messrs. F. D. Adams and A. E. Barlow, associated in field-work on the area of the Haliburton sheet of Central Ontario, make a joint report on its progress. Besides the economic importance of this region, the examinations in progress there have a special scientific interest, being designed, if possible, to ascertain definitely the relations of the rocks of the Grenville series, the Huronian, and those long ago named the Hastings series, by Mr. Vennor. The whole question of the relations of the several members of the Archæan in North America is peculiarly a Canadian one, originating some fifty years ago in the epoch-making investigations of Sir William Logan, in consequence of which he first introduced a rational classification of the more or less completely crystalline masses underlying the Cambrian. The application of modern methods of research, however, necessarily opens for review many of the conclusions originally formed with less perfect means and knowledge, and the enormous area of these Archæan rocks in Canada renders it particularly important that the best and most natural classification should now be arrived at, for the purpose of delineating them upon our maps. Definite statements on the results so far obtained in the work here particularly referred to, are for the present purposely avoided, in order to leave the subject entirely open for the unbiassed formation of opinion in the light of all the facts. Messrs. Adams and Barlow, however, find reason to entertain the opinion that the Grenville series is the highly altered representative of the Hastings series, and with that opinion Dr. Ells, as a result of his work in the adjoining district is inclined to concur, although he thinks the equivalency of

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the Hastings is with the upper part rather than with the whole of the Grenville series. Any reconsideration of the relations of the Huronian to the above-mentioned series, must remain rather a matter of conjecture than of opinion until the detailed work in progress shall have advanced further.

Synopsis of
field-work—
Cont.

Work by Dr. Ells, above alluded to, has been chiefly in connection with sheet 119 of the Ontario series, which forms a continuation of the region covered by two sheets previously surveyed. One of these sheets includes the plumbago, mica, asbestos and apatite deposits of the Gatineau, Buckingham and Grenville districts, and both will be prepared for publication, with an explanatory report, as soon as practicable.

The work in progress by Mr. Giroux, on a map-sheet to the east of Ottawa, including portions of both Ontario and Quebec, was approaching completion; but has been most unfortunately interrupted by the death of that gentleman, as elsewhere mentioned. It will be necessary to endeavour to provide next summer for the additional surveys still required and for the working up of the remaining area and of Mr. Giroux's notes and plans.

The basin of the Nottaway or Noddaway River, one of the largest rivers flowing to James Bay, has been further explored during the past season by Dr. Bell, and with results of interest both geographically and geologically. Thirteen branches of the main stream were surveyed for portions of their lengths, and a route was explored northward from Waswanipi Lake to Nemiskau Lake, an expansion of the Rupert River, by means of various streams and lakes. Mr. R. W. Brock, Dr. Bell's assistant, also carried out a track-survey to the eastward along the Waswanipi River, by which he ultimately reached Lake Mistassini. The more important geological results obtained are those relating to the distribution of the Huronian rocks in the region, which it will now be possible to lay down with some accuracy on the map.

In the "Eastern Townships" of Quebec, researches on the gold-bearing deposits and on the superficial geology generally, have been continued by Mr. R. Chalmers. With the results already obtained in 1895, it will be possible to produce a useful general report on the district, and upon this, work is now in progress in the office. Some interesting particulars relating to gold mining are given by Mr. Chalmers in his progress report, on a later page, as well as facts showing the existence of two boulder-clays and the presence and height of old shore-lines indicating remarkable differential changes in elevation.

Synopsis
field-work—
Cont.

Mr. A. P. Low's investigations were again directed to the further exploration of the great peninsula of Labrador, across the northern part of which another exploratory line was surveyed, from Richmond Gulf on Hudson Bay, to Fort Chimo on Ungava Bay. The actual distance, in a straight line, between the two points mentioned, is about 350 miles, but the total distance travelled, via Missinabie, Moose River, Hudson Bay and return round the eastern coast of Labrador, was about 4200 miles. The Cambrian rocks, with their iron ores, were again found on the northern line of traverse, but no formations of late date were met with, the greater part of the district being characterized by granitic and gneissic rocks of the Archæan. It was found that the rock-striation indicated a flow of ice, during the glacial period, from the vicinity of the present watershed, both to the westward and to the eastward, nearly in conformity with the general slopes of the surface.

In Nova Scotia, Mr. H. Fletcher, Mr. E. R. Faribault and Prof. L. W. Bailey, were engaged in geological work. Prof. Bailey devoted his time to the further examination of the south-western part of the province, with the object of obtaining data for a somewhat detailed general report, such as to fulfil requirements until the regular mapping on the scale of one mile to the inch can be extended to these counties. Attention was given to the relations of the Cambrian gold-bearing rocks and the granites, in connection with the recent renewed activity in gold mining. The Devonian rocks of Digby county were also investigated, with interesting results in respect to their distribution and the horizon which they occupy. Mr. H. Fletcher's time was again particularly directed to the surveys required for new and revised editions of the geological maps of the Sydney coal-fields. The field-work necessary for this is now complete, and the preparation of the new maps will be proceeded with as soon as possible. Some work was also done in Pictou county, and a beginning was made toward the detailed mapping of the Springhill district in Cumberland county. By Mr. Faribault, work was continued in the gold-bearing Cambrian formation of the Atlantic coast region of the province. Surveys have now extended to the westward as far as Mahone Bay, in Lunenburg county, it having been decided, for the time being, to pass over the granitic country between this and the Halifax City sheet, as of minor practical importance. The geological mapping of the structural features of the auriferous Cambrian rocks, is much appreciated by those engaged in mining, and it is hoped shortly to publish some of the large-scale plans of special mining districts which have been made by Mr. Faribault.

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Boring at Athabasca Landing.

Work on the experimental boring for petroleum at Athabasca Landing, in northern Alberta, was resumed early in May last by Mr. W. A. Fraser. A depth of 1731 feet had been attained before the suspension of operations in December, 1895, the Cretaceous strata penetrated had been proved to be almost exactly similar to those coming to the surface in natural outcrops further down the river, and it was believed that the top of the lowest member of the Cretaceous—the so-called “tar sands”—in which petroleum is to be looked for, would be met with within the next 100 feet. Under these circumstances it was decided that no effort should be spared to accomplish the additional amount in depth, before abandoning this first experimental hole. It was further intended to carry the boring through the “tar sands” if these should be proved to exist under Athabasca Landing, and to a depth of about 2000 feet, if possible.

Boring operations in Northern Alberta.

As explained in the last Summary Report, the difficulties in executing this experimental boring have proved to be exceptionally great, in consequence of the incoherent character of the beds; while the unexpectedly great thickness of the strata, under the actual circumstances, led to the reduction in size of the original boring, in depth, to such a degree as to make further operations extremely troublesome. So long, however, as any reasonable prospect existed of carrying the boring down a few hundred feet further, it was deemed advisable to continue work on it, and Mr. Fraser was so instructed, as will appear by his report. Almost the entire working season was spent in endeavouring to enlarge the bore, by under-reaming below the smallest (or $3\frac{3}{8}$ inch) casing, so as to enable that casing to be driven down to arrest the caving in of the shales. The work has been very arduous and slow, but with all his efforts, Mr. Fraser could not succeed in advancing more than thirty-nine feet in further depth. The boring was eventually abandoned when further progress became absolutely impossible. Attention was then directed to withdrawing as much as possible of the steel casing, and a considerable proportion of this has been recovered for future use.

Difficulties encountered.

The bore-hole eventually abandoned.

Although this first experiment at Athabasca Landing has thus proved inconclusive, and has not absolutely settled the question as to the existence or otherwise of the “tar sands” so far to the southwest of their natural outcrop, nor the further question of the continued presence of petroleum in them, much valuable information has been gained. As explained in the last Summary Report, the great regularity

Information gained by the work.

and persistency of the Cretaceous formations in the region has been established, and the depth at which the "tar sands" and base of the Cretaceous may be found, over a wide region, has been determined. We now also know the nature of the overlying strata to be penetrated, and although this is unfavourable to boring operations, it may be stated with confidence that, with this knowledge, a second boring at the Landing could now be begun and carried down to any required depth without much chance of failure or loss of time.

Proposed further operations.

Sooner or later in the course of testing the great oil-bearing territory believed to exist in Athabasca and Alberta, it will probably be necessary to arrange for such a second boring at the Landing, but in the meantime, it is proposed, in the light of the facts now known, to make, in the first instance, a second experimental boring about eighty miles further down the Athabasca Valley, near the mouth of the Pelican River. At this place the summit of the "tar sands" should be reached at a depth of about 700 feet, and the base of the same formation (probably resting on the Devonian limestones from which the petroleum is originally derived,) at 800 or 900 feet. It is hoped that a boring to such a depth may be made with facility, in adopting the necessary precautions, during next summer.

Two boring plants might be employed.

As explained in the last report, it would greatly accelerate the proving of the field if money sufficient to enable two borings to be carried on concurrently in different localities could be obtained. This would, in fact, practically enable the experimental work now possible in two years to be executed in one, because of the restricted length of the favourable season for operations of the kind. It may be supposed that this work could be prosecuted throughout the year, and this may no doubt eventually be the case, should petroleum be discovered; but at the present time, the difficulty of communication, the distance from the base of supplies and the great expense and almost impossibility of having every appliance on hand in duplicate or triplicate, renders this practically impossible.

Conditions as to probable occurrence of petroleum unaltered.

It is proper to add that the work so far accomplished, although without positive results in the matter of petroleum, has not in the least degree tended to render the existence of petroleum, even at Athabasca Landing, more doubtful than before. It means only that the stratum in which the petroleum is likely to occur has not been reached in this instance, because of its unforeseen depth and other difficulties encountered. The importance of the inquiry, and its probable eventual success remain unchanged, and all that has been said on this subject in the Summary Reports for the years 1894 and 1895, might here be repeated.

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Had petroleum been found in the boring at Athabasca Landing, it would probably have been decided to at once move the boring plant to some place in the valley of the North Saskatchewan, for the purpose of tracing the productive beds further south, where their economic development might be of greater importance, because of the adjacent settlements and proximity to railway communication. With this possibility in view, it was thought proper to instruct Mr. R. G. McConnell, before returning to his work in West Kootanie, to spend a few days in making a special investigation of part of the North Saskatchewan valley below Edmonton, of such a character as to supplement that already carried out by Mr. J. B. Tyrrell, by whom this part of Alberta had been geologically mapped. The result of this investigation is thus summarized by Mr. McConnell :—

Examination
of North Sas-
katchewan.

“ It was found that the central anticline of the plains, which has been traced northwards from the International boundary to beyond Battle River, dies away or becomes inappreciable before the Saskatchewan is reached. The beds, so far as can be judged by the eye, are practically horizontal along the valley, from Edmonton eastward as far as the examination extended, or to Saddle Lake Crossing, some thirty-five miles below Victoria. The choice of a site for a bore-hole, in the absence of any evident arching up of the strata, becomes a difficult one, and will necessarily be largely speculative. If a test is decided on, I would advise the selection of a site in the vicinity of Victoria. The upper beds disappear gradually going eastward, and a hole of less depth would therefore be required here than further west ; also, if the anticline referred to above continues north in a reduced form, it must cross the Saskatchewan in this vicinity.”

Site recom-
mended for
boring there.

As already stated, the results at the Landing were not such as to enable any further boring elsewhere to be attempted during the season. Mr. McConnell's observations will, however, serve as a guide for future explorations.

The greatest credit is due to Mr. W. A. Fraser for his indefatigable and skilful conduct of the work at Athabasca Landing, under circumstances often very discouraging, and for most of the time without any prospect, under the arrangements made, of obtaining any adequate remuneration for his time and labour. His report is as follows :—

Report on
boring opera-
tions.

“ During the season of 1895, the boring had been carried to a depth of 1731 feet, and had reached into the Clearwater shales which overlie the ‘ tar sands.’ Further progress at that depth had become impossible owing to caving in of the sides of the bore. The casing had been carried down to a depth of 1473 feet. Reaming had then been

Report on
boring opera-
tions—*Cont.*

resumed with the 'under-reamer,' and the casing had been carried down to 1624 feet. This was the condition of the bore when work ceased, owing to the severe weather, on the 5th of December, 1895.

"The under-reaming had ceased in an extremely hard stratum of sandstone; presumably one of the concretionary nodules, similar to those found in this formation below Grand Rapids. The reaming had been carried into this for six feet, and the constant wearing away of the reamer by the emery-like rock, had reduced the shoulder the reamer was carrying down, until the bore was not larger than the casing. It became evident that an entirely different reamer was required.

"Great difficulty was experienced in making a reamer strong enough to stand this hard rock, owing to the small size of the bore. Before going up in the spring of the present year, I had one made in Toronto from patterns of one used successfully in Australia, and resumed work on the 4th of May.

"The new under-reamer worked fairly well for a time, but finally the steel legs broke. An extra pair of legs had been provided, but these also were used up before the hard stratum was reamed through. Two of the legs broke off in the bore, but were fished out successfully. Another pair of legs was got from Calgary, and reaming was resumed. Most of the summer was taken up in reaming through this hard stratum, for it proved to be about 18 feet thick.

"It was thought to be of great importance to get the casing through this hard streak, for we were probably not over a hundred feet from the 'tar sands,' the reaching of which might make the test a successful one and determine whether the sands carried oil at this place or not. The bore had cost so much, that it was thought wise to spend a little more time and money in an endeavour to get down the short remaining distance.

"Finally, on the 27th of July, the reamer passed through the hard streak. But it took several days more to enlarge the hole to $4\frac{3}{8}$ in. diameter to allow the casing to pass through. On the 4th of August the casing was tried for the first time, and it just managed to scrape through.

"From this depth (1635 feet) to 1720 feet, the reaming and casing went very well, but on another very hard streak which was encountered at 1670 feet, the reamer broke again, and much time was lost trying to fish it out.

"When the casing was down to 1720 feet, the bore caved very badly, the shale being often forced up into the casing 100 feet, and

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requiring to be drilled out. From 1720 to 1731 feet the caving was again very bad.

Report on
boring opera-
tions—Cont.

“Drilling was now resumed, and five feet drilled, when the casing was put down a few feet again. At 1735 feet, the casing was only a foot off the bottom, and the sand-pump could not be got to the bottom, even then, because of the caving. As no progress could be made, I was forced to put the casing on the very bottom. If the formation below had been soft, the casing might have been carried on, but it turned out that about a foot below this (1736 feet) a very hard streak of about six feet occurred, and further reaming was impossible, because at least three feet of space was required between the casing and the shoulder to work the reamer.

“For the last few feet, the casing had been put down a few inches at a time, trying to shut off the caving sufficiently to work without getting it on the bottom, if possible. But it was found impossible to even get to the bottom before the casing was actually on the very bottom. This was owing to two causes.—The gas travelling down outside the smaller casing and forcing the caving shale up on the inside, and the great pressure of 1736 feet of overlying strata acting on the shale in much the same manner.

“Under these circumstances drilling was again resumed, and if the formation had continued hard, no further casing would have been required, but unfortunately, it soon again changed to a very soft shale and the caving became so bad that all progress was finally stopped at 1770 feet.

“My instructions had been to carry on the bore while there was any prospect of getting down to the ‘tar sands,’ and not to abandon it until further progress had become impossible. Recognizing the wisdom of this, I had used every endeavour to get down to a depth which would make it a test and had laboured against obstacles seemingly unsurmountable.

“Acting in compliance with instructions received by wire, I now made preparations to pull out and recover as much of the casing as was possible, as soon as I had found that further progress was stopped. I succeeded in cutting off the 4 inch casing at a depth of 1100 feet, and pulled that much out of the bore. Of the 4½ inch casing I cut off and saved 700 feet. In pulling it, it parted three times, owing to a defective joint. The 5½ inch casing was parted at 200 feet from the top, and this was all I was enabled to save of it.

“After this the derrick was pulled down, the casing all piled up in good order, and the material left in good shape for an early move down

Report on
boring opera-
tions—*Cont.*

the river. Logs for a large raft have been taken out and landed just at the rig, and a large boat has been built and made ready for moving next spring. A contract has also been let for chopping 60 cords of wood at the Pelican River.

“From the work that has been accomplished much valuable information has been obtained. The bore has demonstrated that all the strata which overlie the ‘tar sands’ at their outcrop lower down the river, extend as far as Athabasca Landing. The ‘tar sands’ appear to be at a greater depth than estimated, but the discovery of the overlying strata in very regular order, would seem to indicate that the ‘tar sands’ also will be encountered within the next few hundred feet.

“The want of success in reaching the depth necessary to decide by actual boring whether the ‘tar sands’ are beneath the Landing or not is to be deplored, but every endeavour was used to get the bore as deep as possible.

“The strata actually penetrated before the abandonment of the hole, and beneath those reported on last year, are as follows :—

“1731—36, very soft shale, dark, caving badly.

“1736—47, very hard sand-rock.

“1747—52, shale.

“1752—59, shale and sand sandstone, shale caving badly.

“1759—63, shale, caving badly.

“1763—67, hard, supposed sandstone.

“1767—1770, soft shale, caving badly.”

It will be understood that the above strata may now be added to the thickness of the Clearwater shales, as given in the Summary Report of 1895 (p. 12 A.) The thickness of the entire Cretaceous section known at the Landing, now amounts to 1950 feet.

In accordance with the practice previously followed, the succeeding reports of work accomplished, are arranged by order of provinces and districts, from west to east.

BRITISH COLUMBIA.

British
Columbia.

The winter months of 1896, were spent by Mr. R. G. McConnell in working up the geological and topographical surveys of the previous season in West Kootanie, and in other investigations related to the preparation of a detailed report on that very important mining district.

Geological Survey Department.

Mr. McConnell left Ottawa for the west on May 13th, and was instructed in the first place to devote a short time to an examination of part of the North Saskatchewan River, below Edmonton, with the object of determining the most favourable place for an experimental boring, should it prove to be desirable to move the plant then employed at Athabasca Landing to the Saskatchewan. Mr. McConnell's observations on this point are given elsewhere, in connection with the report on boring operations (p. 15).

Respecting the work accomplished during the summer in West Kootanie, Mr. McConnell reports as follows:—

“ From Edmonton, I went to Nelson, B. C., arriving there on June 1st. Owing to the late season, snow still covered the higher peaks and ridges in this region and I was unable to commence regular mountain work for some weeks. The time, however, was fully occupied in an examination of the Kootanie and tributary valleys. In the latter part of June a traverse was made up Sproule Creek, a stream flowing into the Kootanie from the north, four miles below Nelson. From the head of Sproule Creek, a summit about 4500 feet in height was crossed to Cedar Creek, and the latter stream was followed down to Slocan River, which it joins about thirteen miles below Slocan Lake. A traverse was also carried up Slocan River to Lemon Creek, connecting there with the work of the previous year. We returned by the Slocan River, down which a track-survey was carried. In July, the work was extended south of the Kootanie to Toad Mountain and neighbourhood, and to the North Fork of the Salmon. In August we moved to the Columbia River, and the remainder of the season was spent on Trail, Murphy, Champion and other creeks flowing into that river below Robson. Work was discontinued on the 20th of October.

“ Mr. H. Y. Russell, my assistant during two previous years in this region, having resigned, Mr. W. W. Leach, B. Ap. Sc., was engaged as field assistant for the season. I was also joined on the 1st of August by Mr. J. McEvoy of the Geological Survey staff, who assumed charge of the topographical work.

“ The region examined forms part of the southern continuation of the Selkirk Range, and is everywhere of a rugged and mountainous character. It is traversed by several large and deep valleys running in different directions, the principal ones being those of the Columbia, the Kootanie, the Slocan, the Beaver and the Salmon. Draining into these are numberless small streams, usually of no great length, which take their rise among the higher peaks and summits and descend through deep wooded valleys to the main rivers. The present rough condition

British Columbia—Cont.

Work by Mr. McConnell, West Kootanie.

Districts examined.

Character of country.

British Columbia—Cont.

of the country is mainly due to the slow but persistent wearing action of these streams, or their predecessors, on rocks of differing hardness, the process having continued long enough to entirely obliterate all traces of the earlier configuration.

“The most prominent range south of the Kootanie, is the group called on some of the maps the Beaver Mountains, situated in the granite belt west of the North Fork of the Salmon. The higher peaks of this range approach an altitude of 8000 feet. A number of peaks of scarcely inferior height also occur south of the head of Hall Creek. South of the Beaver Mountains the country declines 1000 feet or more in general elevation and the contours of the hills and ridges become more uniform and rounded. Portions of the interior of this district bear a strong resemblance to a boldly rolling plateau. West of the Columbia River, an apparently endless succession of deep branching valleys and lofty ridges crowned at intervals with sharp peaks and crests, are everywhere met with.

Forest.

“The whole country is, or rather has been, covered with heavy forests, for, since mining operations began, destructive fires have raged every summer over large areas. The forest is principally coniferous, but is relieved by a few broad-leaved trees, among which are the aspen (*Populus tremuloides*), the cottonwood (probably *Populus trichocarpa*, a birch (*Betula occidentalis*), and a small maple (*Acer glabrum*.) Among the coniferous trees the pines are represented by the red pine (*Pinus ponderosa*), the black or bull pine (*P. Murrayana*), the white pine (*P. monticola*), and the high mountain species (*P. albicaulis*). The firs by the Douglas fir (*Pseudotsuga Douglasii*), two mountain species (*Abies subalpina* and probably *A. amabilis*), and by a species usually of fair size, growing on the lower flats, which is possibly *Abies nobilis*. The spruces include Englemann's spruce (*Picea Englemanni*), and a couple of other varieties not determined. Other trees well represented are the larch (*Larix occidentalis*), the cedar (*Thuja gigantea*), the hemlock (*Tsuga Mertensiana*). Of occasional occurrence are the juniper (*Juniperus Virginiana*), and the yew (*Taxus brevifolia*). The above list of forest trees has been revised by Professor Macoun.

Prevalence of igneous rocks.

“The most notable feature in the geology of the district examined, is the marked predominance of rocks of igneous origin. Two great series are represented, of which the older consists mostly of porphyrites, diabases, gabbros, tuffs and agglomerates, and the younger of granites.

Granites.

“The granites belong to the same mass so largely developed in the country north of Kootanie Arm and outlined in my summary of last year. The normal type is a medium-grained grayish rock, consisting

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mostly of biotite, hornblende, quartz, orthoclase and plagioclase ; but great variations in both texture and composition are frequent. In places and over considerable areas the development of large felspar crystals give it a distinct, porphyritic appearance. When crushed, this form results in a typical augen-gneiss. With variations in the proportion of its constituents the granite passes into hornblende-granite, granodiorite and mica-syenite. The latter, cut by dykes from the more acidic varieties, occurs largely along the Kootanie River west of Nelson. British Columbia—Cont.

“The granites, except for some small inliers of schists, are found in their various phases all along the Kootanie River and down the Columbia to near the mouth of Bear Creek. The south-eastern edge of the area crosses the Columbia River, below the mouth of Bear Creek and continues south for some distance along Lookout Mountain ridge. West of the Columbia River from Lookout Mountain north to China Creek, the granites occur in a band from one to two miles in width, following the river and sending out occasional spurs to the west, one of which partly encircles the Kootanie-Columbia and Monte-Cristo mountains ; but north of China Creek it spreads westward beyond the edge of the district treated of. East of the Columbia River, the granites extend, in an irregular-shaped mass from three to ten miles in width, north-eastward to Hall Creek. Besides the main granite area, numerous bosses and reefs of granite, evidently of the same age, break through the older rocks throughout the district. The largest of these crosses the Nelson and Fort Shepherd Railway near Salmon siding, and extends eastward into the still unknown country between the Salmon and Kootanie rivers. Distribution of granites.

“The rocks on the Columbia River, for some miles above and below the mouth of Champion Creek, have some resemblance to parts of the Shuswap series. They consist of mica-schists and gneisses, evidently derived from granites interbanded with pegmatites, and the ordinary gray granites of the district in a more or less schistose condition. Somewhat similar rocks were also found on the Slocan River, near the 15-mile house, but the presence there of some bands of lustrous mica-schists, typical of the Shuswap, led me to refer them to that series.

“The older system of predominantly porphyritic rocks, through which the gray granite breaks, occurs under so many forms and in such different degrees of preservation that it is highly probable rocks of different ages are represented in it. The prevalent rock of the series is a greenish augite-porphyrite often passing into a porphyrite. The groundmass of this rock is usually diabasic, and in many places the augite phenocrysts of the porphyrite disappear and it passes into a fine-grained diabase. The Porphyrites and associated rocks.

British Columbia—*Cont.*

porphyrites, while often massive and uniform in texture and appearance, usually show a more or less brecciated structure on weathered surfaces. The embedded fragments and the groundmass, except for slight differences in coloration, appear macroscopically almost identical. Besides the augite-porphyrates and diabases, massive eruptive rocks are also represented by gabbros, small areas of which occur at Rossland and on the North Fork of the Salmon, and by the grayish porphyrites with plagioclase phenocrysts of Toad Mountain and Spokane Mountain. Fragmental volcanic rocks, consisting of tuffs and agglomerates, occur on Granite, Spokane and Sophia mountains, and also on the ridges south of Lake and Bald mountains and in other places in the district. The agglomerates are calcareous in places and are interbedded occasionally with bands of fossiliferous limestones. The fossils collected are imperfectly preserved, but are probably Carboniferous in age.

Slates.

“The eruptive series of rocks inclose bands and patches of dark fissile slates, which appear in most cases to be residual portions of the formations amid which the igneous rocks, were erupted, as none of the bands, even where a thousand feet or more in thickness, can be traced for any distance along the strike. Slates holding small limestone bands occur on Hall Creek, on the North Fork of the Salmon, on Trail Creek and in other places.

Dykes.

“The granites and other rocks of the district are cut by numerous dykes and bosses mostly belonging to about the same period, but showing extreme variations in texture and composition, specimens showing a range from a light-coloured acidic rock to a dark basic one, and from a microcrystalline to a coarse granitic condition.

“The distribution of the various members of the eruptive series is extremely irregular, and owing to the large proportion of the surface concealed by drift and forests, and the limited time at our disposal, it was found impossible in many cases to trace out junctions except in an approximate manner. A brief statement of the distribution and character of this group so far as known, will, however, be given here; being of great economic interest, inasmuch as it contains the gold-bearing pyrrhotite ores which have made the district famous. The principal rocks of the series are now being examined microscopically by Mr. Ferrier and some of the names given here may be altered when his investigation is completed.

Distribution of gabbros.

“At Rossland, the central member of the group is a fine- to coarse-grained gabbro, apparently passing in a couple of places into a uraltic granite. The gabbros occupy an irregular-shaped area with a length of about four miles and an average width of one mile. They extend

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from Deer Park Mountain eastward to the western base of Lookout Mountain. The line of junction between the gabbros and the bordering porphyrites, commencing at the north-west corner of the area, runs south through the Cliff, War Eagle and Le Roi claims; then turning to the west, circles round a spur from the main area which covers part of Deer Park Mountain and continues eastward in a sinuous line, passing about a quarter of a mile north of the Crown Point mine to the foot of the west slope of Lookout Mountain. The northern edge of the area runs from the Cliff mine eastward to Monte Cristo Mountain, then bends more to the south, and skirting the southern base of the Kootanie-Columbia Mountain, continues in a south-easterly direction towards Lookout Mountain. The eastern edge of the area has not been precisely defined owing to the absence of sufficient exposures. The gabbros are fringed with a varying width of augite- and uralite-porphyrates, and fine-grained green diabases. The passage from the porphyrites to the gabbros is nowhere sharply defined and the two rocks have apparently originated from the same magma, but have cooled under different conditions. The gabbros and bordering porphyrites are important from an economic standpoint, as most of the ore-bodies at present being worked are situated either on or close to their line of junction.

British Columbia—Cont.

Relation of gabbro to ore-bodies.

“In passing outward from the gabbro area, a section taken at almost any point, shows a bordering zone of brecciated porphyrites and diabases of varying width, but seldom exceeding a mile, beyond which comes an alternating series of porphyrites, tuffs and slates, and still farther away agglomerates, associated in places with fossiliferous limestone, make their appearance. Slates and tuffs occur with the porphyrites on Red Mountain, on Kootanie-Columbia Mountain and south of the gabbro area on Lake and Bald mountains, and the ridges running south from them. Agglomerates make up the main mass of Sophia Mountain and occur with slates, tuffs and porphyrites on Granite, Spokane, Grouse and Lookout mountains, and on the ridge immediately east of Sheep Creek.

Massive and fragmental igneous rocks surrounding gabbros.

“The roughly concentric arrangement of the Trail Creek rocks, and the gradual passage outward from a holocrystalline central area through semi-crystalline rocks to bedded volcanic fragmentals, suggest an ancient (although now deeply eroded) volcanic centre, situated near the site of the present town of Rossland, from which lavas and ashes deluged the surrounding district. The presence of small bands of coral-bearing limestones with the agglomerates and tuffs, also makes it probable that a shallow sea existed at the time of the outburst, and that the eruptions were intermittent and continued during a lengthened period.

Volcanic origin of rocks.

British Columbia—*Cont.*
Serpentines.

“The porphyrites on Spokane and O. K. Mountain and on Lake Mountain are much fresher looking than those on Red Mountain, and may belong to a more recent period. An area of partly, and wholly serpentized rocks occurs on Sheep Creek between the western base of Deer Park Mountain and O. K. Mountain.

“From Rossland, porphyrites and associated rocks, often crushed into a schistose condition and accompanied by bands of argillites, were traced northward across Rock and Murphy creeks to China Creek, where they are cut off by the gray granites.

Distribution of porphyrites and associated rocks.

“West of the Columbia River, porphyrites and other igneous rocks similar to those at Rossland have a wide distribution. They are found along the Columbia River from the boundary north to near the mouth of Bear Creek, where they are replaced by granites, and thence were followed in a north-easterly direction along the line of the Nelson and Fort Shepherd Railway to within a couple of miles of the Kootanie River. The width of the band was not ascertained, as the country east of the N. and F. S. Railway was not examined except at a couple of points. From the railway west to the granite area, a variable distance, dependant on the sinuosities of the latter, the country is altogether occupied by these rocks. They were found at the head of Bear Creek and Champion Creek and along the lower part of the North Fork of the Salmon. Near the mouth of the latter stream is a small area of gabbro indistinguishable in appearance* from that at Rossland, while farther up augite-porphyrates of the ordinary type, accompanied by diabases and slates, make their appearance. The series here, as over most of the district, is traversed in all directions by porphyrites and other dykes of a later age.

Schistose eruptives.

“The eruptive series bends round the end of a spur of the granite area near the head of Hall Creek, and extends eastward across Toad Mountain as a broad band penetrating the granite, to Rover Creek, and then continues in a more southerly direction to near Waterloo on the Columbia River. In parts of this area, as on Toad Mountain, the porphyrites and other igneous rocks have been crushed and altered into finely foliated diabasic, chloritic and hydro-mica schists. The strike of the schists usually corresponds very closely with the edge of the bordering granite. The derivation of the schistose rocks from the massive eruptives, as already noted by Dr. Dawson (Annual Report, N.S., vol. IV., p. 56 B) admits of little doubt, as gradations from one to the other are frequent, and in many places the crushed and flattened phenocrysts of the original porphyrite are still apparent. On Rover Creek and southward towards Waterloo, where they disap-

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pear, the narrowing bands of porphyrites and associated volcanic and argillaceous rocks are broken up by numerous granitic intrusions, and assume a more or less schistose character, although the alteration is nowhere so complete as on Toad Mountain. British Columbia—Cont.

“No systematic examination of the mines in the district treated of was made during the past season, as Mr. Carlyle, recently appointed Provincial Mineralogist of British Columbia, was devoting his time to this particular work, and it was thought best, in consequence, to give all possible attention to the geological structure of the country. A bulletin descriptive of the Trail Creek mines has already been published by Mr. Carlyle, and another, which will embrace those of the Slocan, Toad Mountain and other parts of the district, is in course of preparation. A large number of mines and prospects in different parts of the district were, however, examined in connection with the geological work, and with a view to the elucidation of their character and the classes to which they may be referred. A brief statement of the results of these examinations is given below. Examination of mines.

“The auriferous iron and copper sulphide-ores of Trail Creek, occur almost exclusively in the massive members of the eruptive series, and most of the important ore-bodies which have so far proved productive, are situated either on or close to the line of contact between the gabbros and surrounding porphyrites and diabases. The Le Roi, War Eagle, Cliff and a number of other leads west of Centre Star Gulch, cut through the line of junction almost at right angles, while the Josie is situated a short distance to the left of it, in the porphyrites, and the Centre Star workings almost immediately east of it in the gabbros. The Monte Cristo and Deer Park claims occur close to the same line, the Kootanie-Columbia, a few hundred feet to the north of it in a band of porphyrites, and the Crown Point, Homestake, Gopher and other leads in the south belt, a short distance to the south of it, in diabases and porphyrites. The ore-bodies are, however, not altogether confined to the neighbourhood of the central gabbro area, but are also found in the bands in massive porphyrites which alternate with the surrounding volcanic fragmental rocks and argillites. The Jumbo is situated on one of these belts, as is also the Coxy, the Giant and a number of other claims. The tuffs, agglomerates and associated slates, with few exceptions, and those of little promise, do not carry the typical iron and copper sulphide-ores characteristic of the Trail Creek region, but are traversed by occasional quartz veins which appear to belong to a later date. Distribution of ore-bodies.
Quartz veins.

“The ores of the massive eruptive rocks, as stated above, consist principally of sulphides of various metals. Of these pyrrhotite or mag- Trail Creek ore.

British Columbia—*Cont.*
Pyrrhotite.

netic iron-pyrites is by far the most abundant. This mineral constitutes the common Rossland ore and also occurs in quantity, among other places, on Bear Creek, Champion Creek, the North Fork of the Salmon, and at Waterloo. It is found as a rule in a massive condition, ranging in texture from a fine to medium grain, but it is also disseminated through the country-rock. The massive variety usually holds blebs of quartz, and grains and irregular patches of other sulphides. The pyrrhotite contains gold and silver in varying quantities, a small percentage of nickel and traces of cobalt. A specimen from the Iron Colt, analysed in the laboratory of the Survey gave 0.234 per cent of nickel, and one from the Monte Cristo 0.13 per cent. The gold contents are exceedingly irregular, ranging from traces up to several ounces to the ton, and the silver from traces to four or five ounces to the ton.

Chalcopyrite.

“The pyrrhotite is usually accompanied by a certain amount of chalcopyrite or copper-pyrites, intimately commingled with it. The copper-pyrites is extremely irregular in its distribution, in some places constituting a considerable proportion of the ore-body and in others occurring only as isolated and occasional grains and patches. It was nowhere seen pure in large masses. It is auriferous and holds apparently about the same percentage of gold as the inclosing pyrrhotite.

Mispickel.

“Mispickel or sulph-arsenide of iron, is found associated with the pyrrhotite in a number of the mines, and in places occurs in considerable quantities. It is auriferous, and at the Evening Star mine and possibly at other places, a portion of the iron is replaced by cobalt and it passes into cobaltiferous mispickel or danaite. Dr. Hoffmann furnishes the following note on this mineral.—The specimen consists of a fine to coarse crystalline calcite carrying a cobaltiferous mispickel—most probably the variety known as danaite. It is coated in parts with ferric hydrate and peach-blossom red, hydrous cobalt arsenate (earthy cobalt bloom a variety of erythrite) resulting from the decomposition of the mispickel. The mispickel may not improbably contain sufficient cobalt to be of economic importance, a point which will shortly be determined; the analysis of the mineral having been entered upon.

Cobaltiferous mispickel.

Molybdenite.

“Molybdenite or sulphide of molybdenum, occurs at some of the mines, notably at the Coxy and Deer Park. At the latter mine it is stated to be highly auriferous.

Other minerals.

“Besides the above minerals, galena and blende occur at the Lilly May and other locations in the south belt and also at the Union and other mines to the north of the main mineral area, but are not found,

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so far as I am aware, in the principal Red Mountain mines. Ordinary iron-pyrites is met with in greater or less quantities nearly everywhere. British Columbia—Cont.

“ The ores are usually oxidized on the surface, but the alteration seldom extends downwards for more than a few feet, and in some cases a single shot brings the unchanged sulphides into view.

“ The ores in the schistose eruptive rocks differ markedly from those in the massive eruptives. In the well known Silver King mine, on Toad Mountain, the ore consists mostly of argentiferous bornite with some copper- and iron-pyrites, tetrahedrite, argentite, blende, galena and stromeyerite. A specimen of the latter interesting mineral, which has only recently been detected, was handed to me for determination before leaving Nelson, and was submitted to Dr. Hoffmann who reports as follows.—It consists of stromeyerite, a sulphide of silver and copper, with a little galena and pyrite in a gangue composed of a grayish felspathic rock. An approximate determination of the silver in this particular specimen of the mineral after separation of all gangue etc., gave 51.9 per cent, of silver. The analysis of this mineral will shortly be taken in hand. Ores in schistose eruptive rocks. Stromeyerite.

In the Dandy, a claim adjoining the Silver King, argentiferous galena is the principal mineral, and associated with it in more or less abundance in different places are tetrahedrite, blende, bornite and copper- and iron-pyrites.

“ The classification of the Trail Creek ore-bodies, and the sulphide deposits generally of the igneous rocks of the district, is a difficult problem and one which has given rise to considerable differences of opinion. They may be original segregations from a cooling magma, like the Sudbury pyrrhotite ores, secondary segregations from the basic rocks which inclose them, replacement veins along lines of fissuring, or, as the majority of the miners are inclined to believe, true fissure veins. Isolated examples might be cited in support of any of these views, but taking the deposits as a whole, the theory which fits in best with the prevailing conditions is undoubtedly the third. The blunt irregular outlines of some of the ore-bodies, and their fissure-like regularity in others, the presence in most cases of a single wall which is often meaningless as a confining line, and the occasional lack of any wall, the gradual blending of the ore with the country-rock, and the presence of the latter as the principal gangue, are all characters consistent with the deposition of the ore from ascending heated waters, which have eaten away portions of the country-rock along lines of fracturing, and replaced it by the minerals held in solution. The definite and approximately parallel direction and dip of the majority of the Rossland Classification of ore-bodies.

British Columbia—*Cont.* leads, the siliceous character of many of the ores and the presence of calcespar in seams and irregular pockets, tell against the theory of original segregation, which has of late years been applied to somewhat similar deposits in different parts of the world, while the ordinary ear-marks of fissure veins, as usually understood, are seldom observable.

Permanency of ore-bodies. “The miners of the district are generally prejudiced in favour of fissure veins, under the belief that they are the only ones which are apt to be continuous in depth. There is no reason, however, why replacement veins following lines of fissuring, and filled with material derived from below, though subject to greater variation in volume, should not be equally permanent.

Auriferous quartz veins. “Besides the pyrrhotite and associated sulphide ores characteristic of the basic volcanics, an important system of siliceous ore-bearing fissure veins has a wide distribution in the district. The quartz leads are not confined to one formation, but occur indiscriminately in all. The O. K. occurs in an altered and partly serpentinized basic volcanic rock, the Fern in massive porphyrite, the Poorman, Maud S. and Clearwater in granite, the Exchequer in schistose eruptives, the Elise in slates, and the Gold Hill and Helen in eruptive rocks later than the granite. The quartz leads vary greatly in size, but seldom exceed six to eight feet in width, and usually average less. They contain free gold, auriferous pyrites, chalcopyrite and galena. Stamp-mills have been erected at the Poorman, O. K. and Fern, and a number of the other leads are being prospected.

Mineralized belts. “A third class of gold leads includes the Starlight, Golden King and others in the vicinity of Toad Mountain, and consist of pyritized belts, often a hundred feet and more in width, traversing the schistose eruptives. These leads are simply more or less mineralized portions of the schistose country-rock, carrying occasional ribs and stringers of quartz. They are low grade, the Starlight, which has been prospected during the past summer by Mr. Francis for an English company, averaging about \$3 in gold per ton, but owing to the practically unlimited amount of material available, they may possibly in some instances be profitably worked.

“Mining has made satisfactory advances on all sides in West Kootanie during the past season. Prospectors, the pioneers of the industry, swarmed over the country making numberless locations everywhere. A fair percentage of the prospects of previous years on which development work has been done, promise to become mines, and the older mines show no signs of deterioration as developed. Several new camps, notably Waterloo, Champion Creek, the North

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Fork of the Salmon, and the Springer Creek district, have come into prominence, while the older ones have developed into recognized mining centres. The output of ore has largely increased and the capacity of the smelters has been more than doubled in order to meet the demand. Favourable reports from competent men have been received in regard to a number of outlying districts which have not yet been examined, and it is altogether probable that, with the advent of easy communication, the successes of Trail Creek and the Slocan will be repeated in East Kootanie, Boundary Creek, the Lardo, the Big Bend and other places. Capital has flowed freely into the district during the season, but it is to be feared that an undue proportion of it has found its way into the pockets of speculators rather than into legitimate mining.

British Columbia—Cont.

“In Rossland and vicinity, although there has been a good deal of scarcely warranted speculation, much conscientious development and prospecting work is being carried on, the result of which, in large part, will not be known for some time yet, as the hard eruptive rocks of the district necessarily make mining a slow and expensive operation. Compressor plants have, however, been erected at a dozen or more of the principal mines, and machine drills with their quicker results are rapidly supplanting hand labour. The Le Roi and War Eagle are still the principal producing mines in the camp, but considerable shipments at irregular intervals have also been made from the Josie, Iron Mask, Cliff, Evening Star, Crown Point and others, and it is highly probable that, with the extensive development work now in progress, the output from these will be largely increased in the near future.

Development in Rossland.

“The Rossland ores, as a rule, are not of high grade, and a large proportion of those in sight cannot be profitably worked under present conditions. The cost of freight and treatment is given by Mr. Carlyle at \$10 to \$14 per ton.* If the cost of mining, a variable factor, is added to this, it will be evident that ores carrying less value than \$15 per ton can only be worked at present at a slender profit, if at all. In order to utilize this material, reductions in both freight and smelting charges are imperative, and will doubtless be made as the treatment of the ore becomes better understood and competing lines of communication are opened up. Should the railway now projected through the Crow Nest Pass be built, and the mines connected with the extensive coal-fields known to exist in the Rocky Mountain Range, fuel, the principal item in the expense of smelting, could be obtained at a much lower figure than at present, and the smelting charges reduced in pro-

General character of the ores.

Importance of reducing smelting charges.

* Bulletin No. 2. The Provincial Bureau of Mines, Victoria, B.C. Aug., 1896.

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umbia—*Con.*

portion. A large percentage of the ores are of too low grade to be worked under any circumstances, but it is believed that with smelters built on the spot, cheap fuel and improved processes, those with a valuation of \$8 and upwards will eventually be profitably treated.

“The Slocan and Ainsworth camps, accounts of which were given in last year’s Summary Report, were not visited by me during the past season.”

Work by Mr.
McEvoy.

In the early part of the year, Mr. J. McEvoy was chiefly engaged in compiling the information obtained during the previous summer for the completion of the Shuswap map-sheet, with a view to ascertaining if any further geological investigation would be desirable. Some time was also spent in the final revision of the Kamloops map-sheet for publication.

Mr. McEvoy left for the field on the 10th of June and returned on the 1st of November. The first part of the season was occupied in filling in certain portions of the Shuswap sheet which had proved to be wanting in detail. Upon this work Mr. McEvoy reports as follows:—

Completion of
surveys for
Shuswap
sheet.

“Arriving at Kamloops on the 15th of June, and having secured the necessary equipment, I started with pack-horses up the North Thompson River. Some days were spent in examining the country in the vicinity of the Barrière River, where the outline of the rocks of the Adams Lake series was uncertain.

“A short trip was next made to the north-east side of Mount Tod to define the boundaries between the Shuswap and Nisconlith series there.

“Attention was then turned to the geology of the south-west corner of the sheet, where little was known of the arrangement of the rocks. Here the discovery of a small area of rocks of the Shuswap series (gneisses and mica-schists) on Sucker Creek, to the east of Chaperon Lake, gave a definite point to work from. From this an ascending series of rocks was traced up to the Triassic, similar to that found elsewhere on the area of the sheet as well as upon the adjacent Kamloops sheet. A couple of weeks spent in this vicinity resulted in obtaining satisfactory outlines for the formations.

Surveys un-
dertaken near
Rossland.

“After this a few days were spent on Shuswap Lake, and then, leaving the horses at Kamloops, I proceeded to Rossland to commence a survey of the country in that vicinity.

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“The methods of surveying employed were triangulation with the transit, extended from points fixed by Mr. J. H. McGregor of the Provincial Survey, with topographical sketches supplemented by odometer and paced surveys. Barometers were used for heights going from and returning to definite points.” British Columbia—Cont.

“Much trouble was experienced on account of the dense smoke which prevailed during the greater part of the season and prevented any distant views. This difficulty was partly overcome by taking more small and partial sketches than would otherwise have been necessary.

“The area surveyed extends from the International boundary-line northward to Robson, and from the head of Murphy Creek on the west to the mouth of Salmon River on the Pend D’Oreille River.” Area covered.

“I was assisted in carrying out this work by Mr. W. W. Leach.”

NORTH-WEST TERRITORIES AND KEEWATIN.

Subsequent to the date of the last Summary Report, Mr. J. B. Tyrrell was employed chiefly in completing a report on the country between Athabasca Lake and Churchill River, and in working up the results of his expedition of 1893, through the Barren Lands. Work by Mr. Tyrrell.

On June 13th, Mr. Tyrrell left Ottawa for the west, having been instructed to undertake a preliminary geological examination of a tract of country to the north of Lake Winnipeg and lying between the upper part of the Nelson River and the longitude of Cumberland House. The existence of rocks referable to the Huronian system in this region had been conjectured, from information already gained by Mr. Tyrrell in adjoining areas, and as it is comparatively easy of access from Lake Winnipeg, it appeared to be of particular importance to define the area occupied by these rocks and to ascertain their character. Mr. Tyrrell reports as follows on the work done, and it will be observed that he believes the region to be one of considerable promise and worthy of the attention of the prospector. Country north of Lake Winnipeg.

“On the 29th of June I left Selkirk, Manitoba, accompanied by two canoeemen who had been with me through two previous seasons, and the following day reached Selkirk Island, near the mouth of the Saskatchewan River. On the morning of the 1st of July we were taken by a small fishing tug northward to Limestone Bay, and thence we proceeded by canoe along the north shore of Lake Winnipeg and through Playgreen Lake to Norway House.

“Here two Indians and an extra canoe were hired, and we turned westward into the country lying to the west of Nelson River, exploring.” Enumeration of routes surveyed.

North-west
Territories—
Cont.

ing Goose-gut, Pine and Wolf rivers ; returning from the latter stream to Norway House, where the two Indians were paid off.

“ We then descended Nelson River to Cross Lake, where two other Indians were hired, and the descent of the Nelson River was continued to the north end of Sepaywisk Lake, whence we crossed several portages and small lakes until we reached Burntwood River, which was ascended to Nelson House, where the Cross Lake Indians were paid off and allowed to return home. With one canoe, and the two men from Selkirk, I returned to Paint Lake, and then ascended Grass River, through Setting, Herb and Reed lakes to its source in Cranberry Lake. From the south end of Cranberry Lake, we crossed the Cranberry Portage to Athapapuskow Lake, and thence descended Goose River, through Goose Lake, to Sturgeon River, which was descended to Cumberland on the Saskatchewan River.

“ From Cumberland we ascended the Saskatchewan River to Fort à la Corne, where the canoe was stored for the winter, and we drove to Prince Albert, arriving there on the evening of the 9th of October, three months and eleven days after leaving Selkirk, having travelled in all about 1100 miles, largely over routes previously unexplored.

Northern
ledge of
Palæozoic
limestone.

“ From Lake Winnipeg and the Saskatchewan River, the horizontal Palæozoic limestone was found to extend northward to the south end of Hills Lake, on Pine River, and Herb Lake, on Grass River. Thence, the northern limit of the limestone extends westward, keeping to the south side of Grass River, and generally forming an escarpment from fifty to one hundred feet high. Goose and Athapapuskow lakes lie in a deep bay in the face of this escarpment. West of the latter lake the northern edge of the limestone is known to extend along the south-west side of Beaver Lake, and thence onward towards Lac la Ronge, south of Churchill River.

Laurentian
and Huronian
rocks.

“ North of the limestone escarpment, the country is underlain by Archæan rocks, which have usually a gently undulating surface contour. From the Nelson River westward as far as longitude 99° 30' they consist chiefly of gray and reddish-gray Laurentian gneisses and granites. Along the Nelson River these are cut by numerous dykes of dark-green, highly basic traps, and in the vicinity of Pipestone and Cross lakes they are associated with an area of micaceous, hornblendic and sericitic schists, stretched schistose conglomerates and fine-grained slates of Huronian age.

“ On the south side of this area, and near the edge of the gneiss, is an eruptive mass of light greenish-gray anorthosite, and a gabbro con-

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taining a large quantity of mispickel, associated with some copper-pyrites. North-west Territories—
Cont.

“ On the south side of the Indian Reserve Island in Cross Lake, the hornblende-schists are cut by wide veins of coarse, white, pegmatitic granite, containing large crystals of black and white mica, some of the latter being nine inches in diameter, and very possibly indicating deposits of commercial value. On account of the evenly rounded nature of the surface, and the want of blasting materials, none of the larger crystals could be taken out, but some of the smaller fragments obtained were clean and unbroken.

“ Thinly foliated green schists, probably of Huronian age, were again found on another Pipestone Lake, on the way from Cross Portage to Burntwood River.

“ But the most extensive and interesting area of Huronian rocks was discovered on the upper part of Grass River. Beginning a short distance east of Herb Lake it extends almost continuously westward through Reed, Elbow and Cranberry lakes, and crossing to the drainage basin of the Saskatchewan River, underlies parts of Athapapuskow and Goose lakes. Largest Huronian area.

“ Seven miles east of the north end of Herb Lake, the Huronian rocks are first encountered, in a hill of massive or slightly foliated diabase largely altered to chlorite, and a short distance further west is a ridge of dark-gray micaceous schist studded with rather large crystals of staurolite. On the east side of Herb Lake is a ridge of thinly foliated light-gray micaceous gneiss, containing a good deal of white mica, and cut by many veins of white quartz.

“ On the west side of the same lake, and extending south to Wekusko Point, is an eruptive mass of coarse gabbro, approaching a diabase in texture. South of this is a considerable area of dark-green, slaty schists. On the south-west side of the lake these are cut by another large eruptive mass of a finer grained and more typical gabbro. The schists are also disturbed and altered by a large mass of red granite.

“ Almost everywhere the schists are cut by larger and smaller veins of white quartz. The river above Herb Lake runs for a considerable distance along the line of contact of red granite on the west, and Huronian schists and conglomerates on the east, above which it crosses an area of coarse, dark-gray gabbro, returning, near the entrance into Reed Lake, to the red granite. Near the contact are many quartz veins, associated with a good deal of iron-pyrites. Numerous quartz veins

North-west
Territories—
Cont.

“ On Reed Lake, the Huronian rocks consist chiefly of fine-grained, green, slaty schists, holding much pyrites, and cut by many stringers of quartz.

Rocks of Reed
and Cranberry
lakes.

“ Above Reed Lake the country becomes more rugged and the hills more precipitous. The river circles round an area of basic igneous rocks, as far as Cranberry Lake, often occupying a valley along the line of contact of these rocks with the surrounding granite or gneiss. Near the contact, the rocks have been much disturbed and are cut by many veins of quartz, often containing a large quantity of pyrite.

“ On Cranberry Lake the Huronian rocks are often altered to a silvery sericitic schist. The same schists extend across the watershed to Athapapuskow Lake, and thence continue westward, perhaps beneath the undisturbed Palæozoic limestones.

Promising
field for pros-
pectors.

“ This area of Huronian rocks, extending about seventy-five miles from east to west, and an unknown distance towards the north, presents a good field of exploration for the prospector for gold and other precious metals, on account of the number and variety of eruptive masses that break through it, surrounded by zones of highly disturbed and fissured rocks.

Superficial
deposits.

“ From Nelson River westward to longitude 100° 30', and from the north end of Lake Winnipeg northward to beyond latitude 56°, the country is generally covered with a coating of stratified clay, varying in thickness from a few feet up to fifty, sixty or even one hundred feet. This clay is of much the same character as that of the Red River valley, having been, like it, deposited in the bed of the old post-glacial lake that once occupied the basin of Lake Winnipeg. The rivers have, as a rule, cut down through this clay to the underlying rock, but away from the water-stretches, rock-exposures are not of very frequent occurrence. The soil is rich and fertile, and since summer frosts do not seem to be very prevalent, the country will doubtless produce in abundance all the hardier roots and cereals grown in the province of Manitoba, and cattle, sheep and horses could be successfully raised. If the country were made accessible by a railway passing through it to Hudson Bay, it would certainly support a considerable agricultural population.”

Soil and
climate.

Mr. Tyrrell returned to Ottawa on October 16th.

ONTARIO.

(With adjacent parts of Quebec.)

Work by Mr.
McInnes.

The greater part of the winter of 1895-96 was spent by Mr. W. McInnes in plotting surveys of the previous summer, in preparing for

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the engraver the Shebandowan Lake sheet, correcting the Seine River sheet, and in compiling a report on these two sheets, shortly to be issued. On the field-work accomplished in 1896, Mr. McInnes reports as follows:—

Ontario—
Cont.

“I left Ottawa on the 5th of June, and arrived at Port Arthur on the 8th. Mr. William Lawson, B.A., of Toronto, who had been engaged as assistant for the summer, joined the party here. During the early part of the summer Mr. Lawson was employed in making independent surveys in the region immediately east of Lake of the Woods. He first made a survey by boat-log of the canoe-route leading from the head of Long Bay, Lake of the Woods, to Eagle Lake. A series of lakes lying to the north of this route, between it and the line of the Canadian Pacific Railway, was also surveyed. This included Hilly, Whitefish, Narrow, Windy, Porcupine, Buzzard and Pine lakes, with connecting streams and portages. A survey was then made of the long westerly arm of Eagle Lake known as Vermilion Bay, and of the greater part of the main body of Eagle Lake, with its easterly extension, Osborne Bay. Geological notes were taken by Mr. Lawson throughout, and a set of typical rock specimens was collected.

Surveys by
Mr. Lawson.

“While Mr. Lawson was so engaged, I made a trip from English River station on the Canadian Pacific Railway, southwards to the Seine River, for the purpose of supplementing the information on that region contained in the notes of the late Mr. W. H. Smith.

Re-examina-
tion of Seine
River coun-
try.

“The route led through Upper and Lower Scotch lakes, Irish Lake, Welsh Lake, Norway Lake and a number of small lakes and streams to Upper Seine Lake and the Seine River.

“About midway on this route, the belt of Keewatin which forks from the Seine River band at Steep Rock Lake, was crossed. It has here, at its narrowest, a width of about two and a-half miles, and is made up of diorites and kindred eruptives of the Keewatin, with considerable areas of grauwacke and crushed quartz-porphry, and of felsitic and quartzose schists, all more or less pyritous. Belts of the schist, in a number of places, show pyrites in thin sheets along the planes of cleavage, as well as scattered irregularly through the mass of the work.

Route from
English River
station.

“Large angular blocks of quartz with iron- and copper-pyrites, which evidently had not travelled far, were noted about the shores of two of the small lakes near the height-of-land.

“Along the southern edge of this belt, a band of hornblende-gneiss or crushed hornblende-granite occurs, and forms a vein along the

Ontario—
Cont.

northern edge of the large biotite-gneiss area of Caribou Lake. This hornblende-gneiss band, where crossed on this route, has a width of a little over a mile, and is without doubt continuous with the area of the same rock about Sawbill and Moose lakes. The area just described with its extension towards the head of Sawbill Lake seems to offer a promising field for the prospector.

Sawbill Lake.

“Sawbill mine (location 313X.) was visited and the rocks about Sawbill Lake examined. They were found to consist in the main of hornblende-gneisses and hornblendic granites and syenites often much crushed and sheared, in places becoming schists in structure.

Sawbill mine.

“In one of these much crushed and sheared bands the vein occurs on which the Sawbill shaft has been sunk. The shaft, which follows the vein, was down about 40 feet at the time of my visit, and work was continued actively during the summer. The vein at the surface has a width of about 4 feet. It strikes N. 9° E. astronomical (or N. 15° E. mag.) * and can be followed in a southerly direction for 300 feet, where it bends to a direction S. 24° W. for another 300 feet, gradually failing in width until it becomes very small. In a northerly direction it has been traced about 900 feet, beyond which point the surface falls away into a swamp. It was stated by those in charge at the time, that the vein could be picked up again beyond the swamp. The hade of the vein is easterly at an angle of a little over 10 degrees from the vertical. Though running ‘with the formation’ there seems to be no doubt about the true fissure character of the vein. The walls are well defined, the hanging-wall particularly so, often showing slickensided surfaces and a parting of crushed chloritic material between the wall and the vein-matter. On the foot-wall, there is a certain amount of mingling of the vein-matter with the inclosing rock and a number of stringers and small parallel veins, so that the vein contents do not come away so freely from this wall as from the hanging-wall. The dump showed quartz carrying iron- and copper-pyrites and a considerable amount of free gold, and the vein at the bottom of the shaft was well defined and solid.

Harold Lake.

“After a few days spent in an examination of some points about Steep Rock and Moose lakes, where the geology is somewhat complicated, Harold Lake was visited. A number of veins have been exploited here, and half a mile of tramway has been built, connecting the different openings with a five-stamp mill at the lake shore. The outlet of the lake has been deepened to allow sinking on a vein known

* Bearings throughout this report are referred to the true meridian unless otherwise stated.

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as the shore vein, which outcrops at the base of a low cliff near the south-west corner of the lake. This vein strikes N. 29° W., with a hade to the north-east of a few degrees from the vertical; it is rich in free gold, but small and somewhat irregular. On No. 1 and No. 2 veins, which vary in width from one to two feet, were drifts about 200 and 140 feet respectively with a shallow winze on each. The mill was not working at the time of my visit. Work was continued during the summer, and Mr. Wiley informs me that a more promising vein, near the tramway, was being opened up. The veins occur near the contact of a highly crushed and altered granite with Keewatin schists and diorites. Ontario—
Cont.

“At Nonwatin or Calm Lake, the Seine River route was left for the purpose of exploring the Pipestone River. Pine Lake, at the head of Pipestone River, is reached from Calm Lake by two portages with a small intervening lake. On the first of these portages the ascent from Calm Lake is about 130 feet, and on the next there is a descent of a few feet to Pine Lake. As Calm Lake has probably an elevation of nearly 100 feet above Rainy Lake, the descent by the Pipestone River must be a little over 200 feet. The river proved very rough, with many falls and rapids, and along its upper stretches was barely large enough for canoeing. Evenly foliated, fine biotite-gneisses of the Couchiching, occur all along its course, striking about east-and-west, with minor local deviations from this direction. These gneisses are an extension easterly on their strike of those described by Dr. A. C. Lawson as occurring about the most easterly extension of Rainy Lake, into which this river empties. Exploration of
Pipestone
River.

“A week was next spent in the region about Bad Vermilion Lake, in an examination of some of the gold locations. In this vicinity, on the north shore of Shoal Lake, at Foley’s (locations 174E. and 175E.), the veins occur in the so-called protogine granite area. This granite is first seen on the road leading northwards from the shore of the lake, at a point about 200 yards from the shore, and extends continuously northwards nearly to the southern shore of Bad Vermilion Lake. Two shafts have been sunk on a vein on this property to depths of a little over 200 and 100 feet respectively, with drifts aggregating over 300 feet. The vein is a true fissure, and has a width, as exposed on the surface, of from 18 inches to 3 feet. At the bottom of the deeper shaft it is stated that the vein has widened to 5 feet or more. The dump shows very rich looking quartz with iron- and copper-pyrites, galena, and a good proportion of visible free gold. Bad Verm.
Lion Lake.
Foley’s

“Other good looking veins occur on the same property. One of these about 100 feet to the south-west of the first-named vein promises very

Ontario—
Cont. well. It has a surface width of about $2\frac{1}{2}$ feet, and shows free gold in good quantity. Since my visit the company have continued active work on the property, and a mill is in course of construction.

Mine Centre,
Shoal Lake. “ Further to the east, on the road running northward from Mine Centre towards Hillier’s and Ferguson’s, the first rock exposures after leaving the Keewatin rocks, which are seen on the immediate shore, are met with about half a mile south of Hillier’s, or about three miles north-west of Mine Centre, on Shoal Lake. They are greenish, highly altered granites with prominent blebs of opalescent quartz. The same granite is continuous to and beyond Ferguson’s (A.L. 110). To the north, between the granite and the south shore of Bad Vermilion Lake, occurs a belt of alternating bands of gabbro and Keewatin diorite and schist. A great part of the area crossed by the road is covered with a thick coating of fine white sand, with large boulders of granite, which conceals the underlying rock, except where occasional bosses protrude.

Ferguson’s. “ At Ferguson’s (A.L. 110 and adjoining locations) in addition to a considerable amount of surface stripping, cross trenching, etc., two shafts have been sunk to depths of about 50 feet each. On one of these the vein is divided into two small veins of a few inches each, separated by an intervening mass of granite about 18 inches in thickness, which continues to the bottom of the present shaft though narrowing down to a few inches.

“ In the other shaft on the same vein, further west, the vein is better defined though still narrow. Among the other veins on the property is one, on which only stripping has been done, which can be traced for over 1000 feet, varying in width from 6 inches to between one and two feet. These veins carry free gold in quantity sufficient, it is claimed, to well repay working. Work was continued during the summer on this property, preparatory to the building of a mill.

Lucky Coon. “ At Hillier’s (the ‘Lucky Coon,’ 655 P.) the mill was idle and nothing was being done. The shafts, which were filled with water at the time of my visit, have been sunk on two parallel veins about 80 yards apart, one vein showing a surface width of from 3 to 6 feet and the other varying from a little over a foot to a broad, irregular vein showing about one foot of crushed country-rock, a foot and a-half to three feet of quartz, and 2 to 3 feet of mixed stringers of quartz and country-rock. These are fissure veins cutting the granite mass. This whole area of granite lying between Bad Vermilion and Shoal lakes has been very much crushed and is fissured in all directions, so that the number of veins is very great, some of them promising well. On

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locations A.L. 103-4-5-6, are many good veins, the principal among them striking from N. 20° W. to N. W. They vary in size up to a width of from 3 to 7 feet and generally show good walls. Many show visible free gold and others are strong in sulphides. At K. 244, on the north shore of Bad Vermilion Lake, a band of greenish-gray, quartzose, massive rock, fairly mineralized with iron- and copper-pyrites and from 50 to 100 feet in width, is inclosed in green hornblending schists of Keewatin age with a trend parallel to the strike of the schists. This band appears to be an arm from the granitic area; it is cut in all directions by stringers and small veins of quartz from 9 inches in thickness to mere threads, running generally across the trend of the band but following also every possible direction. These stringers, where weathered on the surface, it is stated, pan well.

Ontario—
Cont.

Other gold
properties.

“On K. 231, are a number of veins, some of good size but irregular and difficult to trace on account of a swamp on one side and a sand-hill on the other. What their gold content is was not ascertained. Many other properties from which good assays are stated to have been obtained, have been taken up in the neighbourhood, some in the granite, and others both in the interbanded gabbro and diorite and in the Keewatin bands.

“There does not seem to be any good reason why gold-bearing lodes in these last-mentioned rocks should be less permanent or persistent than in the granite.

“Prospectors in the district informed me they have observed that the gabbro in places sends arms or apophyses into the granite mass. This I was not able to verify. My own observation has been to the contrary, and where the two were seen in contact on the south shore of Bad Vermilion Lake, the granite cuts the gabbro in an unmistakable manner. The gabbro at this point has an indistinct schistose or foliated structure from crushing, and this foliation is cut across abruptly by the granite.

Relations of
gabbros and
granite.

“Fort Frances was next reached by steamboat, and after refitting there, a log-survey was carried from Lawrence Lake through Rowan, Denmark and Sturgeon lakes to Caribou or Deer Lake. The western shore of this lake and its northern and north-eastern arms were surveyed, together with a route by a number of small lakes to one of the southerly bays of Eagle Lake.

Surveys in the
Manitou
district.

“Lake Rowan was found to be entirely within the Keewatin area of Crow and Whitefish lakes. The exposures along its northern shore consist of diorites and felspathic grauwacke-like rocks of the agglomerate type, with bands of green and gray schist. The western

Lake Rowan.

- Ontario—
Cont. end of Denmark Lake shows the same rocks, and its eastern end extends into the band of hornblende-syenites and gneisses which form a rim between the Keewatin and the extensive biotite-gneiss area lying to the north-east.
- Caribou Lake. “Caribou Lake lies within the biotite-gneiss area. The eastern edge of the arm of Keewatin, which extends north-easterly to Eagle Lake, after crossing Caribou Lake at its extreme south-western end, keeps about two miles to the west of that lake, with the same narrow rim of hornblende-gneiss intervening between the Keewatin and the biotite-gneiss area.
- Keewatin belt “This Keewatin belt gradually narrows down as it is followed northward from a width of about six miles between Dryberry and Caribou lakes, to little more than a mile where it crosses the narrows between Eagle Lake and Vermilion Bay. It, however, widens out again almost immediately and bends around to the east to join the Keewatin area of Wabigoon and Manitou lakes.
- Eagle and
Wabigoon
lakes. “Surveys by micrometer telescope were next made of parts of Eagle and Wabigoon lakes and of the routes between them, both north and south of the Canadian Pacific Railway. Two other routes to Caribou Lake were traversed, one leaving Eagle Lake at the narrows between the lake and Vermilion Bay, and the other starting from the western side of Osborne Bay. Both lead through a series of small lakes which were surveyed by boat-log. The easterly one lies wholly in the biotite-gneisses; the western cuts across the Keewatin band, referred to above as connecting the Crow and Whitefish Lake areas, and gives a good cross-section of that band.
- Routes to
Caribou Lake. “The regions lying immediately to the south of Eagle and Wabigoon lakes offer a field which promises well for the prospector. In both these districts are bands of Keewatin of very irregular outline, with intrusive areas of hornblende-granites and saussurite-gabbros. These two districts and that to the south of Lower Scotch Lake, have been particularly mentioned only because they are all easily accessible and do not seem to have attracted the notice of prospectors to any great extent, though the character of their rocks is such as to warrant their examination.
- Areas which
invite atten-
tion.
- Caribou Lake
to Whitefish
Bay. “The micrometer survey was continued through Caribou, Sturgeon and Whitefish lakes to Whitefish Bay on Lake of the Woods, and the long easterly bay known as Lobstick Bay was also surveyed. From the foot of Caribou Lake this route lay for the whole distance in Keewatin rocks, excepting where the granite area on which the Regina mine is situated, extends easterly about the mouth of Lobstick Bay.

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“ While on Lake of the Woods, the Regina and Sultana mines were visited. The vein in the case of the former of these, traverses both an intrusive area of altered hornblende-granite and a Keewatin diabase, the line of contact between the two cutting the drifts in the mine and showing an overlap of the diabase by the granite. Ontario—
Cont.
Lake of the
Woods.
Regina.

“ At the Sultana, the vein occurs in a very much crushed and sheared hornblende-granite which occurs here, as it does generally, as an intrusive mass not far from the contact between the biotite-gneiss area and an area of Keewatin rocks. The Scramble mine, which lies to the north of the railway, within six miles of Rat Portage, occurs in a band of Keewatin hornblendic schists or crushed diorites, and close to the edge of the Rosslund granitic area. Some surface stripping has been done here, and a shallow shaft has been sunk on a band 25 to 35 feet in width, made up largely of quartz and heavily charged with iron-pyrites, occurring both in thin sheets along the planes of cleavage, and irregularly distributed through its mass. Parts of the band were found to pan well, and an average value of over twenty dollars to the ton is claimed for the whole band. Sultana.
Scramble

“ Considerable activity has been shown in developing and exploiting gold properties about Lake of the Woods generally, and attention is being again devoted to various properties which have lain undeveloped for years. New discoveries of gold-bearing veins have been made in various places in the district, notably about Shoal Lake, where the Mikado and other properties have been attracting attention. Shoal Lake.

“ Here, as in the Seine River country, the gold has been found, in every case of which we have any record, at no great distance from the contact between the Keewatin and intrusive granitoid rocks, which occur most frequently as narrow rims along the edge of the more extensive areas of biotite-gneiss, but which also invade the Keewatin rocks as isolated intrusive masses. I know of no case where gold-bearing veins have been found to occur in the main body of the biotite-gneiss areas which we have classed as Laurentian. On a preliminary edition of the Seine River sheet, the rocks in which the Sawbill vein occurs were so classed, but this was owing to a misinterpretation of the notes of the late Mr. W. H. Smith, and it has been corrected on the regular edition of the map. The gold-
bearing rocks.

“ As surveys of Manitou Lake were already available from the work of previous seasons, it was not thought necessary to visit this lake during the summer. A number of claims have been located along the shores of the lake as well as about Little Manitou Lake. These claims lie in the Keewatin belt, which extends all along the lake in the form Manitou
Lake.

Ontario--
Cont.

of a narrow band, between the large Laurentian areas to the east and west, and connecting the Keewatin area of Pipestone Lake with that of lakes Wabigoon and Minnetakie. It was known from last seasons' work that the Laurentian areas approach the shores of the main Manitou closely, and a trip eastward from the foot of Osborne Bay, made by Mr. Lawson last summer, proved that the gneiss area of Eagle Lake extends eastward at least to beyond Niven's 22-mile post on the Base Line of 1893-94. The marginal area of hornblende-gneiss which so commonly surrounds the biotite-gneiss areas, was found to intervene here also between the main gneiss area and the Keewatin.

Minnetakie
Lake.

"Prospecting was extended northward during the summer into the region lying to the north of the Canadian Pacific Railway along the Minnetakie Lake Keewatin belt, which is a continuation north-easterly of the Wabigoon Lake area. Promising veins are reported in this district, and assays of specimens from there made in the laboratory of the Survey gave small quantities of gold, enough at least to confirm the occurrence of gold in the region.

Lake Superior.
Empress
mine.

"Work for the season was closed on the 6th of October, but on the way back to Ottawa, the Empress mine, situated on the north shore of Lake Superior, was visited. This is a low-grade proposition, largely free milling. It lies to the north of the Canadian Pacific Railway, near Jackfish station. At the lake-shore, the rock exposed in the cuttings on the line of railway is a medium-grained, red, hornblende-granite, and along the road leading to the mine the same rocks are seen to within a half-mile or less of the mill. The veins on which work is being done occur in green, somewhat hornblendic schists striking N. 67° E. and dipping eastwards at an angle of 64°. Where work was being carried on, there is a series of closely parallel veins, striking and dipping with the cleavage of the schists. The largest of these was about six feet in width where stripped. The belt has been uncovered by cross-trenching for upwards of a mile along the strike, varying, of course, very considerably in quartz contents in that distance. The outcrop occurs on the slope of a southerly-facing hillside at a height of two hundred feet or more above the valley bottom. The ten-stamp mill now on the property, has been placed near the bottom of the hill, so that a tunnel may readily be driven which will catch the veins at a depth of about 140 feet below their outcrop, and will prove the property pretty thoroughly and permit also the economical stoping of a large amount of vein-matter. At the time of my visit no mining work of a permanent character was being done, the ore for the mill was being taken by shallow shaft and drift from wherever it could be got at most conveniently. It was the intention of the management, however, to

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proceeded with the driving of the tunnel during the winter. The owners claim only a low grade ore, but they claim also that the unusual facilities for working economically will ensure them a reasonable margin of profit. Ontario—
Cont.

“ Other discoveries of gold-bearing veins were reported during the summer from different points along the north shore, but none of these were seen. Ottawa was reached on the 11th of October.”

Before the commencement of field, operations in 1896, Mr. A. E. Barlow was engaged in the collection and compilation of the material necessary for the completion of the report and maps in connection with the exploration and surveys made in the Temiscaming region (Sheets Nos. 131 and 138 of the Ontario series of geological maps). These two maps, as will be seen by a reference to the Chief Draughtsman's statement, are now in the hands of the engraver, and it is hoped that both report and maps will be ready for issue shortly. The plotting of the various surveys made during the previous season and the labelling of the large number of rock specimens then collected, consumed a considerable proportion of the time. In addition to this, detailed petrographical studies were made, in conjunction with Mr. W. F. Ferrier, of a large number of thin sections of the various gneissic rocks which cover much of the area examined, and a subdivision based upon their lithological and mineralogical characters will be incorporated in the forthcoming report. Work by Mr.
Barlow.

The work on the Nipissing and Temiscaming sheets having thus been practically completed, it was deemed advisable to associate Mr. Barlow with Dr. Adams in the continuation of the work already begun by the latter on the Haliburton sheet in Central Ontario (Sheet No. 118, Ontario). Mr. Barlow had already spent the month of September in 1895, on work in connection with this sheet, and its geographical position is described in his preliminary report of that year.* Field-work
in Central
Ontario by
Messrs. Bar-
low and
Adams.

The construction of the Ottawa, Arnprior and Parry Sound Railway renders accessible the northern part of this area, as a portion of this line, from a short distance east of Barry's Bay to a point a few miles beyond Whitney, lies within the confines of the area. The extension of the Irondale, Bancroft and Ottawa Railway to Baptiste Lake in the Township of Herschell, affords an easier entrance to the southern portion, while the Central Ontario Railway with its present terminus at Coe Hill, opens up the south-eastern portion.

*See Summary Report 1895, p. 63A.

Ontario—
Cont.

Surveys of
roads, &c.

Mr. A. A. Cole, B.A.Sc., as in previous years acted as assistant, his attention being mainly directed to the prosecution of some of the various topographical surveys necessarily undertaken. The surveys of the roads were made with Rochon micrometer and compass, although occasionally, in the measurements, the chain or steel tape was substituted for the former. Leaving Ottawa on May 31st, Mr. Barlow accompanied by Mr. Cole reached Peterborough the following day. A couple of days were spent in Peterborough and Lindsay, engaging men, procuring supplies, and making other preparations for the season's work. Gelert station on the Victoria Branch of the Grand Trunk Railway was made the starting point, and all the roads in this vicinity were surveyed, while a detailed geological examination was made of the adjoining townships of Snowdon and Glamorgan. This occupied the time till the 10th of June, when a few days were spent at Minden, completing surveys in the townships of Minden, Lutterworth and Anson, when a move was made to Haliburton. The latter part of June was occupied in making similar road-surveys, with Haliburton as a centre, in the townships of Dysart, Guilford, Dudley, Harburn and Monmouth. The northern shore of Twelve-mile Lake was the next stopping place, from which surveys and geological examinations were made northward through the townships of Stanhope and Sherborne as far as the village of Dorset on the shores of Trading Lake.

Districts geo-
logically
examined.

Dr. Adams joined the party on July 1st, at Haliburton, and spent the first month in a detailed geological examination of the shores of most of the lakes situated in the western and north-western parts of the sheet, and also of the portion of the Muskoka River running through the townships of Peck, Finlayson and McClintock. During this time also he made paced and compass surveys of the roads around Dorset, as well as of the colonization and lumber road from Dorset north-eastward to Tea Lake, in the township of Peck.

The month of August was spent in geological and topographical surveys in the central and southern parts of the sheet, chiefly in the townships of Cavendish, Monmouth, Dudley, Harcourt, Cardiff, Anstruther, Chandos, Herschell, Faraday, Wollaston, Limerick, Duggannon and Monteagle. At the same time, Dr. Adams was engaged in making examinations of the country bordering the lakes in these townships, as well as some paced surveys of roads in the same neighbourhood.

A few days (September 7th to 10th) were spent by Dr. Adams and Mr. Barlow in the examination of the various rock-cuts along the line of the Ottawa, Arnprior and Parry Sound Railway between

Geological Survey Department.

Killaloe and Whitney stations, for which facilities were kindly given by the Chief Engineer of the road. Dr. Adams returned to Montreal on September 10th to resume his duties at McGill University, while Mr. Barlow went northward to complete certain surveys in the Temiscaming district, returning to Ottawa on October 2nd. Ontario—
Cont.

Surveys made in September by Mr. James White, in this region, for the purpose of fixing the necessary geographical positions, are referred to on a later page.

The surveys and examinations which Messrs. Barlow and Adams are carrying out in the area of the Haliburton map-sheet and its vicinity, have a special importance because of their bearing upon some of the most intricate questions of Archæan geology, including the relations of the Grenville and Hastings series, the Fundamental gneisses, and also those of rocks probably equivalent to the Huronian system. Upon the results so far arrived at, the gentlemen above named make the following joint report :— Geological
importance
the work.

“ The rocks exposed within the boundaries of the present sheet belong to several subdivisions of the Archæan. 1. Lower Laurentian. 2. Grenville series. 3. Hastings series. The Lower Laurentian covers by far the largest portion of the area examined, as rocks belonging to this formation occupy the whole northern and north-western half of the district, while a smaller area occurs at the south-western corner of the map in the townships of Lutterworth, Snowdon and Glamorgan. In the southern and south-eastern parts of the sheet, there are other occurrences of similar rocks which, however, present a more normal granitic character. Rocks present
in Haliburton
sheet.

“ 1. The Lower Laurentian of Logan is also frequently referred to under the names of the Basement Complex or the Fundamental gneiss, as it seemed to be composed of an assemblage of crystalline foliated rocks, of which the macroscopical appearance, causes them to be constantly spoken of and described under the general term of ‘ gneiss.’ Petrographical studies have of late amply demonstrated the inapplicability of this latter name, save as a ‘ field ’ term or for the purpose of rough correlation and description, or as an affix to describe the structural features of the rock-type examined. In petrographical character the Fundamental gneiss is more or less monotonous, consisting as it does of several varieties of plutonic rocks, belonging chiefly to the granitic and dioritic families, with which are intimately associated dark basic masses of amphibolite and pyroxene-granulite. These have the appearance of igneous masses in which a more or less distinct foliation is usually present, the persistence of such a structure over large areas having Lower Lau-
rentian or
Fundamental
gneiss.

Origin of
foliation.

Ontario—
Cont.

suggested the term 'gneiss', as all were supposed to be of the same origin and composition. Although it seems quite certain that the foliation so common in these rocks is, in many cases, a structure developed during the solidification of the magma from which they have crystallized out as a result of differentiation, it is in other cases probably the result of movement or flowing in the mass itself, or again it may be owing to subsequent pressure exerted at a time when the rock had acquired much of its present rigidity. This has in many instances rendered foliation originally present, more pronounced, by the breaking down of the large felspar individuals and the drawing of these out into lenses or pod-shaped areas, in the direction of motion. Thus it usually happens that the most beautifully and evenly foliated rocks are those in which the constituents have undergone excessive granulation as a result of such pressure. It would therefore seem evident that this foliation, which may generally be seen in the hand specimen, is in the first place but an illustration in miniature of the effects of magmatic differentiation, by which probably the immense bodies of the more basic constituents have become segregated out, forming the dioritic or amphibolitic bands which are so commonly found associated with rocks of the granitic type.

Complicated
intrusions.

"The different varieties of gneissic rocks, alternate with or succeed each other across the strike, and sometimes cut one another off, suggesting a complicated intrusion of one mass through the other, but there is usually a general strike, to which in any particular district the foliation of all the varieties conform. The associated basic masses are very dark or black in colour. They are usually rather distinctly foliated, but are sometimes quite massive, occurring in pieces and fragments of all sizes and shapes scattered through the more acidic portions, and in the great majority of cases so intimately mixed with the latter, that it is impossible to separate the two in mapping. The smaller of these masses can be distinctly seen to have been separated from the larger ones, which are often of enormous size, and this process may be observed in all its stages. The different varieties of granite-gneiss, which are perhaps the most prevalent of these gneissic rocks, invade the great basic masses, partially absorbing and sending wedge-like arms into them which tear them apart and anastomose through them in the most complicated manner. The smaller masses may then be seen to be separated into still smaller fragments, which either from the fact that they split more readily in the direction of their foliation, or owing to subsequent movements when the rock was in a more or less plastic condition, often assume long ribbon-like forms. That great movements have taken place in the whole series at a later date, is shown by the

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complicated folding and curving of these darker bands and masses into all sorts of curious forms, as well as in the frequent rolling out of great masses of the amphibolite when penetrated in all directions by little pegmatite veins, giving rise to masses of a dark, basic, gneissoid rock, filled with strings, bunches or separated fragments or grains of quartz and felspar, giving a pseudo-conglomeratic appearance.

“2. The Grenville series differs in a marked manner from the Fundamental gneiss. In the region under examination, it comprises a great development of limestones, with which are associated certain gneissic rocks whose minute structure and appearance mark them as highly altered sediments. In the Archæan area to the north of the St. Lawrence and Ottawa rivers, where these rocks have been studied in much detail by Dr. Adams both in the field and under the microscope, these are seen to be very different from the prevailing types of granitic and dioritic gneisses.

“The various analyses made, indicate in most instances a composition almost identical with that of ordinary shale or slate, while more quartzose specimens resemble the siliceous bands frequently met with in many slate quarries. These gneissic rocks frequently contain garnet, sillimanite, graphite, rutile and pyrite, the last-named mineral when present, as it usually is, causing the rock to weather in a very rusty manner, which suggested the name ‘rusty gneiss’ so commonly applied to this member of the series. Under the microscope, they are seen to have undergone such complete recrystallization as to entirely mask their original character, although the appearance and arrangement of the component minerals is often suggestive of the contact-zones bordering granites. Their almost invariable association with the limestones was also an additional argument in favour of their original clastic character. In the Haliburton sheet, similar gneissic rocks are found associated with the crystalline limestones.

“The gneiss, on a fresh fracture, is generally light-gray in colour, sometimes nearly white, the rusty weathering of the rock being caused by the abundant dissemination of pyrite and pyrrhotite. Frequently the pyritous matter is so abundant that the exposure is capped by a veritable ‘gossan’ of the decomposed mineral, and their resemblance to the Sudbury nickeliferous deposits appeared to be so close as to warrant a detailed examination of some of the occurrences. Their total dissimilarity in origin to the Sudbury deposits as well as their analogy to pyritous deposits so abundant in the Laurentian was, however, clearly shown by Dr. Adams’s work in this region in 1893.

“These rocks constitute an irregular belt, between the great area of Fundamental gneiss in the north-west portion of the sheet and the

Ontario—
Cont.

The Grenville
series.

Composition
of gneisses.

Relation to
Fundamental
gneisses.

Ontario—
Cont.

Hastings series exposed in the south-east. The strike of the foliation of the Grenville series follows, in a general way, the boundaries of the Fundamental gneiss, and is seen in an especially distinct manner to wrap itself around the long and narrow area in the south-western corner of the map. Isolated masses of the limestone and gneissic rocks characteristic of the Grenville series are also found in the form of outlying patches in the Fundamental gneiss about its margin, as for instance, in the townships of Lutterworth and Stanhope.

“The limestones and associated gneisses which characterize this series, form but a very small proportion of the rocky complex of the areas in which they occur, and which, owing to their presence, has usually been referred to as the Grenville series. They are associated with and usually inclosed by much greater volumes of gneissic and amphibolitic rocks identical in character with those of the Fundamental gneiss. The limestones are also almost invariably penetrated by great masses of coarse pegmatite, and in some cases large occurrences of the limestone are embedded in the Fundamental gneiss.

“The whole thus presents the character of a series of sedimentary rocks, chiefly limestones, invaded by great masses of the Fundamental gneiss, and in which possibly some varieties of the gneissic rocks present may owe their origin to the partial commingling of the sedimentary material with the igneous rocks by actual fusion. There is, however, no reason to believe from the evidence at present available that any considerable part of the series has originated in this last-mentioned manner.

Separation
from Funda-
mental gneiss
difficult.

“It will be readily seen that the exact delimitation of areas of the Grenville series is thus often a matter of great difficulty, as there is no sharp boundary between this series and the Fundamental gneiss, and it has hitherto been difficult, in the case of the Grenville series, to account for the existence of such a comparatively small proportion of sedimentary strata intimately associated with such great volumes of igneous gneissic rocks.


Bearing of
recent obser-
vations.

“The relations of the two series in Central Ontario, as they appear by the investigations of the last two seasons, throw new light on the subject and indicate its probable explanation. These are such as to suggest that in the Grenville series we have a truly sedimentary group of strata, which has sunk slowly down into, and has been invaded by great intrusions of the igneous rocks of the Fundamental gneiss, when these were in a molten or plastic condition. The limestones however do not show any distinct evidence of absorption or solution in the invading rocks, unless some of the highly garnetiferous gneisses often associated

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with the limestone are really formed by an intimate admixture of the two rocks. The limestones are always highly metamorphosed, presenting the characters of coarsely crystalline, although often more or less impure, white and pink marbles. Masses of this highly crystalline limestone or marble in some cases lie quite isolated, imbedded in the gneissic rocks as if they had been separated from the parent mass and pressed outwards or downwards into the gneissic magma. The contact of the Fundamental gneiss and the Grenville series would therefore appear to be a contact of intrusion. Ontario—
Cont.

“ 3. The south-eastern portion of the sheet is chiefly underlain by rocks of the so-called Hastings series, consisting in the main of thinly bedded limestones, dolomites, &c., cut through by great intrusions of gabbro-diorite and granite. These limestones and dolomites are usually fine-grained and bluish or grayish in colour, with thin interstratified layers holding sheaf-like bundles of hornblende crystals, and as compared with the limestones of the Grenville series, are usually much less altered. They constitute beyond all doubt a true sedimentary series, and in the region to the south of the present map are associated with conglomerates or breccias and slates of undoubtedly clastic origin. Hastings
series.

“ Although repeated traverses have been made from the Grenville to the Hastings series, no sharp line of division has as yet been found. Toward the south-eastern part of the area, the limestones of the Grenville series in many places, while still highly crystalline, seem to be less altered, and finally, as the Hastings series is approached, they present in places the bluish colour of the limestones of the latter series, so that it is often impossible to determine to which series they should be referred. The limestones of both series have the very numerous interstratified impure or gneissic bands so frequently referred to in descriptions of the limestones of the Grenville series, making the resemblance still more complete. In fact, although the true relations of the two series are obscured by the presence of numerous great intrusions of granitic and basic pyroxenic rocks, and can only be determined with absolute certainty by the completion of the mapping, the investigations so far indicate that, in the region in question, the Hastings series probably represents the rocks more nearly in their original form, and that the same rocks, when invaded, disintegrated, fretted away and intensely altered by and mixed up with the underlying gneissic magma into which they had sagged down, became identified as the Grenville series. If this should prove to be a correct diagnosis of the relations of the two series, we have in the Grenville series an extremely metamorphosed portion of the Hastings series. Its relation to
Grenville
series. 

**Ontario—
Cont.
Huronian.** “Concerning the age of the Hastings series but little is known as yet, but the character and composition of some of its members, chiefly the breccias and conglomerates, as well as the nature of its contact with the associated igneous gneissic rocks, seem to offer some presumptive evidence in favour of its ultimate correlation with the Huronian.

**Nepheline-
syenite.** “The occurrence of nepheline-syenite within the boundaries of the present sheet has been previously noticed.* A small additional mass not previously noted, was found by Mr. Barlow on lot 30, con. IV, of the township of Glamorgan. In the townships of Dungannon and Faraday three distinct masses of these rocks were roughly outlined. One of these covers portions of concessions XIII. and XIV., extending from lots 25 to 29 in the former and 23 to 26 in the latter. With this are associated large masses of a deep blue sodalite, much of which

Blue sodalite. might be utilized for jewellery and ornamental purposes. Another much smaller mass occurs on the Mississippi road, to the east of the bridge crossing the York River in the township of Dungannon, near the line between lots 12 and 13 in concession XI. The sodalite found at this locality is in small quantity, but the nepheline occurs associated with the albite in very large individuals, forming pegmatite-like masses and segregations. The rock is usually of a pale gray colour, and, especially when foliated, presents a strong resemblance to the gray or dioritic gneisses so common in the Laurentian. Although the rock is sometimes massive, it has usually a very distinct foliation, this foliation corresponding in direction with that of the ordinary gneissic rocks exposed in the vicinity.

**Hastingsite
and Cancrinite.** “The syenite weathers with a curious pitted surface, the depressions being occupied by the nepheline, which is usually very abundant, leaving the irregular-shaped felspar and bisilicate individuals standing in relief. At the York River mass, the bisilicate present seems to be mainly hastingsite (so called by Dr. Harrington who made an analysis of the material) the most basic hornblende yet described. Cancrinite was found intimately associated with the nepheline on lot 25, concession XIII. of Dungannon.

“A small area of nepheline-syenite occurs to the north-west of the village of Bancroft, sending a spur crossing the Hastings road about half a mile north of the village.

**Iron ores of
the district.** Deposits of iron ore are somewhat frequently associated with the dark basic amphibolites of the Fundamental gneiss in the southern

*Annual Report, Geol. Surv. Can., Vol. VI. (N.S.), part J., p. 5. Am. Journ. Sci., July 18, '94.

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part of the district, but although frequently of very large extent they usually contain a great deal of intermixed pyritous matter, while frequently the ore itself is rendered more or less impure by the presence of black ferruginous silicates such as hornblende, pyroxene and garnet. The ore is in general a magnetite, in places containing a small though varying proportion of ilmenite, but many deposits are entirely free from this objectionable mineral. The quantity of sulphur in many of the deposits, owing to the presence of sulphides, would lessen the value of the ore considerably, while in many cases its abundance would render the ore unsuitable for smelting purposes. Further search may however reveal workable deposits of iron sufficiently free from these sulphides to justify their development.

Iron ores from the following places have been examined in the laboratory of the Geological Survey Department :—

- a. Minden, Haliburton County, lot 11, Range I., Report 1894, page 19 R, No. 14.
- b. Lutterworth (Paxton mine), Haliburton County, lot 5, Ranges V. and VI., Report 1894, page 19 R, No. 16.
- c. Lutterworth (Paxton mine), Haliburton County, lot 5, Ranges V. and VI., Report 1892-93, page 8 J.
- d. Lutterworth, Haliburton County, lot 16, Range VII., Report 1878-79, page 16 H.
- e. do do do 5, do VI., do 1878-79, page 15 H.
- f. Snowdon, Haliburton County, lot 20, Range I., Report 1873-74, page 211, No. 8.
- g. do do do 20, do I., do 1894, page 19 R, No. 18.
- h. Wollaston, Hastings County, lot 16, do II., do 1887-88, page 24 T, No. 4.
- i. do do do 15, do II., do 1887-88, page 24 T, No. 5.
- j. do do do 9-10, Range XV., Report 1887-88, page 24 T, No. 6.
- k. Carlow, do do 6-7, do XVI., do 1887-88, page 24 T, No. 9.

Analyses of the above ores.

Analyses.

Specimen.	Ore.	Met. Iron.	Ox. of Man- ganese.	Alumina.	Lime.	Magnesia.	Sulphur.	Phosphorus.	Titanium.	Insoluble.
a.	Magnetite	30.29							Traces.	
b.	do								None..	
c.	do	48.64		6.24	3.81	3.38	.03	None.	0.15	19.30
d.	do	46.50							None..	20.16
e.	do	49.26								26.55
f.	do	60.19	13	42	1.43	2.56	.04	.07	.73	11.17
g.	do								None..	
h.	do	26.94							None..	
i.	do	56.50							None..	
j.	do	28.42							Trace..	
k.	do	46.66							Trace..	

“Ores from the following localities have been examined and reported on by various chemists (see Report Royal Commission on the Mines of Ontario, pages 130-132.) Other occurrences of iron ores.

Ontario—
Cont.

“ The Howland mine (sometimes also called the Snowdon or Pusey Mine) is situated on lots 26 and 27, concession IV. of Snowdon. The shaft is on lot 26 and the analysis of the ore gave metallic iron 59·50, phosphorus ·005, sulphur ·06.

“ The Imperial mine on lot 33, concession III. of Snowdon is in a brown hæmatite. The analysis shows the ore to contain 45·82 per cent of metallic iron. The phosphorus is very low ; no sulphur or titanium, a little lime and a large amount of silica.

“ The Pine Lake mine on lot 35, concession IV. of Glamorgan, is in a magnetite running from 52 to 55 per cent of metallic iron. It is low in phosphorus but contains considerable lime and titanium.

“ The National mine is on lots 30 and 31 in concession XIII. of the township of Glamorgan. This is likewise a magnetite.

“ The New York mine is on lot 27 in concession XV. of the township of Glamorgan, and contains over 70 per cent of metallic iron, traces of phosphorus, and no sulphur or titanium. .

“ The Coe Hill mine is situated on lot 46, concession VIII. of Wollaston, and seems to occur as a consequence of the local enrichment of a dark basic amphibolite coming in contact with a granite. The ore is a magnetite but contains a considerable admixture of pyritous matter, and some of the lumps piled on the ore-heap are falling to pieces owing to the abundance of the sulphides undergoing decomposition.

“ In the township of Wollaston, magnetite occurs on lots 14 and 15, concession II., and on lots 17, 18, and 19 in concession VIII., being an extension westwards of the Coe Hill deposit. Magnetite also occurs in considerable quantity associated with the masses of nepheline-syenite, but in no place where seen are the deposits of economic importance.

Apatite.

“ Apatite, as might be expected, is found at various points throughout the region, but hitherto the inaccessibility of the district together with low prices have forbidden the shipping of the material, although considerable development work has been done in the township of Monmouth to the north-west of Tory Hill station on the I. B. & O. Railway.

The mineral has however been found at the following places :

Township of Dudley, lot 4, concession III.

“ Dysart, lot 11, concession V.

“ Harcourt, lot 21, concession XI.

“ Monmouth, lots 14, 15 and 17, concession XI.

“ Cardiff, lot 22, concession XIV.

“ Faraday, 5 miles south-west of Bancroft.

“ Monteagle, lot 26, concession VI.

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“ Mica, both phlogopite and muscovite, occurs in considerable quantity at a number of places. A promising deposit was being developed close to the I. B. & O. Railway about two miles west of Wilberforce. In the townships of Herschell and Dungannon, the mineral was noticed at several localities. Ontario—
Cont.
Mica.

“ The discovery of a large deposit of corundum on lot 14, concession XIV. of the township of Carlow, by Mr. W. F. Ferrier of the Geological Survey Department is elsewhere described.

“ The various crystalline limestones are often sufficiently pure to yield the very finest quality of lime, while some of the beds would doubtless furnish material for use as marble. Marble

“ Graphite, has been found associated with rocks of the Grenville series in the townships of Dysart and Glamorgan. It is probably widely distributed throughout the region, but no deposits of economic importance have yet been discovered.” Graphite

About four months of the first part of the year, were devoted by Dr. R. W. Ells to the plotting and compilation of notes of survey made during the preceding season, chiefly connected with map-sheet 122 of the Ontario series. This sheet covers the Ottawa valley from the vicinity of the city of Ottawa to Petewawa, and with sheet 121, lying to the east of it, now only requires final compilation and adjustment previous to publication. Early in May, Dr. Ells began his work in the field, attention being chiefly directed to the area of sheet 119, which adjoins No. 122 on the south. Work by Dr
Ells.

On the work accomplished during the summer, Dr. Ells reports as follows:—

“ The surveys of the present season extended over portions of the counties of Renfrew, Addington, Frontenac, Lanark and Carleton, included in map-sheet No. 119. The first part of the season was devoted to the examination of the country along the Rideau River and Lakes; including several large lakes connected with this system, or in the vicinity, among which were Bob's Lake, Sharbot Lake, and others easily accessible by short portages. The Mississippi River and its chain of lakes, as well as the country adjacent on both sides, was carefully examined from Carleton Place to the head-waters, as also were the lakes on the upper part of the south branch of the Madawaska, including Weslemcoon Lake and others of that chain. Area covered
by surveys in
Ontario.

“ The latter part of July and the first part of August were spent in examining the Black and Coulonge rivers, on the north side of the Black and
Coulonge
rivers.

- Ontario—
Cont. Ottawa. The first-named was ascended for about seventy miles, to Foran's Creek, whence a route extends through a series of lakes and streams, to Bryson Lake, which is about one mile west of the Coulonge, into which it empties by Bryson Creek about seventy-two miles above the mouth of the Coulonge. This portion of the map of Quebec is practically a blank on the Crown Lands plan, though a number of large lakes occur in the area, some of them ten or twelve miles in length.
- In Quebec. "The last two months of the season were spent in the survey, with wagon-odometer, of the roads in the country between the Madawaska and Mississippi rivers, and in the country to the north of the latter stream. Much of this country is very rough and hilly, and in certain portions, the surface is largely bare rock, the timber and soil being almost entirely burned off. While the great mass of the rocks observed belong to the crystalline formations, certain, often large, areas of the newer sedimentary formations from the Potsdam to the Black River, both inclusive, were met with. The largest developments of these belonged to the latter formation, the characteristic fossils being tolerably abundant. These frequently rest upon the crystalline rocks without the intervention of the lower formations of the Cambro-Silurian.
- Rocks of
Black and
Coulonge
rivers. "The area traversed by the Black and Coulonge rivers, is largely occupied by reddish granite and gneiss. The latter is, however, sometimes grayish and hornblendic, and occasionally garnetiferous. Bands of crystalline limestone are well exposed along the lower forty miles of the Black River, and similar bands occur along the Coulonge as far as the 70-mile post from its mouth. The general strike of the gneiss and limestone in this area is N. 30° W., but this is frequently deflected, apparently by masses of granite. The upper part of these streams flow through a comparatively level country, largely covered with sandy drift which is, in places, underlain by clay. Isolated masses of reddish granite rise here and there, but this area is much less rugged than that nearer to the Ottawa.
- Course of
Black River. "The Black River has a very tortuous course, flowing for a great part of the way through banks of sand, with a steady current of two to three miles an hour, when the water in the stream is low. The ascent of the stream is therefore somewhat arduous. Rapids occur at frequent intervals, necessitating a number of portages, some of which are very heavy. The worst of these is past the Long Rapids, sixty miles from the mouth, where a carry of three miles is necessary, over the spur of a mountain. The heavy rapids along the lower part of the stream, from the twentieth to the fortieth mile, are passed by

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taking the Green Lake route, through a chain of lakes with six portages, returning to the river just below the Manitou Rapid. The longest carry on this route is about half a mile. A band of crystalline limestone extends along the route, and is associated with rusty and garnetiferous gneiss. Ontario—
Cont.

“The country between the Black and Coulonge rivers, south of Bryson Lake. Foran’s Creek and its chain of lakes, is generally rough and hilly. No limestone was observed on any of these lakes or streams, or along the portages. The character of the country to the north is similar to that seen on the upper portions of the Gatineau and Rouge rivers, further to the east. About Bryson Lake, which is not laid down on the map of Quebec, and which is from twelve to fourteen miles in length with a breadth of from one to two miles, great cliffs of grayish quartzose gneiss occur along the east side, with a dip of 10° to 50° eastward. These, in places, appear almost as flaggy as the Potsdam sandstone, and they dip beneath the limestone of the upper Coulonge. The limestones show on that stream at and above the mouth of the Crow River, which enters the main stream from the east at about the 70-mile post, and by which a route for canoes extends to the Désert and thence to the Gatineau.

“The strike of the rocks along the Black and Coulonge, as contrasted with that seen on the Gatineau and the streams further east, is worthy of note. This is still more marked when contrasted with the trend of the rocks as noted on the Bonnechère and the Madawaska to the south, where the general strike of the different bands is 40° to 60° east of north. On the Kingston and Pembroke Railway, south of Calabogie Lake, the course of similar rocks is north or a few degrees west of north. The formations therefore appear to follow a broad sigmoid curve over a very considerable area. The details have not yet been laid down on the map, but sufficient data have now been obtained to do so with a fair degree of accuracy. At the same time, it must be recognized that the presence of large areas of intrusive rocks, such as diorites, syenites and granites, has influenced, to a very considerable extent, the disposition of the rocks as shown by the strikes at many points. General trend
of Archæan
rocks.

“A marked feature in the formations in the vicinity of the Madawaska, in the area to the south of that river, is the great development of crystalline limestones. In character these differ somewhat from the limestone found in the Grenville district. They are often characterized by the presence of bluish and bluish-gray shades, and by a well-defined banding, which imparts a peculiar striped aspect to the rock over large Crystalline
limestones.

Ontario—
Cont.

areas. The limestone is also often highly dolomitic, and in places weathers to a peculiar ochreous brown. Instead of the usual association of grayish and reddish-gray gneiss found north of the Ottawa, the associated rocks are mostly schists, either hornblendic, micaceous or chloritic. The characteristic mica-schists are beautifully exposed on the line of the Kingston and Pembroke Railway, between Lavant and Flower stations, as well as along certain portions of the Mississippi River on the north side of Mud Lake, about a mile below Ardoch. They are also well seen on the south side of Marble Lake, in the township of Barrie. The hornblende-rocks, however, have a much greater development, being often massive and without any schistose structure.

Associated
schists.

Argentiferous
galena.

“North of the Mississippi, the limestone is mostly blue in colour and often slaty. This character is well seen along the road from Ardoch to the head of Long Lake; but in the vicinity of the intrusive masses the bluish colour disappears and the rock changes to a highly crystalline cream-coloured mass in places affording a white marble, often of great beauty. Serpentine, though sometimes seen, is rare. In this area the presence of argentiferous galena in the limestone, in close proximity to the hornblende-rock, is worthy of remark, the percentage of silver in some of the veins being sufficient to render them economically valuable. In the hornblende-rocks and other schists of this area, quartz veins also occur which carry gold in small quantities, but these veins, so far as known, are generally pockety in their distribution. As these rocks are apparently the eastward extension of those which carry gold in Marmora and Madoc, it is quite possible that true gold-bearing veins may some day be found.

Gold.

“In this connection, it may be noted that an assay of a sample of quartz from the 28th lot of range VIII. of Clarendon, in Frontenac county, made in the laboratory of the Survey, showed gold at the rate of 2.098 oz. to the ton. This locality is about two and a-half miles north-west of Ardoch, on the Mississippi River, the rocks being those of the Hastings series. Another specimen from the west half of lot 10, concession VI. of Lavant, in the county of Lanark, yielded gold at the rate of 0.195 oz. to the ton. These assays clearly indicate the existence of the gold-bearing belt of the Madoc and Marmora region in this area. Gold has also been reported from several points in the western part of the township of Denbigh, and several mines have been opened in this area, but nothing definite as to the true value of the quartz has yet been ascertained.

Iron ores.

“The principal mineral of economic importance yet found in the hornblende-rocks and associated limestones are the ores of iron.

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These are of two kinds, magnetite and red hæmatite. An examination of these deposits was made in 1895 by Mr. Ingall, of this Survey, whose report is now in course of preparation. A preliminary report on the subject by Mr. Ingall has already appeared in the Summary Report for 1895. A number of these deposits occurring in the area of the present season's work, were carefully examined with reference to their geological relations. It was found that the hæmatites, of which only three were recognized, viz., that at the Dalhousie mine and two on the south side of White Lake, in the township of Darling, occurred in the crystalline limestone formation, in connection with which no eruptive rocks were visible. The magnetites, on the other hand, were invariably associated with eruptive masses, mostly dioritic, hornblende largely predominating. Some of the largest and apparently most important deposits are associated with the limestones, in which case, however, masses of greenstone or hornblende-rock were present, as at the Caldwell and Yuill mines. In no case was any distinctly bedded deposit observed. In many of the ores small quantities of pyrites were observable, but in some cases this was almost entirely absent and the ore was of excellent quality.

“An outcropping of magnetic iron ore was observed near the road from Dacre to Mount St. Patrick, about a fourth of a mile south of the former village, but no attempt has been made to develop the deposit and the quantity is yet unknown.

“The iron ores of the district, in the vicinity of the Kingston and Pembroke Railway, occur in what has been styled the Hastings formation. Small deposits of apatite and mica were observed at several places in the area surveyed, but the associated rocks differ largely from those which occur throughout the lower Ottawa mineral belt, or to the south of the Rideau Lakes, and the observed quantity of these minerals was not such as to warrant the expenditure of much capital in their investigation.

“North of the Madawaska, in the townships of Griffith, Brougham and Bagot, while the surface of the country is often exceedingly rough and broken, great areas of crystalline limestone, often dolomitic, are seen. These calcareous masses occur, not only in the valleys but constituting large hills. In places the rock is highly charged with tremolite, and this character is also well seen in the limestones to the north of Calabogie Lake, as well as at certain places in the township of Darling, and in South Elmsley. Great areas of these limestones, often well exposed, occur in McNab, Darling, Lanark and Ramsay.

Ontario—
Cont.

Mount St.
Patrick iron
ore.

Crystalline
limestones
north of
Madawaska.

Ontario—
Cont.

Graphite mine
of Whitefish
Lake.

“In the 18th lot of range III. of Brougham, at the south end of Whitefish Lake, an important deposit of graphite occurs. The containing rocks are crystalline limestone, but dykes of granite also appear in the vicinity. At the shore of the lake, the deposit has been uncovered to a distance of one hundred and fifty feet or more, showing a bed of graphite eight to ten feet in thickness. The mineral appears to be, for the most part at least, amorphous, but a flakey structure is seen in certain portions. This mine is about twelve miles distant from the railway at Calabogie, and a new road has been constructed for the purpose of shipment. A small deposit of similar graphite occurs in the township of Darling, near Tatlock.

Mazinaw
Lake.

“The country from about the middle of Mazinaw Lake, northward into Denbigh, and thence westward for some miles, including the greater part of the townships of Ashby, Effingham and Abinger, is occupied for the most part, by grayish and reddish-gray gneiss and granite, generally having a well defined foliation. This may probably represent the Fundamental gneiss of the Laurentian. The area is very rough and settlements are few. To the south of Mazinaw Lake, the rocks are mostly hornblendic, often with a well marked green shade, passing in places into well-defined chloritic schists. These often become micaceous, and are associated with slaty bands which sometimes contain an abundance of quartz pebbles, thus constituting true conglomerates, in which the pebbles are unusually elongated along the lines of schistosity. They are well seen in the township of Kaladar, near the gold mine, not far from Flinto.

Boundaries of
the Hastings
series.

“The northern limit of the Hastings series proper on the Ottawa River, as at present recognized, is a short distance west of the mouth of the Bonnechère; whence the line of division between this and the underlying portion of the Laurentian, passes a short distance west of the town of Renfrew. Continuing south-west, it crosses the Madawaska in the township of Griffith, near the Denbigh road, and extends thence to Mazinaw Lake as already indicated. Its southern limit has not yet been continuously traced. On the Kingston and Pembroke Railway, the hornblendic rocks with bands of limestone extend for at least four miles to the south of Sharbot Lake, and they apparently occupy the greater part of the township of Lanark, north of the Mississippi River. Certain areas in South Elmsley also contain masses of tremolitic limestone, and in this respect, as also in the character of the associated rocks, resemble the Hastings series.

Mica mine.

“Mining operations in the area examined during the past season, are at present almost entirely suspended. On the south side of Rideau

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Lake, about four miles from the Narrows at Oliver's Ferry, a very considerable deposit of mica was, however, being worked at the time of our visit. Ontario--
Cont.

"The graphite deposit near Oliver's Ferry is not now being worked, though the mineral appears to be abundant and of good quality. Graphite of
Oliver's
Ferry.

"Great masses of white binary granite, in which the felspar largely predominates, were seen at a number of places, and certain of these, where not too far distant from a point of shipment, should be commercially important for the manufacture of porcelain. Very large masses of these whitish rocks occur a short distance west of the Kingston and Pembroke Railway between Lavant and Snow Road stations. A large deposit of this rock also occurs at Black Lake in North Burgess, not far from the Rideau Lake, and in North Crosby, near the upper lake. Binary
granites.

"A possibly important deposit of good looking iron-ochre was noted on a rough road a short distance west of the Kingston and Pembroke Railway, in Blythfield township. It is situated on ranges II. and III., between lots 5 and 10. Iron-ochre.

"A number of lakes containing marl beds were observed at various points, in some of which the deposits seemed to be extensive. These lakes can easily be recognized by their peculiar light bluish-green colour. Marl.

"The season's work extended from May 10th to October 3rd."

After the close of field-work in the autumn of 1895, Mr. N. J. Giroux began the plotting of his surveys made during the summer, but early in 1896, he was forced to suspend this work on account of severe illness. Upon his recovery, some further progress was made in collecting the material for the geological maps upon which he had been engaged, and on June 1st he returned to the field to continue and if possible to complete the mapping of sheet No. 120, which covers portions of Ontario and Quebec between the Ottawa and St. Lawrence rivers, including the city of Ottawa and Cornwall. As elsewhere stated, Mr. Giroux's labours were unexpectedly ended by death, shortly after his return from the field. The following preliminary report, which had in part been prepared by him, has since been edited by Dr. Ells:— Work of Mr.
Giroux.

"The first few days of field-work, for the season of 1896, were spent with Dr. Ells in the survey of the area along the junction of mapsheets 120 and 119, on which he is engaged; and on the 1st of June, Surveys near
Ottawa.

Ontario—
Cont.

I left for my own field of work, nearer the St. Lawrence. The surveys were resumed in the county of Glengarry, in continuation of those of the previous year, in order to complete, as far as possible, the mapping from east to west.

“ A small amount of work yet remains to be done in Soulanges county, as well as in Huntingdon, on the east side of the St. Lawrence, in order to complete the map-sheet No. 120, for publication.

Area tra-
versed.

“ Surveys of roads were made, principally to the south of the Canada Atlantic Railway, and extending as far south as the town of Prescott, on the St. Lawrence, which is near the southern limit of the map-sheet. Connections were made with the city of Ottawa and with the work on the sheet to the west, No. 119. The greater part of the area between the Ottawa and the St. Lawrence was traversed, so that the surveys in the area of this sheet are now nearly completed.

Rocks seen.

“ The rocks found are entirely confined to the lower Palæozoic formations, extending from the Potsdam to the Lorraine, both inclusive. Large areas are occupied by Calciferous and Trenton beds, and an outcrop of red shales was noted, similar to those classed as Medina to the east of the St. Lawrence, near Three Rivers. The surveys were all made with the wagon-odometer, and the number of miles measured amounted to nearly 1150.

Calciferous
formation.

“ The rock formations throughout the area surveyed have generally a nearly horizontal attitude. A line of disturbance was observed, running almost north-and-south, for a distance of about four miles, in the township of Mountain, Dundas county, extending from Lockville to Van Camp's mill. The Calciferous rocks which outcrop on each side of the line and not very far distant, do not show the least sign of alteration and lie in the usual horizontal attitude. But at a short distance north of Lockville, ledges of fine-grained gray conglomerate, light in colour, with greenish bands, and of Potsdam age, occur. At the northern end of this line, on a small brook, near Van Camp's mill, there are ledges of whitish-gray grit, of Potsdam age, holding small rounded pebbles of white quartz, along with banded micaceous, somewhat twisted, sandy slates or slaty sandstones, probably of Chazy age. These outcrops are, however, so limited in extent, that it will be impossible to show them on the four-mile scale map. So far as I know this is the most easterly disturbance recognized on the area of map-sheet 120.

“ The Calciferous limestones have a very considerable development on this sheet, and the soil overlying them is generally poor and thin

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or sandy, unless covered with heavy beds of clay, as in Soulanges county, the eastern part of Glengarry and some parts of Huntingdon.

“ The principal places at which the Calciferous formation has been observed are as follows. At Manotick, on the Rideau River, the beds resembling those seen at Glen Nevis. They are also well exposed at Manotick station and to the south of this place. Similar rocks also occur on lot 20, range VI., Osgoode township, Carleton county, the dip of which is S. 88° E. $< 6^{\circ}$. They are also well exposed along the road between ranges VI. and VII., Osgoode, from Vernon Corner, north for about three miles, as also on lot 23, range XII., Mountain, Dundas county, and near Van Camp's mill, and they again appear about three and a-half miles west of Winchester, with a dip of S. 45° E. $< 4^{\circ}$ to 6° . Areas in
Dundas Co.

“ About two miles, in a north-easterly direction from Van Camp's mill, Calciferous limestone occurs in thin beds and much disturbed, with characteristic vugs of pink and white calcite. This place has been opened as a quarry.

“ The formation is also well exposed in the neighbourhood of South Mountain, and all along westward of this place towards Kemptville and Merrickville, and southward towards Easton's Corners and Irish Creek. It thence continues on to North Augusta and to the shore of the St. Lawrence as far as Prescott and down the river to Cardinal. Development
in Grenville
Co.

“ This formation is also seen on the Castor River, at about three and a-half miles south-east of Russell. Sandy calcareous basal beds of the same formation can be seen about two miles south of Smirleville, where they have been greatly altered, and hold pebbles and lenticular pieces of quartz.

“ Rocks of this formation extend westward from the eastern half of the township of Grenville, and beds of the same can be seen near Hickston Corners, Hell Gate swamp and Spencerville station on the Prescott and Ottawa Railway. On the Nation River, near Spencerville station, the rocks have been disturbed and altered, so that, along with the ledges of characteristic brownish-weathering, dolomitic, fine-grained, gray limestone of Calciferous age, patches of banded sandy limestone occur, which probably are of Chazy age, or else represent much altered portions of the Calciferous.

“ On the road from Mountain to Smirleville, similar outcrops (Calciferous) also appear, and at about one mile and a-half north of Mountain station, this limestone is full of rounded and angular pieces of quartz, varying in size from a pea to a melon, and angular pieces from a Grenville and
Dundas
counties.

Ontario—
Cont.

fourth of an inch to a foot across. This conglomeritic rock has a very homogeneous matrix, which exhibits plainly all the characters of the Calciferous. The dip of these beds on the south of the exposure, is S. 20° E. $< 18^{\circ}$, and on the north side is about 100 yards wide, the dip is N. 10° W. $< 12^{\circ}$.

“The Calciferous also appears near Ormond Corner in the township of Winchester, Dundas county, in beds of limestone, as well as on the east point of Racket River, on the south side of the St. Lawrence, where ledges of dark-gray, sandy limestone outcrop. The south shore of the river, northward for some distance from this place, is low and without rock exposures, but Calciferous blocks are numerous.

“At the bottom of Hungry Bay, these limestones appear in a small knoll, holding large pocketed vugs of pink and white calcite associated with iron-pyrites. Some of the upper beds are slaty, and where the calcite occurs the rock is of a grayish-buff colour, compact and with a very fine grain, almost fine enough to be used for a lithographic stone, were it not that it contains certain inclusions which unfit it for that purpose. The dip is here S. 30° $< 5^{\circ}$. This place has been opened for a quarry and some of the material used in the construction of the Canada Atlantic Railway bridge was obtained from it.

“The Calciferous also appears on a small brook which empties into the River à la Graisse, lot 17, range VII., Lochiel, but the dip could not here be ascertained.

Chazy forma-
tion.

“The Chazy, in this area, has not so wide a distribution, but is generally well defined, both by the character of its shales and sandstones and by the fossils contained in the upper or limestone portion. In the western part of the sheet, about one mile north of Manotick station, ledges of bluish-gray and grayish limestones appear, which probably belong to this formation. Not far from Berwick, also, are ledges of dark bluish-gray limestone dip S. 40° E. $< 4^{\circ}$. These beds extend north-west from this place as far as Cannamore post-office, and continue on in this direction. A similar rock also occurs in the northern part of Dundas and the southern part of Russell.

“Limestones of this age are also seen about two and a-half miles west of Grantley, and at about three miles south of Chesterville. They also appear, associated with shales, about two miles north-east of West Winchester, as well as on lot 22, range XII., Winchester township.

“On the north shore of the St. Lawrence, at a small point opposite the north-east corner of Barnhart Island, there is a fine exposure of greenish and black Chazy shales. They are very concretionary and

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nodular in places. but no fossils were observed. The dip is N. 10° W < 2°. Ontario –
These shales are exceedingly thin and splintery and are easily crushed *Cont.*
in the hand.

“ At the north-east end of Sheck’s Island, opposite Mille Roches, are *Quarry near Sheck’s Island*
fossiliferous flat-lying Chazy limestones. A quarry has been opened here
and a quantity of material taken out for the construction of the canal.
Specimens were collected from these quarries. The limestone at this
place is bluish-black in colour, very hard, with a flinty fracture, highly
fossiliferous, and holds small dots or specks of clear calcite. It is of
fairly good quality, though somewhat seamy in places. On weathered
surfaces, which are of a brownish-gray colour, it is seen to be concretion-
ary, and the partings of the beds, which vary from six to twenty-four
inches, are very rough, blackish and pitted. I am told that 15,000 cubic
yards a year have been taken out. The rock, in some places, is in beds
of nine to ten feet thick, with generally a parting at about five feet
from the surface.

“ The Trenton formation, with which is associated the Black River, *Trenton limestone.*
has a very extensive development in this area. In the western part
of the sheet, beds are well exposed from Billings Bridge along the main
road to Britannia, where also the Chazy is well seen. The Trenton is
also well exposed near Mr. Henry Onderdonk’s, a short distance to the
north-west of Aultsville, as well as in the township of Russell, on one
of the branches of the Nation River. It also appears about Crysler in
the township of Finch, Stormont county, and thence extends eastward
towards Moose Creek.

“ Near South Finch, the bed of the Payne River consists of Trenton
limestone, and there are also fine exposures about South Finch, Lodi,
and other points in the vicinity.

“ A valuable quarry in rocks of this formation is located near Alex- *Quarry near Alexandria.*
andria, on lot 27, range V., of Lochiel, about 200 yards to the south of
the road. The rocks are heavily bedded and dip S. 10° E. < 7°. They are
vertically jointed and blocks of any dimensions can be obtained as the
limestone is easily split horizontally. It is highly fossiliferous, and
contains small seams of a black bituminous substance. It is rather
hard to work but of very good quality. In places the rock contains
small veins of white calcite, and in certain portions has a mottled
pinkish aspect from the presence of pink calcite. In others it assumes
a greenish hue, due to a thin coating of a shaly bituminous mineral.
This stone is used in the construction of the new reformatory at
Alexandria.

Ontario—
Cont.

Utica shales.

“The Utica is well exposed in the township of Cumberland, Russell county, near Navan Corner, and also about one mile and three-fourths south-east of Cyrville, in the township of Gloucester, county of Carleton. Near Ottawa, at Janeville and Billings Bridge, large outcrops of this formation are seen, as well as in New Edinburgh and in portions of the city of Ottawa itself. These black Utica shales pass upward into the grayish beds of the Lorraine formation which are well seen on the road south of Hawthorn Corner. A belt of these rocks occurs near Maxville, and fine exposures are visible on lot 16, range X., Caledonia, on Mr. McRae’s property. The black shales were struck at about eight feet from the surface, and Mr. McRae penetrated these for about ten feet, obtaining excellent water. These shales have a very considerable development in the townships of Caledonia and Kenyon, but large areas are covered with drift and clay, so that the exact limits of the formation cannot be accurately ascertained.

“Red shales, probably of Medina age, occur in the township of Russell, lot 31, range III., but the distribution of these rocks has not been worked out.

“The glacial striæ, where observed, were uniform in a southerly direction, ranging from fifteen degrees east of south to five degrees west.”

Mr. Giroux’s field-work extended from the 1st of June to the 1st of October.

QUEBEC.

Work by Dr.
Bell.

After the close of the season of field-operations last autumn and until the time for beginning the work of the present season, Dr. R. Bell was occupied in plotting his surveys of 1895 from his field-books and mapping the results; also in working up the geological data for the region covered by the French River sheet (No. 125, Ontario), and putting these upon the map for publication.

Dr. Bell reports as follows on the field-work of the past season, which was directed to the same region, between the Upper Ottawa and James Bay, in which his explorations of the preceding year had been carried out:—

Further explo-
ration of Not-
taway River
basin.

“The region explored lies in a general way between the Upper Ottawa and Rupert River and thence eastward to Lake Mistassini. The exploration was in continuation of the work which had been commenced

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beyond the height-of-land in this region in 1887 and resumed in 1895. ^{Quebec—}
Grand Lake was an objective point on the journey from Ottawa to ^{Cont.}
the field of operations, and I determined to make my way to it via the
town of Mattawa and Keepawa Lake. The newly opened Lake
Temiscaming Colonization Railway facilitating this course, and another
reason for choosing this route was that I could follow a chain of lakes
between Keepawa and Grand Lake which I had never before travelled
and would thus be enabled to make some useful geological notes by the
way.

“Besides voyageurs and a cook, my party consisted of R. W. Brock,
M.A., who had been my assistant during several previous seasons,
Mr. J. M. Bell and Mr. D. A. Rankin. I relied on being able to
hire competent Indian or half-breed voyageurs for the work in the
north country at Keepawa on Grand Lake. Supplies were obtained
partly from Ottawa and partly from Grand Lake. Mr. Brock left
Ottawa on the 10th June and was joined by Mr. Bell at Mattawa on
the following day. With the help of temporary canoemen they
started as soon as possible to convey our outfit and other supplies as
far as Grand Lake.

“I left Ottawa on the 19th of June in time to join Mr. L. Christo- ^{Journey to}
pherson of the Hudson's Bay Company (who has charge of the Upper ^{Grand Lake.}
Ottawa district) a few days later at Keepawa on his way to Grand
Lake house. Chief factor Rankin had kindly arranged for my pas-
sage with this gentleman on his return to that post. It was not till
the 27th, however, that Mr. Christopherson was able to leave Turtle
Portage on Keepawa Lake, but we took only four days to cover the
whole distance of about 160 miles, with some thirty portages, and
reached Grand Lake on the 1st of July. Mr. Brock had already
arrived with our outfit, and the above-mentioned supplies, and I
obtained the heavier part of our provisions for the whole season
through the accommodation of the Hudson's Bay Company at this
post, thus saving much time which would otherwise have been required
to transport them to this distance by my own party. Here I also
obtained from the company a four and a-half fathom bark canoe, which
proved of great service in navigating the strong rapids of the larger
rivers. In the course of a few days I succeeded in securing four good
Indian canoemen, and our party started from Grand Lake house in
two sections on the 6th and 8th of July.

“After leaving Grand Lake, my own share of the work consisted ^{Extent of}
in making a combined geographical and geological exploration of eleven ^{explorations.}
branches of the main river surveyed in 1895, and of a chain of lakes

Quebec—
Cont.

and rivers extending from the Waswanipi to the Rupert River, while Mr. Brock explored the region between Shabogama and Waswanipi lakes by way of the Mekiskan, and afterwards the region lying east of the latter lake by way of the Waswanipi River and Lake Mistasini, from which he returned home by the Asuhapmouchouan River, Lake St. John and Quebec.

Observations
made.

“The above explorations resulted in demonstrating the existence of large areas of Huronian rocks which give promise of valuable metallic ores and other economic minerals, as well as of extensive tracts of agricultural lands and forests of northern timber trees, which are no doubt destined to be of great future value to the country.

“Careful track-surveys were made of the lakes and streams on the routes followed by both Mr. Brock and myself. Numerous observations for latitude and the variation of the compass were taken wherever I went, so that, with the work of last year added, the topography of an extensive region can be laid down on a general map with sufficient accuracy for present purposes. We brought home as many specimens of the rocks of the country as could be conveniently transported, and also about twenty samples of quartz and other vein-stones for examination. Mr. J. M. Bell paid particular attention to the flora of the country traversed. Although many observations were made on the zoology of the country, neither time nor circumstances permitted of the preservation of specimens. A number of Lepidopterous insects, incidentally captured, have been handed to Dr. James Fletcher for determination.

Nomenclature
of places.

“The geographical names to be made use of in describing the exploration from Grand Lake northward, are those which have been given by Indians, wherever such names exist; some were given by my late assistant Mr. Cochrane in 1887, and some by Mr. O’Sullivan in 1894, all of which I have adopted. But it often happened that owing to the absence of any name whatever—Indian or otherwise—I was obliged for the purpose of description to give appropriate designations to some of the geographical features. The few Indians of this great region attach little importance to geographical names, and such as they make use of are generally only temporary and recognized by but few families. They have no idea of a uniform or permanent geography, and each little band of natives coming from a different part of the region, when they have occasion to use the same lake or river, has usually its own name for it, irrespective of what other natives may call it.

“As pointed out in my summary report for 1895, the stream followed northward from the height-of-land near the north end of Grand

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Lake, to Mettagami Lake, of which I made an instrumental survey last year, had been supposed to be identical with a river flowing into Hannah Bay, which, on the sketch-maps of the region, was called Hannah Bay River or Harricanaw River. This latter, however, proved to be an independent stream lying to the west of the one in question, reaching the sea direct and known to the coast Indians as Washahow or Bay River; while the one I surveyed had been confounded with it. At the time of Mr. Cochrane's visit in 1887 and his track-survey of about 70 miles of it from the Boggy portage downward, the river was believed by the Hudson's Bay Company's people and the Indians whom Mr. Cochrane met with, to fall into Hannah Bay. (See Summary Report for 1887, page 24 A.) The same notion prevailed in 1895 when I started on my survey of the stream, and even my guide for the upper part of the river assured me that it did not ultimately fall into Rupert Bay, but into the sea somewhere to the west of it.

Quebec—
Cont.

Erroneous
notions as to
geography of
the country.

“ In my report for 1895 (page 77) reference was made to the Hannah Bay River or Washahow River, above mentioned, and to a lake called Michigami or Michigama (big lake) lying east of it and discharging north-eastward by a large branch into the Noddawai (or Nottaway) River, not far from its mouth. From various sources I have learned that there is another lake of the same name (big lake) to the west of Washahow River, the outlet of which flows directly into Hannah Bay. The want of more definite names is apt to lead to confusion and difficulty of description. In addition to the various ‘big lakes’ in this region mentioned in the present report, the largest sheet of water between Waswanipi and the Ashuapmouchouan River of Lake St. John is also called Big Lake. Indeed, in every part of the Dominion, east of the Rocky Mountains, the Indians (who only know their own district) have their local ‘big lake’.

“ After crossing the height-of-land, my first exploration of the main line of our route was from Simon Lake eastward, via the Mudge Manitou or Devil River to the lake of the same name. On the way, thither (from Simon Lake) our course for ten miles lay through a large unnamed lake whose existence is not yet indicated on any map. While engaged in this work, I sent Mr. Brock to explore a western branch coming in at two miles below Simon Lake and also a small river falling into Obaska Lake,—the next expansion of the main river below Simon Lake.

Mudge Mani-
tou River.

“ On arriving at Shabogama Lake, Mr. Brock was given an efficient Indian voyageur and one of the cedar canoes, with instructions, as

Route from
Shabogama
Lake to
Waswanipi.

Quebec—
Cont.

already stated, to follow a route leading thence to Waswanipi Lake, while I proceeded with the remainder of the party down the main river in order to explore its branches. This was on the 20th of July, and we arranged to rendezvous on the 10th of August at the first narrows of Gull Lake, and accordingly on the morning of that day we met at the appointed place.

Branches of
upper Mekis-
kun.

“ Mr. Brock reported that, having made a track-survey by the Mekiskun to a point about due south of Waswanipi Lake, he turned northward and passing over the watershed of this river, continued his survey through the chain of lakes and streams which had been followed by Mr. H. O’Sullivan in 1894 to the lake first mentioned. In this part of his route, the largest of the lakes traversed were successively Ashpa-bonka, five miles, We-tet-nagami, seven miles, and Pus-ki-tam-ika, fifteen miles in length. Track-surveys showing the details of topography were made of these three lakes. He found that the river discharging We-tet-nagami Lake, instead of falling as supposed into Pus-ki-tam-ika Lake, flowed off north-eastward and joined the lowest southerly branch of the Waswanipi. The Mekiskun here proved to be a difficult stream to ascend, as it flows rapidly down the east slope of the great or leading depression of this whole region. At fourteen miles from Lake Shabogama, it is joined by the Ka-ge-tez-ki-nuk from the south. This branch forms part of a canoe-route to Mudge Manitou Lake, of which I have located the termination in the north-eastern bay of the latter. The Mekiskun also receives a second good-sized branch from the south and two others from the north side in the portion which Mr. Brock surveyed and which had never before been explored by a white man. In this part of its course, the river passed through a lake surrounded by hills and twelve miles in length, which Mr. Brock named Lake Millie.

Various tribu-
tary streams.

“ During the three weeks between the above-mentioned dates, I was occupied in exploring and mapping the large north-east bay of Shabogama Lake, a long branch from the west, which I named the Coffee River, from its water bearing the colour of *café au lait*, the Kiaak River from the east, Kamshigama River, also from the east, and the lake of the same name at its head ; Clay River from the west, the Florence River or first branch from the east below Wedding River, of Mr. O’Sullivan, a river from the south-west falling into Taibis Lake and a stream from the west which my Indians at once named Deer River from having shot a deer on one of its branches. In addition to these eight branches explored by myself and the three by Mr. Brock, I may here add that on my return journey, in the autumn, I explored

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and mapped the lower twelve miles of the considerable tributary which falls into the extremity of Mattagami Lake, and which my guide in 1895 called the 'way-to-Abittibi' river, and also the Shabogama River, a large stream entering the head of the north-west bay of the lake of the same name, but which, within four miles of its mouth, divides into three branches. Quebec—
Cont.

"The geological facts ascertained in the explorations of the above-mentioned thirteen branches and the further geological examinations of the main river itself, together with Mr. Brock's observations between the Mekiskun River and Waswanipi Lake, will enable me to indicate, in a general way at least, the distribution of the principal rocks of this region; and some notes on this subject will be given further on.

"When Mr. Brock rejoined me, although we had already accomplished the work planned out for the season, there still remained six or seven weeks before the rivers might be expected to begin to freeze over, and I decided to devote all of this time not required for the homeward journey, to an exploratory survey of a chain of rivers and lakes from Gull Lake northward to Nemiskau Lake—an expansion of Rupert River,—while Mr. Brock was to proceed eastward by the Waswanipi River to Lake Mistassini, in order to make a track-survey of that large stream and to ascertain as much as possible of the geology of the country it traverses. This journey he successfully accomplished. Waswanipi
Lake to
Rupert River.

"Leaving Mr. Brock at Waswanipi post, I proceeded northward, making at the outset track-surveys of the east side of Gull Lake (of which I had surveyed the west side last year) and of its two northern expansions, which give it a total length of thirty miles. A considerable river from the east falls into the head of each of these expansions. Our route followed the second of these streams for a short distance and then turned up a northern branch and crossed the height-of-land to a river-system lying between the Waswanipi and the Rupert. Our course then lay northward through a number of large lakes, connected by a river which finally discharges them all into Rupert Bay, at a point eleven miles southward of the mouth of Rupert River.

"A track-survey was made of all these lakes, as well as of the connecting links of rivers. The Indians and the Hudson's Bay Company's people told us that some of these lakes had no names, but that the largest of them—about the size of Lake Simcoe, Ontario, was known simply as 'the big lake' and another as 'the long lake.' Several long streams from the eastward fall into this chain of waters, and Mr. Large lakes
on this route.

Quebec—
Cont.

Broad-back or
Little Notta-
way River.

Brock was told at Lake Mistassini, that two of them rise near that sheet of water, and also that the two rivers flowing into the northern expansions of Gull Lake, south of the local divide already referred to, have their sources close to Mistassini post. The large river which discharges the collected waters of all the streams and lakes of the intermediate basin, comes within six miles of Nemiskau Lake on the Rupert. Here we left it, but from this point down it is said to be a very rapid stream with a course parallel and close to the Rupert all the way to Rupert Bay. It is named Broad-backed or Broad-back River by the voyageurs at Waswanipi Post, who follow the route which has just been described to Nemiskau Lake on their way to Rupert house, but at the latter post the same stream is known as Namaigoose's River, after the Indian who hunts at present along its course. The above chain of lakes and their connecting streams appear to receive no notable tributaries from the west, which would show that the country across which they lie slopes westward, like the channel of Rupert River itself, all the way from the rim of Lake Mistassini to Rupert Bay, and the rate of the inclination appears to increase from the line of lakes to the sea-level.

Character of
country north
of Waswanipi.

“The country between Gull Lake and Rupert River became poorer, in a general way, as we proceeded northward. As a rule, it may be described as tolerably level, but now and then isolated hills, several hundred feet high, could be seen from the canoe-route. A good deal of solid rock was exposed on the lake and river shores, but inland, much of the country appeared to possess a good soil. The waters of the upper lakes were tolerably clear, but those of ‘the big lake’ and the lakes below it were quite muddy, owing to the wash from the surrounding clay land. The timber on the whole became smaller as we went northward from Gull Lake, even where it had attained its full size, but much of the forest consists of second growths of various ages. The black ash does not appear to extend north of Gull Lake and the last white cedars were seen at the outlet of ‘the big lake,’ but all the other species of trees are known to continue far to the north of Rupert River.

Climate and
agriculture.

“The general character of the country which was traversed this year, as far as Gull Lake, was described in my preliminary report of last year, as to its rocks, soil, timber, climate and agricultural capabilities. In regard to the last mentioned, at my request, Mr. D. Baxter, the gentleman in charge of Waswanipi post, kindly agreed to make some additional experiments with wheat, oats, barley and a variety of other seed which I obtained from Dr. Saunders of the Central Experimental Farm and sent to him during the past

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winter. When we visited his post on the 12th of August, the various ^{Quebec—}grains looked well. They had headed out some time before and would ^{Cont.} soon be ripe. New potatoes were as large as hen's eggs, turnips six inches in diameter, and carrots and some other vegetables ready for use. Indian corn was showing its silk, tobacco plants were growing well and almost every kind of garden crop grown in an average district of Canada, was flourishing under Mr. Baxter's care

“In my preliminary report of last year, the rocks which had been met with in that part of the district then examined were briefly described. The following is now added as a general outline of the geology of the whole region, between the main height-of-land and Rupert River, and as the result of both years explorations. It is supplemented by Mr. Brock's account of the rocks he met with east of Waswanipi Lake. ^{Geology of the region.}

“*Mr. Brock's Geological Observations.*—Mr. Brock, on his journey from Shabogama Lake towards Waswanipi, in ascending the Mekiskun River, found only granite in the first twenty-three miles, following the general course of the stream, but at this distance he came upon an exposure of chloritic schist. Thence, along his route, which has been already described topographically, gneiss of different varieties prevails as far as Pus-ki-tam-ika Lake. Granite and greenish schist occur around the western part of this large lake and gneiss and similar schist with a little granite around the eastern part. Around Waswanipi Lake the rocks were found to consist of granite with some green schist. ^{Observations by Mr. Brock.}

“In ascending the Waswanipi River on his journey to Lake Mistassini, Mr. Brock observed only granite, like that of Waswanipi Lake, for the first fourteen miles by the general course of the stream. Then for the next seven miles, there are greenstones and green schists, with whitish quartzite in the central part of this distance and granite near its eastern extremity. At one mile further on, syenite containing epidote, occurs, and gneiss and granite occupy the next eight miles. Above this, still measuring along the general course of the river, schists of various kinds were the only rocks seen for the next twenty-six miles. At the end of this distance, or at about fifty-four miles in a straight line easterly from Waswanipi Lake, the route turns off the main river at a right angle and follows up a branch in a due south direction for four miles to Mik-wa-sash Lake, which connects by a short link of river with Opa-mis-ka Lake, eight miles in length. The general course of these two lakes and of this branch river above them is easterly. Greenstones, with a little granite and green schist, were found all ^{Rocks noted along Waswanipi River.}

Quebec—
Cont.

around the above lakes and along this branch above them, to a point thirty miles in a straight line eastward from its junction with the main Waswanipi. From this point, gneiss was found all the way to Wakinitchi Lake. The geology of the route followed by Mr. Brock from this lake to Mistassini post of the Hudson's Bay Company, has already been described by the late Messrs. Richardson and McOuat and by Mr. Low in the reports of the Geological Survey.

Great belt of
Huronian.

“General Geological Description.”—The rocks around Grand Lake consist of Laurentian gneiss, which appears to extend thence south-westward continuously all the way to Georgian Bay of Lake Huron; but when we leave the northern extremity of Grand Lake, we enter at once upon an immense tract of Huronian rocks, with intrusive granites and greenstones, and broken by some areas of gneiss. This great tract of mixed rocks has a breadth of about 150 miles on a line running due north from the head of Grand Lake, and it constitutes an expansion of what I have elsewhere described as the ‘great belt’ of the Huronian system, extending from Lake Superior to Lake Mistassini, a distance of about 700 miles. From the central point of the above north-and-south line, the southern extremity of Lake Mistassini lies about 170 miles in a north-easterly direction, and Mr. Brock's exploration continues the tracing of this belt of Huronian rocks, with a narrowing breadth, all the way to that locality. The northern boundary of this great belt passes through the northern portions of Gull and Mattagami Lakes.

Boundaries of
this area.

“Leaving the height-of-land near Grand Lake, on the route which I followed, schists, greenstones and granites are found as far as about five miles down Shabogama Lake, beyond which gneiss prevails to and also all around the north-east extremity of Shabogama Lake, and it probably connects with the gneisses which Mr. Brock found everywhere on his way from the Mekiskun River to Pus-ki-tam-ika Lake. I came upon the north-westerly boundary of this gneissic area on the south branch of the Kiaak River. Another area of gneiss begins at Clay River and extends for several miles down the main stream. Areas of the same rock, separated by others of Huronian schists, occur in two places between the one last mentioned and Mattagami Lake.

Smaller
northern belt.

“North of the principal belt above referred to, a smaller band of Huronian rocks was found on the route from Gull Lake to Rupert River. It begins at the outlet of ‘the long lake’ and extends to the southern bay of ‘the big lake,’ and has a breadth of about seventeen miles. Deposits of iron-pyrites, sometimes with traces of copper, were found in several places along this band, and these may prove

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large enough to be of economic value. This Huronian band is flanked on its northern side by granite at the first narrows of 'the big lake,' and this again is followed by gneiss, which continued all the way to Rupert River. Quebec—
Cont.

“ From Mattawa, on the Ottawa, northward to Rupert River, the average course of the glacial striæ changes very gradually from about south-south-west to about south-west (true), but it is very constant over large districts. From the neighbourhood of Shabogama Lake, northward, the drift or till contains a varying proportion of rock-fragments derived from the Manitounuck formation (Cambrian), which may have come from the East Main coast of Hudson Bay, as far as their lithological characters are concerned; but as the glacial striæ of the whole region, except along a part of the Noddawai River, all run south-westward, these fragments may have been derived from the rocks of the broad belt of the same formation which Mr. Low found running north-westerly through the central part of the Labrador Peninsula. Glacial striæ
and erratics.

“ On Mattagami, Gull and Waswanipi lakes, and for some distance up the Waswanipi River, many small and some good-sized boulders occur, of a grayish unaltered limestone, containing obscure fossils, but no fixed rock of this kind has yet been found in the surrounding country.

“ The brownish clays, formed of thin horizontal layers and usually containing small nodules, which overspread the river-valleys and the lower levels of the country generally, are not confined to any particular elevation, but occur at all heights from about 100 feet below the watershed, down nearly to the sea-level, where they are replaced by clays of a bluish-gray colour. The brown clays rest upon the till and are sometimes covered by local deposits of sand or more rarely of gravel. Clay deposits.

“ In returning from Rupert River to Grand Lake, I followed the same route as in going and reached the latter place on Saturday, 26th September. Owing to a continuous downpour of rain, we were unable to resume our journey southward till the 1st of October and on the 6th we arrived at Mattawa, where I settled with my men and started them off on their homeward journey.

“ In carrying out the above explorations we were indebted for assistance in a variety of ways to several of the officers of the Hudson's Bay Company, among whom I may mention the Chief Commissioner Mr. C. C. Chipman, Chief Factor Rankin of Mattawa, Mr. L.

Quebec—
Cont. Christopherson of Grand Lake, Mr. David Baxter of Waswanipi, and
 Mr. William Miller of Lake Mistassini.”

Work by Mr.
Chalmers. Throughout the winter of 1895-96, Mr. R. Chalmers was engaged in
correcting final proofs of maps and report on the Surface Geology of
Eastern New Brunswick, north-western Nova Scotia and Prince Edward
Island, and in compiling the data obtained in the field during the pre-
vious summer in the “ Eastern Townships ” of the province of Quebec for
publication. A portion of the field-work relating to the surface geo-
logy of sheets No. 1 N. W., and No. 2 S. W., New Brunswick, was also
put down upon the maps, and the post-Tertiary fossils of that province
were catalogued. The specimens of boulder-clays and other Pleistocene
deposits which had been collected from time to time for the museum
were also classified and labelled.

The field-work of 1896, which was again devoted to the “ Eastern
Townships ” of Quebec, is reported on by Mr. Chalmers, as follows :—

Surface geo-
logy of the
‘ Eastern
Townships.’

“ On the 19th of May, I left Ottawa to resume the investigation of
the gold-bearing alluviums and to study some questions pertaining to
the surface geology of the ‘ Eastern Townships ’ and adjacent portions of
south-eastern Quebec, remaining in the field till the 19th of November.
Operations, though somewhat restricted for a considerable portion of
the season owing to the scarcity of funds, were, nevertheless, carried
on continuously throughout the summer, and the region referred to,
especially where it is occupied by auriferous deposits, has now been
examined in as much detail as time and circumstances would permit.
The glaciation and the deposits due to glacial action, especially in their
relation to the gold-bearing gravels, have been closely studied.

Observations
in gold mining
districts.

“ On entering the field, observations were first made in the different
districts in which gold mining was in progress, especially where shafts,
tunnels, etc., were open. Development work was found to be going on
at Dudswell, Ditton, Massawippi Lake, and in Beauce County, though
only to a limited extent. On the west side of Massawippi Lake, Mr.
James Stark, representing an English company, was at work with
twenty-two men, in the bed of a small stream on lot 14, range VI.,
Hatley, Stanstead county. Some gold was found in the gravels, but not
sufficient quantities to pay for working. Mr. Stark’s object was, how-
ever, to find it in the matrix. Broken quartz seams, with pyritous,
slaty and talcose minerals, traverse the rocks mapped as pre-Cambrian
there. Specimens of these were brought to the office for assay in the
laboratory of the Survey. The work at this place was discontinued
after a month or two.

Massawippi
Lake.

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“The stream along which the gold occurs runs entirely across pre-Cambrian rocks and falls into Massawippi Lake, and the gold seems, therefore, to be derived from these rocks. Their character is very much the same as that of the rocks in Dudswell Mountain. Quebec—
Cont.

“On lot 5, range XV., Magog, near the foot of Orford Mountain, Magog. mining for gold was undertaken by a Mr. Lacroix, and several men were at work in a pit in the bank of a small stream, at the time of my visit. The Cambrian slates there contain some thin quartz seams accompanied by pyritous minerals; but Mr. Lacroix could not show me any gold obtained from this opening, and later on it was closed.

“*Gold Mining at Dudswell.*—From Magog I proceeded to Dudswell, Dudswell. where some time was spent and repeated examinations were made during the summer as work progressed. At Harrison’s, lot 1, range VI., Westbury, free gold was found in the autumn of 1895 in a thin seam of quartz in a sort of conglomerate rock.* The exposure in which it occurred was uncovered to a still greater extent, along a low ridge, during the winter, and an opening made in the conglomerate, but without any further result than as stated in the Summary Report referred to. It is evident, however, that this conglomerate exists here in much greater thickness and extent than at first supposed; but whether auriferous throughout has yet to be proved. Mr. John Armstrong, of Marlow, Beauce county, has leased this property and was preparing to have the auriferous character of these rocks tested preparatory to working them.

“In Kingsley Brook, a considerable amount of work has been going on this season. A company has been formed to operate the mines on this stream, called The Rodrigue Mining Company, and the mining rights along the whole stream have been secured. Mr. H. C. Donnell, of Boston, U.S., is manager. Early in the season a dam was constructed near the source of Kingsley Brook, and an 80-horse-power boiler and hydraulic pump were put in, principally to work the gravels, Kingsley
Brook. Mr. Donnell informed me that he finds gold in paying quantities in these, but his ultimate object is to find the auriferous quartz or matrix, which he hopes to do as he sluices the gravels and uncovers the rock surface in the valley of the stream from the foot of the mountain up towards the dam. The boiler, Mr. Donnell states, is large enough to furnish power to drive a 50 or 60-stamp mill, and can be utilized for that purpose when gold is found in the rock in sufficient quantity to warrant the purchase of a mill.

* Summary Report, Geol. Surv. Can., 1895, p. 93.

Quebec—
Cont.

“The rocks of Dudswell Mountain are, like those on the west side of Massawippi Lake, pre-Cambrian slates and schists. Kingsley Brook crosses them nearly at right angles to the strike and has dropped considerable quantities of gold into the joints and crevices. Mr. Donnell informed me he was finding gold in these to a depth of two or three feet below the surface of the rock. Latterly, he was mining the decayed or partially rotten rock to that depth along with the overlying gravels and had sunk his sluice-boxes to that level. The discovery of gold in the rock-fissures means a continuance of operations for many years longer than if the gravels alone were worked.

Difficulties in
mining.

“In regard to the difficulties encountered in gold mining in Kingsley Brook, and probably also in the valleys of the other small streams flowing off Dudswell Mountain, the first is the scarcity of water during the midsummer months, if operations are conducted on anything like a large scale. This difficulty can only be overcome by the construction of dams and reservoirs. The second is the presence of large boulders in the gravels. These interfere, to some extent, with hydraulic work, and have to be blasted or removed by derricks before the whole of the gravels can be sluiced. No quicksands occur in the valley of these small streams as they do in Beauce county, except in the terraces at the foot of the mountain. Mining has not yet been undertaken in any of these terraces.

Rowe's Brook.

“On a stream from one to two miles north-east of Kingsley Brook, called Rowe's Brook, lot 8, range IV., Dudswell, alluvial gold mining has been prosecuted this season by Messrs. Hayemal and Soteri, for some months and gold in paying quantities obtained by the ordinary process of sluicing. A clean-up which I witnessed while visiting this locality, seemed to prove this statement. The character of the deposits is very much the same as in the Kingsley Brook valley, as described in the Summary Report for 1895 (p. 91), except that the thickness is perhaps, fully greater.

Ditton.

“*Gold Mining in Ditton.*—In the valley of the Little Ditton River, some work has been performed during the past season by Messrs. McCritchie and McKay of Scotstown, about a quarter of a mile above the bridge on the road to Chartierville. The gravels at this point were washed for some weeks by these men previous to the date of my visit and some gold was obtained. One nugget weighing an ounce was found at the bottom of the gravel, close to the bed-rock. The chief auriferous deposits here are those resting upon the rusty rotten rock, and are themselves highly oxidized, though stratified. Overlying them are alternating gravel and sand beds, which must be

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largely of post-glacial origin. The boulder-clay is, however, rarely seen in contact with these. They contain but little gold. Quebec—
Cont.

“To the south of the locality mentioned, along the Little Ditton valley, gold has been washed from the gravels at several points, nearly as far up as the International boundary, *e. g.* at a point a mile north of the cross-road going west from Chartierville, also south of that road and near the source of that stream in the vicinity of Prospect Hill, where it is reported to have been found in quartz, but I could obtain no authentic information on this point. It has also been discovered in the alluviums of the main Ditton River to the south of Chartierville village. No work has been done, however, in the two last-mentioned localities.

“*Gold Mining in the Chaudière Valley.*—Along the Chaudière River and its tributaries, very little gold mining has been carried on during the past season. Work in the tunnel at St. George, referred to in the Summary Report for 1895 (p. 87), was continued until September last, when it was found that the old pre-glacial channel of Slate Creek was not likely to be reached by following the course in which the tunnel was started, and it was abandoned for the present. At the time operations were suspended, the tunnel had been run in nearly 900 feet. Great difficulties were experienced in keeping it open, owing to the presence of quicksands and to the quantities of water in the ground overhead seeking outlet and carrying these sands with it. The succession of the deposits disclosed in the tunnel is interesting from a geological point of view. In descending order it is as follows:—(1) surface soil; (2) boulder-clay with an intercalated band of stratified clay, or stratified boulder-clay; (3) stratified clay and sand (pipe-clay and quicksands); (4) coarse, stratified gravel with pebbles and a few boulders one or two feet in diameter—colours of gold occur in this gravel; (5) a local bed of coarse slaty material with quartz bands running through it. It is apparently a decomposed slate which may have originally been thrown down as a talus at the base of a boss on the slope; (6) fine yellow sand with ochreous streaks through it, passing into rotten rock *in situ* beneath, the strata being in the same position as in the solid rock; (7) unglaciated rock. Chaudière
valley.
St. George.

“The most remarkable member of the series is number 6. It is unlike any other bed met with in connection with the gold-bearing deposits of Beauce county, and is noteworthy as showing the slight erosive action of the Pleistocene ice, exposed, as this slope of the Chaudière valley must have been to the full force of the glacier which moved over this district from north-west to south-east.

Quebec—
Cont.
Rivière du
Loup.

“ In the valley of the Rivière du Loup, Mr. L. Gendreau is endeavouring to open up a series of gravel banks on the west side, which extend from three to five miles above its mouth. These gravels are reported to contain gold in workable quantities, but I have seen no competent tests made. The following is a section of one of these banks situated about four miles above the confluence of the du Loup and Chaudière rivers. (1) Surface soil; (2) boulder-clay, the upper part stratified in places; (3) a thin seam of stratified sand graduating into the following bed (4) stratified clay, (pipe-clay); (5) stratified sand and gravel, the latter usually in lenticular seams with ochreous bands, especially in the upper part. This is the deposit said to be auriferous; (6) fine, gray, stratified sand, the bottom not reached as it lies below the level of Rivière du Loup.

“ Whether gold exists in paying quantities in these gravels does not appear, but Mr. A. A. Humphrey, of the Canada Gold Mining Association, formerly washed a good deal of gold out of the gravels of the du Loup valley in his No. 1 pit, just below the mouth of Gold Stream, *i.e.* about two miles lower down than the above section; and also in No. 2 pit near the river's mouth (see Summary Report for 1895, p. 89, where it is called No. 1 pit), though so far as known not in sufficient quantities to pay for hydraulic work.

Gilbert River. “ In the Gilbert River valley, some gold mining was carried on during the past season by the Leclerc Brothers, who are reported to have met with fair success and to have taken out in a few weeks about \$400 worth. Two nuggets valued at \$50 and \$60, I am informed, were obtained by these men. One of these nuggets was shown to me.

Mill Stream. “ On Mill Stream, near St. François, Beauce, some work has been performed by Messrs. Copal and Pomerleau, and gold has been found in parts of the valley of that stream not hitherto prospected. In the valley of Black River, a branch of Des Plantes River, joining it from the south, gold was discovered in the gravels at the confluence of the main tributary.

General aspect
of mining
operations.

“ The present languishing condition of the gold mining industry in Beauce county, appears to be due to causes other than the scarcity of gold in the alluviums. It would be invidious to make any remarks, however, concerning these causes. That gold still exists in a number of these valleys in paying quantities, *i.e.* in quantities sufficient at least to warrant a skilful and economic expenditure of capital in their exploitation, is a fact which no one who has examined the district can deny. But on the other hand it must be remembered that this district can show a total of a large number of failures in gold mining,

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and that there are other causes for this besides want of scientific knowledge or skill and want of capital. In much of the Chaudière district, the gold exists in a very thin and scattered condition, and the gravels containing it are capped by such thick beds of boulder-clay and quicksands that it is doubtful whether it can be profitably mined. In the deeper parts of the river-valleys there are still greater difficulties to contend with. In the old pre-glacial channels, the gold has, of course, been more or less concentrated, but when it is considered that these often lie below the present water-courses, and that tunnels or shafts at these levels are likely to receive a portion of the drainage waters, the expense of exploration would be great and only deposits of considerable richness would probably prove remunerative.

Québec—
Cont.

“The failure hitherto to find workable gold-bearing quartz, has given wrong impressions concerning the district, leading miners and mining engineers to suppose that it has been but very imperfectly explored. As a matter of fact a considerable number of geologists, mining engineers and experts have visited and examined this district, and the literature pertaining to it is somewhat voluminous. There are, of course, different local conditions existing here as regards the distribution of the gold in the alluviums from what prevail in non-glaciated countries, and these diverse conditions may not have been sufficiently taken into account. But the Chaudière district has not suffered for lack of competent and skilful exploration, or for want of capital.

“Notwithstanding the backward condition of gold mining here, this district, or at least some portions of it, offers inducements to miners and capitalists equal in some respects at least to those of some other gold regions more favourably regarded.

“The further development of the gold mines of the Chaudière area should, it seems to me, lie in the direction of introducing machinery and plant adapted to alluvial mining under the peculiar local conditions which are found there. But first the gold-bearing gravels, in a great number of places, should be tested anew and their gold content per cubic yard proved, with the view of ascertaining whether it is sufficient to pay for the expenditure in the direction indicated. To effect this exploration adequately, it would seem that boring machines are absolutely necessary. The great thickness of the boulder-clay, which never contains gold in paying quantities, but which must be penetrated by shafts or tunnels before the auriferous deposits can be reached and worked, as well as the difficulty of locating the old river-channels in which the auriferous deposits mainly lie, have hitherto proved serious obstacles to exploration in the deep-lying beds. With boring appli-

Improvement
in methods.

Quebec—
Cont.

ances these difficulties could be overcome, at least to a much greater extent than by the methods hitherto employed, the position of the old channels could be located in less time and at much less expense, and the thickness of the auriferous beds in these ascertained before commencing actual mining operations.

Quartz veins.

“*Quartz Veins.*—In addition to the facts obtained relating to alluvial gold mines, a considerable body of data concerning quartz veins and other rocks which might be likely to yield gold was collected in the field, with a view of ascertaining, if possible, its primary source. The details regarding these will be given in my forthcoming general report ; while such specimens as were brought in from the field will, meantime, be subjected to examination and assay in the laboratory of the Survey.

Observations
on glaciation.

“*Glaciation.*—A portion of the season, at intervals, was spent in the investigation of the glaciation of this region, which undoubtedly has a close relation to the distribution of the gold throughout the gravels of the river-valleys. The direction of movement of the ice of the glacial period, the causes of its greater accumulation in certain localities than in others, particularly in the depressions of the surface, the denudation of all the superficial material on portions of the higher grounds, the transport of the drift from one locality to another, are questions bearing intimately upon the problem, and in this respect are of economic importance. The facts now at hand have been collected from all parts of the region from the Lake Champlain valley eastward to Gaspé, and are sufficient to enable us to arrive at conclusions with some confidence. They are mainly in confirmation of the observations recorded in the last Summary Report (p. 94), viz., that the earliest glaciation of this region was caused by ice which moved northward from the Notre-Dame Mountains into the St. Lawrence valley, the striae produced by it being still preserved on the south and west sides of ridges and hills where the Laurentian ice, which flowed southward and south-eastward subsequently, did not efface it. Each of these two glacier-movements seems to be represented by its own boulder-clay as well as by striae, and consequently the boulder-clay is found to have a two-fold division in a number of places. The lower, so far as it has been possible to examine it, consists of local material, while the upper contains Laurentian and other transported boulders from the north. The two boulder-clays were observed in the St. Francis River valley east of Angus station, Quebec Central Railway, where the intercalated bed consists of 12 or 15 feet of tough, stratified clay in a horizontal attitude. The boulder-clay was also seen in an upper and lower divi-

Two periods
of glaciation.

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sion in the bank of Clifton River, south of Sawyerville, Compton Quebec—
county, as well as in other places referred to in the Summary Report Cont.
for 1895 (p. 95). It has been noted as occurring in the tunnel at St.
George, Beauce county, on a preceding page, in the same two-fold bed.

Changes of Level.—A good deal of evidence has been obtained Changes of
tending to show that this region has undergone remarkable changes of level.
level in later geological ages and especially during the Pleistocene
period. The basins of those long narrow lakes extending north and Lake basins.
south, such as Memphremagog, Massawippi, Little Magog, Megantic,
St. Francis, etc., appear to be merely dislocated portions of old river-
valleys, interrupted by differential movements, the axes of these
movements following mainly the direction of the present mountain
ranges. The uplift of the range nearest the St. Lawrence, *i.e.* the range
forming the extension of the Green Mountain Range into Canada,
probably took place long before the Pleistocene period. It was this
movement which principally affected the old valleys of the rivers
referred to, and which appear to have flowed northwardly.

The great changes of level of which the evidences still remain in the Beaches and
form of raised beaches and terraces, however, took place in the later terraces.
Pleistocene. These beaches and terraces extend along the slopes of
the mountain range referred to, and face the open St. Lawrence
valley from the Gulf to the International boundary in the vicinity of
Lake Champlain. The uplift which raised these shore-lines has been
unequal, or differential, as shown in the Summary Report for 1895
(p. 96), the gradient increasing in height above sea-level from Gaspé Amount of
till we reach Arthabaska. Here a series of three shore-lines occurs at uplift variable
heights of 600 to 625 feet, 700 to 720 feet, and 875 to 885 feet, as
levelled by aneroid, starting from the known elevation of the nearest
railway station. From this point south-westward, they descend
gradually towards the International boundary on the north-west slope
of Sutton Mountain.

The lower shore-lines are tolerably well preserved throughout,
but the higher are greatly denuded, and on the slopes between St.
Francis River and the Vermont boundary are very difficult to trace,
owing to their broken, detached condition. These slopes are much
intersected by valleys extending transversely to the direction of
the ridge, as well as by others running longitudinally, and the
Pleistocene shore-lines can be traced only around the denuded
hills or along the sides of the broken ridges which remain.
In many instances the hills are isolated. Two of these isolated
hills, near the Canadian Pacific Railway at West Shefford

Quebec—
Cont.

station, have furnished examples of Pleistocene shore-lines upon their slopes—Shefford Mountain and Brome Mountain. Here they occur at heights of 650, 700 and 820 feet. West of Sweetsburg two of these were observed at 600 to 610 feet and at about 700 feet. Near Frelighsburg and Abbott's Corner and north of 'The Pinnacle' in Sutton Mountain, the inner border of the marine plain is 475 or 480 feet high, the first shore-line above it from 600 to 625 feet, and another very broken and imperfect one, not yet accurately traced, at about 785 feet. This point is within a few miles of the International boundary. Further detailed examination and levelling of these shore-lines is desirable.

Shore-lines
are marine.

" All the shore-lines noted face the open plain of the St. Lawrence valley, in the deposits of which marine fossils occur at various points. No barriers exist or could have existed, capable of holding in a body of fresh water at heights sufficient to allow the formation of these shore-lines; and the only reasonable theory as to their origin seems to be that they were formed along the margin of a sea which occupied the St. Lawrence valley in the Pleistocene period.

" Photographs of several of these shore-lines have been taken during the past season.

Differential
uplift.

" Evidences of uplifts, with probably corresponding subsidences, were noted in other parts of the area under review. A differential change of level of this kind has occurred at the Devil's Rapids on the Chaudière River. As pointed out in the Summary Report for 1895 (p. 97) there must have been a local uplift here, with perhaps, a correlative subsidence in a parallel belt of country which crosses the Chaudière valley to the south between these rapids and the mouth of the du Loup. Further detailed observations during the past summer confirmed the conclusion previously arrived at. This uplift probably commenced before the Pleistocene, and may have been part of the movement which dislocated the old river-valleys and produced the lake basins referred to on a previous page.

Post-glacial
dislocations.

" Dislocations or slips of the slates over each other, along certain zones or bands, since the glacial period, were observed in a great number of places, the displacements ranging in extent from two or three inches to five or six feet. One of the most remarkable examples of these movements in the rocks, was seen in the southern part of the seigniorie of Aubert Gallion, Beauce county, where a band of slates from three to four feet thick and several hundred yards in length had sustained an upward shove of nearly six feet above the general level of the glaciated rock-surface, as evidenced by the parallel and well-

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marked striæ. The rocks on both sides of the protruding band were also more or less dislocated for several feet distant from it. Whether the upthrust is due to great lateral pressure, or to some other cause, remains to be determined.”

Labrador
Peninsula.

LABRADOR PENINSULA.

Mr. A. P. Low, during the past winter, was engaged in writing a report on the previous season's work on the Manicouagan River, to be incorporated in his report on Labrador, also, with the assistance of Mr. Eaton, in the continued compilation of the map of the Labrador peninsula.

Work by Mr.
Low.

In the spring, plans were made for an additional traverse across the northern portion of Labrador, and Mr. Low was entrusted with the execution of this exploration. One principal object of the work was to trace out the northern continuation of the iron-bearing Cambrian rocks previously met with in Labrador. The results accomplished are outlined by Mr. Low as follows:—

“I left Ottawa on May 29th by the Canadian Pacific Railway for Missinaibie, to explore the country between the east coast of Hudson Bay and Ungava Bay. My party was made up as follows:—Mr. G. A. Young, assistant; Mr. W. Spreadborough, collector of natural history, and three canoemen, all of whom completed the entire trip. From time to time extra Indians were engaged as canoemen and guides as will be mentioned later.

“Two days were spent at Missinaibie in securing four extra Indians to assist in conveying the outfit to Moose Factory. On the 30th we left the railway, with everything in one large bark canoe and two wooden ones. The next day Brunswick post was reached, at the outlet of Missinaibie Lake, where four more Indians were engaged to assist in passing the strong rapids which extend for twenty miles below the lake. Having passed these, we continued down stream with the spring freshet, and without mishap arrived at Moose Factory on June 8th.

Missinaibie to
Moose Fac-
tory.

“At Moose, a Collingwood fishing boat, the property of the Geological Survey was launched, but owing to its having been out of the water for several years, a number of repairs were necessary before it was fit for use, and in consequence we were detained until the 14th. The boat was heavily loaded with provisions and outfit for a three months' trip, and its deck was encumbered by the two wooden canoes, which could not be carried otherwise.

Moose to
Richmond
Gulf.

Labrador
Peninsula—
Cont.

“After crossing Hannah Bay, a course was taken to the east of Charleton and Strutton islands, and the east coast of James Bay was reached near Cape Hope, where a hurried examination of the rocks showed them to be chiefly green chloritic and hornblendic schists of Huronian age. From Cape Hope the coast was followed northward to Richmond Gulf, about 500 miles from Moose Factory. Stops were made at Paint Hills, some forty miles south of Fort George, at Fort George and at Great Whale River. At Paint Hills another area of Huronian rock was noted. Several interesting groups of Indians and Eskimo were photographed at Fort George and Great Whale River, and at the latter place an Indian guide, who had, in 1885, been over the route we proposed taking, was engaged for the trip across country to Ungava.

East coast of
Hudson Bay.

“The east coast of James Bay is very irregular, being broken by long rocky points, and it is fringed with innumerable islands of rock and drift that extend outward from five to twenty-five miles from the mainland, often with very shallow water between them. To the northward of Cape Jones, the coast is higher and the water along shore much deeper, while the islands are arranged in chains parallel to the coast and often afford excellently sheltered channels for boats. For forty miles to the southward of Great Whale River, and for thirty miles in the vicinity of Little Whale River, there are no islands, and boating is somewhat dangerous, as the shores are high and rocky and landing is impossible with the wind from seaward.

“The past season was remarkable for the small quantity of ice in Hudson Bay and Hudson Strait. On our passage from Moose Factory to Richmond Gulf only one small field was seen, to the southward of Great Whale River, whereas usually ice blocks James Bay and the coast to the northward until July. The ice left the coast about Great Whale River early in the year and did not return. In Hudson Strait, Capt. Gray, of the H. B. Co's Steamer *Erik*, reports that on the passage to Churchill, in July, he encountered practically no ice, and similar conditions prevailed on the return trip late in August.

Richmond
Gulf.

“Richmond Gulf is a body of water separated from Hudson Bay by a high ridge of Cambrian rocks. It is roughly triangular in shape, being about eighteen miles along the base, from the entrance eastward to the mouth of the Clearwater River, and about twenty-five miles from north to south. It is connected with the bay by a channel from 200 to 1000 yards wide and about one mile long, formed by a break in the ridge, which rises perpendicularly on both sides to elevations varying from 200 to 1200 feet. The rise and fall of the tide causes

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a tremendous rush of water in and out through the channel, which renders the passage dangerous to small craft, except at slack water at the change of tide. Labrador
Peninsula—
Cont.

“The gulf is surrounded by sharp hills of Cambrian rock, which also forms several large islands. The hills rising abruptly from the water on all sides, vary in altitude from 500 to 1000 feet, and are quite barren on top, with small trees growing only in the lower gulleys and about the edge of the water. At the time of our visit, great patches of snow still remained on the tops and steep sides of the hills, and added to the wild and desolate aspect of the scenery of the place. Two days were spent here examining the rocks, collecting specimens and obtaining photographs.

“We then proceeded to the east side of the gulf where a portage-route to Clearwater Lake begins. This route was surveyed by me as far as the lake in 1888.* Having unloaded the boat we started over the first portage of three miles and a-half, up and over a hill 800 feet high, and ending on a small stream, which has a fall of 315 feet just below. This stream was ascended some twenty miles, passing a fall of sixty-five feet, to another portage of two miles up hill, to the beginning of a chain of small lakes nearly on a level with the country of the interior, or about 800 feet above sea-level. The next week was spent mostly in carrying loads over portages between small lakes, and in this manner Clearwater Lake was reached on July 11th. Portage-route
to Clearwater
Lake.

“This lake is about thirty-five miles long from north-west to south-east, and about eighteen miles across in its widest part. The coastline is very irregular and many islands are scattered over its surface, especially along shore. The surrounding country is broken by rounded hills of granite and gneiss that vary from 100 to 400 feet in elevation above the lake, which is about 800 feet above sea-level. All the hills are bare and rocky with very little soil on or about them, the valleys being chiefly filled with boulders. The summits of the higher hills rise above the tree-line, and are clothed only with white lichens and arctic shrubs. The trees about the lake are all very small black spruce or larch. The water, as the name of the lake implies, is remarkably clear, and is well stocked with fish. Clearwater
Lake.

“Having finished the survey of the lake on July 20th, we next crossed a portage-route fourteen miles long to Seal Lake. This route follows the course of a small stream, which empties into Clearwater Lake near its north-east corner. It passes through several small lakes Seal Lake.

Annual Report, Geol. Surv. Can., vol. III. (N.S.), pp. 80-82A and 55-62J.

Labrador
Peninsula—
Cont.

connected by rapids, and ends in an irregular narrow bay that stretches southward from the main body of Seal Lake. This lake takes its name from the number of seals living in it. During our stay we saw three seals, but unfortunately could not kill one. From skins seen in possession of the Indians they are known to be either the true Harbour seal (*Phoca vitulina L.*) or a variety of the same species.

“ Seal Lake is a long and comparatively narrow body of water lying nearly east-and-west. Its greatest length is about fifty miles, and it varies in breadth from one to five miles. Its western end is situated some twenty-five miles north of Clearwater Lake, where it discharges by the Nastapoka River into Hudson Bay. About the middle of the lake there is a short narrows, with strong current, which practically divides it into two lakes. About fifteen miles from its east end it is split into two long bays, and the northern of these is again divided by a deep bay running north-west from near its mouth. Like Clearwater Lake it is studded with islands, but its water is not nearly so transparent and has a brownish tinge. The surrounding country is similar to that about Clearwater Lake. The hills toward the east end are higher than elsewhere, the trees are smaller and the barren areas more extensive.

Height-of-
land Portage.

“ Seal Lake was left on August 4th, by a small stream flowing into the head of its northern bay at the east end. This stream was ascended nine miles, through four small lakes, to the watershed between the rivers of Hudson Bay and Ungava Bay. The height-of-land portage is about 900 feet above sea-level, and is only fifty yards long, ending in a narrow lake seven miles and a-half long, out of the east end of which flows the main stream of the Natuakami or Stillwater Branch of the Koksoak River. This stream was surveyed to its mouth.

Stillwater
Branch.

“ For the first fifty-five miles it is an almost continuous succession of rapids, there being sixty-four such in that distance. The general course is nearly east-north-east with minor bends to the north and south. At first it is small and narrow, but is soon enlarged by the addition of several branches from the northward. At the end of the above distance, it is joined by a large northern branch, and then flows with slackened current for nine miles, when it widens out into a delta as it enters Natuakami or Stillwater Lake. This lake is fifteen miles long and varies from a quarter of a mile to four miles in width, merely occupying an expansion of the river-valley.

“ The country surrounding the river, from its head to Stillwater Lake, is very rugged and barren. The river flows in a distinct valley

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from an eighth to a half mile wide, and the valley is bounded by rocky hills, that rise from 100 to 800 feet above the river, being highest for about twenty miles above Stillwater Lake. Trees are confined to the valleys and are very small.

Labrador
Peninsula—
Cont.

“Below Stillwater Lake, both the valley and the river widen, the former varies from a half to two miles between the hills, and the latter from a quarter to a half mile wide. Several heavy rapids occur in the next thirty miles, to the junction of the Kenogami Branch, but none of them are sufficiently bad to entail a portage in descending.

“In the valley, the trees are somewhat larger and in several places small straggling trees of balsam poplar were seen. Between the river and the hills there is usually a wide swamp, from twenty to fifty feet above the river, caused by the impervious stiff clay of the valley. Below Stillwater Lake, terraces are almost continuously seen along the hillsides.

“The Kenogami Branch joins from the southward, and has at least twice the volume of the stream descended. We ascended it about six miles, and then climbed a hill from which a good view was obtained of its course, showing continuous rapids for several miles. The Indians state that the rapids continue for about thirty miles, or to where the river divides into two branches to the southward of Stillwater Lake.

Kenogami
Branch.

“Below the junction of the Kenogami, the river averages half a mile in width, and to the mouth of the Kaniapiskau River, sixty-five miles below, it flows generally with an even current from three to four miles an hour, and is broken by three heavy rapids, the last one being nearly five miles long, immediately above the junction with the Kaniapiskau. From the Kenogami the course is nearly north-east for twenty-five miles, when the river takes a sudden bend to the southward as it passes out of the Laurentian region into an area underlain by bedded Cambrian rocks. It then again slowly bends back to a nearly north-east course, and continues so to the forks. The character of the country changes with the underlying rocks, and in the Cambrian area the hills are lower and sharper with frequent cliff-faces. As the Kaniapiskau is approached, these sharp hills increase in height and at the forks attain elevations of more than 1000 feet above the river.

River below
the Kenogami

“The river below the Kaniapiskau widens out to about a mile across, and from there to its mouth, ninety-five miles below, it varies in width from one mile to two miles and a-half. The valley is also wide and the hills soon decrease in attitude, so that as the sea is approached they seldom rise more than 300 or 400 feet above sea-level. The river

Labrador
Peninsula—
Cont.

has everywhere a strong current, and its shallow channel is often obstructed by sand and shingle bars and islands. Only one rapid occurs along this portion, being situated at the head of tide, or sixty-three miles above the mouth.

Reach
Ungava Bay.

“ We arrived at Fort Chimo on August 26th, and finished the remaining thirty-three miles of survey to the mouth of the river on September 5th. From Fort Chimo, passage was taken on the Hudson's Bay Company's steamship *Erik*, on September 13th. On the way down the Labrador coast, stops were made at George River, Nachvak and Davis Inlet, and Rigolet was reached on September 28th. Here an exchange was made to a schooner, which had been luckily delayed, and in which we took passage directly for Quebec, thus escaping a long trip by way of Newfoundland. Rigolet was left on October 2nd, and after a remarkably quick passage Ottawa was reached on the 10th.

Distances
travelled and
results of the
work.

“ The distance travelled in all is approximately estimated at 4200 miles—in canoes, 700 miles; in boat on Hudson Bay, 500 miles; by steamship and schooner, 2000 miles, and by railway 1000 miles. The results of the exploration include a micrometer survey of the route from Hudson Bay to Ungava Bay, together with observations on the resources and climate of that region. A large collection of plants was made, useful as an index to the climate and also in extending the range of many species. Collections of bird-skins, birds' eggs, small mammals, shells and insects were also made and are at present in the museum, together with a small collection of Eskimo carved ivory.

Geology.

“ The rocks of the country were carefully examined and a number of interesting and practically valuable facts observed in connection with the geology, including the location of a large area of valuable iron-bearing rocks which form an extension of the Cambrian area of the Kaniapiskau River previously discovered.* Iron ores were also discovered in the gneisses along the upper part of the Stillwater River. Attention may further be called to the areas of Huronian rocks at Cape Hope and Paint Hills on the east coast of James Bay, which from their resemblance to those of the same age elsewhere, may yet be found to contain valuable ores.

Glaciation.

“ Interesting notes were also made as to the glaciation of this northern region, and it was found that the ice flowed downwards and outwards on both sides of the present watershed.

Climate.

“ The climate of the region is such as to totally unfit the country for agriculture. Along the coasts it is almost arctic, owing probably

* Annual Report, Geol. Surv. Can., vol. VII. (N.S.), p. 67A.

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to the low temperature of the sea. Inland, although much less severe, as is shown by the plants, it is yet too cold to grow crops. Snow was seen in gulleys until the middle of August, and on the 8th of that month ice one-eighth of an inch thick formed during the night. Snow flurries occurred throughout July. The value of the region will be found in its minerals and fisheries. All the lakes and streams are abundantly stocked with fish, including large lake-trout, brook-trout, whitefish and suckers. Salmon are abundant in the rivers flowing into Ungava Bay and young salmon were caught on the Stillwater River to within a few miles of Stillwater Lake. A northern trout, probably Hearn's salmon, is very plentiful in the lower parts of the rivers and along the northern coasts from Cape Jones to Ungava Bay. This fish is not quite as fat and fine flavoured as the salmon, but has a good red colour and may be found to answer well for canning. It is as before mentioned, abundant, especially about Ungava Bay, where it varies in weight from 2 lbs. to 15 lbs. and averages about 5 or 6 lbs. Barren ground caribou were found in large numbers along the route eastward from Clearwater Lake to the Kenogami Branch, while everywhere throughout the region the willow grouse or ptarmigan breeds in thousands. Other game is scarce."

Labrador
Peninsula
Cont.

Fish.

NOVA SCOTIA.

The general geological examination of the south-western part of Nova Scotia, was continued by Professor L. W. Bailey during the past summer. Prof. Bailey, who was assisted by Mr. Roy Van Wart, reports as follows on the work accomplished:—

Work by
Prof. Bailey

"These explorations were made in compliance with your letter of instructions of May 28, directing me 'to continue and if possible to complete, for a final general report, the geological examination of south-west Nova Scotia, filling as far as possible the gaps in our knowledge of the geological structure of the part of Nova Scotia indicated, and giving particular attention to the character and mode of occurrence of minerals of economic value.' At the same time, at my request, the two manuscript reports previously submitted and accepted for publication, were returned for revision, with directions that they should be combined into a single report in connection with the work of the season just passed.

South-western
counties of
Nova Scotia.

"The special objects to which my efforts were directed and the results relating thereto may accordingly be summarized as follows:—

Particular
objects of the
work.

"1. The more complete delimitation of the Cambrian system and the granite in portions of Queen's and Shelburne counties. The tracts

Cambrian
rocks.

Nova Scotia—
Cont. more particularly examined for this purpose were portions of Lunenburg county bordering on that of Queen's, portions of the coast of Queen's county west of Liverpool Harbour, the peninsula between Shelburne Harbour and Jordan Bay, and the region about the Brookfield mine. Among the results attained were the recognition of some anticlines not previously worked out, the more exact limitation of others, and the establishment of the staurolitic and andalusitic schists of Shelburn county as the metamorphosed equivalents of the green slates (Div. 1.b) of the Cambrian succession. The facts ascertained have also an important bearing on the age of the similar strata in Yarmouth county.

"2. The determination, by the evidence of fossils, of the rocks referred to the Cambrian system. Much time was devoted to the solution of this question, but without result, prolonged search at many different points or wherever there seemed to be any promise of success, uniformly failing to show any trace of undoubted organic remains.

Boundaries of
the Devonian. "3. To determine the position and extent of the Devonian rocks of Digby county as distinguished from the rocks of supposed Cambrian age; and to fix the boundary between these two systems. This was found to be a work of much difficulty, and the conclusion reached can hardly yet be regarded as final. While evidence is abundant as to the co-existence of both systems in the region referred to,—the evidence in the one case being the occurrence of fossils and in the other the close correspondence, both in the nature and succession of the beds, to the so-called Cambrian rocks of Queen's and Shelburne counties,—there are many points of resemblance between the two, while the difficulty of identification is greatly enhanced by the metamorphism to which both groups of rocks have been subjected. The areas as to which this uncertainty still attaches, include certain tracts about Mistake River, a branch of the Sissaboo, the vicinity of Cape Cove near Cape St. Mary, and portions of the high land between the Grand Joggins and Bear River. The data obtained during the past summer have not yet been sufficiently studied to permit of any definite conclusions being stated here.

Age of the
Devonian and
Silurian. "4. To ascertain the exact age of the rocks referred to the Devonian system at Mistake settlement, Bear River and Clementsport, whether wholly Devonian or partly Silurian; to fix the order of succession of these beds, and their structural relations.

"These points were of the first importance, not merely as tending to settle questions as regards the age of the beds themselves, about which in past years there has been much controversy, but also as

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bearing upon economic questions, such as the distribution of iron ores, and as helping to afford data for the more certain separation of the Devonian and Cambrian strata as referred to above. For the reasons mentioned, a large part of the summer was devoted to the study of these rocks, and the results were most satisfactory. In addition to large collections of fossils from localities previously known, many new localities were ascertained, and these in such relations to each other and to the principal ore-beds, as to leave no doubt as to the general structure of the whole region. In pursuance of these investigations it was found necessary to devote especial attention to the rocks at and about Nictau, and thence to the vicinity of the Torbrook mines, while a short excursion for the purpose of comparison was made as far eastward as New Canaan. Through this great tract, for a distance of over fifty miles, the beds were found to be essentially the same as regard both their nature and succession, the latter occurring in inverse order on either side of a general axial line, and thus revealing a general synclinal structure. The fossils referred to are now in the hands of Dr. Ami for examination. Other results were the recognition of fossiliferous strata well within the areas assigned in all previous maps to the granite, and the working out of the often intricate contacts of these two groups of rocks.

Nova Scotia—
Cont.

“ 5. The occurrence of economic minerals. These embrace gold, iron, copper, ornamental stones, sand, brick-clays, infusorial earth, and asbestos. Economic
minerals.

“ *Gold.*—In addition to the work of ascertaining and defining the position of anticlines not previously made out, a visit was made to the Brookfield mines in Queen’s county, which have recently assumed a position of great importance as a gold producing centre. This visit afforded a striking illustration of the uncertainties of gold mining, as also of the fact that mines regarded for a time as unproductive may under more effective treatment prove highly remunerative. Thus, at the time of my first visit to Brookfield in 1890, the work then in progress was confined to what was known as the Philadelphia mine, employing about 40 hands, to reach which it was necessary to pass the McGuire mine where work had wholly stopped for want of satisfactory returns. On the second visit, made last summer, but little was being done at the Philadelphia mine, while the McGuire mine was making returns of from \$7,000 to \$10,000 per month. About 50 men are at present employed here as miners, with as many more in other ways, the proprietors being so encouraged by what has been already done as to have entered upon the construction of a new and large mill of 40 stamps, in which the ore will be subjected to combined processes of

Nova Scotia—*Cont.* amalgamation and chlorination. It is also proposed that all the tailings resulting from former workings shall be subjected to the same process.

“At Molega also, as well as at Whiteburne, there have been similar vicissitudes, the Parker Douglas mine, which for several years past has been lying idle, having resumed work. The Ballou mine is also being worked here, with good results. At Whiteburne, on the other hand, formerly a centre of much activity, but little is now being done, a 10-stamp mill being the only one in operation, on ore from what is known as the ‘Graves Mine,’ formerly owned by the Whiteburne Mining Company.

“In Yarmouth county, work, chiefly of a prospecting character, was being carried on both at Kempt and at Carleton, but as yet with very meagre results.

“Gold is reported to have been found in small quantities in some parts of Digby county, but reliable information on this point is wanting.

Iron.

“*Iron.*—The study of the iron ores of Annapolis county was wholly incidental to the working out of the geological structure of the region, but led to some important results. Thus ores of this character were recognized as occurring on not less than thirty-four different properties, these being further so disposed as to indicate the existence of several parallel belts, which are, in part at least, repetitions of the same beds along the crests of anticlinal folds. The diversity in the nature of the ores, whether red or black hæmatite or magnetite, seemed apparently to have no direct relation to the neighbourhood of granite, all these varieties being sometimes found in close proximity to each other. At Nictau, the ores are abundantly fossiliferous, even though the rock be magnetite. At Torbrook the rock, though hæmatite, is without fossils, these being confined to the associated beds. Some of the latter, were it not for the fossils, could not well be distinguished from the hardest quartzites of the Cambrian system. Work at Torbrook had been suspended and the pumps removed from the mines, as a result of diminished demand for the product.

Copper.

“*Copper.*—The trappean rocks of the North Mountains and Digby Neck, frequently exhibit green stainings resulting from the presence of this metal, and occasional strings of native copper are met with. One of the best localities for the latter is the shore about the eastern side of the entrance of Digby Gut. There is, however, no reason to suppose that any workable veins will be found either at this point or elsewhere in the rocks referred to.

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“*Ornamental stones.*—Varieties of quartz, such as agate chalcedony, amethyst and jasper, were frequently observed, but not of such quality as to deserve special notice here. Thomsonite, sometimes associated with *analcime*, was found rather abundantly either side of the entrance of Digby Gut. At Paradise, in Annapolis county, veins in the granite sometimes exhibit quartz penetrated by black acicular crystals of tourmaline. Garnets were observed abundantly in different parts of Yarmouth county, but of poor quality.

Nova Scotia—
Cont.
Ornamental
stones.

“*Sand.*—The only deposits of this material deserving special notice here, are the dunes or hills of blown sand which occur at various points upon the southern coast. The largest beds are those found on the west side of Port Mouton Harbour and the east side of Barrington Bay. In each case they cover many acres of surface, and are piled up to heights of from 50 to 60 feet. Though destructive to the soil and trees of the region they invade, their purely siliceous character would seem to fit them admirably for glass making, for the manufacture of artificial stone and for kindred purposes.

Sands and
clays.

“Fine white sands were also observed at several points in the Annapolis valley, especially near Middleton.

“*Brick-clays.*—Clays suitable for brick making are also found in the vicinity of Middleton. They are tough, brick-red in colour and of unknown depth. Bricks are manufactured here in considerable quantities. About a mile south-east of Marshalltown Church, Digby county, is a deposit of fire-clay. This has not been visited by me, but it is described by Mr. J. Lonergan, of Saulnierville, as extensive. Specimens received from this gentleman are reported by Dr. Hoffmann to be non-calcareous, fusible with difficulty and susceptible of employment in the manufacture of fire-brick.

“*Infusorial earth.*—Specimens of this material, said to have been found in the vicinity of Meteghan River, in Digby county, and of good quality, have been shown to us, but we are without definite information as to location or amount.

Other mine-
rals.

“*Asbestos.*—Veins of this mineral occur in connection with dioritic rocks between Clementsport and Bear River, and some specimens of good quality as to purity and length of fibre, have been shown to us, but such as we have seen *in situ* have been small in amount and of inferior character.

“*Scheelite.*—Among some specimens sent to the Geological Survey by Mr. W. H. Prest, from the Ballou mine, Molega gold district, Queen’s county, Dr. Hoffmann has detected this mineral, valuable as an

Nova Scotia— ore of tungsten. It is not known to be present in any considerable quantity but may be worth looking for in connection with future mining operations.

Cont.

“ The following additional results of the summer’s work may be noticed here as of some interest :—

Rocks possibly newer than the Trias.

“ In connection with the examination of the red sandstones and associated beds about Digby and in the Annapolis valley, and which have generally been regarded as having antedated in origin the traps of the North Mountain, these were at several points found to contain numerous and in some instances very large blocks of the same traps. It would seem to follow from this observation that the beds in question are either of later origin, as has been supposed by Dr. Ells in the case of certain *whitish* sandstones observed by him in Scott’s Bay, near Blomidon, *resting on the traps*, or that they are agglomerates of contemporary origin. As similar beds, often whitish, but as far as known without embedded traps, occur all the way from Digby to Kentville, underlying the fertile Annapolis valley, the observations referred to and the conclusions to be drawn have a wide application.

Marine organisms in clays.

“ In the brick-clays in the vicinity of Middleton, remains of marine shells and star-fishes, (Ophiurans) have been found, as well as remains of true fishes. This would indicate that the Annapolis valley was in the post-Tertiary (Champlain) period wholly occupied by salt water, the North Mountains being then an island in the Bay of Fundy.

“ The work of revision of the two large reports previously submitted, and covering the whole of the four south-western counties, is now in hand, and will be carried on to completion, in connection with the work of the past season, as rapidly as circumstances will permit.”

Work by Mr. Fletcher.

Mr. Hugh Fletcher was engaged during the winter of 1895-96 in plotting his surveys and in revising those made by his assistants in Cape Breton; in reducing his plotting sheets, the Dominion Coal Company’s map and plans of Sydney Mines, North Sydney, and other places, as well as in compiling on a scale of one mile to an inch, many surveys made in Cumberland county by the late Mr. Scott Barlow, Mr. McOuatt and others in the immediate neighbourhood of Springhill Mines, on twenty chains to an inch, with a view to further operations in that part of Nova Scotia. Some time was also spent in connection with the preparation of the map-sheets including the Pictou coal-field. As preparatory to this, all Mr. Poole’s field-maps were compared with Mr. Rutherford’s twenty-chain plan. Sir William

Geological Survey Department.

Logan's large plan and other sources of information were also consulted and the map finished to date by the addition of roads, brooks, crops, faults and other geographical and geological features. Nova Scotia--
Cont.

During the winter, connected sections were also made from the various holes bored by the diamond drill in the Sydney coal-field, for comparison with others measured on the sea-coast. One of these, Mr. Fletcher states, seems to show that in the bore-hole near the crossing of the Hines road and old Louisburg railway, the Tracy seam lies only about four hundred and fifty feet from the surface, where it had previously been supposed to be more than fourteen hundred. A recent opening at the Tracy mines gave an opportunity to examine the coal of this seam which showed :

Top coal	2 feet	7 inches
White fire-clay	0 "	3 to 9 "
Bottom coal	0 "	11 "

By miners who have worked in this seam and by Lyman, the clay parting is said to run out or decrease to one or two inches in thickness. The quality and thickness of the coal at the bore-hole above mentioned are still to be tested by careful boring or by a deep trial-shaft.

Respecting operations during the past summer, Mr. Fletcher writes as follows :—

“Leaving Ottawa on June 10th, 1896, to resume field-work in Nova Scotia, I remained in Cape Breton until August 1st, to make additional surveys, particularly in the neighbourhood of the Cow Bay, Morrison and Macpherson roads, and on the west side of Sydney Harbour, necessary to complete information for the new editions of the Little Glace Bay, Sydney, and Cape Dauphin map-sheets in the Sydney coal-field, and returned twice afterwards (Sept. 23-25 and Dec. 4) to examine the results of explorations subsequently made by Mr. E. T. Moseley and the Messrs. Burchell at the west end of the Cow Bay basin and along the anticline between the Lingan and Glace Bay coal-basins. I was in Pictou county with Dr. Dawson and Dr. Ami (August 3rd to 19th and again on September 19th,) to make supplementary surveys required near New Glasgow, also from Nov. 20th to 25th, to discuss with Mr. Poole geological relations of the rocks of certain portions of the sheets of the Pictou coal-field. The remainder of the season was spent in an examination of the country covered by the Springhill map-sheet, between Thompson and Athol railway stations ; and from November 9th to 18th, a section was measured of the strata exposed on the shores of Chignecto Bay, between Shulee and Spicer's Cove, for comparison with Sir William Logan's Joggins section Outline of
field-work.

Nova Scotia— on the opposite side of the basin, with the object of endeavouring to
 Cont. fix the age of the various groups of rocks.

Observations “ In Cape Breton, the coal seam at the head of Bridgeport Basin
 in Cape (Summary Report 1895, p. 109) has been successfully traced round
 Breton. the anticline by Mr. Burchell’s explorations, and its identity with the
 seam found in Macdougall’s pits, I find apparently established. The
 bottom of the Cow Bay basin has been defined more precisely, as well
 as the position of the anticline between the basin and that of Glace
 Bay, by a continuation of the explorations of Messrs. Moseley and
 Kennelly ; but more work is necessary to prove the existence of work-
 able coal seams among the lower strata of these basins. It has been
 already stated that the axis of the former anticline lies further north
 than was at first supposed. To verify this, pits were sunk at Allan
 Nicholson’s, Lauchlin McLean’s and Angus McDonald’s (Shoemaker)
 some distance north of the Cow Bay road, in all of which a low north-
 erly dip was obtained. Consequently, the coal-seam of the Martin
 pit and those underlying it, must be carried for some distance to the
 westward, unless an easterly dip of the bottom of the basin throws
 the crops to the surface, of which there is no proof from the dip
 observed, while a line of strong springs points to the continuity of the
 strata as far as John D. McDonald’s.

“ It was also stated in last Summary Report, that the steep dips of
 the Cow Bay basin pass the old Louisburg Railway. Southerly dips
 have also been found on the west side of the Macpherson road. Here
 and on both sides of the Cow Bay and Morrison roads, certain belts
 of rock were followed as an indication of the structure, and the
 Buchanan seam was traced by the shale or coherent flag which over-
 lies it. Near the shore of Bridgeport Basin, above Lingan Bar, a
 seam of coal about four feet thick, but twisted, dirty and unfit for
 burning, with a roof of coherent argillaceous shale and sandstone, was
 lately opened in a shaft and level on the line between the General
 Mining Association and Mr. Rabbit.

“ Several bore-holes, some of them more than two hundred feet in
 depth, have been sunk by the Messrs. Routledge in search of the
 Tracy seam, in the grey sandstone of the North-west Brook and
 towards Sydney Harbour. At Mira Bay red strata cease some little
 distance above the Tracy seam, very few bands being found beneath
 it, whereas at the Cow Bay road it is overlain—if it be the equi-
 valent of the Fitzpatrick seam, as has been generally assumed—by a
 great thickness of gray sandstone with thin layers of grey argillaceous
 shale, as far as Mr. Hugh Cusack’s, where a belt of gray coherent

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flag is associated with one of red sandstone and shale. The line of replacement of the red rocks by the gray has not yet been definitely determined. Nova Scotia—
Cont.

“A section was made of the strata overlying the Coalbrook seam of Mira Bay, not before closely measured, but necessary for comparison with the rocks of the bore-holes along the old Louisburg Railway. They were found to be all regular, to contain no coal and to lie flatter than estimated, so that only 457 feet 4 inches was found instead of 683 feet of the alternations immediately overlying the Coalbrook seam given in the Report of Progress for 1874-75 (p. 177).

“The Dominion Coal Company continues to develop its mines, and a larger coal-washer has been erected at Morrison Lake. There was no interruption to the shipment of coal from Louisburg last winter. At the North-west Arm of Halifax Harbour, the People's Heat and Light Company has built works capable of converting annually 20,000 tons of coal from their mine into “crushed coke” for domestic, foundry and manufacturing purposes and all the uses to which anthracite is generally applied, gas for illuminating and heating purposes, and coal tar, sulphate of ammonia, ammonia, ferrocyanide of potash, benzol and other bye-products. Coal mining.

“On December 10th I visited, in company with Mr. C. P. Moffat of North Sydney, the copper mine at George River, where a considerable quantity of chalcopyrite, remarkably free from admixture with other sulphides, has been taken from a shaft 80 feet deep, on a vein said to vary in thickness from 12 to 28 feet, with 6 feet very rich, but not accessible at the time of my visit because the shaft was full of water. The ore is associated chiefly with quartz, calcite, chlorite, serpentine and other minerals of the George River limestone formation (Laurentian?) described in the Report of Progress for 1875-76, pages 381 to 387. Specimens of this ore were collected for the museum. Copper ore.

“At Long Island Barachois, 300 or 400 tons of rich hæmatite have been taken from the contact between the Carboniferous and pre-Carboniferous rocks. Other mineral
products.

“From St. Anns about 10 tons of infusorial earth were shipped last year by the Victoria Tripolite Company, from a deposit three or four feet thick, in a lake.

“About 60,000 bricks were made last summer by Mr. A. D. MoLeod from a large clay deposit near the Cossitt mine, about $2\frac{1}{4}$ miles south-east of Sydney.

“Graphitic shales, said to be suitable for the manufacture of carbons for electric lights, have been worked near Christmas Island,

Nova Scotia—*Cont.* among quartzites and dark slates underlying soft, red, Carboniferous marl and conglomerate and perhaps of Cambrian age.

Work in Cumberland county. “Of the work in the neighbourhood of Springhill Mines, but little can be said at present, as the district requires more study and closer examination. The scarcity of outcrops and similarity of composition of the different groups of rocks, makes the determination of the geological structure difficult and has led to the different views held regarding their age and relative position. Surveys were made of various branches of Black and Maccan rivers, River Philip, Polly Brook, and other streams not already mapped by Dr. Ells and the late Messrs. Scott Barlow and Walter McQuat, whose reports contain much valuable information concerning the geology of the district. A general description of the rocks of the section on the Chignecto Bay, may be found in the Summary Report for 1892 (p. 42).

Infusorial earth. “Near Castlereagh in Cumberland county, a large deposit of infusorial earth has been worked in Bass River Lake, which has been drained for the purpose. Buildings have been erected for the workmen and, for cleaning and drying the ‘silica,’ a considerable quantity of which has been transported over a pole railroad to a shipping-place on Minas Basin.

“I have again to express my appreciation of the work done by Mr. M. H. McLeod in the capacity of assistant in the field.”

Work by Mr. Faribault. Mr. E. R. Faribault's office work, since the date of the last Summary Report, has been wholly in connection with the compilation of the results of his surveys in the gold-bearing regions of Nova Scotia. The first part of the winter of 1895-96 was spent plotting the surveys made during the previous summer, and revising those made by assistants, as described on pages 111-114 of the last Summary Report. Much time was also occupied in compiling, from these surveys and other sources, the manuscripts for the four following sheets, on the scale of one mile to an inch :—

Map-sheets in course of completion.

No. 53—Lawrencetown sheet.

“ 54—Preston sheet.

“ 55—Middle Musquodoboit sheet.

“ 56—Stewiacke sheet.

These sheets are now almost completed for the engraver. They cover an area of 864 square miles, extending along the Atlantic coast from Musquodoboit Harbour to Halifax Harbour, and inland to the

Geological Survey Department.

Stewiacke and Shubenacadie rivers, and are included in the counties of Halifax and Colchester. A structural section has also been made for the Fifteen-mile Stream sheet, and similar sections have still to be prepared for the seven sheets numbered 49, 50, 51, 53, 54, 55 and 56, in order to complete these.

Nova Scotia
Cont.

A special plan of the central part of the gold-mining district of Goldenville was also plotted on the scale of 150 feet to an inch, and a cross-section prepared.

Mr. Faribault's report on the work accomplished during the season is as follows:—

“According to your instructions, received May 23rd, I left Ottawa on May 25th, to resume field-work in Nova Scotia and to continue the mapping and study of the structural geology of the gold-bearing rocks of the Atlantic coast region, including the completion of the surveys required for the sheets numbered 67, Waverley sheet, 68, Halifax City sheet, 69, Prospect sheet and 88, Mahone Bay sheet; but a severe illness prevented me from reaching my field of operations before June 17th. My assistants, Messrs. A. Cameron and J. McG. Cruikshank, however, began field-operations on the date appointed, June 5th, and they completed the surveys required for the Waverley sheet, the Halifax City sheet and the Prospect sheet, on August 14th, when they proceeded to survey the Mahone Bay sheet. The intervening granitic country between this sheet and the Halifax City sheet, being of relatively small importance geologically or from an economic point of view, has been passed over for the time being, in conformity with instructions received.

Districts sur-
veyed in 1896.

“Continued heavy rains in September and October interfered greatly, however, with the progress of work in the field, and bush-work had to be discontinued on September 29th. From that date Mr. Cruikshank was engaged surveying the sea-shore from East Chester westward, reaching La Have River on October 26th, and Mr. Cameron resumed the surveys, by odometer, of the roads included in the Mahone Bay sheet, and those in the Lunenburg sheet on the east side of La Have River, ceasing field-work on November 19th.

“My own time in the field was principally devoted to the study of the structural geology of the Waverley sheet and the Halifax City sheet. The area covered by these two sheets and the Prospect sheet, is nearly all included in Halifax county, the north-west corner of the Waverley sheet only being included in Hants county. It comprises the country surrounding Halifax City and extending along the Atlantic coast from Devil's Island, at the eastern entrance of Halifax Harbour,

Nova Scotia— to Dover Bay, and inland to the Shubenacadie Grand Lake and Mount Uniacke.
Cont.

Waverley. “The Waverley sheet is almost entirely occupied by rocks of the gold-bearing series, only a small area at its eastern limit, to the east of Soldier Lake, being covered by the western extremity of the granite ridge extending from here to Sheet Harbour; while, at its western end, the gold-bearing rocks are cut by the mass of granite forming the back-bone of the country, extending from here to Yarmouth.

Halifax City sheet. “The Halifax City sheet is about equally divided, the north-east part being occupied by gold-bearing rocks and the south-west part by the most eastern extremity of the last above-mentioned granite ridge, which also entirely covers the Prospect sheet.

“The gold-bearing rocks of the region examined have been forced into a series of folds, almost parallel to each other, bearing a general easterly and westerly course. Eight double folds, each composed of one anticline and one syncline, were located across the belt of twenty-five miles extending from the coast to Mount Uniacke. The structure of these plications was carefully studied and the anticlinal axes were traced and worked out with as much accuracy as possible, on account of their importance in regard to the occurrence of gold.

Anticlines between Cow Bay and Mount Uniacke. “The names given to the eight anticlines, in order of their occurrence from Cow Bay to Mount Uniacke, and their location, with notes in the gold mines worked and quartz veins observed along their course, are as follows:—

De Said Lake anticline. “1. *De Said Lake Anticline*—Crosses the middle of McNab Island about the Garrison pier, where only the upper strata of the lower quartzite group are brought up to the surface on the axis; and, extending eastward, it passes at the outlet of De Said Lake. The fold ends at the beach, before reaching Cole Harbour, where a few quartz veins, especially on the east side of the harbour look promising. About three-quarters of a mile south of this anticline, a true fissure vein running north and south and cutting at right angles the highest strata of the lower quartzite group at their junction with the upper slate group, was discovered to contain gold in the autumn of 1895. Since then a number of other fissure veins quite similar and parallel to each other have been found to be auriferous at this place on the Hill and Thompson, the Foster and other properties. A crusher was built last summer, and development is being pushed with activity.

Lawrencetown anticline. “2. *Lawrencetown Anticline*—Crosses the city of Halifax between Buckingham and Jacob streets, and running westward traverses the

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northend of the Citadel Hill and the commons about Egg Pond, whence following the south side of Quinpool Road about Shirley street, it crosses the North-west Arm at Melvin Island Cove, where it is cut off by granite. Only rocks of the upper slate group are brought up to the surface by this fold in the city of Halifax, but on the east side of the harbour, it has brought up to view the lower quartzite group. Passing near the lunatic asylum, the axis then crosses the middle of McDonald Lake and the Big Salmon River at its discharge into Cole Harbour, on its course to Lawrencetown gold district. Gold has often been found in the rock débris while trenching along Quinpool road and the streets to the south ; and a few small quartz veins cut across between Pepperal and Shirley streets are reported to have exhibited a few 'sights' of gold. Promising quartz veins, a few of them prospected, have been observed at the head of Cole Harbour.

" 3. *Montague Anticline*.—Crosses the west side of Bedford Basin at Birch Cove, and comes in contact with the granite but a short distance west of the basin. Eastward, it passes about Navy Island in the basin, at the foot of Lake Charles and through the Montague gold district. The belt of numerous quartz veins so extensively worked in length and depth at Montague for over thirty years, is wholly comprised in the south dip of this fold, nothing but exploratory work having so far been done on the northerly dipping veins. A rich vein, however, was reported to me to have been found on the north dip last autumn. Numerous very promising quartz veins, many of them of a barrel-structure, have been noticed on the west side of Bedford Basin at Birch Cove and on Carney Road, also directly west of the cove as far as the granite, and on the east side of the basin, about Taylor and Spectacle lakes.

" 4. *Waverley Anticline*.—From the edge of the granite south of Hammond's Plains, this runs eastward and crosses the Hammond's Plains road, at its junction with the new road to Bedford. Then it crosses Sandy Lake, and from the Windsor road it follows the old Cobequid road to the Intercolonial Railway, passing thence through the gold district of Waverley and terminating at the south end of Soldier Lake, where it is cut off by granite. The wide belt of quartz veins occurring at Waverley has been extensively worked both in depth and length, especially on the north side of the axis, but a number of veins have also been worked on its south dip, some of them having been traced on the surface completely around the westerly end of the elliptical dome of the fold.

" *Caribou Anticline*.—This fold only brings up here the upper black slate group. Leaving the granite west of Hammond's Plains, it passes

Nova Scotia—*Cont.* the post office of this place and crosses the Sackville River at the outlet of Middle Sackville Lake, runs about the middle of Lake Fletcher and Kelley Long Lake, and crosses the road to Oldham, half a mile north of Goff post-office. A few quartz veins have been prospected along this line, and some have been found to contain gold on the road to Oldham and at Hammond's Plains, but most of them are small and not promising.

Horn settlement anticline.

"6. *Horn Settlement Anticline*—Leaves the granite at the west end of Pockwock Lake, and, following the south side of this lake eastward, it crosses the Windsor road at the south end of Lewis Lake, the Windsor and Annapolis Railway at the saw-mill, one mile north of Long Lake, the Beaver Bank River at the north end of Square Lake and the Beaver Bank road on Joe. Shaunahan's farm. Thence, passing on the north side of Sandy Lake and following down King's Meadow Brook, it strikes the north-west side of Shubenacadie Grand Lake at Sleepy Cove, and its south-east side at the Horn settlement. Very promising quartz veins, showing free gold, were opened up at the Horn settlement a few years ago, but no exploratory work of any importance has since been done on them. Gold-bearing drift is reported to have been found in many places along this line between the Beaver Bank road and Shubenacadie Grand Lake, mining areas have been taken up from time to time, and a few quartz veins tried between Sandy Lake and Gold Lake. Quartz veins were also observed south of Lewis Lake and along Pockwock Lake, some having a barrel structure.

South Uniacke anticline.

"7. *South Uniacke Anticline*.—Leaves the granite east of Lacy Mill Lake, crosses the Windsor road one mile north of the county-line, passes 700 feet south of the belt of quartz veins worked at South Uniacke, to the east of which it degenerates into an undulation crossing the Beaver Bank road half a mile south of North Beaver Bank post-office. Only a few veins have so far been worked at South Uniacke, one of them, however, the Hard lead has been mined 1000 feet along a very rich and most regular and persistent pay-streak, dipping at an angle of 30° and averaging 50 feet broad and 4 to 5 inches thick, with a uniform yield from the outcrop to the bottom of the pay-streak of 7 to 12 ounces to the ton. It is most probable that good pay-streaks exist in this district in parts of other quartz veins which occupy the same structural position as that held by the pay-streak of the Hard lead with reference to the anticlinal fold. On veins south of the Hard lead, pay-streaks should then be looked for to the west of the outcrop of the pay-streak of that lead; and on veins north of the Hard lead, pay-streaks should be sought for to the east of

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the same outcrop. These conclusions have been arrived at from the study of the structure of the principal gold districts in the province. They are of the most practical importance in locating pay-streaks in a gold district, and should be well understood by gold miners. As the anticline at South Uniacke dips east, so does the pay-streak, and the interbedded quartz veins, like the strata, curve to the south-east around the eastern end of an elliptical dome; but, as the south side of the anticline has an almost flat easterly dip, the veins will not in this district curve completely around the anticline, and there will be no southerly dipping veins.

Nova Scotia—
Cont.

“ 8. *Etter Settlement Anticline*.—Leaving the granite at the north east cove of West Lake, this crosses the Windsor road 500 feet north of the Etter settlement church and Lewis Mill road at the bridge on the head of Sackville River, where the lower quartzite group is capped by the upper slate group to the eastward beyond the limit of the Waverley sheet. No quartz vein has been observed along this line within the latter sheet.

Etter settle-
ment anti-
cline.

“ Detailed observations have been made of the structural geology of the city of Halifax and its immediate surroundings, by taking advantage of the many miles of trenching made along the streets by the People's Heat and Light Co., to lay their pipes.

“ I have done so far but little geological work in examination of the area covered by the Mahone Bay sheet, (No. 88), the surveys of this sheet having been made entirely by my assistants. It has been observed that the upper slate group of the gold-bearing rocks predominates in the area covered by this sheet, and the lower quartzite group is only brought up in narrow belts along anticlinal folds. On the northern limit of the sheet the gold-bearing series comes in contact with the granite mass of the interior; and along the sea-shore, at Indian Point and East Chester, it is overlain by small patches of Lower Carboniferous limestones, conglomerates and sandstones, apparently denuded outliers of a great Carboniferous basin extending far into the Atlantic. Beds of Carboniferous limestone are quarried at East Chester on Indian Point and on the shore of Goat Lake. The gold mining districts of Chester Basin and Blockhouse are included in this sheet, but have not yet been surveyed. Operations were being carried on at both places last summer.

Rocks near
Mahone Bay

“ A few faults, bearing a general north-and-south course, cut the stratification at right angles, and some time was taken up in tracing these and working out the magnitude of the displacements. Some very interesting facts have also been gathered bearing on the surface geology.

Nova Scotia—
Cont.
 Report in
 progress. “ A report is now in progress, which will, it is hoped, be ready for the printer next spring, on the gold-bearing rocks covered by the following eight sheets, which are in different stages of advancement toward publication.

- No. 39 Tangier sheet.
- “ 40 Sheet Harbour sheet.
- “ 41 Fifteen-mile Stream sheet.
- “ 42 Trafalgar sheet.
- “ 48 Eastville sheet.
- “ 49 Upper Musquodoboit sheet.
- “ 50 Moose River sheet.
- “ 51 & 52 Ship Harbour sheet.

“ The area covered by these sheets contains the gold districts of Tangier, Killag, Fifteen-mile Stream, Caribou, Moose River, Moose-land, Salmon River, Ragged Falls, Little Liscomb Lake, Beaver Dam and Gold Lake. Plans of the six first-named districts have also been prepared on the scale of 500 feet to an inch, the intention being that the shall accompany the report above referred to.”

CHEMISTRY AND MINERALOGY.

Report of Dr.
 Hoffmann. Reporting on the work done in these branches of the Survey's operations, Dr. Hoffmann, says:—“ The work carried out in the chemical laboratory during the past year, has been, in pursuance of the practice of former years, almost exclusively confined to the examination and analysis of such minerals, ores, etc., as were considered likely to prove of more or less economic value and importance. Briefly summarized, it embraced:—

Character of
 analyses and
 assays made. “ 1. Analyses of natural waters—with the object of ascertaining their suitability for domestic or manufacturing purposes or probable value as a remedial agent—from various parts of the provinces of Nova Scotia, Quebec and British Columbia.

“ 2. Analyses of various fossil fuels from the province of Nova Scotia, the North-west Territory and the province of British Columbia.

“ 3. Analyses of iron ores from the provinces of New Brunswick, Quebec, Ontario (chiefly from the townships of Bedford, Palmerston, Storrington and Portland, in Frontenac county; the townships of South Sherbrooke, Bathurst, Darling and Lavant, in Lanark county; and the township of Bagot, in Renfrew county), and British Columbia.

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“4. Analyses of limestones and dolomites—in continuance of the series of analyses of limestones and dolomites already carried out, in connection with an enquiry into the individual merits of a number of these stones, from various localities, for structural purposes, for the manufacture of lime, or of hydraulic cement, *etc.*”

Chemistry
and mineralogy—*Cont.*

“5. Assays, for gold and silver, of ores from the provinces of Nova Scotia, New Brunswick, Quebec and the Ungava district of the Labrador Peninsula; from the districts of Nipissing, Algoma, Thunder Bay, Rainy River, and other parts of the province of Ontario; from the districts of Alberta and Athabasca, in the North-west Territory; and from the East and West Kootanie districts, Interior Plateau region and Coast Ranges and coast region, of the province of British Columbia.

“6. Analyses of several highly interesting and, in most instances, from a commercial standpoint, important minerals, comprising, among others—‘altaite,’ a lead telluride, from a new locality; ‘scheelite,’ a tungstate of calcium, also from a new locality; and the following, not previously recognized as occurring in Canada, namely, ‘tetradymite,’ a bismuth telluride; and a mineral obtained by Mr. R. G. McConnell, which proves to be ‘stromeyerite,’ a sulphide of silver and copper; and which was found to contain over fifty-one per cent of silver. A specimen has also been received of another somewhat recently discovered mineral, which is new to Canada, that is to say ‘hessite,’ a silver telluride, which also contains a very high percentage of silver, and not unfrequently more or less gold. An analysis has also been entered upon of another mineral, collected by Mr. McConnell, which is evidently a highly cobaltiferous mispickel, most probably referable to ‘danaite,’ and which also carries free gold. This, if occurring in quantity, would, apart from its gold content, be of some economic importance as an ore of cobalt. Among other minerals identified in this laboratory, and which were not previously known to occur in Canada, may be mentioned ‘bismite’ or bismuth-ochre, a trioxide of bismuth; ‘smithsonite,’ a carbonate of zinc, and some few others of lesser importance.

“7. Analyses, in regard to nickel content, of certain ores from the province of British Columbia.

“8. Miscellaneous examinations, such as the partial analysis or testing, as the case might be, of samples of manganese ore, graphite, carbonaceous shales, iron-sand, clay, marl, and of other material not included under the above headings.

“The number of mineral specimens received, during the past year, for identification or for an expression of opinion in regard to their economic value, amounted to six hundred and ninety-seven. Of these,

Mineral specimens examined.

Chemistry
and mineralogy—*Cont.*

a large number were brought by visitors, to whom the desired information was communicated at the time of their calling, or failing that—owing to a more than mere cursory examination being necessary, or when a partial or even complete analysis was considered desirable—it was subsequently conveyed to them by letter. The number of letters personally written—chiefly of the nature of reports and embodying the results of the examination, analysis, or assay, as the case might be, of mineral specimens—amounted to two hundred and ten; and the number of those received to one hundred and fifteen.

Work of
assistants.

“Messrs. R. A. A. Johnston and F. G. Wait, assistants in the laboratory, have, by their application and assiduity in carrying out the work respectively entrusted to them, proved most efficient aids. Of these, the former has, apart from the carrying out of a very lengthy series of gold and silver assays, made many important mineral analyses, and likewise conducted a great variety of miscellaneous examinations; whilst the latter has made very many analyses of natural waters, iron-ores, limestones, etc., as also many miscellaneous examinations.

“In the work connected with the mineralogical section of the museum, I have been, as heretofore, diligently assisted by Mr. R. L. Broadbent. He has, in addition to the general museum work—such as the labelling and cataloguing of all newly received specimens, and the maintaining of the collection generally in an orderly condition—been engaged in correcting printer’s proof of labels for the collections illustrating the distribution of iron, copper, lead, antimony, and other ores; and in preparing the manuscript of similar labels for the collection of gold and silver ores from certain sections of the province of British Columbia, and from the Thunder Bay district of the province of Ontario.

Contributions
to museum.

“The additions to this section of the museum—which now contains some nine thousand specimens, of which about seven thousand are on exhibition in the cases, and two thousand placed away in drawers—during the past year, amounted to one hundred and thirty-one. Of these, the following were :—

(A.) Collected by members of the staff, or others engaged in field-work in connection with the survey :—

Ami, Dr. H. M. :—

- a. Pyrolusite from Teny Cape, Hants county, N.S.
- b. Limestone from the St. Louis de MileEnd quarry, Montreal, Q.
- c. Limestone from the St. Laurent quarry, Montreal, Q.

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- d.* Raw cement stone from the Gale Farm, Hochelaga, Montreal, Q. Contributions
to museum—
Cont.

Barlow, A. E., and Adams, Dr. F. D. :—

- a.* Sodalite from the township of Dungannon, Hastings county, O.
- b.* Nephelite “ “ “
- c.* Hastingsite “ “ “
- d.* Magnetite “ “ “
- e.* Pyroxene from the township of Herschell, Hastings county, O.
- f.* Biotite “ “ “
- g.* Diabase showing concretionary structure from two miles west of Sudbury, district of Algoma, O.

Ells, Dr. R. W. :—

Calcareous nodule attached to crystalline limestone boulder from Besserer's Wharf, Ottawa River, Carleton county, O.

Faribault, E. R. :—

- a.* Limestone from quarry at Indian Point, East Chester, Lunenburg county, N.S.
- b.* Limestone from quarry at Goat Lake East Chester, Lunenburg county, N.S.

Ferrier, W. F. :—

- a.* Andradite from the Emily mine, Tudor, Hastings county, O.
- b.* Stilpnomelane (var. chalcodite) from the Wallbridge mine, Madoc, Hastings county, O.
- c.* Pyroxene from the township of Carlow, Hastings county, O.

Low, A. P. :—

Crystal of pyrite from the Ungava River, Labrador Peninsula.

McEvoy, J. :—

- a.* Alunogen from Blair Creek, a branch of Bolean or Six-mile Creek, Salmon River, Grande Prairie, Yale district, B.C.
- b.* Clinocllore from Fadear Creek, a branch of Louis Creek, North Thompson River, B.C.

McConnell, R. G. :—

- a.* Stromeyerite from the Silver King mine, Toad Mountain, West Kootanie district, B.C.
- b.* Cobaltiferous mispickel with erythrite from the Evening Star mine, Rossland, B.C.
- c.* Sphalerite from the Enterprise mine, Ten-mile Creek, Slocan mining district, B.C.

Contributions
to museum—
Cont.

McInnes, W. :—

- a. Tourmaline from a small island near Partridge Point, Eagle Lake, Rainy River district, O.
- b. Auriferous quartz from the main shaft, Regina mine, loc. 566 P, Whitefish Bay, Lake of the Woods, O.
- c. Auriferous quartz from the west shaft, Regina mine, loc. 566 P, Whitefish Bay, Lake of the Woods, O.

(B.) Received as presentations :—

Ahn, Robert H., Rat Portage, O. :—

- a. Auriferous quartz from the Mikado claim, Bag Bay, Shoal Lake, Lake of the Woods, district of Rainy River, O.
- b. Auriferous quartz from the Cornucopia claim, Bag Bay, Shoal Lake, Lake of the Woods, district of Rainy River, O.

Appleby, B. H., St. John, N.B. :—

Granite from Spoon Island quarry, Hampstead, Queen's county, N.B.

Armstrong, Wm., Armstrong's Mills, Hastings county, O.,
per W. F. Ferrier :—

Tremolite in dolomitic limestone from the township of Lake, Hastings county, O.

Bache, R. P., Buckingham, Q., per E. D. Ingall :—

Prepared graphite from the Weart mine, Buckingham, Ottawa county, Q.

Baker, Hon. James, Victoria, B.C. :—

- a. Auriferous quartz from the C ache claim, Cayoosh Creek, Lillooet district, B.C.
- b. Lignite from St. Mary's River, West Kootanie, B.C.

Baycroft, Thomas, Copper Cliff, O.

Anthraxolite from the township of Balfour, district of Algoma, O.

Chambers, F. H., Westville, N.S., per Dr. H. M. Ami :—

- a. Manganite from Bridgeville, East River, Pictou county, N.S.
- b. Limonite from Bridgeville, East River, Pictou county, N.S.
- c. Stalactites from cave in Lower Carboniferous limestone at Springville, Pictou county, N.S.

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Cinnabar Mining Company of British Columbia, Savona, B.C., Contribution
per F. C. Innes, Managing Director :— to museum—
Cont.

- a. Cinnabar (retort ore) from the Yellow Jacket claim, Kamloops Lake, B.C.
- b. Average furnace ore from the Yellow Jacket claim.
- c. Cupriferous ore from the Big Dyke claim, Kamloops Lake, B.C.
- d. Average furnace ore from the Big Dyke claim, Kamloops Lake, B.C.

Cowie, Isaac, Edmonton, N.W.T.

- a. Iron-pyrites from a little below Vermilion River on the Athabasca River, N.W.T.
- b. Iron-pyrites from a point between Pelican and Vermilion rivers on the Athabasca River, N.W.T.
- c. Iron-pyrites from above Pelican Rapid, Athabasca River, N.W. T.

Doyle, Owen :—

Felspar from the township of March, Carleton county, O

E. B. Eddy Company, Hull, Q :—

Sandstone used for the manufacture of pulp grindstones :—

- a. Scotch sandstone.
- b. Ohio (U.S.) sandstone.

Fraser, J.D., Ferrona, N.S. :—

Malachite from Cameron's mine, Bridgeville, Pictou county N.S.

Gray, Robert T., Madoc, O., per W. F. Ferrier :—

- a. Erythrite on magnetite from the Dominion mine, Madoc, Hastings county, O.
- b. Hæmatite (var. specular iron) from the Kane mine, Huntingdon, Hastings county, O.

Grüner, H. :—

Coke from Sheep Creek (Alberta) coal.

Hill, A. J., New Westminster :—

- a. Pyrrhotite with arsenopyrite from Capt. Jones' claim, Jarvis Inlet, B.C.
- b. Chalcopyrite and pyrrhotite " " "

Contributions
to museum—
Cont.

Jennings, Herman, Johannesburg, Transvaal, S.A.R. :—

Auriferous conglomerate—

- a. From the Main Reef, Ferreira mine, Witwatersrand, S.A.R.
- b. “ “ (Leader) “ “ “
- c. “ South Reef “ “ “

Johns Manufacturing Company, The H. W., 87 Maiden Lane,
New-York :—

- a. Asbestos Roofing.
- b. “ Fire-proof Rope.
- c. “ Sewing Twine.
- d. “ Building Felt (about 6 lbs. per 100 sq. ft.)
- e. “ “ (“ 10 “ “ .)
- f. “ “ (“ 14 “ “ .)
- g. “ Fire-felt covering.
- h. “ “ “ with Superated Jackets.
- i. “ National covering.

King, J. G., Port Arthur, O. :—

Specimen showing weathering of dolomite.

Lanigan, R., Calumet, Q. :—

- a. Kaolin from the township of Amherst, Ottawa county, Q.
- b. Quartz “ “ “ “ “

Martineau, Salomon, Rivière Desert, Q. :—

Molybdenite from the township of Egan, Wright county, Q.

McKenzie, H. R., Sydney, N.S. :—

Chalcopyrite from the Old French Road, Gabarus, Cape Breton
county, N.S.

McKellar, John, Fort William, O. :—

Auriferous quartz from the Empress location, Jackfish Bay,
Lake Superior, district of Thunder Bay, O.

McRae, Hector, Ottawa, O. :—

Graphite (core from boring) from the township of Brougham,
Renfrew county, O.

Moberley, Frank, Rossland, B.C. :—

- a. Chalcopyrite and pyrrhotite from the Josie claim, Trail
Creek mining district, B.C.
- b. Galena and pyrite from the Mayflower claim, Trail Creek
mining district, B.C.
- c. Pyrrhotite with chalcopyrite, Monte Cristo claim, Trail
Creek mining district, B.C.

Geological Survey Department.

- d.* Chalcopyrite and pyrrhotite, from the LeRoi mine, Trail Creek mining district, B.C. Contributions
to museum—
Cont.
- e.* Chalcopyrite and pyrrhotite, from the Commander claim, Trail Creek mining district, B.C.
- f.* Galena with pyrite from the Deadwood group.
- g.* Bornite from the Silver King claim, Nelson, B.C.
- Nadeau, J. A., Iberville, Q. :—
Two specimens of nepheline-syenite (polished) from the Mt. Johnson Quarries, Iberville county, Q.
- Nadon, F. X. :—
Molybdenite from the township of Egan, Wright county, Q.
North American Graphite Company, Ottawa, O., per H. P. H. Brumell, manager.
- a.* Disseminated graphite from lot 28, range VI, Buckingham, Q.
- b.* Flake plumbago, grade L.A.
- c.* “ “ “ L.B.
- d.* “ “ “ L.C.
- e.* “ “ “ L.D.
- f.* “ “ “ L.K.
- Pennock, J. T., Ottawa, O. :—
Magnetite from the township of Grenville, Argenteuil county, Q.
- Poole, H. S., Stellarton, N.S. :—
Coal from the Acadia Colliery, Westville, Pictou county, N.S.
- Prest, W. H. :—
Mineral associations of gold from the Jumbo vein, Westfield, and the Ballou mine, Molega, Queen's county, N.S.
- Rutherford, J. G., Stellarton, N.S. :—
- a.* Coal from the main seam, Fan pit, Albion Mines, Pictou county, N.S.
- b.* Coal from the McGregor seam, McGregor pit, Albion Mines, Pictou county, N.S.
- Saunders, H., Victoria, B.C. :—
Chalcopyrite and molybdenite from the Van Anda Copper Company's mine, Texada Island, B.C.
- Selwyn, Dr. A. R. C., Ottawa, O. :—
Carbonaceous schistose quartzite traversed by vein of quartz, from Quesnel, B.C. :—

Contributions
to museum—
Cont.

Seymour, T. F., Madoc, O., per W. F. Ferrier :—

- a. Calcite crystals in hæmatite, from the Kane mine, Huntingdon, Hastings county, O.
- b. Magnetite crystals from the Seymour mine, Madoc, Hastings county, O.
- c. Garnets in mica-schist from Green Island, Moira Lake, near Madoc, Hastings county, O.

Sparham Fire-proof Roofing Cement Company, Montreal, Q. :—
Specimens of fire-proof roofing cement.

Spotswood, G. A., C.E., Parsons Pond, west coast of Newfoundland :—

Borings from great Greenland meteorite.

Stewart, Archibald, Ottawa, O. :—

- a. Limestone (six inch cube) from the Rockland quarries, Clarence, Russell county, O.
- b. Sandstone showing dendrites from the Soulanges Canal, Q.

Todd, Wm. :—

Steatite from Kennington Cove, four miles W. of Louisburg, Cape Breton county, N.S.

Turner, G. H., Mission City, B.C. :—

Bog-iron ore from Mount Leaman, vicinity of Mission City, New Westminster district, B.C.

Von Müller, Baron, Melbourne, Australia :—

Forty-seven specimens of borings from Oodnadotta, Lake Harry and William Creek, South Australia.

Vye, George A., Digby, N.S. :—

Limonite from Bridgeville, Pictou county, N.S.

Wakeham, Commander W., Gaspé Bay, Q. :

- a. Petroleum from Block 42, Galt, Gaspé county, Q.
- b. Petroleum from Block 40, Larocque, Gaspé county, Q.
- c. Mineral tar from near the west line of York township, Gaspé county, Q.

Whitton Granite Company, per L. J. Frechette, M.P., St. Ferdinand, Q. :—

Granite from lot 34, range IV, of Whitton, Compton county, Q.

Wilkinson, Lieutenant-General H. C., Rat Portage, O. :—

Asbestos from Island S. E. of Rendezvous Point, Long Bay, Lake of the Woods, District of Rainy River, O.

Geological Survey Department.

‘Mr. C. W. Willimott has, for the most part, been engaged in making up collections of minerals and rocks for various educational institutions. The following is a list of those to which such collections have been sent :—

1. Leslie Street School, Toronto, Ont.....	consisting of	80	specimens.
2. Board of Trade, Edmonton, N.W.T.....	“	120	“
3. Collegiate School for boys, Windsor, N.S..	“	120	“
4. Church School for girls, Edgehill, Windsor, N. S.....	“	80	“
5. Collegiate Institute, Niagara Falls, Ont...	“	120	“
6. High School, Port Elgin, Ont.....	“	120	“
7. Dist. School No. 14, Sharp, Kings Co., N. B.....	“	80	“
8. Public School, Apohaqui, N. B.....	“	80	“
9. Collegiate Institute, Portage la Prairie, Man.	“	120	“
10. Model School, Robinson (Bury), P.Q.....	“	120	“
11. Public School, Surrey, Hillsborough, N.B.	“	80	“
12. High School, Omemee, Ont.....	“	120	“
13. Pictou Academy, Pictou, N.S.....	“	160	“
14. Monument National, Montreal, P.Q.....	“	108	“
15. Public School, Dist. No. 3, Hampton vil- lage, Kings Co., N.B.....	“	80	“
16. Public School, Sheet Harbour, Halifax Co., N.S.....	“	80	“
17. Institute of Mines and Forests, George- town, British Guiana.....	“	120	“
18. Villa Maria Convent, Notre Dame de Grâce, P. Q.....	“	120	“
19. Truro Academy, Truro, N.S.....	“	120	“
20. High School, Florenceville, Carleton Co., N.B.....	“	120	“
21. Queen's University, Kingston, Ont.....	“	77	“
22. High School, Wolseley, N.W.T.....	“	90	“
23. High School, Hawkesbury, Ont.....	“	120	“
24. Public Library, New Westminster, B.C. .	“	120	“
25. Public School, Indian Head, N.W.T.....	“	80	“
26. Public School, Whitewood, N.W.T.....	“	80	“
27. Public School, Moosomin, N.W.T.....	“	80	“
28. Public School, Doaktown, N.B.....	“	80	“
29. High School, Maitland, Hants Co., N.S..	“	120	“
30. High School, New Glasgow, N.S.....	“	120	“
31. Kings County Academy, Kentville, N.S...	“	120	“
32. County Academy, Annapolis, N.S.....	“	120	“
33. Mother House Congrégation de Notre Dame, Montreal, P.Q.....	“	80	“
34. Sisters of Charity, Mt. St. Vincent, Hali- fax, N.S.....	“	80	“
35. Graded School, Norton Station, N. B....	“	80	“
36. McGill University, Montreal, P.Q.....	“	77	“

Educational
collections
supplied—
Cont.

37. Toronto University, Toronto, Ont.....	consisting of	56	specimens
38. Laval University, Quebec, P.Q.	“	50	“
39. Public School, Memramcook, N.B.	“	80	“
40. Grammar School, Shediac, N.B.	“	120	“
41. Public School, Clifton, Kings Co., N.B. ...	“	80	“
42. Convent of Holy Names, Hochelaga, P.Q. .	“	80	“
43. Public School, Shubenacadie, N.S.	“	80	“
44. Fredericton University, Fredericton, N.B.	“	37	“
45. Sisters of the order of Notre Dame, Anti- gonish, N.S.	“	80	“
46. High School, Springhill, N.S.	“	120	“
47. Bureau of Mines, Victoria, B.C.	“	100	“
48. Public School, Harcourt, Kent Co., N.B. .	“	80	“
49. Our Lady of Good Counsel, Montreal, P.Q.	“	80	“
50. Central School House, Middle Sackville, N.B.	“	80	“
51. Weymouth School, Weymouth, N.S.	“	80	“
52. Minister of Agriculture, Dunnville, Ont. .	“	80	“
53. Montreal College of Commerce, Montreal, P.Q.	“	25	“
54. School of Mining, Kingston, Ont.	“	60	“

“ Making a total of 5,040 specimens, aggregating over two tons in weight of material.

Minerals
collected by
Mr. Willimott

“ Mr. Willimott subsequently spent some time in rearranging and cataloguing the contents—representing balance of material on hand—of two hundred and eighty-eight drawers, one hundred racks and forty-eight shelves; and afterwards visited with the object of procuring further material for future collections, the townships of Hull, Wakefield, and Calumet, in the province of Quebec; and those of March, Bagot and Burgess in that of Ontario. Whilst so engaged he collected:—

	Specimens.	Weight.
Apatite, crystals.....	100	
“ in calcite.....		100 pounds.
Anorthosite.....	200	“
Biotite.....	200	“
Celestite.....	250	“
Calcite.....	215	“
“.....	70	
Calcareous conglomerate.....	40	
Diorite.....	125	“
Felspar.....	2	
Graphite.....	225	“
Garnet.....	220	“
Galena.....	130	“
Gneiss.....	88	
Perthite.....	165	“

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	Specimens.	Weight.
Pyrite.....	300 pounds.
Phlogopite, crystals.....	100	
Sphalerite.....	210 “
Serpentine limestone.....	200 “
Scapolite.....	120 “
Serpentine.....	150 “
“Mr. Willimott has, in addition, received—		
(a) in exchange.		
Stellarite.....	75 “
Bituminous shale.....	125 “
Hæmatite.....	100 “
Limonite and pyrolusite.....	125 “
(b) by purchase,		
Chromite.....	275 “
Chrysotile in serpentine.....	450 “
and further—		
Anthracite, presented.....	170 “
Sodalite, through Mr. A. E. Barlow.....	350 “
Nephelite, “ “ “.....	75 “
Magnetite, “ “ “.....	4
Pyroxene, “ “ “.....	50
Hæmatite, through Dr. H. M. Ami.....	200 “

“In all, some four hundred and fifty-four hand specimens, and four thousand seven hundred and fifty-five pounds of massive material.”

LITHOLOGY.

On the work accomplished by him during the past year, Mr. W. F. Ferrier makes the following report:—

“In the museum label-holders have been prepared for the upright Museum cases of the Stratigraphical Collection of Rocks, and will shortly be placed in position. Cabinets, furnished with locking doors, are now ready for the reception of those rock specimens which are undergoing petrographical investigation, and drawers have been set apart in the museum, and for the most part filled, with sets of rocks from various localities which have already been examined and reported on.

“Since the appearance of the last Summary Report two petrographical reports have been printed, and one is ready for the printers. Of those printed, one, entitled Petrographical Characters of some Rocks from the Area of the Kamloops Map-sheet, British Columbia, appears as Petrographical reports.

Lithology—
Cont. an appendix to Dr. Dawson's report on that region* whilst the other, under the title of Notes on the Microscopic Structure of some Rocks from the Labrador Peninsula, is to form an appendix to Mr. Low's report on the interior of Labrador.† Separate editions of both appendices have been issued.

Examinations
in progress. "The report on Mr. Barlow's rocks from the areas of the Nipissing and Temiscaming sheets is now almost ready for printing. The study of these rocks has yielded many important and interesting facts regarding the origin of the Laurentian.

"Mr. McConnell's rocks from the West Kootanie district, British Columbia, are now being examined. One hundred and thirty thin sections of specimens collected by him during the past season have been prepared to supplement those already in hand. Much interest attaches to these rocks because of their association with the rich ore-deposits of this important mining district.

"Various blowpipe examinations of rocks and minerals have been, as usual, undertaken during the year, and memoranda of results furnished to those from whom the specimens were received. A new microscope, model II, made by Fuess of Berlin, Germany, with all the latest improvements, has been purchased, and is giving good satisfaction and greatly facilitating the petrographical work.

Discovery of
corundum. "One of the most interesting occurrences upon which I have to report, is the recent discovery of corundum in Hastings County, Ontario. This came about in a somewhat unusual way. In 1893 I came into possession, by purchase, of a number of specimens collected by Mr. John Stewart, formerly of Ottawa, amongst them being a package labelled 'Pyroxene crystals, south part of Carlow.' On examining these specimens some time ago I recognized them as corundum, and immediately took steps to ascertain, if possible, the precise locality from which they came. As you are aware, I communicated the facts to you and was authorized in October to visit the township of Carlow, endeavour to locate the mineral, and determine the extent of the deposit. I was accompanied by Mr. Cole, and after considerable difficulty found the mineral on lot 14, con. XIV. of the township of Carlow, Hastings county, Ontario.

Its mode of
occurrence. "It was there found to occur in a coarse-grained, red, felspathic rock having the appearance of a pegmatite. Microscopic sections are in course of preparation, and the precise nature of the rock will then

* Annual Report, Geol. Surv. Can., vol. VII. (N.S.) part B, Appendix I.

† Annual Report, Geol. Surv. Can., vol. VIII. (N.S.) part L, Appendix V.

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be fully determined. The difficulty of preparing sections, consequent on the hardness of the contained corundum, has rendered it impossible to make the examination in time for this report. This rock, together with a red and brown micaceous gneiss, forms a perpendicular cliff from 80 to 100 feet high, at the base of a sloping mountain. The corundum-bearing rock runs into the gneiss on the side of the mountain along the strike, which is about N. 65° E., as well as occurring, as already stated, on the face of a cliff across the strike. Lithology—
Cont.

“Well developed crystals, often of large size, and generally of a grayish or brownish colour, as well as irregular masses of the corundum, are thickly distributed through the rock, and the mineral was observed throughout this rock for a distance of about 300 feet across the strike, more or less continuously and traced along the strike for about 700 feet. The grain of the mineral varies with that of the rock. The quantity is not uniform throughout the mass, portions of the rock being more thickly studded with the crystals than others, and in places they seemed to form ‘stringers’ in the rock.

“The interest of the find lies not so much in the possibility of the discovery of the gem varieties of the mineral, ruby and sapphire, about which so much has lately been said in the press, and which is improbable in view of the mode of occurrence, but in the fact that this is the first time that the mineral has been found to exist in Canada in any quantity and that it is valuable as an abrasive material on account of its great hardness, which is, in the pure mineral, next to that of the diamond.

“In the *Geology of Canada* (1853) p. 499, mention is made of corundum in the following words:—‘Corundum has been observed on the second lot of the ninth range of Burgess, and in the immediate vicinity of a deposit of copper-pyrites. Here, in contact with the crystalline limestone, occurs a rock made of felspar, quartz, calcite, silvery white mica and sphene. Disseminated throughout this aggregate were small grains of a mineral whose colour varied from light rose-red to sapphire-blue, while its hardness, which was greater than that of topaz, showed the mineral to be corundum. Small crystals of light-blue corundum have been found elsewhere in the limestone of the vicinity. Where previously reported in Canada.

“No specimens of this occurrence have found their way into the collections of the Survey, and I have not met with anyone who has seen the mineral from this place. It is the only locality cited for Canada in the report on American corundum by Francis P. King,* the information being furnished by Dr. F. D. Adams.

*A Preliminary Report on the Corundum Deposits of Georgia, by Francis P. King, Assistant Geologist. Bull. No. 2, Geol. Surv., Georgia, 1894.

Lithology—
Cont.
 Nature of the
 mineral.

“Corundum is an oxide of aluminium, the crystallized varieties being essentially pure, whilst the granular variety, to which the name ‘emery’ is given, contains more or less impurities, chiefly magnetite and hæmatite. The transparent purer kinds of red and blue colours constitute the gems ruby and sapphire. These usually occur as rolled pebbles in river beds, or as crystals embedded in various rocks, such as limestone, as in the famous ruby mines of Burma.

Sources of
 supply.

“Statistics show that as an abrasive material there is an extensive market for the corundum. The supply of the mineral in the United States comes chiefly from North Carolina and Georgia, small quantities of emery being also obtained in Westchester County, New York State. The finer grades of emery continue to be imported from Turkey and Greece.

Mode of
 preparation.

“Since the present discovery was announced by the Geological Survey, numerous inquiries have been received regarding it, and samples have been furnished to interested parties. Some of these have been tested in the United States, and the corundum pronounced to be of the finest quality. It may be well here, I think, to allude to the proper preparation of the material, essential to its introduction for commercial purposes. It is necessary that it should be completely freed from the gangue and this can only be accomplished by a special process. The corundum-bearing rock is first crushed, and then washed by means of sluice-boxes or revolving barrel-shaped cylinders through which a stream of water passes. But this is not all, for if the fragments of corundum be examined, it will be found that a large proportion of them are coated with a micaceous mineral having in many instances the composition of margarite, and resulting from the alteration of the corundum. This is removed by passing the mineral through another machine, which, in a form used at one of the principal Georgia mines, contains two discs armed with points which are revolved with great rapidity, and soon wear away the soft coating. After undergoing this process the mineral is again washed, crushed, and sifted to the various degrees of fineness required. Great care is necessary to prevent its reduction to ‘flour’ as this has only a small value compared to that of the coarser grades.

“The purpose of all the manipulation it undergoes is to secure uniformity of hardness in the finished material.

Further dis-
 coveries pro-
 bable.

“Pending further investigation, the lands (which belong to the Crown) on which the corundum occurs in Carlow, have been withdrawn from sale by the Ontario Government, and it is hoped that the deposit will prove as valuable as the surface conditions seem to indicate. It

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is more than likely that this is not an isolated occurrence, but that other deposits will be found in the Hastings district, now that attention has been called to it. The very circumstances attending the present discovery show that the mineral is liable to be passed over or mistaken for something else. Lithology—
Cont.

“As instructed, I visited a number of other localities in Hastings county for the purpose of obtaining minerals, and collected a number of fine specimens for the museum, amongst them being good examples of the stilpnomelane described by me in 1895. Also erythrite, fine crystals of andradite garnet, hæmatite, limonite, hornblende, pyroxene, and various felspars.”

MINING AND MINERAL STATISTICS.

Mr. E. D. Ingall reports of the work under his control as follows:— Mineral statistics.

“During the year the work of the section was carried on as usual, Mr. L. L. Brophy acting as assistant in connection with the statistical work. Mr. A. A. Cole acted as assistant for a short time in the spring, but for most of the year the technical part of the work has fallen to myself to do.

“The collection of statistics relating to the various mineral industries of the Dominion, together with the necessary compilation and checking of information gained, has occupied much of the time of the diminished staff of the section. The Preliminary Summary of the Mineral Production of Canada for 1895, was completed by 22nd February, 1896, a very much earlier date than ever before attained.

“Beside this, much time has been occupied preparing memoranda covering technical points relating to the mining and smelting of Canadian minerals, and in giving information to many inquirers regarding minerals and mining in Canada.

“Some work was also done in adding to our catalogue and reference system of the mineral deposits of Canada. The object in view in this system is to enable us, when it is completed, to have an entry for each of the mineral deposits in the country with references embodying every available source of information. Thus when information is asked about any mineral deposit, district, or mineral industry, it will be possible at once to get all the data available. To attain to anything like completeness in this matter would, of course, require a larger staff than we have at present.

Mineral
statistics—
Cont.

“As opportunity permitted, attention was paid by myself to the detailed report on my field-work of 1895 in the Kingston and Pembroke Railway iron district. This has included examination of specimens and the selection of a certain number for analysis, with a view to determining the contents of the magnetite itself in phosphorus, and titanium in relation to the iron content.

“In October, short trips were made east, through Ontario, to collect outstanding returns regarding mineral production for 1895, which it had been impossible to get in by correspondence, and in the latter months of the year preparations were made toward getting information for the report for 1897.

Asbestos
mining.

“The eastern trip was undertaken by myself, and a short visit was made to the asbestos mining centres of Black Lake, Thetford and Danville. In this industry the low prices ruling for the past few years have caused all but the larger producers to suspend operations, and have resulted, in the case of those still operating, in a much larger use of machinery and the extraction of much fibre that used to be considered too short to be worth treatment. The processes in use consist, in a general way, of some method that while crushing the rock frees the fibre without breaking it; followed generally by the passage of the crushed material over travelling picking tables, where the longest fibre is selected out, and then over shaking screens having a slight slope. The effect of these screens is to sort out the remaining shorter fibre into lengths, and also by reason of a funnel with strong up-draft, over-hanging the lower end of the screen, to lift the fibre away from the rock particles, the latter then passing off over the ends of the screens. At Danville this latter material is being stored outside the mill in dump, as it is now coming into use to replace ordinary sand and hair in wall plastering. It is claimed that this ‘Asbestic,’ as it is called, takes a better finish than ordinary plaster, does not crumble under the action of fire, and that it will not crack or crumble when nails are driven into it.”

Of his trip in the peninsula of Ontario, Mr. Brophy reports as follows:—

“Leaving Ottawa on the 8th October, I visited, among other places, Toronto, Windsor, Sarnia, Clinton, Seaforth, Petrolea, London, Buffalo, Caledonia and Hamilton, returning to Ottawa on the 28th of the same month. No difficulty was experienced in obtaining all particulars required, when asked for in person, and the failure of some operators to reply to our circulars and letters is, in most instances, due to oversight and not to a desire to withhold the information. Although the

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trip was made almost entirely with a view to acquire the statistical data essential to the completion of the report, yet some general information was incidentally secured. Mineral statistics -
Cont.

“The following notes on natural gas and on iron smelting may be of some interest at the present time.

“At Windsor, through the courtesy of Mr. S. T. Copus, secretary-treasurer of the Natural Gas and Oil Company of Ontario, Ltd., some interesting particulars were obtained regarding the operations of the company up to date (October 12th, 1896). This company, which succeeded to the business and plant of the Ontario Natural Gas Company some three years ago, now practically controls all the principal wells in the Essex field, and is piping large quantities of gas from their main field in the townships of Gosfield and Mersea, to Walkerville, Windsor and Detroit. Two lines of pipe have been laid into Windsor, a distance of about 32 miles. Some 2000 families in Walkerville and Windsor are now supplied with the gas, while the number of connections in Detroit is in the neighbourhood of 6000. The total number of miles of piping laid is about 130, including all branch lines and connections. The gas, which is used almost entirely for fuel purposes, is sold for twenty cents per thousand (M) cubic feet in summer and twenty-five cents in winter; the extra price in the latter season being due to the increased cost of keeping the regulators, mains, etc., in working order during the cold weather. The total number of wells drilled by both the old and new company, up to the time of my visit, was twenty-six and of these seventeen are still active producers. The rock-pressure at the wells is given at 400 pounds to the square-inch, and their estimated output is about 35,000,000,000 cubic feet per annum. Natural gas at
Windsor.

“While no very marked decrease has been noticed in the rock-pressure at the wells in the Essex fields no doubt owing to the comparatively recent date at which the consumption became other than of a local character, a very different condition of things prevails in the Welland field, where the wells have been supplying the city of Buffalo with a considerable portion of its fuel for a number of years past. The reason for this statement will become apparent on a perusal of the following information, kindly furnished by Mr. D. Coste, manager of the Provincial Natural Gas and Oil Company, which corporation operates most of the large wells in the Welland peninsula. Their whole output is piped into Buffalo, N. Y., through two large mains running from the field to the Niagara River. The length of pipe laid, including the mains and all connections, is about 120 miles. Up to the 20th of October, 1896, the number of wells drilled by this company and also by the Gas wells in
Essex county.

Mineral
statistics—
Cont.

Erie Company, (whose rights were acquired in 1893) was 124, of which 65 are still producing. When the first wells were bored some years ago, the initial rock-pressure was 520 pounds to the square-inch, but the supply of gas in the meantime decreased to such an extent that the average pressure of all the wells is now barely 175 pounds to the inch. The large compressor plant erected near Sherk's Station in the fall of 1893 was in operation for some nine months, but is now seldom used except to pump out a well of which the pressure has fallen below 70 pounds to the square inch. When a well reaches this stage the pumps are put on, the hole is pumped dry and permanently closed down and plugged. This procedure is rendered necessary by reason of the fact that the pressure in the supply mains is so much higher than that in a failing well, that instead of such a well being a source of supply it really becomes a drain on the main pipe-lines and absorbs a large quantity of gas from other wells which would otherwise be available for immediate consumption. Wells which were at one time large producers are sometimes purposely fed in this way, being used as temporary storing chambers for such gas as is not required for immediate use, the reservoirs of these wells being more readily accessible when the gas is really wanted, than in those formerly having but a small producing capacity. According to the opinion expressed by several of the leading authorities on the subject, it would appear to be merely a question of a few years before the gas supply in the Welland field will be exhausted, at least for commercial purposes, though a small flow may still continue for a much longer period which will be of service for domestic uses to farmers and others with wells on their premises and requiring only a very limited daily supply. In support of this opinion, mention may be made of the Provincial Company's well No. 63, drilled in 1893, which yielded when the gas was struck, a flow of over 10,000,000 cubic feet per day. The flow from this well has now decreased to such an extent that it does not produce 400,000 feet in the same time, although it has in the interval been several times fed from the other wells.

Iron smelting
at Hamilton.

“ While in Hamilton, I was, through the kindness of Mr. Robert Hobson, secretary-treasurer of the Hamilton Blast Furnace Company, enabled to obtain some details as to the company's operations since the completion of the plant. Their furnace was blown in on the 31st of December, 1895, though no pig-iron was made until some weeks later. Production, has, however, been going on continuously ever since. The ore used is derived both from Canada and the United States, the Canadian ore coming from the Wallbridge and other mines in Hastings county; from the north shore of Lake Erie, between

Geological Survey Department.

Port Rowan and Port Dover, and also from the district near Smith's Falls and Merrickville. The United States ore is obtained from Escanaba, Mich., and Two Harbours, Minn. The Canadian ore used to the 17th September, 1896, was 9062 tons, producing pig iron to the amount of 5890 tons. The quantity of United States ore charged was, at the same date, 16,781 tons, turning out pig to the amount of 13,247 tons, thus showing the total amount of ore charged to have been 25,843 tons; and producing pig iron amounting to 19,137 tons during a period covering about nine months. The fuel used is entirely coke, which is procured from the Reynoldsville district in Pennsylvania and costs, laid down at the works, about \$3.60 per ton. The flux is a limestone obtained from Port Colborne, Ont."

Mineral
statistics—
Cont.

PALEONTOLOGY AND ZOOLOGY.

Mr. Whiteaves submits the following summary of the palæontological and zoological work accomplished in 1896:—

Palæontology
and Zoology.

"The manuscript of the third part of the third volume of *Palæozoic Fossils*, referred to in the last Summary Report as having been commenced, has since been completed and is now ready for the printer. This publication will consist of a descriptive report upon all the fossils from the (Galena) Trenton and Black River formations of Lake Winnipeg and the Red River valley, in the museum of the Survey. It will contain identifications, with references, &c., or detailed descriptions of 145 species, and when printed, will make a little more than 100 pages of text, illustrated by seven full-page lithographic plates and by several woodcuts. Its preparation has entailed considerable correspondence with specialists in the United States and Europe.

Publications.

"By permission of the Director, a paper on 'Canadian Stromatopoids' has been prepared and published in the July number of the *Canadian Record of Science*. This paper is essentially a stratigraphical and systematic list, with references, &c., of all the species of *Stromatoporoidea* (about thirty-five in number), that have either been recognized or even supposed to have been recognized in Canada; or described from Canadian localities.

"In the Quarterly Journal of the Geological Society of London for May, 1896, Dr. Henry Woodward, F.R.S., has published descriptions and illustrations of the four species of fossil crabs from the Cretaceous rocks of Vancouver and the Queen Charlotte Islands, sent to him by the writer last year, and a small series of long-tailed decapods

Paleontology and zoology—*Cont.* or lobster-like crustaceans, from the Nanaimo group of the Vancouver Island Cretaceous, has been forwarded to him this year for identification or description.

Cambro-Silurian fossils. “Collections of fossils recently made by Mr. J. B. Tyrrell from the Cambro-Silurian rocks near Fort Churchill, Hudson Bay, and at Sturgeon Lake, Wekusko (or Herb) Lake, and Hill Lake on the Minägo River, Saskatchewan; from the Silurian rocks at Pine Island Lake, Saskatchewan; and from the Cretaceous rocks at seven different localities in the district of Athabasca, have been examined and notes upon the species represented prepared for publication in his reports.

“Several small consignments of fossils from the Guelph formation at Elora and from the Corniferous drift near Kincardine, Ontario, have been named for Mr. R. A. Farquharson of Kincardine.

Triassic fossils. “Thirteen specimens of fossils from rocks apparently of Triassic age at Texada Island, B.C., and three from the basal beds of the Cretaceous at Lasqueti Island, B.C., collected last summer by Mr. Walter Harvey, of Comox, were sent to the writer for examination, and as much information as possible in regard to them has been furnished to Mr. Harvey.

Cretaceous fossils. “Six additional consignments of the rarer fossils of the Cretaceous rocks of the Queen Charlotte and Sucia Islands, B.C., have been received from Dr. C. F. Newcombe, of Victoria, who has kindly presented five unique or remarkable specimens from Skidegate Inlet to the museum of the Survey. Some of these fossils have been named and returned, but about one half of them have been retained for further study. A few of the more critical forms among them have been sent to Dr. Franz Kossmat, of Vienna, for comparison with European and Asiatic types, also to Mr. F. W. Stanton, of the U. S. National Museum at Washington, and to Professor John A. Merriam, of the University of California at Berkeley, for comparison with Californian fossils.

“Numerous small boxes of fossils from the Cretaceous rocks on the Comox and Trent rivers, Vancouver Island, and from Hornby and Denman islands, B. C., have been forwarded, for examination, by Messrs. W. Harvey, J. B. Bennett, F. W. Robbins and Dr. G. D. Beadnell. Among these fossils there are some unusually fine specimens and a few species not previously represented in the Survey collection. Most of these have been kindly presented to or acquired for the museum, as will be seen from the list of donations. The remainder have either been named and returned, or kept a little longer for further study and comparison. These specimens, together with those

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sent by Dr. Newcombe last year and this year, upon which copious notes have been kept, will enable the writer to make a much more complete revision of the fossil faunæ of the Cretaceous rocks of the Queen Charlotte and Vancouver groups of islands, than would otherwise have been possible. Palæontology
and zoology—
Cont.

“In Zoology every efforts have been made to increase and improve the collections in the museum. Fifty-one additional specimens of birds and one mammal have been mounted by Mr. Herring during the year, and 346 birds have been placed upon new and smaller stands in order to economize space. Fine specimens of the Glaucous-winged, Short-billed and Heermann's Gull, a male Black-vented Shearwater and a pair of Tufted Puffins, from Vancouver Island, have been received from Mr. John Fannin, curator of the Provincial Museum at Victoria. A Dusky Shearwater from the Queen Charlotte Islands, and eggs of some of the rarer sea birds of British Columbia, have been presented by Dr. C. F. Newcombe, of Victoria. A female White-fronted Goose, a pair of the White-tailed Ptarmigan in winter plumage and a fine pair of the American Three-toed Woodpecker, from Alberta, have been acquired by purchase. Specimens of about 100 species of shells, mostly from Japan and previously unrepresented in the museum, have been received in exchange for duplicate shells from the coast of British Columbia. Zoological
collections.

“An interesting series of small mammals, birds, and the eggs of about thirty-five species of birds from Labrador and Hudson Bay, were collected by Mr. A. P. Low. Among the latter are one egg each of the Long-tailed Jager, Snow Goose, Hutchin's Goose, Gyrfalcon, Labrador Jay, also ‘clutches’ of eggs of the Old Squaw, Eider, Willow and Rock Ptarmigan, Redpoll, Snowflake, Lapland Longspur, Fox, Tree and White-crowned Sparrows.

“Skins of an adult male Sea Lion and Fur Seal, and of the young of each, with several separate skulls of both, also twenty bird's skins, and eggs of Kotzebue's Gull and of the Least Auk, all from the Pribyloff Islands, in Behring Sea, have been received from Mr. Jas. A. Macoun.

“The space available for the exhibition of mounted mammals and birds in the museum is already overcrowded and there are many large birds which have been recently set up, for which no room can be found in the cases. Want of space
in museum.

“Dr. Ami reports that during the past year he has continued the work of determining palæontological collections obtained by officers of Work by Dr.
Ami.

Paleontology and zoology--
Cont. the Geological Survey, and others, in Ontario, Quebec and the Maritime Provinces.

“ To the local lists of fossils prepared to accompany Dr. Ells's report on the geology of the south-western portion of the province of Quebec, referred to in the Summary Report for 1895, he has made several important additions. These are for the most part the result of an examination of numerous fossils from the Cambro-Silurian and Silurian rocks in the vicinity of Montreal, which form part of the collection in the Peter Redpath Museum of McGill University. These completed lists were published early in June and form an appendix to Dr. Ells's report. Systematic lists of fossils, arranged zoologically and chronologically, were also prepared by him with a view of bringing together the palæontological data available for the following geological maps, in course of preparation :—

- Sheet No. 119, Quebec and Ontario—Perth sheet.
- “ 120, Quebec and Ontario—Ottawa City sheet.
- “ 122, Quebec and Ontario—Pembroke sheet.
- “ 126, Ontario—Manitoulin Islands sheet.
- “ 131, Ontario—Lake Nipissing sheet.
- “ 138, Lake Temiscaming sheet.

Field-work in Pictou county. “ On the 23rd of June, Dr. Ami was instructed to proceed to Nova Scotia, there to continue the palæontological work upon which he had been employed for a short season in the autumn of 1895. The main object of this work was to obtain sufficient palæontological material, from as many localities as possible, to fix the age of the rocks in these localities for mapping. He remained in Nova Scotia until September 14th. Most of his time was spent in the county of Pictou, but some time was also spent examining the Cambro-Silurian rocks of Rights Ruin and James River, of Eigg and Brown Mts., and along the I. C. Ry. above and below Marshy Hope, in Antigonish county. At McArra's Brook and in other places along the shore of Northumberland Strait, interesting collections were also made.

“ Some progress has since been made in determining the palæontological collections obtained in 1895 and 1896 from various horizons in Pictou county, and in preparing local lists of fossils from them. This work necessarily involves a study of all the available material in the possession of the Survey and of the literature on the subject.

“ In connection with the work of Dr. L. W. Bailey of Fredericton, who has been examining the geology of the south-western portion of Nova Scotia, Dr. Ami has just completed a preliminary determination of the fossils comprised in twelve new collections from Bear

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River, Nictau, Torbrook and other localities in the iron-bearing district of Annapolis county, N.S. Palæontology
and zoology-
Cont.

“Several collections of duplicates for educational institutions have also been prepared, and some time has been devoted to a detailed palæontological and microscopical examination of specimens of drillings, from the gas, petroleum and salt regions of western Ontario.

“Attention has also been given to the determining and classification of other palæontological collections which have come in to the office from time to time, as well as to the preparation of labels for the Devonian fossils from Lake Winnipegosis in the museum cases, and progress has been made in the re-classification of the collections of fossils in the museum drawers. Besides the lists of fossils published with Dr. Ells's report, several papers on Canadian palæontology have been contributed to scientific journals.

“Mr. L. M. Lambe has continued the study of the Canadian fossil corals, and during the year has been engaged, almost continuously, in a revision of the *Tabulata*, which is now nearly completed and includes all the genera known to occur in Canada, with the exception of about two, represented by the same number of species. In the revision of this section of the *Actinozoa*, seventeen genera, including about sixty-three species, have been exhaustively studied and descriptions prepared of the different forms giving details of their structure with remarks as to their generic and specific affinities. Drawings of the minute details of structure of some of the species have been completed and it is proposed to prepare further drawings for the illustration of the remaining species with as little delay as possible. Work by Mr.
Lambe.

“A short paper entitled ‘Description of a supposed new genus of Polyzoa from the Trenton limestone at Ottawa’ was written in the early part of the year and published in the April number of the *Canadian Record of Science*.

“In the early part of May, a week was spent by Mr. Lambe in the field with Dr. Ells in the vicinity of Arnprior, Renfrew, Cobden and Eganville, west of Ottawa, examining certain exposures of rock with a view to determining their exact geological horizon. Collections of fossils were made at different localities at or near the above-named places and a list was afterwards prepared of the fossils for a paper by Dr. Ells entitled ‘Palæozoic outliers of the Ottawa River’ now being published in the Transactions of the Royal Society of Canada for 1896.

“A small collection of fossils, made by Mr. J. B. Tyrrell in 1893, at Markham Lake, Doobaunt River, Lat. 62° 44', Long. 103°, was also

Paleontology and zoology—
Cont. examined; the fossils, principally corals, were named and a list of them was prepared.

“Mr. Lambe also made drawings at various times during the year of a number of fossils from the Cretaceous of the Pacific coast and of some from the Cambro-Silurian rocks of Lake Winnipeg for the illustration of papers or reports by Mr. Whiteaves, already mentioned as published during the year or in course of preparation.”

Contributions to museum.

The following is a list of specimens collected by or received from officers of the Survey, during the year 1896, in addition to those already mentioned:—

Dr. R. W. Ells, and L. M. Lambe:—

Specimens of fifty species of fossils from the Black River and Utica formations at Renfrew county, Ont.

R. G. McConnell:—

A few fossils from rocks apparently of Carboniferous age at Grouse and Sophy mountains, near Rossland, B.C.

J. B. Tyrrell:—

About seventy-five fossils from Pine River, Herb and Cumberland lakes in eastern Saskatchewan.

Head of Moose (*Cervus alces*, L.)

A. P. Low:—

Skull of Eskimo.

Model of kyak and unyack (Eskimo boats) from George River, Ungava District.

Specimens of four species of fresh-water mollusca from Ungava.

Donald Gillies, Great Whale River, Hudson Bay; per A. P. Low:—

Collection of birds' eggs, including an egg of the Snow Goose; a stone deer-skin scraper, fish-hook and line, whalebone ptarmigan snare, and ivory implement, all from Great Whale River.

G. B. Boucher, Ungava Bay; per A. P. Low:—

Collection of birds' eggs from Ungava Bay.

John Ford, George River, Ungava district; per A. P. Low:—

Collection of birds' eggs from George River.

—Guy, Rigolet, Labrador; per A. P. Low:—

Collection of birds' eggs from Rigolet.

A. E. Barlow:—

Eggs of three species of birds from Central Ontario.

Geological Survey Department.

N. J. Giroux :—

Several hundred Cambro-Silurian and Pleistocene fossils from Eastern Ontario.

Contributions
to museum—
Cont.

Dr. H. M. Ami :—

Extensive collections of fossils from the Silurian, Devonian, and Carboniferous systems at Pictou and Antigonish counties, N.S.

About fifty fossiliferous nodules from the south bank of the Ottawa, near Besserer's grove.

“The additions to the palæontological, zoological and ethnological collections during the year, from other sources and in addition to those previously mentioned, are as follows :—

By presentation :—

(A.—*Palæontology.*)

J. G. S. Hudson, Glace Bay, Cape Breton :—

Fifteen specimens of fossil plants from the Coal Measures at Glace Bay.

Dr. C. F. Newcombe, Victoria, V. I. :—

Fine specimen of a large and undescribed species of *Turritites*, two specimens of *Olcostephanus cepoides*, one *Phylloceras ramosum* and a new *Cercomya*, all from the Cretaceous rocks of the Queen Charlotte Islands.

The Provincial Museum, Victoria, V. I. (per Mr. John Fannin) :—

The three Ammonites figured on Plates 2 and 3 (Section 4) of the first volume of the Second Series of Transactions of the Royal Society of Canada.

The Harrogate Museum, Yorkshire, England ; per Dr. Beadnell :—

Fine specimen of *Hamites (Anisoceras) Vancouverensis*, Gabb, from the Cretaceous rocks at Hornby Island.

J. B. Bennett, V. I. :—

Fine specimen each of *Pachydiscus Ootacodensis*, *Desmoceras Gardeni*, *Capulus* (or possibly *Anisomyon Meekii*) *Palæocorystes Harveyi*, and two claws of crustacea, from the Cretaceous rocks of the Comox River, V. I.

F. W. Robbins, Denman Island, B. C. :—

One specimen of *Hamites (Anisoceras) Vancouverensis*, two specimens of *Phylloceras ramosum*, one *Baculites Chicoensis* with an *Anomia* or young oyster attached, and two *Nucula truncata*, all from the Cretaceous rocks at Hornby Island B. C.

Contributions
to museum—
Cont

- S. J. Cliffe, Comox, B. C. :—
Portion of the vertebral column of a fossil fish from the Tsolum River, Vancouver Island.
- L. M. Lambe, Ottawa :—
A small collection of fossil sponges from Metis.
- Archibald Stewart, Ottawa :—
Four fossils from the Trenton limestone at Rockland, Ont.
- R. N. Slater, Ottawa :—
Two specimens of *Calamites* from a railway cutting between the 'Narrows,' and North Sydney, C. B.
- Colonel C. C. Grant, Hamilton, Ont. :—
Two fossils from the Medina sandstone and eighteen from the Niagara limestone at Hamilton. Nine fossils from the Hudson River drift at Winona, Ont., and four from the Iroquois Beach at the Desjardins Canal.
- Owen P. Schreiber, Kirkfield, Ont. :—
Thirty-seven fossils from the Trenton shales at Kirkfield.
- Adam Brown, Hamilton, Ont. :—
Fossil wood (according to Prof. Penhallow, *Picea nigra*) found in the Erie clay at Hamilton.
- T. C. Weston, Ottawa :—
An unusually perfect specimen of *Metoptoma Melissa*, from the Quebec Group at Point Levis.
- J. R. Chamberlain, Ottawa :—
Specimen of a species of *Calamites* from the Carboniferous rocks at Springhill, N. S.
- J. D. Fraser, Ferrona, N.S. (per Dr. Ami) :—
Thirty specimens of fossils from the Cambrian or Cambro-Silurian rocks at Great Bell Island, Newfoundland.
- S. W. Wilkins, Ottawa :—
Fossils from the Cretaceous rocks at the Belly River.

(B.—Zoology.)

- The Provincial Museum, Victoria, B.C. :—
Two eggs of the Black Oystercatcher and two of the Pigeon Guillemot, collected by Dr. Newcombe, June 1, 1896, at Sea

Geological Survey Department.

- Bird Islands, Barclay Sound, V.I. Three eggs of the Glaucous-winged Gull collected by Dr. Newcombe, June 18, 1896, at Mittlenatch Island, near Cape Mudge, in the Strait of Georgia. Contributions
to museum—
Cont.
- Dr. C. F. Newcombe, Victoria, B.C. :—
Named specimens of five rare species of Chitonidæ and three specimens of *Chrysodomus tabulatus* from the coast of British Columbia.
- Dr. G. D. Beadnell, Denman Island, B.C. :—
Egg of the Black Oystercatcher, from Mittlenatch Island.
- Walter Harvey, Comox, V.I. :—
Nest and eggs of the Rusty Song-sparrow from Comox.
- Albert J. Hill, New Westminster, B.C. :—
Cocoons and silk of *Bombyx mori* grown at New Westminster.
- L. M. Lambe, Ottawa :—
Recent marine shells and starfishes from Metis.
- Miss Norah Lewis, Ottawa :—
Five starfishes (*Asterias polare*), from Little Metis, P.Q.
- Rev. J. Lofthouse, Fort Churchill, Hudson Bay :—
Nineteen eggs of seven species of birds, from Fort Churchill.
- Louis J. Coursolles, Ottawa :—
Specimen of the Green Heron (*Ardea virescens*), shot at Billings Bridge.
- (C.—*Ethnology.*)
- A. M. Campbell, Perth, Ont. :—
Stone spear-head and copper gouge, from the north shore of Mud Lake, Lot 5, Concession VI., township of Bedford, Frontenac county, Ont.
- Lieut.-Col. Percy, G. B. Lake, Grenfell, Assa :—
Spear-head from Grenfell, Assa.
- Matthew Riddell, Moores Corners, near Galetta, Ont. ; (per W. J. Wilson) :—
One flat stone scraper from Lot 19, Concession V., Fitzroy, Carleton county, Ont.
- Natural History Society of New Brunswick :—
Fifteen stone implements and seven fragments of Indian pottery, from various localities in New Brunswick.

Contributions
to museum—
Cont.

C. Coutlee :—

Stone gouge from Cascades Point at the lower end of the Soulanges Canal.

James Lusk, Eardley, P.Q. :—

Fragment of pipe bowl, piece of pottery, quartz spear-head and partially chipped quartz implement, from Lot 20, Range XI., Eardley.

By purchase :—

Fifteen rare fossils from the Cretaceous rocks of Vancouver, Hornby and Denman islands, B.C.

Two eggs of the Western Horned Owl, and a clutch of twelve eggs of the Blue-winged Teal, from Alberta.

Stone pestle found at Lot 10, Concession IV., Township of Torbolton, Carleton county., Ont.

NATURAL HISTORY.

Natural
History.

The work carried out by Prof. J. Macoun, or under his supervision, in the office and museum, is thus reported on by him :—

“The office-work connected with the Botanical Section continues to increase and at present no little portion of my time is taken up with the determination of obscure species of all classes sent from almost every province of the Dominion. During the year just closed, I find by my letter book that I have named, of difficult forms, no less than 1983 species, chiefly for the collectors mentioned below.

Botanical
specimens de-
termined.

“Mr. John McSwain, Charlottetown, P. E. I; Mr. John Moser, Queen's Co., New Brunswick; the authorities of St. Laurent College Que.; Mr. William Scott, of the Toronto Normal School; Mr. Roderick Cameron, Queen Victoria Park, Niagara Falls; Mr. J. M. Dickson, Hamilton, Ont.; and Mrs. A. Hollingworth, Beatrice, Muskoka, Ont. All the above are actively at work and are doing much to promote the knowledge of botany in their respective districts. In Alberta Mr. Willings, of Olds, and Mr. Gaetz, of Red Deer, have contributed many fine specimens, Mr. A. J. Hill, C. E., and Rev. J. Gowan, New Westminster; Mr. J. Henry, High School, Vancouver, and Mr. A. J. Pineo, of Victoria high school, as well as Mr. J. C. Gwillim, of Slocan City, have sent many hundred specimens.

Collections
presented.

“Last winter a fine collection of plants made at the mouth of the Mackenzie River and on Herschel Island in the Arctic Sea, was placed in our hands, by Rev. J. D. Stringer, for determination. These

Geological Survey Department.

localities gave together eighty-five species which were entirely Arctic and most interesting on that account. Through the kindness of Mr. Stringer, we have retained a set of his plants for the herbarium. Natural History—
Cont.

“This autumn another large donation has been made to the herbarium by Charles A. Hamilton, M. D., Mahone Bay, Nova Scotia. This collection consists of over 600 species and contains many duplicates. It is the joint work of himself and his sister Miss Harriet R. Hamilton. The specimens are well preserved and the greater number correctly named. They are a valuable addition to the herbarium and of much interest as they are a representation of the Atlantic coast flora of our most eastern province. The thanks of this Department are certainly due to Dr. Hamilton and his sister for their donation.

“Under your instructions, Mr. A. P. Low took my field-assistant Mr. William Spreadborough, with him to Labrador in connection with his expedition of last season. Besides doing good service for Mr. Low, he made a very fine collection of the plants of Northern Labrador. A partial examination of this material shows that the interior of Labrador has a far higher degree of summer heat than any part of the coast, and further that the Atlantic coast is colder than that bordering on Hudson Bay. Other collections made by Messrs. Low and Spreadborough, are referred to by Mr. Whiteaves. Collections made in
Labrador.

“The Catalogue of Lichens and allied forms has been in progress, but has been delayed by want of help in the office, due to the absence of my assistant. Catalogue of
Lichens.

“Between January and May, 1896, Mr. James M. Macoun, my assistant, distributed 1559 sheets of botanical specimens, for the most part in exchange for plants sent to our herbarium. Office-work.

“Since my last summary report, 1946 sheets of specimens have been added to the herbarium. Several thousand specimens are ready for mounting, when time may permit.

“During the winter months my assistant, in addition to the routine work of the office, compiled a list of the plants of Labrador Peninsula for Mr. Low's report and contributed to the *Canadian Record of Science* three papers on the distribution of Canadian plants. On the first of May last he was sent on special service to the Behring Sea, and since that time has been working for the Marine and Fisheries Department.”

A considerable part of the summer was spent by Prof. Macoun in field-work in Manitoba and the North-west. The results of this are briefly given by him as follows:—

Natural
History—
Cont.

Field-work by
Prof. Macoun.

“ Acting on your instructions to proceed to Manitoba and the North-west Territories and still further carry on my observations and collections of the Natural History of the region, I left Ottawa on May 27th and reached Winnipeg on the 29th. On the 30th I collected and noted at Victoria Park, near West Selkirk, all the species seen there. June 1st found me at Otterburne, on Rat River. I visited Stonewall on June 3rd, and on the 4th Stony Mountain. On the 5th I examined River and Elm parks of the city of Winnipeg, and in these four days, and an additional five days in August, noted 401 species and collected all that were in flower at the above dates. Owing to the almost incessant rains during May, vegetation was backward and the open prairie all but impassable.

“ On the afternoon of the 5th, I went to Brandon, and for the next nine days collected botanical specimens, listed all plants observed growing there, and made observations on the birds breeding in the neighbourhood.

“ On June 12th, I visited Sewell and went south to a tamarack swamp about two miles from there. This is the most western tamarack swamp in Manitoba and is the home of numerous species of eastern plants that are seen no more in the prairie regions.

Wind-breaks
on the prairie.

“ Visits were made to the Experimental Farm at Brandon, for the purpose of seeing the value of shelter belts and the results of tree planting. Having seen these at Indian Head I was prepared for what I found at Brandon. The first day I visited the farm, (June 9th) a heavy north-west gale prevailed, so strong that I was scarcely able to make headway against it. On the west side of the farm where the tree belts were, there was a perfect calm but away from the influence of the trees the severity of the gale began to be felt. I was so satisfied with the value of the experiments that I desire now to place on record my matured opinion as to the great value of tree planting throughout the north-west.

Why trees do
not thrive.

“ Later in the season I made collections at Prince Albert and in southern Manitoba and was struck with what I shall call the hardiness of the trees and shrubs in these regions. I had seen that the Canadian Pacific Railway gardens at Moose Jaw and Medicine Hat grew trees and shrubs without being winter-killed and that the cause of the want of hardiness must be looked for in other directions than severity of climate. I had long suspected that the trees on the prairie died for the want of nourishment and exposure to biting winds and not from severe cold, and this year I became convinced of it. Were a supply of moisture given to trees, grown from seed,

Geological Survey Department.

so that they could mature their wood in July or early August for a couple of years, and the grass allowed to grow around them without being cut or pastured over, enough snow would gather in the winter to give all the moisture needed for the next summer's growth. A study of any thicket on the prairie will prove this. Did the farmer but realize the importance of collecting the snow on his farm, he would begin at once to grow hedges around, say, ten-acre fields. These hedges besides being valuable wind-breaks, would be snow gatherers, and in a very few years belts of trees would spring from the seed sown within the hedge, and while the hedge would protect the young trees it would also gather the snow for the next year's growth. Success in tree planting will only be assured when steps are taken to collect the snow by means of hedges or some other way, and successful tree growing means the settlement of the prairies.

Natural
History
Cont

"From Brandon I proceeded to Moose Jaw (June 15th) where I remained collecting until June 26th, when I went to Regina and the next day to Prince Albert where I remained until July 17th.

"Before I left Ottawa, you had instructed me to make further observations on the question of rainfall and water supply, and I went to Moose Jaw chiefly for that purpose. In the autumn of 1895, I had noticed that the drought was broken, and on page 148A of the Summary Report for that year I stated my belief that owing to the saturation of the soil there would be a surplus of moisture in the following spring, and that the ponds would fill up. The results were far beyond my expectation. More rain fell than usual and all the ponds were full, the ground was saturated and as the warm weather began, all vegetables grew vigorously, so that where grass was scarcely three inches high in the spring of 1895, it was from a foot to eighteen inches in 1896. On June 18th, I went to Chaplin on the border of Old Wives Lake and found the water much higher than it was the year before. At Parkbeg where I was on June 23rd, I found all the ponds full and the grass fit to mow. Inquiries, at Moose Jaw, made of farmers and others, brought out the statement that owing to the saturation of the soil they had moisture enough now to insure them two more good crops. The same conditions prevailed at Regina and from there to Saskatoon. The whole prairie was covered with waving grass that by the end of June was all in seed and looked more like a field of grain than a pasture. From my own observations and the accounts of others, I am led to believe that grass produced seed everywhere on the prairie last year, and should the coming spring be fairly moist, in May and June, much of the western prairie will be re-seeded and a great change will take place in the value of the pasture.

Rainfall in
the North-
west Terri-
tory.

Natural
History—
Cont.

“ A striking effect of the long continued drought was the almost total absence of water-fowl on every part of the prairie. Their disappearance is caused by the absence of cover consequent on the drying up of the ponds and the burning or stunting of the reeds around their borders. Last summer the ponds were full, but there were neither old reeds nor birds. Next spring there will be reeds and water, and I confidently look for the birds as well.

“ Between Saskatoon and Duck Lake, the rainfall had been light, and as a consequence the vegetation was sparser and shorter, but from Duck Lake to Prince Albert we passed through a different region, within the poplar belt, and on the prairie the vegetation was more that of the forest than that of the true plains to the south.

Climate indicated by flora.

“ Very large collections were made in the three weeks I remained at Prince Albert, and enough material was obtained to show what its summer climate is like compared with Moose Jaw and Brandon. Although Prince Albert is more than 200 miles north of Brandon, its climate is about the same, and that of Moose Jaw from five to ten days earlier than either. The real cause of the early season of Moose Jaw is its dry and consequently warmer soil. Prince Albert is almost due north of Moose Jaw, with a less altitude but damper atmosphere, and hence is more subject to summer frosts, but this may be expected to decrease as the subsoil is drained.

“ North of Prince Albert is a large muskeg, caused by the springs oozing out of the sand-hills near by. This bog contains at least one hundred species of eastern plants, and it is quite evident that very many of the Atlantic coast and Quebec species pass westward, in the forest region, to, and into the Rocky Mountains; while to the south the prairie now forms, and very likely did in the past, an effective barrier to prevent this.

“ During the time I was at Prince Albert, I collected 438 species of flowering plants and ferns, and in the whole collection there were fewer indications of a cool climate than at Wood Mountain, 300 miles to the south. I have noticed this everywhere, and am satisfied that 300 miles north of the boundary the climate is as good if not better (especially to the west), than it is at any point on the 49th parallel. There may be more liability, at present, to local white frosts, owing to the more humid soil and air, but as the ponds are drained and the superfluous wood and brush cleared away, a permanent change for the better will come.

Country best fitted for settlement.

“ My three season's experience have convinced me that, while the prairie is even richer and more valuable than we have believed it to be, the brush and aspen district to the north of it is best

Geological Survey Department.

suiting for immediate settlement, as shelter, which is necessary for comfort, is to be found everywhere, and although more labour is necessary to make a beginning, the settler from the first has more conveniences and needs far less capital. The soil is good, there are no droughts, blizzards cannot prevail, water is good, wood is plentiful and farming just as we have it in Ontario will be the outcome of settlement. Railway communication is a necessity and the settlement of the northern belt must of course depend largely on this being provided.

Natural
History—
Cont.

“ After leaving Prince Albert, on July 17th, I proceeded to Brandon and made a collection of the flora of that district until July 30th. The collections made in June, added to those made in the latter part of July, gave a list of 514 flowering plants and ferns. Nearly all the plants of the ravines and river-bottoms are of eastern species, but the prairie flora is a mixed one, containing both eastern and western forms with others that have their home to the south.

Collections
made.

“ On the completion of my work in Brandon, I went south-west to Napinka to obtain a more complete knowledge of the flora of the southern district. The first ten days of August were spent at Killarney, Morden and Morris where I made excursions and collections and noted the changes both in the flora and growth of the species.

“ A question I had often asked myself and others was why the basswood, elm, grape-vine, wild plum and certain other species, ceased to grow in the river-valleys west of Manitoba. It was supposed that cold and exposure was the probable cause. This may be the cause, and a case in point occurs to me as I write. Last November and December we had very cold weather at Ottawa without snow, and as a result a serious loss of the less hardy trees and shrubs took place at the Experimental Farm. The exposed prairies are always or nearly always bare, and it is this exposure, in my opinion, and not the intensity of the cold that causes the death of the trees. Wherever trees are growing naturally the cold is just as intense as elsewhere, but where they are, snow lies, and where they are not snow does not lie. The conclusion is irresistible that tree planting and the planting of shrubs must go hand in hand with snow gathering and where the snow accumulates and protects the roots there trees will live and thrive.

Western
limits of cer-
tain species.

“ Fine basswood trees were found by the brook at Morden, which no doubt had three or four feet of snow around them in winter. One hundred yards from these trees, seedlings from them would not succeed under present conditions. How then can we expect less hardy stock to survive? At Lumsden, twenty miles north of Regina, in the Qu'Appelle River valley, I found the last Elm towering above all the

Natural
History—
Cont.

shrubs and small trees in its vicinity and having a graceful spreading top like the elms of the east. Yet a few hundred yards from where this elm stood, its own seedlings could not grow owing to unfavourable conditions.

“Since my return, I have been engaged working up various collections sent in for determination, and in the intervals in putting in shape my own collections, which amount for the season to over 1200 species, more than 900 of which are from the prairie and the others (fungi) chiefly collected near Ottawa.”

Report on
Entomologi-
cal Collection.

Dr. James Fletcher, F.R.S.C., Entomologist and Botanist to the Central Experimental Farm, furnishes the following report upon the Entomological collections in the Geological Survey museum, in connection with which he is kind enough to tender his services as honorary curator :—

“I have the honour to report that the Entomological collections of the Geological Survey Department are in a good state of preservation. Some additions have been made during the past year, the most important being by purchase of a collection made in the Okanagan valley by Mr. C. De Blois Green. Twelve species were previously unrepresented in the museum and nineteen species were insufficiently or poorly represented. A small but very interesting general collection has been presented by Mr. W. Ogilvie, D.L.S., made by him near Fort Cudahy, latitude 64° 26' longitude 140° 32'. This collection includes Coleoptera, Hymenoptera and some Arachnida and Hemiptera, every one of which is of great scientific interest from the locality. Mr. Ogilvie says : ‘I have secured one at least of every kind of insect I have seen. Butterflies seem to be very scarce, only one or two varieties. Notwithstanding the great abundance of mosquitoes and other pests of that kind, dragon-flies are very scarce.’

“A small collection was presented by Mr. J. C. Gwillim, of Slocan City, B. C., consisting of eleven species of Lepidoptera, seven of Coleoptera, and two of Hymenoptera. These were for the most part in poor condition.

“Of collections made by officers of the Geological Survey the most important are : No. 1 by Dr. Robert Bell, in the Nottaway basin, consisting of eighteen species of Lepidoptera with the exact date and locality attached to each specimen.

“No. 2 by Mr. J. McEvoy at Feadear and Louis Creeks in the last week of June, 1895. This collection contained specimen of *Lycena*

Geological Survey Department.

Anna and *Papilio Turnus*, the latter very interesting for the locality. ^{Maps.}
There was a beautiful suffused variety of *Melitæa Whitneyi*.

“In accordance with your instructions I am preparing for the Banff Park Museum a collection of Rocky Mountain Lepidoptera, which will be placed before the spring opens.”

MAPS.

Mr. James White, Geographer and Chief Draughtsman, makes the ^{Maps.} following report on the progress of mapping work, and on a further measured line run by him in Ontario for the purpose of fixing geographical positions for the geological map-sheets in progress there:—

“The assignment of work was much the same as in former years. Mr. C. O. Senecal has compiled and drawn, for photo-lithography, the map of Doobaunt and Kazan rivers, and has also drawn, for photo-lithography, the map of the country between Lake Athabasca and Churchill River and the Labrador maps (4 sheets), besides autographing the Red Lake sheet. Mr. L. N. Richard has drawn sheets 43 to 47 inclusive and sheet 51 of the Nova Scotia series, for the engraver, and the map of Argenteuil, Terrebonne, etc., counties for photo-lithography. Mr. W. J. Wilson was engaged in arranging and cataloguing the maps and plans and in reducing and compiling material for the N. W. sheet of the ‘Eastern Townships’ map and for a general map of Canada. Mr. O. E. Prudhomme drew sheet 138, Ontario, and sheets 40, 41 and 42, of the Nova Scotia series for the engraver, and, since August, has been compiling and tracing material for the general map above mentioned. Mr. D. I. V. Eaton was engaged on the compilation of sheets 122, Ontario, and 12A of the Nova Scotia series from Feb. 9th to the date of his resignation, July 20th. Mr. J. F. E. Johnston was employed to assist in draughting work on Nov. 30th and has since been at work in the office. Mr. Hugh Cameron was employed from Jan. 27th to Feb. 26th, in cataloguing and numbering plans.

“The number of maps published this year is considerably less than usual, in consequence of the commercial embarrassment of one of the contracting firms, which stopped all work, for about two months, on several of the maps.

“At the present time 15 sheets are being engraved on stone and 2 on copper, while 9 are being photo-lithographed. Of the above 26 sheets, about 11 should be ready early in 1897, so that the number of maps published in 1896 and 1897 combined, will be much above the average. The engraving of the Lièvre Phosphate Map is suspended pending the completion of the geological work. ^{Mapping work in progress.}”

Maps—*Cont.*

“ A new map of the Dominion of Canada, on a scale of 50 miles to 1 inch, was commenced in the latter part of August, and the reductions for it are now well advanced. Wherever possible the original plans and surveys have been used, to avoid all errors that may have been introduced in subsequent publication. It will also include a large amount of topographical and geological information hitherto unpublished. The method adopted, viz., that of reducing the original plans by photography to the uniform scale of 40 miles to the inch and then tracing from the photographic reductions, has so far given excellent results, the details of the topography being exactly reproduced. The compilation being on a scale of 40 miles to the inch will require a further reduction by photography to the publication scale of 50 miles. The original will, however, remain available if, at any time, it be deemed advisable to publish on the larger scale. The geographical features of the tract of country between the Nelson and Albany rivers are somewhat doubtful, owing to the uncertainty as to the position of any of the principal points along the coast of Hudson and James bays between York and Albany. The determination of the longitude and latitude of a few of the principal points, such as Capes Smith, Jones and Henrietta Maria and mouths of Richmond Gulf and Severn and Weenisk rivers, by the Hudson Bay expedition in contemplation for next summer, would be very useful geographically.

“ The oblique secant cylinder projection has been adopted for the above-mentioned general map, as giving less distortion at all points than any other. The figures used are those calculated by Capt. E. Deville, Surveyor General, for a cylinder cutting the sphere along two small circles perpendicular to the central meridian—in this case 110° W.—and intersecting it in Lat. 51° N. and 67° N., respectively.

Survey made
to fix positions
in Ontario.

“ As the geographical position of the townships in the southern part of Sheet 118 Ontario (Haliburton Sheet), was in doubt, it was arranged that I should, for the purpose of determining this, take over Mr. Barlow's party when he left the field. I accordingly left Ottawa on September 7th and proceeded to L'Amable, where Mr. Cole, Mr. Barlow's assistant, was encamped. From this point a transit and chain line was carried southward by the Hastings road to Ormsby and north-westward by the Hastings and Baptiste Lake roads to the terminus of the Irondale, Bancroft and Ottawa railway at Baptiste Lake station; thence down the railway to my line of 1895, at the Irondale and Grand Trunk Junction. Returning to Ormsby I carried the line down the Central Ontario Railway to Eldorado, where it connected with the northern part of my work of 1886. Resuming the traverse at the southern part of my 1886 work, near Moira Lake, I carried it

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via the Grand Trunk Railway to Crookstown, Canadian Pacific rail- Maps—Cont.
 way from Crookstown to Tweed and Kingston, Napanee and Western
 railway to Enterprise; thence by road to Verona on the Kingston
 and Pembroke railway, where it intersected my line of 1894 on Sep-
 tember 29th. This completes the line from Waubashene on Georgian
 Bay to Kingston, and fixes the geographical position of the townships
 in the southern part of Sheet 118, and those along the line through
 Sheets 112 and 114 and the Madoc and Marmora map.

“ The cataloguing of the maps and plans is suspended at present, as
 there is no one available for this work. About 4500 out of the
 13,000 (estimated) plans have been catalogued in temporary lists and
 numbered. These include (A) charts, (C) township plans, Quebec, and
 (V) foreign maps.

“ An enumeration of the maps published during the past year or
 in course of preparation, is appended herewith.

Maps Printed in 1896.

	Area in square miles.
578. Keewatin and Ontario—Vicinity of Red Lake and part of Berens River—Scale 8 miles to 1 inch.....	8,240
589. Western Ontario—Sheet No. 9—Lake Shebandowan Sheet. Scale 4 miles to 1 inch.....	3,456
571. Quebec—South-west quarter-sheet of the “ Eastern Townships ” Map (Montreal Sheet.) Scale 4 miles to 1 inch.....	7,200
565. Nova Scotia—Sheet 39—Tangier Sheet. Scale 1 mile to 1 inch..	216

Maps, Engraving or in Press.

— Dominion of Canada, 2 sheets each 28 x 34, including the Dominion from the Atlantic to the Pacific and from the Inter- national Boundary to Hudson Strait and Great Bear Lake...	4,760,000
604. British Columbia—Shuswap Sheet—Scale 4 miles to 1 inch....	6,400
594. Athabasca and Peace Rivers—Sheet I—Scale 10 miles to 1 inch..	39,700
595. “ “ “ —Sheet II— “ “	39,700
596. “ “ “ —Sheet III— “ “	41,000
597. North-west Territory — Country between Lake Athabasca and Churchill River—Scale 25 miles to 1 inch.....	137,100
570. Ontario—Sheet No. 125—French River Sheet—Scale 4 miles to 1 inch.....	3,456
605. Ontario—Sheet No. 126—Manitoulin Island Sheet—Scale 4 miles to 1 inch.....	3,456
606. Ontario—Sheet No. 131—Lake Nipissing Sheet—Scale 4 miles to 1 inch.....	3,456
599. Ontario and Quebec—Sheet No. 138—Lake Temiscaming Sheet— Scale 4 miles to 1 inch.....	3,456

Maps—Cont.	599. Quebec—Lièvre River and Templeton Phosphate District. Sheets 1 and 2. Scale 40 chains to 1 inch.....	220
	590. Quebec—Parts of Joliette, Argenteuil, Terbonne and Montcalm Counties—Scale 4 miles to 1 inch.....	3,350
	585. Labrador Peninsula—South-west Sheet—Scale 25 miles to 1 inch.	251,100
	586. “ “ —South-east Sheet— “ “	251,100
	587. “ “ —North-west Sheet— “ “	251,100
	588. “ “ —North-east Sheet— “ “	251,100
	592. Nova Scotia—Sheet No. 40—Sheet Harbour Sheet—Scale 1 mile to 1 inch.....	216
	607. Nova Scotia—Sheet No. 41—Fifteen-mile Stream Sheet.—Scale 1 mile to 1 inch.....	216
	593. Nova Scotia—Sheet No. 42—Trafalgar Sheet)—Scale 1 mile to 1 inch.....	216
	598. Nova Scotia—Sheet No. 43—Stellarton Sheet.—Scale 1 mile to 1 inch.....	216
	600. Nova Scotia—Sheet No. 44—New Glasgow Sheet.—Scale 1 mile to 1 inch.....	216
	608. Nova Scotia—Sheet No. 45—Toney River Sheet.—Scale 1 mile to 1 inch.....	216
	609. Nova Scotia—Sheet No. 46—Pictou Sheet.—Scale 1 mile to 1 inch	216
	610. Nova Scotia—Sheet No. 47—Westville Sheet—Scale 1 mile to 1 inch.....	216
	611. Nova Scotia—Sheet No. 51 (and 52)—Ship Harbour Sheet.—Scale 1 mile to 1 inch.....	256

Maps, Compilation Completed.

603. North-west Territory.—Doobaunt and Kazan Rivers and North-west Coast of Hudson Bay.—Scale 25 miles to 1 inch.....	250,000
Ontario—Kingston and Pembroke Mining District—Scale 4 miles to 1 inch.....	1,700
Ontario—Sheet No. 129—Mississauga River Sheet—Scale 4 miles to 1 inch.....	3,456
Nova Scotia—Sheets Nos. 48, 49, 50, 53, 54, 55 and 56—Scale 1 mile to 1 inch.....	1,512
Nova Scotia—Plans of Goldenville, Wine Harbour, Tangier, Killag, Caribou, Moose River and Mooseland mining districts—Scale 500 feet to 1 inch.	

Maps, Compilation Incomplete.

British Columbia—West Kootanie Sheet—Scale 4 miles to 1 inch....	6,400
North-eastern Manitoba—Lake Winnipeg Sheet—Scale 8 miles to 1 inch. Area about.....	20,000
Quebec—North-west quarter-sheet of the “Eastern Townships” Map—Scale 4 miles to 1 inch.....	7,200
New Brunswick—Sheet 1 N.W.—Fredericton Sheet—Surface Geology. Scale 4 miles to 1 inch.....	3,456
New Brunswick—Sheet 2 S.W.—Andover Sheet—Surface Geology. Scale 4 miles to 1 inch.....	3,456

Geological Survey Department.

	Maps— <i>Cont.</i>
Nova Scotia—Sheet No. 10A—Cape Dauphin Sheet. Scale 1 mile to 1 inch.....	216
Nova Scotia—Sheet No. 12A.—Sydney Sheet. Scale 1 mile to 1 inch	216
“ —Sheet No. 12B—Little Glace Bay Sheet. Scale 1 mile to 1 inch.....	216
“ —Sheets Nos. 56 to 65, 76, 82, 100 and 101 scale 1 mile to 1 inch.....	3,024
“ —Sheets Nos. 66, 67, 68, 69. Scale 1 mile to 1 inch....	864

LIBRARY.

Dr. Thorburn, Librarian, reports that during the year ending 31st December, there were distributed 9833 copies of the Survey publications, comprising reports, special reports and maps, of these 6682 were distributed in Canada, and the balance, 2951 were sent to other countries. Library and publications.

Sales of publications by the Librarian during the year, including reports and maps, numbered 2642, the amount received therefor being \$450.28.

During the year 1896, the number of publications received as donations or exchanges was 2559, the number purchased 90, and the periodicals subscribed for 31.

The letters received in connection with the distribution of the publications were 1080, besides 1306 acknowledgments.

The number of letters sent out from the library was 914, and in addition to these 513 acknowledgments were sent to our exchanges and to others from whom publications were received.

The number of books bound during the year was 161.

VISITORS.

The number of visitors to the museum during the past year was 31,595. In 1895 it was 26,785. With a more attractive and commodious building, in which the collections could be properly displayed, there is no doubt that even greater attention would be given to the museum by the public. Visitors.

STAFF, APPROPRIATION, EXPENDITURE AND CORRESPONDENCE.

The strength of the staff at present employed is 46, being one less than at the close of last year, consequent on the death of Mr. N. J. Giroux, of the technical staff, which took place on the 30th November.

Appropriation
and expendi-
ture.

The funds available for the work, and the expenditure of the Department during the fiscal year ending 30th June, 1896, including appropriation for boring in Alberta, were:

	Grant.		Expenditure.	
	\$	cts.	\$	cts.
Civil list appropriation.....	49,742	50		
Geological Survey appropriation.....	45,054	25		
Artesian boring.....	8,311	18		
Civil list salaries.....			49,432	38
Exploration and survey.....			14,903	08
Wages of temporary employees.....			10,831	69
Boring operations. Deloraine (unsettled claims).....			58	50
Athabasca Landing.....			6,927	09
Printing and lithography.....			11,603	99
Purchase of books and instruments.....			643	56
" chemicals and chemical apparatus.....			182	06
" specimens.....			80	27
Stationery, mapping materials and Queen's Printer.....			881	99
Incidental and other expenses.....			1,303	17
Advances to explorers on account of 1896-97.....			9,261	56
			106,109	34
Less—Paid in 1894-95 on account of 1895-96.....			4,773	87
			101,335	47
Unexpended balance Civil list appropriation.....			310	12
" Geological Survey appropriation.....			78	25
" Artesian boring.....			1,384	09
	103,107	93	103,107	93

The correspondence of the Department shows a total of 7992 letters sent, and 8110 received.

I have the honour to be, sir,

Your obedient servant,

GEORGE M. DAWSON,

Deputy Head and Director.

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